





A Collaborative Approach to Great Lakes Restoration

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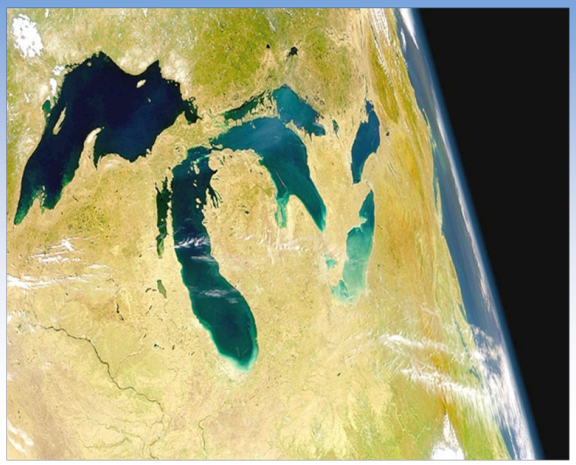


Executive Summary

The environmental crises facing the Great Lakes have been enmeshed with shifting tides of economic development in the region over the 20th century. As the regional economy boomed, ecosystem health susceptible to pollution and uninformed public management suffered at the cost of gains to private industry. Today, as the region faces the impacts of the domestic recession, the very ecosystem services that have been so damaged and depleted actually exacerbate the decline in economic opportunities in the now ailing manufacturing sectors.

Through the Great Lakes Collaboration Implementation Act of 2009, the spirit of collaboration is infused into legislative attempts to remediate and restore this unique ecosystem. Over the past 6 months, the Great Lakes Workshop Group has identified essential components of the scientific approach to analyzing the environmental problems facing the Great Lakes which have contributed to the development of strategies for future implementation of specific parts of the Act. The following report highlights the urgency with which the environmental degradation of the Great Lakes must be approached through a targeted, collaborative program.

Disjointed, historical legislative efforts to improve the ecosystem health of the Great Lakes have crystallized the need for this formal collaborative approach to emerge. Increasing public awareness of the environmental problems of invasive species introductions, toxic substances, wastewater discharges, and wetland degradation have spurred momentum of collaboration among stakeholders and funding streams centered on these four problem areas. In keeping with the overarching theme of the Act, we've made collaboration a focal point of our Program Design to improve ballast water management and implement targeted funding through grant allocation.

Streamlining multi-agency communication and accountability will enhance a regional approach to combating the four environmental problems identified by the Act. What remains unknown, however, is how improved collaboration will impact the long-term goals of improved water quality, restored natural habitat, and elimination of invasive species. Future restoration will therefore be dependent on enacting meaningful measures of tracking progress among various projects. One of the driving forces behind incorporating communication and reporting chains between agencies in our Program Design is the hope that best practices can be effectively shared and adapted for site-specific needs. With the cadre of problems facing the region though, this Act only sets the foundation for improved government efforts to stabilize a degraded environment. Collaboration fostered through the Interagency Task Force can only realistically nurture these efforts, but regional efforts must move further to curb the negative impacts of development and human action on this once-vibrant area.

Introduction

Introduced in Congress on January 14, 2009, the Great Lakes Collaboration Implementation Act amends, reauthorizes, or modifies previous legislation aimed at mediating the environmental degradation of the Great Lakes Region.

In an attempt to address the key environmental problems facing the Great Lakes ecosystem, the Great Lakes Collaboration Implementation Act (further referred to as "the Act") aims to infuse inter-agency collaboration into the variety of federal programs currently operating throughout the lakes. In addition to requiring changes to the Nonindigenous Aquatic Nuisance Prevention and Control Act to address aquatic invasive species introductions through ballast water, the Act also amends the Great Lakes Fish and Wildlife Restoration Act and the Federal Water Pollution Control Act to develop science-based indicators of water quality and related environmental factors in the Great Lakes (see Appendix A for full glossary).

The Act codifies the Great Lakes Interagency Task Force (IATF) as a task force headed by the Environmental Protection Agency (EPA) administrator, in hopes of streamlining communications between 11 different federal agencies to guide the development of a restoration and preservation strategy for the Great Lakes and to ensure effective funding allocation. The Act currently sits in the House Natural Resources Committee, undergoing review by the Subcommittee on Insular Affairs, Oceans, and Wildlife.

The rationale behind our Program Design approach is centered on some of the themes of the previous legislation included or modified in the Act: reducing invasive species and improving criteria to evaluate and award successful toxic remediation, wastewater treatment, and wetland restoration projects (see Appendix B for a full description of the titles of the Act).

Based on the Act's cadre of new or changed Federal laws directing efforts to address some of the most common and widespread environmental problems, we have streamlined the invasive species management options by focusing on ballast water regulation to reduce introductions. To best unify our approach to toxic substances, wastewater discharges, and wetland degradation, we decided to group these priority areas of concern to streamline funding approaches through grant distribution. Based on the increasing regional awareness of the prevalence of these often interconnected and omnipresent problems, the contemporary story of stakeholders working together to develop solutions is promising. The strides made to bridge different agency expertise and environmental understanding of the region lack direction without mandated action to collaborate and share research and development. The following proposed Program Design is based on historic attempts to craft a path for various stakeholders to effectively and efficiently implement difficult components of the Act, through the development of organizational capacity and effective lines of communication between agencies.

Ecological Problems & Legislative Efforts

Expansive, region-wide restoration and conservation efforts like those needed in the Great Lakes require a whole ecosystem management approach in which all environmental factors are considered in the context of their effect on other environmental factors. In an attempt to consider targeted sites across the region, 26 Areas of Concern (AOCs) solely within the U.S. have been identified in the region by the EPA, exhibiting significant harm to resources and impairment of beneficial uses (such as fish, wildlife, and drinking water consumption, EPAb, 2009). Despite a desire to coordinate government efforts to better these degraded areas, none of the AOCs have been fully restored to date.

Rather than emphasize isolated environmental problems, such as sediment contamination or aquatic invasive species (AIS), the Act recognizes that the natural environment can only thrive if it receives broad-spectrum political attention to all facets of its value and its vulnerabilities. The importance of the Great Lakes both in terms of ecosystem function and human reliance on the resources of the region underscores the need for integrated federal legislation to protect the integrity of the ecosystem. The environmental problems span a variety of issues including AOCs and other, site-specific problems that lack uniform synopsis or identification. It is essential that the scope of governmental collaboration transcends municipal, state, tribal, and international boundaries to combat these problems.

The wealth of natural resources and ecosystem services provided by the Great Lakes originally supported an exploding population of European settlers. Eventually, commerce and industry that developed along the shores and in the Great Lakes Basin became the industrial hub of America. This industrial economy became the driving force behind the source of its massive environmental degradation, however. The completion of the St. Lawrence Seaway in 1959 opened the ports of the Basin to international shipping and commerce, forever altering the ecological and human landscape of the Great Lakes. Opening the Great Lakes to increased international trade marked the beginning of the invasion of AIS via ballast water. As the Lakes became a major transportation route, over 200 million tons of cargo are shipped annually, bringing with it AIS like the zebra mussel (GLRC, 2005).

Currently, over 35 million U.S. residents call the Great Lakes Basin home and rely on it for various basic needs. The Lakes are the largest single source of surface freshwater in the Western Hemisphere and a vital supply of drinking water for the region and surrounding areas (UCS, 2003). They also contribute to the region's economy in myriad ways, particularly in terms of recreation and tourism (GLRC, 2005). Thirty-five federally-recognized tribes, most notably the Ojibwe and the Dakota Sioux, rely more fundamentally on the region's ecosystems for subsistence activities, which include hunting, fishing, and gathering, for which reason Native Americans may suffer the effects of environmental degradation associated

with toxic substances like mercury (GLRC, 2005). Overall, the legislative efforts to remediate the environmental problems of the Great Lakes have occurred during continuous environmental degradation, spurring momentum on further efforts to tackle the problems (see Appendix C for timeline of legislative efforts and concurrent environmental problems).

Political Climate

Stakeholders

The Act, introduced by Representative Vernon J. Ehlers (R-MI), is bipartisan co-sponsored by 29 representatives from nine states (Library of Congress, 2009). In the 2008 presidential election, the Act was publically championed by both Senator John McCain and Senator Barack Obama (Sisson, 2009). The Act outlines responsibilities for 26 agencies; its major purpose is to facilitate collaboration among them through the IATF, in which it vests the authority to provide guidance to the many institutions involved in the stewardship of the Great Lakes.

Original support also stemmed from local politicians and environmental lobbyists. In August 2009, environmental advocates gathered in Detroit, Michigan to persuade Congress to support now-President Obama's initiative to mitigate an array of the environmental problems facing the Great Lakes. In September 2009, the 5th Annual Restoration Conference was held with representatives from the Great Lakes Resource Center, regional Mayors' offices, and from more than one-hundred environmental organizations such as Clean Water Action. The nongovernmental private sector and public sector participants demonstrated support for the aggressive clean-up of the Great Lakes and the subsequent economic benefits associated with restoration (von Sternberg, 2009).

IN FOCUS: *The Ojibwe & Changing Patterns of Walleye Consumption*

Native Americans inhabiting the Great Lakes Region have long relied on fish consumption from their waters. The Ojibwe, for example, have netted walleye from the Great Lakes and surrounding regional lakes in federally ceded territories in Wisconsin, Michigan, and Minnesota as a traditional, culturally important dietary staple. Harvests brought in by the Ojibwe have increased since 1980, when federal courts reaffirmed tribal rights to hunt, fish, and gather in territories ceded to the U.S. (Madsen et al., 2007).

Netting walleye is a critical means of survival in lean times, and one manifestation of interpersonal reliance, say many tribal members. "We give them to neighbors and friends…There are a lot of elders and disabled people as well who don't have the means to go out there and do it, so we can provide for everybody at the same time. These will be gone by the end of the day," Erik Parsons of the Mille Lacs Ojibwe told Minnesota Public Radio. During tough economic times, netting is of particular importance as a food source, because fish is both accessible and nutritious (Minnesota Public Radio, 2009). The ability to rely on local resources for food continues to be an important aspect of tribal lifestyle and self-sufficiency.

Past and current industrial activity has threatened this tribal livelihood, with the emissions of elemental mercury. Once in the environment, this toxin can be transformed into an even more toxic form called methylmercury, which accumulates in fish tissue. Humans who consume this fish are likely to experience nervous system related health problems (Clifton II, 2007). With methylmercury concentrations often uncertain and variable among lakes in recent years, local organizations grapple with how best to adapt consumption advisories to the tribes, while weighing these precautions against the health benefits and cultural significance of the prized fish. The Great Lakes Indian Fish and Wildlife Commission has issued walleye consumption advisories since 1996 to help tribes reduce their exposure to methylmercury while maintaining some semblance of traditional harvest and consumption patterns. Methods were adjusted in 2005 to make the guidelines easier to understand and less dependent on sample size (Madsen et al., 2007).

The Act recognizes the risk of methylmercury exposure to Native Americans, and other anglers consuming fish by authorizing funding for projects to reduce this degenerative toxin.

—G. Slocum

Native Americans, as mentioned earlier, are an underrepresented but critical stakeholder group, given the disproportionate role of ecosystem services in their largely subsistence livelihood and the resulting skewed burden of the degradation

of tribal culture and communities. The thirty-five federally-recognized tribes with reservations within the Basin have treaty-guaranteed rights to hunt, fish, and gather there (GLRC, 2005). The U.S. government's treaty obligations to the tribes include funding tribal resource and environmental management programs. Tribal programs, already a miniscule portion of federal funding though, are extremely vulnerable to budgetary reductions and program cuts (GLRC, 2005). Tribal leaders have been included in recent collaborations such as the GLRC and their participation is further mandated in the Act.

The Act contains very limited mandates for collaboration with Canada, another significant Great Lakes stakeholder. Much collaboration with Canada on environmental issues has historically taken place through the International Joint Commission, an intergovernmental organization to assist governments in protection agreements and research on shared waterways, as well as some air pollution issues. Of 43 designated AOCs in the region, 12 are located wholly within Canadian territory (EPAd, 2009), making international agreements of particular concern. Coordination on the issue has been weak, having largely disintegrated on a national scale, in terms of both federal funding and cohesive direction, since the late 1990s. As a result, much of the effort has taken place on the state, tribal and local levels, but even local efforts have declined in past years (GLRC, 2005).

Many industry stakeholders wield significant political power in the region and influence environmental as well as legislative outcomes. They include the shipping industry (represented by trade associations such as the Lake Carriers' Association), utilities (particularly coal-fired power plants that have been major sources of toxic emissions), steel producers, the tourism and fishing industries, and agriculture, among many other commercial, coastal industries. Due to shifts in the economy of the region, local politicians throughout the region have demonstrated a growing interest in increased water stewardship in the face of historic industrial activity that results in pollution. Almost every city on a river or Great Lakes waterway has begun efforts in recent years to downsize waterfront industries and replace them with lower-impact development such as condominiums, retail businesses, and parks (Michigan Land Use Institute, 2007).

This array of stakeholders represents a general region-wide economic shift concerning land use priorities, from a once-predominantly industry-dominated view to one that values clean waterfront property for regional real estate gains and diversified economic development opportunities. Many local leaders have acknowledged spiraling economic implications of inaction (Michigan Land Use Institute, 2007). Coupled with the public recognition of the Great Lakes' environmental dire straits and an emerging conservation-minded outlook, the bulk of key stakeholders may have different motivations for improving the state of the Lakes, but most agree that it is past time to take steps to restore the once vibrant ecosystem.

GREAT LAKES FACTS:

- *Humans have relied on the Great Lakes since their arrival in the region, 10,000 years ago*
- *Over 35 million people live and rely on resources from the Great Lakes Basin*
- *The lakes comprise 20% of total surface freshwater worldwide*
- *Home to 130 endangered or rare plant and animal species*
- *Over 84,000 cubic feet withdrawn per second for municipal uses, manufacturing, and power production*

Funding Stream Precedents and Collaborative Efforts

The Great Lakes National Program Office: The first federal attempt at aggregation of efforts and interests in the Great Lakes came in 1977 with the formation of the Great Lakes National Program Office (GLNPO) in Chicago, Illinois, which became the first geographically-based office to represent the restoration efforts of the entire region (as opposed to media-based stations, dealing with single issues such as those pertaining to water or air) (EPAa, 2009). Among other activities, the GLNPO monitors ecosystem indicators, manages and provides public access to Great Lakes data, and addresses restoration issues such as contaminated sediment and habitat restoration (EPAa, 2009). The GLNPO assists Great Lakes Partners through grants, inter-agency agreements, and contracts, as well as coordinating federal activities with other stakeholders. It oversees many regional stakeholder organizations, including research labs and education centers and public participation forums (EPAa, 2009).

The Great Lakes Interagency Taskforce: Two major efforts at streamlining governmental oversight began with President Bush's 2004 Executive Order 13340 (see Appendix D), which organized both the IATF and the Great Lakes Regional Collaboration. The IATF, led by the EPA Administrator and comprised of a conglomeration of 11 agency and cabinet-level departments, was formed to coordinate agency actions and avoid duplication of efforts. Numerous restoration and research programs had been created at the federal and state level as well as the private sector, and the IATF has been responsible for integrating these efforts, beginning with the inventory and coordination process (IATF, 2005). Since the IATF's inception, it has collaborated with the Regional Working Group also established by the Executive Order and is responsible for overseeing on-the-ground actions for the Great Lakes to implement the Great Lakes Legacy Act and many other interagency initiatives (IATF, 2009).

The Great Lakes Regional Collaboration of 2004: The Great Lakes Regional Collaboration (GLRC), also established under Executive Order 13340, received collaborative guidance from 1,500 stakeholders, including federal, state, local and tribal governments and non-government entities to establish a strategy that became the blueprint for both the Act and the Obama administration's Great Lakes Restoration Initiative Funding Plan (GLRI). The GLRC restoration plan proposed a total of $26 billion (2006 dollars) over 5 years to adequately target the critical environmental problems currently addressed in the Act: invasive species, toxic substances, wastewater discharges, and wetland degradation (GLRC, 2005). The GLRC restoration plan for the Great Lakes and estimated costs of existing sources of degradation and needed remediation funds set the foundation for the collaborative approach to developing solutions. For a comparison of different funding streams suggested to remediate the environmental problems of the Lakes, see Appendix E.

The Great Lakes Collaboration Implementation Act of 2009: Using the GLRC strategy as a model for money that would actually be needed, the Act was crafted with more realistic expectations of actual funding availability and took advantage of the existing IATF structure to codify the role of the IATF in the region. The Act mandates accountability and information sharing between agencies by making the IATF an official, operational group. The Act also steps beyond the box of past, incremental approaches to tackling the variety of environmental problems head on by authorizing $300 billion annually for AIS management, increased funding for sediment remediation, mercury reduction grants, a revolving loan fund over 5 years to assist rural and small municipalities improve wastewater treatment infrastructure, and wetland-related projects and research efforts. The unique aspect of the Act is that the legislative authorizations spur the development of site-specific technical solutions that will happen in tandem with the hopes that all problems may see improvement over time.

Great Lakes Regional Initiative of 2009: Signed into law on October 30, 2009, President Obama's Department of the Interior, Environment, and Related Agencies Appropriations Act of 2010 authorized $475 million to the EPA budget to undertake the GLRI. The mission of the EPA and its federal partners under this legislation is influenced by the Act to "coordinate state, tribal, local, and industry actions to protect, maintain, and restore the chemical, biological, and physical integrity of the Great Lakes" (EPAc, 2009). The GLRI was developed by the EPA and other members of the IATF. It builds upon five years of work by the IATF and stakeholders, using the GLRC recommendations as guidance (GLRI, 2005). The intent is to use funds to implement both federal projects and prioritized, competitive grants. The EPA will be in charge of selecting proposals and distributing grants (GLRI, 2009).

IN FOCUS: *The Clean Water Act & Ballast Water Regulation*

Federal agencies, such as the EPA and Coast Guard, and non-profit and advocacy organizations, both recognize ballast water as the largest vector for introduction of invasive species. However, the EPA has not defined ballast water discharges as point sources of pollution, leaving them exempt from Clean Water Act regulation. As a result, there are to date no national mandatory regulations to control the content of ballast water, including organisms (EPA, 2003).

In 1999, a group of non-profit organizations petitioned the EPA to regulate ballast water discharge as a point source under the Clean Water Act. The petition was denied in 2003, on the grounds that the Clean Water Act's regulatory history indicates that it was never intended to regulate ships (EPA, 2003). However, the exemption was found to be illegal by a Federal court in 2007, and while the EPA proposed to regulate ballast water later that year, the litigation has continued (NSGLC, 2007).

Other invasive species regulations, such as the National Invasive Species Act, have proven ineffective, and currently shipping industry coalitions are actually requesting national regulation to unify the competing state rules (NYSDEC ,2007).

Nevertheless, these occurrences do not explain why the EPA chose to not exercise its authority over ballast water for more than 30 years. According to David Cowgill of the EPA's Great Lakes National Program Office, a large part of the problem with regulating ballast water stems from the fact that regulation could be perceived as creating barriers to trade, possibly in violation of international free trade agreements. Because of this conflict, most regulations to date have been voluntary.

The Act and our proposed implementation strategy would rectify this problem by creating a forum in which these issues can be addressed. The Act presents a clear, quantitative ballast water standard, and outlines the road to achieving it. With the implementation of the Act, achievable, binding national ballast water regulations will at last be a reality.

—L.Kelly

ENVIRONMENTAL PROBLEMS IDENTIFIED BY THE ACT

Continuous efforts towards restoration, both collaborative and isolated, have been in place since the 1970s. Beginning with the Clean Air and Federal Water Pollution Control Acts addressing inefficient pollution standards, various pieces of legislation have urged governments, citizens, and industry (including manufacturing and agriculture) to work together to strive toward a cleaner, more resilient Great Lakes ecosystem. These attempts have produced limited outcomes and only recently began to forge the idea of collaboration into regional environmental management best practices. Toxic pollutants have been reduced over the years, but cleanup work has been partially canceled out by the continued influx of pollutants (GLRC, 2005). Additionally, intensive attempts at data collection, research, and monitoring have been made, but little of the information has been employed to inform action upon the state of ecosystem health (GLRC, 2005). New stressors have merged with and exacerbated historic ones to the point where ecosystem-level changes occur rapidly and with little warning. The Act mandates that inter-agency collaboration currently adopted by the IATF be infused into all government solutions to abate these problems, unifying

individual and separate localities' approaches into a true regional strategy. Although the Act does not cover the variety of environmental problems facing the Great Lakes, national leadership and intergovernmental collaboration is emphasized in a large-scale restoration strategy that must incorporate strategies to address four, pressing problems.

Invasive Species

The Great Lakes now contain over 160 invasive species (UCS, 2003), many of which have been introduced through international shipping, particularly AIS that arrive in the ballast water of vessels. Invasive species have no natural predators in a new environment and can thereby rampantly multiply and decimate native species' populations. Introduction typically causes economic, environmental, and human health harm. Once invasive species spread, their eradication is nearly impossible; therefore prevention is of the utmost importance to control. The Act offers a variety of invasive species management options, from which we elected to focus on ballast water management as a means of eliminating introductions of AIS in the Lakes.

GREAT LAKES FACTS:

- *160 species of invasive algae, fish, invertebrates, or plants have established themselves since the 1800s*
- *Approximately 1,000 substances of concern contaminate a total of 75 million cubic meters of sediments throughout the region*
- *43% of the nations combined sewer overflows occur in the region*
- *70-80% of original wetlands have been lost to development*

Toxic Substances and Areas of Concern

Effluent from industry, agriculture, and urban centers contains many persistent toxic substances (PTS). PTS can enter the food chain, where they bioaccumulate as they move further up from species to species. In the Great Lakes, PTS like methylmercury and poly-chlorinated biphenols are of particular concern because of their tendency to concentrate in fish tissue, which can then be ingested by humans. The Act specifically addresses mercury contamination because of the region-wide impediments it causes to human use of the lakes and consumption of resources.

Wastewater Discharges

Wastewater runoff and treatment outflow from urban and agricultural areas are major threats to the region's water quality. Wastewater infrastructure in the region is outdated and cannot handle the excessive overflow. This occurs primarily during heavy rainfall events, when untreated overflows — containing human waste, pharmaceuticals, and industrial chemicals — make their way to rivers and streams that feed into the lakes. These events are known as combined sewer overflows (CSOs) (Karamouz et al., 2009). CSO discharges contaminate beaches, drinking water, and threaten many aquatic species. According to the National Resources Defense Council, "the number of 2008 closing and advisory days at ocean, bay and Great Lakes beaches topped 20,000 for the fourth consecutive year" (NRDC, 2009). The Act addresses the wastewater infrastructure shortfall by authorizing grants and loans to municipalities for improved technology and infrastructure.

Wetland Degradation

Wetlands are a source of many valuable ecosystem services. They retain water, which is useful in flood control, and filter water, removing many pollutants including heavy metals, before water

reaches the Lakes. Wetlands cycle nutrients and as a result, foster an array of rich habitats and biodiversity. Wetland degradation has resulted in loss of water quality, biodiversity, and sinks for carbon and heavy metals, with 60% of wetlands in the region lost to development, nutrient loading, and increased turbidity from agricultural runoff and erosion. The economy of many coastal areas throughout the Great Lakes is dependent on the recreational value coastal habitats and ecosystems. One acre of wetlands provides an estimated $10,573 worth of ecosystem services (National Wildlife Federation, 2009). The Act authorizes grant money for coastal wetland restoration.

Technical Solutions

Possible solutions to the four main issue areas incorporate proactive prevention, such as reduction of source pollution and introduction of nonnative species, with active remediation, often including a combination of technical fixes and ecological restoration funded through additional or new pockets of grant funding streams. Much of the Act emphasizes the need for both stricter ballast water discharge regulations and improved ballast water technology, such as filtration or chemical treatment, to prevent the escape of any nonnative species into the Lakes. Toxic substance contamination must be both stymied at the source and mitigated through dredging or capping technologies. New money for technological improvements to wastewater infrastructure to reduce CSOs, along with funding for maximizing wetland integrity through increased protection and deliberate rebuilding are other major priorities in the Act.

There is significant dispute and much uncertainty, however, about the best technological fixes to the aforementioned four environmental problems in many instances. The Act leaves wide discretion and room for interpretation about the best remediation tactics, restricting its mandates largely to improved ballast water management (including requirements for vessels to have AIS management plans), funding for research and development, and grants for remediation and cleanup. The legislative solution to implement these technologies is centered on the aspect of collaboration through the IATF, which will drive development and further research of appropriate technical solutions.

The focus of all of the contemporary collaborative efforts mentioned earlier is on coordinating many resources disseminated by all levels of government to aid all collaboration partners across the Great Lakes (IATF, 2009). The Act is designed to further align goals and oversight of the IATF and its partners with environmental initiatives happening at all levels throughout the region. We have built our Program Design off of the overall collaborative approach to these four, targeted environmental problems by instituting a new Ballast Water Management Coordination Branch and Grant Coordination Branch under the policy supervision of the IATF.

Program Design

In order to focus on what we have identified as the most robust solutions to address the environmental problems named in the Act, we have narrowed our scope for this Program Design to showcase ballast water management and targeted funding through grant allocation. We have identified these solutions as the mechanisms to bridge available technical solutions to the long-term restoration goals of improved water quality, restoration of natural habitat, and elimination of introductions of invasive species of the Great Lakes. Additionally, we focused our analysis on the specific outputs necessary for successfully launching this program within the first 12 months for the grant allocation requirements and within 18 months for the ballast water management requirements. Although ballast water management and grant allocation have different programmatic characteristics, both parts of this Program Design are improved through collaboration fostered by the IATF. The Ballast Water Management Coordination Branch and Grant Coordination Branch represent new additions to the current policy efforts overseen by the IATF.

Codifying Collaboration

In keeping with the overarching theme of the Act, we've made collaboration a focal point for this Program Design, because of the lack of formal, effective, coordination in the past. Public policymakers have not streamlined the variety of stakeholders' concerns and attempted to enact only a patchwork of legislative solutions, which has turned out to be inadequate. The Act emphasizes that effective collaboration must be promoted between the diverse stakeholders attempting to clean up the Great Lakes. Likewise, our following Program Design aims to integrate components of collaboration and cross-communication in order to achieve the Act's long-term restoration goals.

The main mechanism for ensuring this collaboration is the IATF (see Figure 1 for an abbreviated organizational chart, new program additions seen in green, and Appendix F for a complete Program Design organizational chart). Since its inception in 2004, the IATF has produced budget recommendations for inclusion in the President's annual submissions to Congress.

Additionally, the IATF produces an annual report. Under our Program Design, these annual reports will now include detailed analysis of overall progress toward achieving outcomes aligned with overall restoration goals. Acting through its Working Group, the IATF also conducts weekly conference calls to ensure stakeholders remain fully informed about progress of programmatic efforts to combat the Lakes' environmental problems (personal communication D. Cowgill, October 16, 2009). The developed Program Design will continue to foster communication and facilitate interactions within the IATF and the agencies spe-

cifically responsible for new, additional program components.

Ballast Water Management Coordination Branch: Eliminating AIS Introductions

Invasive species in the Great Lakes Region pose perhaps not only the largest potential threat to the Great Lakes' ecosystem services, but also to the economy of the Lakes themselves. As detailed earlier, the Act specifically tackles the threat of introduction and invasion exhibited by AIS like the sea lamprey, the Asian carp, and the zebra mussel. Stakeholders on all sides are supportive of efforts to (1) stop new invasive species introductions, (2) control the spread populations of already existing invasives and (3) eradicate them. Over 70% of the text in the Act is reserved for Title I, which proposes several different strategies to address invasive species.

In order to provide sufficient detail on one aspect of this title, we've narrowed the scope of our Program Design to encompass only ballast water management provisions, the most important invasive species vector in the Great Lakes. Other Chapters in Title I mandate a myriad of programs such as public outreach through the National Park Service, the creation of a National Invasive Species Council and preventing introductions of AIS through other pathways (see Appendix B).

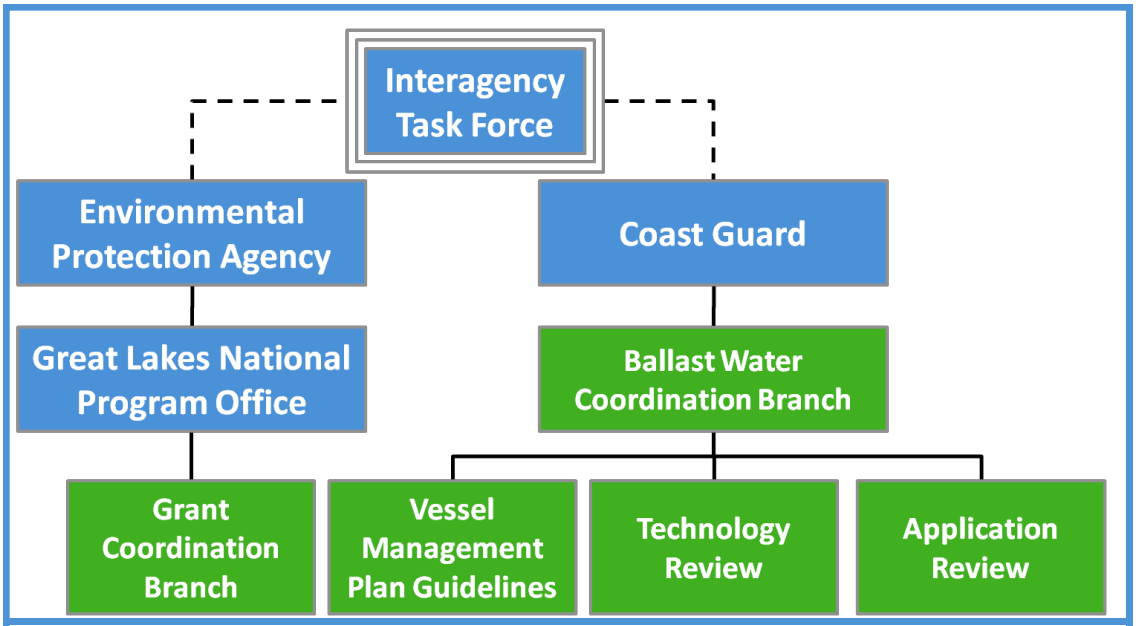


Figure 1: Abbreviated Program Design Organizational Chart

Within the first 18 months after enactment, the Act mandates several pertinent outputs concerned with ballast water management. The completion of these outputs will ensure a trajectory towards full implementation of the program:

1. Issue final guidelines for the development of invasive species vessel management plans, including guidelines within 18 months.
2. Issue guidelines on best management practices to eliminate or minimize and monitor organism transfer by vessels within 18 months.
3. Promulgate regulations to minimize the discharge of invasive species from ships that claim no ballast on board, or that claim to be carrying only unpumpable quantities of ballast within 180 days.
4. Promulgate regulations allowing ships entering the Great Lakes to use a ballast water treatment technology that is as effective as ballast water exchange.
5. Determine vessel management guidelines 18 months after the enactment of the Act.
6. Promulgate standards for land and water-based ballast water reception facilities 180 days after the enactment of H.R. 500.
7. Begin determining a timeline for use of new technologies.

Many of these mandates do not require much coordination or research and can be accomplished with existing staff housed in the U.S. Coast Guard. These are important mandates that must be met but do not include sufficient guidance for how they should be achieved. Working off of the IATF as a central contact for disseminating information and collaborating with other agencies concerned with AIS, the Ballast Water Management Coordination Branch will take intermediary and strategic planning steps in order to more efficiently meet the ballast water management mandates and prepare for future monitoring and enforcement next steps after the first 18 months.

The Secretary of Homeland Security is responsible for promulgating guidelines; but due to historical experience on regulating ballast water discharges, the Coast Guard's Environmental Standards Division (housed under the U.S. Department of Homeland Security) will effectively be in charge of these outputs. The new Ballast Water Management Coordination Branch will oversee three additional advisory teams: the Vessel Management Plan Guidelines Advisory Team, the Technology Review Advisory Team, and the Application Review Advisory Team. The Ballast Water Management Advisory Teams are responsible for developing guidelines for vessel ballast water management, certification of ballast water invasive species control technology and review and approval of vessel applications for certification. Vessel ballast water management guidelines and technology certification will take place in the first year of the program, with application review starting in the second year, once regulations have been promulgated.

Grant Coordination Branch: Targeted Funding through Grant Allocation

We've designed a Grant Coordination Branch to be housed under the EPA GLNPO to streamline the grant disbursement process for toxic remediation, wastewater treatment, and wetland restoration projects. Although the GLNPO currently disburses grants related to many of these environmental problems, the dramatic increase in potential available funding under the Act and the GLRI indicates that the GLNPO must increase its institutional capacity to better distribute funding to promising projects. This will be best achieved by adding a separate branch to the GLNPO and hiring new employees to oversee the entire grant distribution and monitoring process. This would, in turn, alleviate the burden current employees would have had if the branch was not established while still requiring that the GLNPO adopt further collaboration with additional grant funding projects in the region to develop best criteria for identifying and evaluating promising projects.

The grants process involves three major players: EPA headquarters in Washington D.C., the GLNPO, and grant recipients. The EPA's headquarters will secure funding and promulgate standards that determine grant eligibility to the GLNPO. Using its regional awareness of environmental projects and relationships with stakeholders, the GLNPO will conduct outreach to potential grantees. The state, tribe or municipality can then apply to the GLNPO's Grant Coordination Branch for assistance-providing a detailed project proposal complete with proposed quality indicators and measures of success. The GLNPO will distribute funds to those projects that best meet standards and address regional goals. Once funds are enacted, the grant recipient will be responsible for submitting an annual progress report. Once the report is released, the Grant Coordination Branch will determine whether or not to continue funding in the next year.

Embedding Collaboration into Program Implementation

In order to take advantage of existing organizational infrastructure and agency capacity mentioned earlier, our Program Design builds off of loose agency relationships and strong, internal agency hierarchies to strengthen collaborative efforts to remediate and restore water quality and natural habitat and reduce invasive species introductions in the Great Lakes Region. We will enhance current modes of communication within the IATF by creating a more streamlined chain of command to share and disseminate information from the Ballast Water Management Coordination Branch and Grant Coordination Branch to the 11 IATF agencies annually. To this end, a primary objective in our first year of implementation will be to establish a strong administrative foundation in each of these new branches, utilizing our budget to ramp up personnel hiring and organizational sustainability.

Primary new staff will be located in the Ballast Water Management Coordination Branch housed under the Environmental Standards Division in the national U.S. Coast Guard Headquarters in Washington D.C., and the GLNPO in Chicago (see Appendix G for additional overview of existing U.S. Coast Guard and GLNPO organizational structure). Internal reporting and feedback processes will forge development of meaningful performance measurement systems to direct programmatic efforts toward long-term restoration goals. The Program Design starts Year 1 with an aggressive approach to quickly institute the following:

- Multiple-agency collaboration through staffing
- Utilization of available funding streams
- Accountability for reaching quarterly milestones

These will ensure that collaboration is realistic and program outcomes will be directly tied to achieving restoration in the region. In order to effectively address the four critical environmental problems facing the Great Lakes, inter-agency collaboration will typify the implementation strategy for legislative allocations of funding.

Proposed Staff Collaboration & Supportive Budget Plan

Ballast Water Management Coordination Branch

The Act mandates collaborative work to accomplish three main goals centered on ballast water regulation: development of guidelines for ballast water management plans to be used by vessels in the Great Lakes, approval of vessel applications, and sanction of new technologies for ballast water treatment. As established in our Program De-

sign, the creation of Advisory Teams will enhance the essential collaborative process to achieve these goals. The central staff in the Ballast Water Management Coordination Branch will oversee the logistics of the Team meetings, and to ensure that the decisions reached and information shared at these meetings is appropriately reported and shared with all agencies in the IATF (see Appendix H for complete staffing plan and line-item budgets for our Program Design). The overarching goal of this infrastructure is to ensure that the Advisory Teams' staggered completion of proscribed mandates under the Act are enfranchised with a robust, field-wide understanding of best technical solutions to addressing ballast water management in the U.S. Collaboration between staff from a variety of agencies with ballast water management knowledge, centralized under the U.S. Coast Guard, will enable collaboration that will improve overall enforcement and monitoring coordination between agencies in the Great Lakes.

Advisory Teams

Vessel Management Plan Guidelines Advisory Team: The purpose of the Vessel Management Plan Guidelines Advisory Team is to set guidelines in accordance with ballast water management plans pertaining to large ballast-carrying vessels. The overarching purpose of this Team is to minimize introduction and transfer of invasive species within the Great Lakes by specifying standards for vessel ballast water treatment that will limit introductions. This Team will require regular collaboration between scientists, government and shipping industry professionals in order to identify vessels for which plans are required, determining compliance criteria and the processes for updating and revising the plans. The development of guidelines requires the exchange of technical information regarding ship types and the determination of treatment systems and operations appropriate to the size and class of the ship. As such, the Vessel Management Plan Guidelines Advisory Team shall meet semi-monthly during the 18 months during which the guidelines are developed and every 6 months after that for the purpose of updating and revising the guidelines.

This ongoing opportunity for collaboration, with oversight by the Central Ballast Water Management Coordination staff, will ensure that a comprehensive outreach plan is undertaken to reach all respective stakeholders concerned with ballast water standards. The vessel management guidelines will be developed with a complete picture of the capacity and realistic timeline for adoption of new guidelines by the industry, while ensuring that the guidelines are strict enough to make a difference.

Technology Review Advisory Team: The Technology Review Team is responsible for reviewing ballast water treatment technologies available for ballast water treatment and identifying and recommending the Best Available Technology for achieving the standards put forth by the Act. The group will draw from the U.S. Coast Guard, the EPA, the Department of the Interior, the Department of Commerce, and the Department of Transportation. Scientists at research facilities will review ballast water treatment technologies and collaborate with to the Team to add new techniques or apparatuses to the list of approved technologies. Unlike the previously described Team, the Technology Review Team will continue to exist indefinitely to review ballast water treatment technologies as they are developed for their ability to meet the requirements of the Act. The Team will meet quarterly during the initial technology assessment and at least every three years to update guidelines regarding Best Available Technology for ballast water management, as required by the Act.

Application Review Advisory Team: This Team will review specific vessel operators' applications for certification of on-board ballast water treatment systems for compliance with environmental regulations, in order to prevent the introduction and transfer of AIS. Certification will be the last step in the process of adhering to the Act's ballast water management requirements, following the vessel management plan guidelines survey and

development of guidelines and technology review. For this reason, the Application Review Advisory Team will not be active until the middle of Year 2 at the earliest. Even with this in mind, the Application Review Advisory Team will be comprised of former members of the Vessel Management Guidelines Team, who will have participated and become acquainted with the degree of collaboration necessary to ensure appropriate guidelines have been enacted to enforce stricter ballast water standards in the future.

Grant Coordination Branch

The current GLNPO grant system involves grant coordination by expertise, and takes staff time from various employees inconsistently throughout the year. The increased potential grant recipient pool and complexity of grant categorizations associated with the Act will necessitate much greater staff support. These new Grant Coordination Branch positions will fulfill that need by coordinating all grant activities through the centralized GLNPO. A new branch of the GLNPO exclusively focused on grant efforts will take the untenable responsibility off of the other employees who have other monitoring, policy, and technical assistance responsibilities. As detailed earlier, we propose adding the new Grant Coordination Branch to the GLNPO to be staffed by one Grant Coordination Director and four new Grant Coordinators. The purpose of the Grants Coordination Branch will be to ensure that monies allocated by Congress are awarded to projects that will support the ongoing restoration of the Great Lakes ecosystems.

The branch will take on primary responsibility for implementing and overseeing eligibility requirement development for targeted projects that address the environmental problems identified in the Act. Introducing collaboration into this process will allow the new Grant Coordination Branch to formally reach out to other existing grant programs in the region and build off of best practices to identify and develop region-wide criteria for promising projects that address the Act's call for overall remediation and restoration. Additionally, the opportunity for collaboration with grant programs housed in other agencies within the IATF will ensure pre-application coordination and comprehensive stakeholder outreach to all historic, emerging, and new, potential grantees. The branch will be better suited to determine grant deadlines when conferring with other grant program staff housed in agencies with focused or exclusive grant priorities. Additionally, the Grant Coordination Branch can spur development of more targeted multi-agency efforts that may not have been possible under former legislation (e.g. a Department of Health and Human Services outreach effort to public health projects centered on mercury consumption could happen in tandem with a GLNPO call for Request for Proposals for toxic remediation projects). Fulfillment of technical assistance requirements can be shared across the region to better coordinate existing projects to identify environmental problems with overlapping site-specific projects that may be able to leverage additional funding streams.

Total Operations Costs

Total implementation operations costs in the first year will be $2.46 million dollars. Broken down by percentage, 18% of the money will support the Grant Coordination Branch and the remainder will outfit the central staff and advisory teams housed in the Ballast Water Management Coordination Branch with sufficient staff and resources. The breakdown is reflected in Figure 2.

The majority of funding in the initial year of program implementation goes to program elements that address ballast water management. This is a reflection of the Act's focus on combating invasive species introduction on a federal level while encouraging state efforts to address the issue areas of toxic substances, wastewater infrastructure, and wetland restoration. Once grant programs are selected by the end of Year 1, a substantial portion of the $300 million authorized to

grant programs may be awarded starting in Year 2 (see Figure 3, altering the budget distribution.

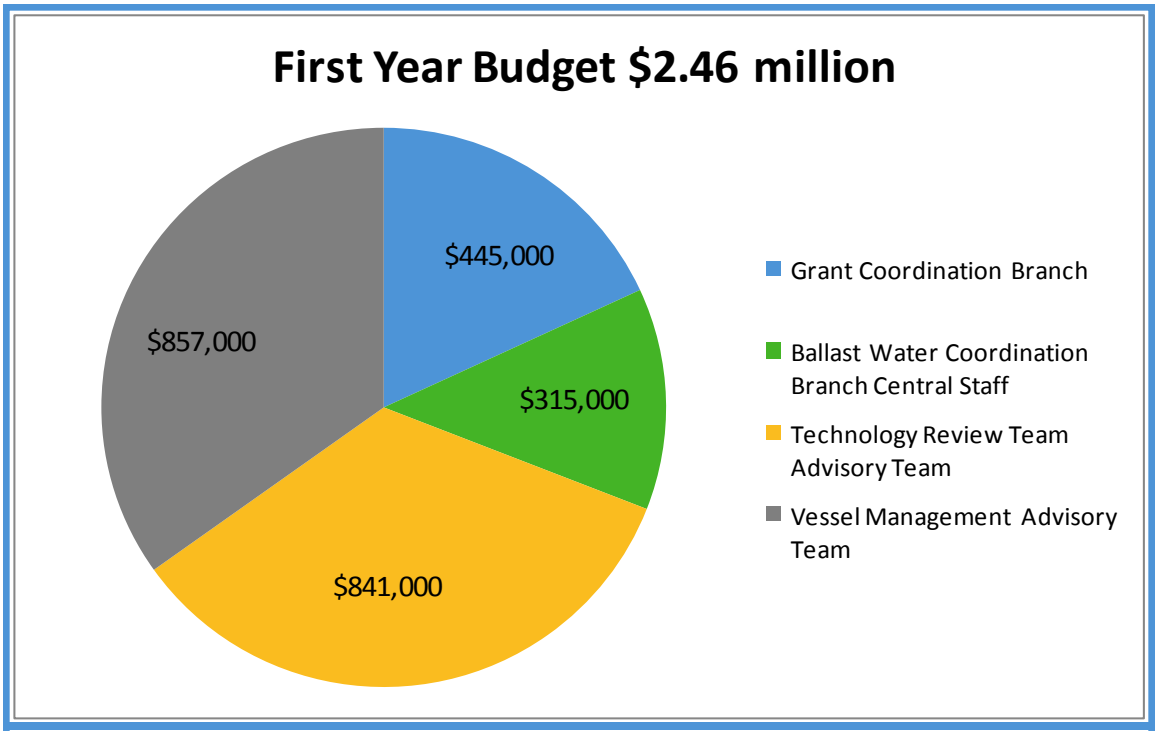


Figure 2: Breakdown of Total Implementation Operations Costs by Personnel.

Ultimately, the personnel costs and staffing responsibilities fostered in Year 1 initiate the most important aspect of overall progress toward long-term goals of restoration and reduction of invasive species: collaboration between multiple agencies with vested interests in remediating the environmental problems of the Great Lakes, while restoration remains possible.

Performance Measurement & 18-month Objectives

While there are many requirements within the Act concerning the rehabilitation of the regional ecosystems, our first-year Program Design focuses on enhancing Federal agency collaboration and coordination to improve ballast water management and the creation of a dedicated Federal office to manage inter-agency grant coordination and allocation. With the idea of infusing all program operations with heightened opportunity and mandate for collaboration and reporting, we have identified three major program objectives to set in motion beginning in Year 1 and spanning the first 18 months of our initial program implementation:

1. Grant allocation.
2. Promulgation of rules relating to ballast water vessel management plan guidelines
3. Release of a ballast water technology assessment report.

Furthermore, we have developed a performance management plan to ensure that program activities are carried out to meet program and legislative objectives. Perhaps most importantly, the performance management system will also measure the longer-term outcome of each program objective to determine whether or not our programs are effectively contributing to the overall restoration of the Great Lakes through collaborative information-sharing and progress evaluation.

Program Objective I: Award grants to project/organizations that will meet remediation and restoration goals

The grant programs aim to distribute grant funding authorized by the Act to improve water quality and restore natural habitat . The Grant Coordination Branch will work collaboratively with the IATF and selected program partners to develop a targeted grant allocation strategy for wastewater treatment, wetland restoration, and sediment remediation to ensure that funding is allocated to organizations and projects that are able to meet remediation and restoration goals (see Appendix I for complete breakdown of indicators for each program objective).

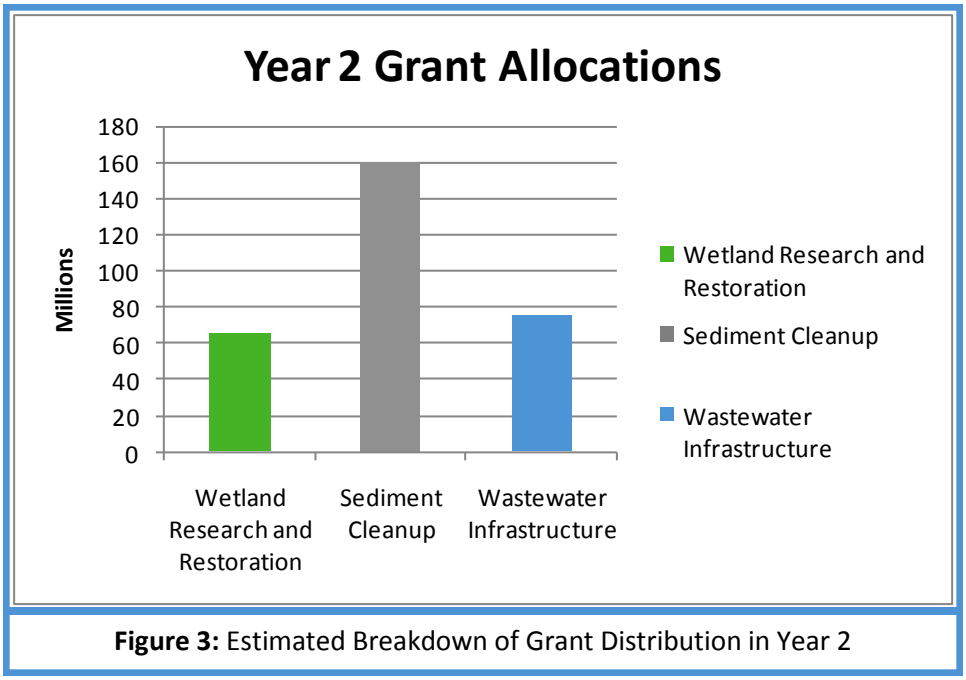


Figure 3: Estimated Breakdown of Grant Distribution in Year 2

Program Objective II: Develop feasible and enforceable Vessel Management Plan Guidelines

The Ballast Water Coordinator will ensure that Vessel Management Plan Guidelines are developed and promulgated as a rule through a highly coordinated and collaborative effort including the IATF and the Vessel Management Plan Guidelines Team. The rule will be developed in consultation with key stakeholders and elected officials. Eventually the public will have an opportunity to affect the final rule when it is made available for public comment. It is anticipated that successful rule promulgation will result in feasible and enforceable Vessel Management Plan Guidelines that will contribute to the reduction of the introduction of invasive species via ballast water.

Program Objective III: Complete Ballast Water Management Technology Assessment

The Ballast Water Coordinator will ensure that a Technology Assessment Report is developed through a highly coordinated and collaborative effort consisting of the IATF and the Technology Review Advisory Team. The Technology Assessment will be developed in consultation with key stakeholders, elected officials and the public. A meaningful Technology Assessment Report should lead to vessels adopting approved technologies, which are anticipated to contribute to the reduction of invasive species introductions via ballast water.

Working toward these targeted program objectives, our performance management plan demonstrates accountability by providing government officials and the public with evidence that staff time and tax dollar expenditures are achieving, or not achieving, desired outcomes. Moreover, the ability to demonstrate each mechanism's (ballast water management and targeted funding through grant allocation) success will help us to secure funding to continue our programs into future years. Finally, first-year reporting and feedback components provide signals that allow for a rapid response to potential pitfalls, thus ensuring timely improvements in process, outputs and outcomes while collaboration is underway.

Conclusion: The Future of the Great Lakes

Our proposed Program Design and implementation strategy for the Great Lakes Collaboration Implementation Act builds off of three decades of historic legislative attempts to address the growing environmental problems facing the regional ecosystem. Implementing the Act will streamline multiple-agency efforts by centralizing ballast water management and grant allocations for toxic substance remediation, wastewater facility upgrades, and wetland restoration. The unique aspect of implementation is centered on the functions of the IATF, enhancing the crux of collaboration among the variety of governmental and non-governmental stakeholders who spurred the inception of the Act in 2009. Since its proposal on the floor of the House of Representatives earlier this year, however, the Great Lakes Collaboration Implementation Act remains in review in the House Subcommittee on Insular Affairs, Oceans and Wildlife. With multiple pressing items on the political agenda, it is unclear how even bipartisan support in Congress may actually translate to continued action toward restoring the Great Lakes while restoration remains possible.

Collaboration has been a missing component of past legislative efforts to tackle the critical environmental problems holistically. Whereas many legislative efforts have encompassed regulatory measures to address some of the problems individually, this is the first Federal attempt to try and cobble effective solutions together to implement in tandem, in hopes of yielding the most expansive and lasting positive impact on restoration efforts. By promoting accountability and transparency between the 11 agencies overseeing policy in the region through the IATF, initial strides can be made to create a more effective, accessible bureaucratic structure for communication and progress. Although the Act does not articulate the route for local and state government to contribute to regional restoration efforts, the Act effectively calls for coordinated efforts to experiment with and develop best solutions for the variety of site-specific needs across the Lakes.

Funding streams for restoration projects and continued research and development of technical solutions are a primary legislative solution provided by the Act. Although this is the first time such a large amount of Federal money has been allocated for disparate projects in the region, funding as a core governmental solution is only as sustainable as available funding. In conjuncture with President Obama's recent $400 million appropriation for parallel restoration efforts through the GLRI, the increase in resources is a welcome addition to cumulative spending to remediate the environmental problems.

Without adequate internal infrastructure to monitor and track the disbursement of the large pool of money, however, it will be difficult to determine what criteria must be met by regional projects to warrant continued funding. Even technical solutions that are determined to be good fits for particular kinds of environmental degradation will require tailoring for individual communi-

ties and unique environmental needs. Even with all the money to fund long-term projects, there will never be a "one size fits all" solution to the daunting environmental future facing the Great Lakes.

In spite of emerging stakeholder enthusiasm, direction, and collaboration around combating the degradation of the Great Lakes, the prevalence of environmental problems that continue to get worse could be a losing battle. In the case of AIS specifically, the extensive reach of the zebra mussel across the country through recreational boating may mean domestic enforcement is too little and too late. Additionally, two species of Asian carp that were introduced hundreds of miles away from the Great Lakes in Arkansas in the 1960s have made their way north and concern over their expected invasion of Lake Michigan in the near future is grave (Associated Press, 2009). Even if remaining restoration efforts to remediate sediment, upgrade wastewater facilities, and restore wetlands are initiated under the Great Lakes Implementation Collaboration Act, the AIS problem is already a potentially catastrophic issue past the point of no return.

The realistic impact of grants funding and ballast water enforcement will be centered on setting a strong foundation for continued, further development of these mechanisms for promoting overall, long-term natural habitat restoration and improved water quality of the region through subsequent state and local government efforts. Although both the amount of money and the size of the region facing such dire environmental prob-

IN FOCUS: *The Coast Guard's Draft Guidelines on Ballast Water Standards*

The Act is not the only current attempt at Federal regulation of ballast water. In August of 2009, the U.S. Coast Guard proposed ballast water standards for public comment, which were met with general industry support and environmentalist calls for more stringent standards aligned with some current state measures already in place (Kobell, 2009).

The proposed standards would go into effect in two different phases. Phase 1 would match the International Maritime Organization's (IMO) ballast water standard, which limits the number of aquatic organisms allowed in ballast tanks to 10 per cubic meter of water, and go into effect in 2012. This Phase of the Coast Guard's approach would require all vessels operating in U.S. waters that are equipped with ballast tanks to install and operate an approved ballast water management system before discharging ballast water. Starting in 2016, all vessels must comply with a new standard that would be 1,000 times stricter than the current IMO standards, allowing for only one organism per 100 cubic meters of water (Standards for Living Organisms, 2009).

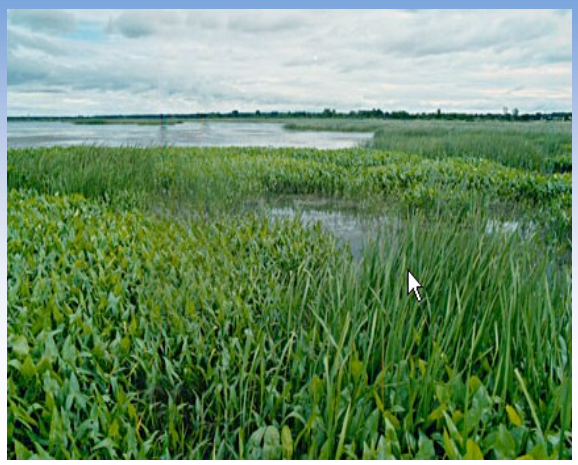
The Coast Guard's proposed phase-in of the IMO standards is meant to address industry concerns about the short-term capacity and long-term cost for ship owners to install treatment systems, which can cost up to $1 million per ship (Kobell, 2009). The preliminary phase of standards aims to enable ship owners to enter an intermediary phase of compliance before more stringent standards are enforced. Even with these policy concessions, industry representatives still believe that the timeline is too strict because of the uncertainty over the feasibility of testing the standards and whether or not technology will be available to meet the Phase 2 standard (J. Mackey, Hyde Marine, personal communication, November 17, 2009). To environmentalists, the increasing spread of AIS warrants a need to move to the stricter standard right away. Despite discrepancies over the stringency of the Coast Guard's proposed standards, however, most stakeholders embrace a nationalized regulatory response to the need for better managing the ballast water of ships in all key ports of the country, including the Great Lakes.

The extended public comment period relating to these draft standards ended on December 4, which means the Coast Guard will work towards publishing a final regulation in the coming months. Accordingly, the Act were to be reviewed again, the ballast water requirements under the Act would be retracted from the bill in full as a result of new Coast Guard standards. The Coast Guard's implementation of new standards represents a significant move towards making up for lost time when it comes to reducing AIS. The proposed new ballast water standards ultimately advance the goals of the Act as well, in spite of whether or not the Act is the mechanism that actually forges the path to reach the goals.

—T. de Valledares Pacheco, R. Jackson, B. Schallert, and L. Wild.

lems are great, it will be important to target funding to the most critical sites with greatest environmental degradation early on and set the precedent for future regional work to decide what solutions work best for any given area's specific problems. At best, the Act provides a protocol for collaboration so that additional legislative efforts can continue to go further. The Act is not an inclusive remedy, but the first step toward curing various aspects of the problems facing the region that will take decades to address in total.

Whether or not the Act itself passes, the Act has already initiated a plausible path for successful collaboration among multiple agencies. During an historic period of other pressing domestic and international issues – from Healthcare Reform, Climate Change, and two wars — the space for regional environmental restoration efforts can be lost on the public radar. However, the spirit of government collaboration is unique and applicable to other pressing issues if implemented successfully. The Act has already instilled the importance of multi-agency collaboration in research, development of best practices, and promising technological solutions to the key environmental problems facing the area in any future restoration efforts in the region. Promoting shared accountability over combating the environmental problems by multiple agencies and stakeholders will hasten the speed with which solutions should be implemented across the Great Lakes, making restoration for this unique ecosystem possible before it is too late.



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Appendices

A. Glossary

Areas of Concern
Great Lakes Areas of Concern are defined in the Great Lakes Water Quality Agreement (Annex 2 of the 1987 protocol) between the United States and Canada as "geographic areas that fail to meet the general or specific objectives of the agreement where such failure has caused or is likely to cause impairment of beneficial use of the area's ability to support aquatic life" (EPA, 2004).

Authorization
This is the amount of money which, according to the bill, is allowed to be spent by Congress to support the programs elaborated in the bill. However, Congress can only allocate this money through the budget process. The final allocations are often mush less than the legislative authorizations.

Ballast water
This is the water which ships take into tanks in their holds to help keep them stabilized. Because the ships fill their ballast tanks on one place and empty and refill them in another, ballast water can be a vector for invasive species introductions.

Coast Guard Environmental Standards Division
The Environmental Standards Division works to develop, maintain, and implement regulations that protect marine environments in the United States. The Division also works to reduce discrepancies in interstate and international marine environmental legislation and represents the Coast Guard on the Aquatic Nuisance Species Task Force and National Invasive Species Council.

Combined sewer overflow
A combined sewer overflow occurs when a a heavy rain causes a combined storm- and wastewater treatment system of a municipality to exceed capacity. As a result, a mixture of untreated wastewater and storm water will be released into a water body.

Dredging
This involves using hydraulic hoses, backhoes, or other machinery to remove sediment from the bottom of a water body. It is a commonly used technique for remediation or to deepen a water body to facilitate shipping.

Environmental Protection Agency (EPA)
This is the Federal organization which is highly involved in many aspects of Great Lakes research, restoration, and pollution mitigation. The EPA implements many pieces of national legislation, including the Clean Water Act, is the primary agency that undertakes monitoring of the Great Lakes, and disburses research grants, among other activities.

Eutrophication
This occurs when nutrient excesses cause unusually intense blooms of algae in a water body. When the algal bloom dies, the decomposition uses up the dissolved oxygen in the water, which can create a "dead zone," or a place where the oxygen is too low to support life.

Fish and Wildlife Service
This is an agency under the Department of the Interior that undertakes monitoring and enforcement of wildlife laws in the Great Lakes Region, including the Endangered Species Act.

Great Lakes Region
This is the region that includes the Great Lakes and all contiguous US states, such as New York, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Wisonsin, and Minnesota and Canadian Provinces, including Ontario, Quebec, and Manitoba.

Great Lakes Regional Collaboration (GLRC)
This group formed as part of a US Executive Order to bring together diverse stakeholders for the purpose of establishing a strategy for addressing the problems faced by the Great Lakes Region. It continues to compile information concerning the progress of Great Lakes restoration efforts, and issues reports periodically.

Great Lakes Restoration Initiative (GLRI)
This initiative works to achieve similar goals as the Interagency Task Force (IATF) and also focuses on goals from the Great Lakes Regional Collaboration (GLRC) Strategy. The initiative seeks to improve the quality of the region by targeting environmentally distressed areas. President Obama authorized $475 million in funding, and $400 million was authorized in the 2010 budget.

Interagency Task Force (IATF)
This group of representatives from 11 U.S. Cabinet and Federal Agencies focuses on coordinating each of the member agency's objectives for improving environmental health of the Great Lakes. President Bush established the IATF in 2004 along with a Regional Working Group (RWG) in order to streamline federal government restoration efforts.

Invasive species
An invasive species is defined as any non-native species that is likely to cause harm to the economy, the environment, or the human health of an particular ecosystem.

Methylmercury
This compound is the most bioavailable form of the neurotoxin mercury, and therefore highly dangerous to human health. It is generated by microbes in sediment when they process mercury released from industrial processes, and it bioaccumulates to fish that are consumed by humans. Content of methylmercury in fish tissue is a valuable indicator of ecosystem health.

Non-point source pollution
This occurs in the form of runoff from areas where pollutants that are spread out over a large space. This may be in the form of agricultural runoff containing fertilizers and pesticides that were applied over a large farm field, or urban runoff from city streets.

National Oceanic and Atmospheric Administration (NOAA)
This Federal agency operates the Great Lakes Environmental Research Laboratory, which undertakes monitoring and research activities throughout the region. NOAA also disburses research grants for studies of the Great Lakes.

Remediation
Regarding ecosystems, remediation generally refers to restoration to a previous level of ecological health, usually experienced prior to a human disturbance.

Sediment
This substance is the collection of silt and other organic and non-organic particles that collect on the bottoms of water bodies. Sediment is often a medium of contamination though heavy metals, PCBs, or other heavy pollutants those settle out of the water.

Toxic pollutant
This refers to any substance, usually anthropogenic, that has been found to cause significant harm to human or ecological health when released into an ecosystem.

Wastewater
This refers to the effluent containing various forms of human wastes which come from the use of water for domestic or industrial purposes. The most common form of wastewater is sewage or storm water, which can be ecologically problematic if it enters the ecosystem untreated (see combined sewer overflow).

Wetland
This ecosystem is defined by soil saturation, though not necessarily inundation, by water. The characteristics of wetlands can vary widely, but all are defined by plant and animal species that are adapted to the presence of water during a large portion of the year.

Zebra Mussel
This highly invasive species was introduced from the Caspian Sea to the Great Lakes through ballast water discharge. Because if its small size, high fecundity, and lack of predators, it has spread rapidly throughout the region and causes hundreds of millions of dollars of damage each year.

B. The Great Lakes Collaboration Implementation Act Legislative Summary

As one of the most comprehensive bills ever written for Great Lakes environmental improvement, the Act addresses a diverse but interrelated number of principal environmental problem areas in eight separate titles. Although the Act does not cover the gamet of additional environmental problems that may face the region, the principal problem areas as found in the legislation can be summarized as invasive species, toxic substances, wastewater discharges, and wetland degradation. Most titles in the Act pertain to addressing these four principal problems. However, the Act devotes Titles VI and VIII specifically to continued scientific research of the region and codifying an existing administrative structure respectively. We've intentionally left certain parts of the Act out of our Program Design to focus on presenting an implementation strategy for the first chapter of Title I and the entirety of Titles II, III, V, and VII.

Title I: Invasive Species Prevention

The Great Lakes are particularly vulnerable to invasions of non-native species through a variety of vectors. Chapter I in this title addresses ballast water transfers from all vessels entering the Great Lakes by way of the St. Lawerence Seaway, since most AIS enter the Lakes in this manner. This title mandates a specific ballast water treatment standard to be achieved by all ships, the promulgation of vessel management guidelines, and certification of ballast water control technology and other outputs to stop new introductions of AIS. Our Grant Coordination Branch will administer compliance with Title 1 of the Act.

The other chapters under Title I mandate several complementary programs. Chapter 2 tackles the intentional importations of AIS, Chapter 3 attempts to coordinate agencies to detect early invasive species colonization, respond rapidly to those new invasions, and subsequently control existing populations through public outreach. Coordinated through the National Park Service, this outreach will be targeting recreational boaters explaining the threats AIS pose and how they can remove organisms prior to transporting a watercraft. Under Subtitle B, the Act requires AIS research. This is incredibly important due to all of the uncertainties over how to best prevent new invasions and control and eradicate existing populations. Finally, Subtitle C establishes a National Invasive Species Council under the Executive Branch.

Title II: Coastal Discharges

This title authorizes $20 billion over five years and amends the Federal Water Pollution Control Act to provide grants and secure loans specifically for rural and small municipalities to improve their wastewater treatment infrastructure. The Federal Water Pollution and Control Act's revolving loan fund has functioned since 1972 to provide funding for wastewater facility upgrades. This title simply aims to recapitalize the fund. Title II is carried out under the Grant Coordination Branch within our Program Design.

Title III: Areas of Concern

This title also amends the Federal Water Pollution Control Act and allocates $600 million over four years to remediate contaminated sediment in Areas of Concern as designated by the U.S. EPA (see Appendix A for glossary definition). Our Program Design includes Title III under the Grant Coordination Branch as well.

Title IV: Clean Water Authority

The Federal Water Pollution Control Act is amended by Title IV. Unlike other titles in this bill, Title IV mandates an alteration in legal language changing "navigable waters" in all sections of the Federal Water Pollution Control Act to "waters of the United States." The implications of this simple shift in language are great because it would effectively allow the federal government to protect wetlands as non-navigable waters.

Realistically, developers and other vested interests will cut this title from the bill. Currently the Senate version of the Act —also named the Great Lakes Collaboration Implementation Act—does not include this legal language change. Our Program Design does not include Title IV because no administration is needed to undertake this legal change.

Title V: Toxic Substances

Funding for projects that reduce the amount of toxic substances in the Great Lakes is provided through Title V. This Title will be administered through our Grant Coordination Branch.

Title VI: Indicators and Information

Divided into three Subtitles, Title VI combines research and national ocean observation. Subtitle A reauthorizes funding under the Federal Water Pollution Control Act for scientific research that had previously expired. Subtitle B, the Ocean and Coastal Observation Systems Act, has already been signed into law by President Obama as part of an appropriations bill in February 2009. Subtitle C requires Great Lakes water quality indicators and monitoring to be enacted through inter-agency collaboration and cooperation with Canada.

Title VII: Sustainable Development

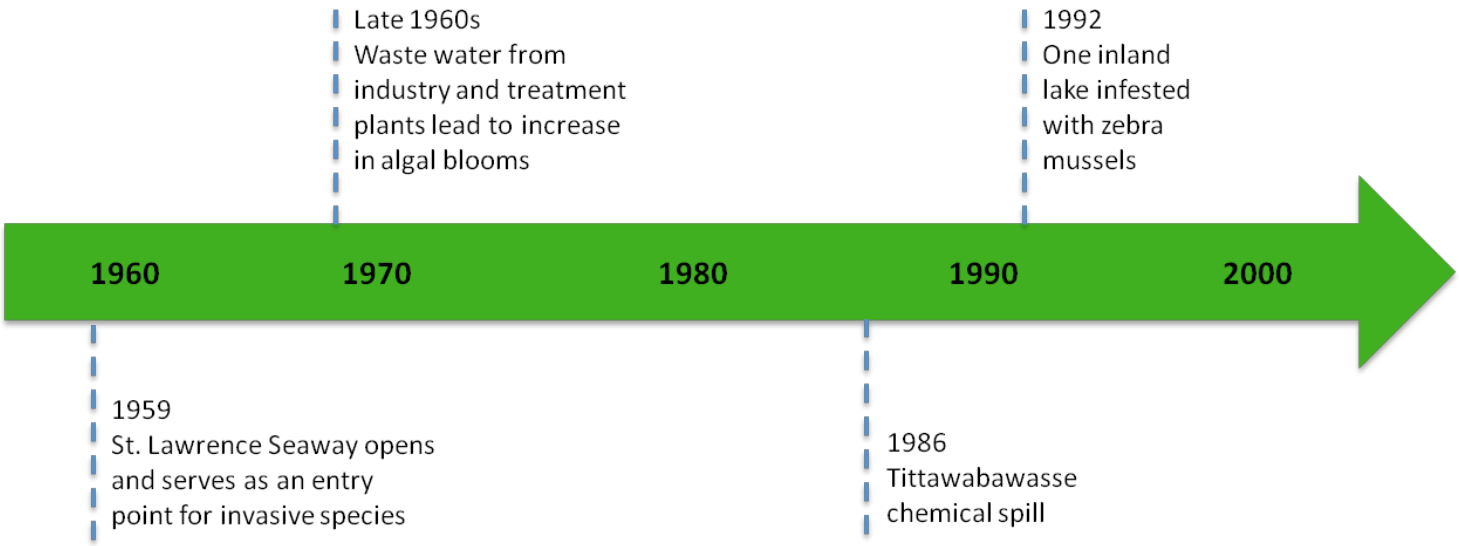
This title allows remediation and/or restoration to take place in waterfront areas to enhance aquatic habitats or prepare currently degraded land for redevelopment. Our Program Design addresses Title VII through the Grant Coordination Branch grant allocation projects as well. Many of the potential waterfront areas that could receive funding through our program are wetlands.

Title VIII: Coordination and Oversight

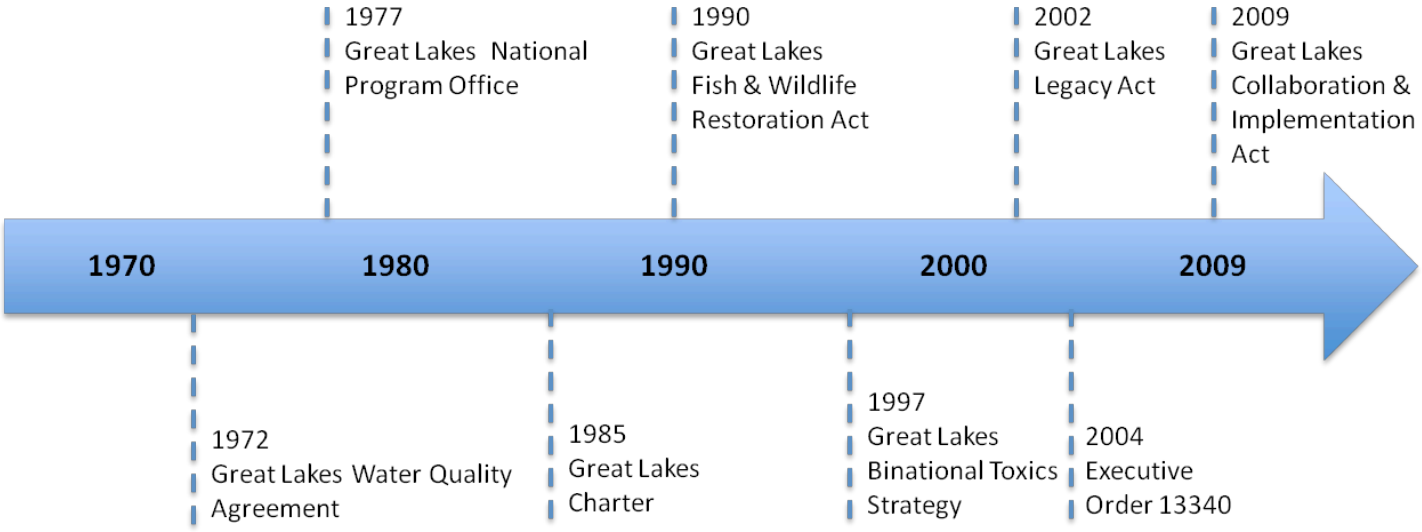
The final title of the Act codifies the Great Lakes Interagency Task Force and the Great Lakes Regional Collaboration. Title VIII that articulates the main goal of the Act to foster collaboration to guide region-wide restoration. This notion of cooperation permeates our Program Design and implementation strategy at all levels.

C. Great Lakes Timelines

Environmental Issues



Environmental Legislation



D. Executive Order 13340

May 18, 2004

ESTABLISHMENT OF GREAT LAKES INTERAGENCY TASK FORCE AND PROMOTION OF A REGIONAL COLLABORATION OF NATIONAL SIGNIFICANCE FOR THE GREAT LAKES

By the authority vested in me as President by the Constitution and the laws of the United States of America, and to help establish a regional collaboration of national significance for the Great Lakes, it is hereby ordered as follows:

Section 1. **Policy**. The Great Lakes are a national treasure constituting the largest freshwater system in the world. The United States and Canada have made great progress addressing past and current environmental impacts to the Great Lakes ecology. The Federal Government is committed to making progress on the many significant challenges that remain. Along with numerous State, tribal, and local programs, over 140 Federal programs help fund and implement environmental restoration and management activities throughout the Great Lakes system. A number of intergovernmental bodies are providing leadership in the region to address environmental and resource management issues in the Great Lakes system. These activities would benefit substantially from more systematic collaboration and better integration of effort. It is the policy of the Federal Government to support local and regional efforts to address environmental challenges and to encourage local citizen and community stewardship. To this end, the Federal Government will partner with the Great Lakes States, tribal and local governments, communities, and other interests to establish a regional collaboration to address nationally significant environmental and natural resource issues involving the Great Lakes. It is the further policy of the Federal Government that its executive departments and agencies will ensure that their programs are funding effective, coordinated, and environmentally sound activities in the Great Lakes system.

Sec. 2. Definitions. For purposes of this order:

1. "Great Lakes" means Lake Ontario, Lake Erie, Lake Huron (including Lake Saint Clair), Lake Michigan, and Lake Superior, and the connecting channels (Saint Marys River, Saint Clair River, Detroit River, Niagara River, and Saint Lawrence River to the Canadian Border).

2. "Great Lakes system" means all the streams, rivers, lakes, and other bodies of water within the drainage basin of the Great Lakes.

Sec. 3. Great Lakes Interagency Task Force.

1. Task Force Purpose. To further the policy described in section 1 of this order, there is established, within the Environmental Protection Agency for administrative purposes, the "Great Lakes Interagency Task Force" (Task Force) to:

   a) Help convene and establish a process for collaboration among the members of the Task Force and the members of the Working Group that is established in paragraph b(ii) of this section, with the Great Lakes States, local communities, tribes, regional bodies, and other interests in the Great Lakes region regarding policies, strategies, plans, programs, projects, activities, and priorities for the Great Lakes system.

b) Collaborate with Canada and its provinces and with bi-national bodies involved in the Great Lakes region regarding policies, strategies, projects, and priorities for the Great Lakes system.

c) Coordinate the development of consistent Federal policies, strategies, projects, and priorities for addressing the restoration and protection of the Great Lakes system and assisting in the appropriate management of the Great Lakes system.

d) Develop outcome-based goals for the Great Lakes system relying upon, among other things, existing data and science-based indicators of water quality and related environ-mental factors. These goals shall focus on outcomes such as cleaner water, sustainable fisheries, and biodiversity of the Great Lakes system and ensure that Federal policies, strategies, projects, and priorities support measurable results.

e) Exchange information regarding policies, strategies, projects, and activities of the agencies represented on the Task Force related to the Great Lakes system.

f) Work to coordinate government action associated with the Great Lakes system.

g) Ensure coordinated Federal scientific and other research associated with the Great Lakes system.

h) Ensure coordinated government development and implementation of the Great Lakes portion of the Global Earth Observation System of Systems.

i) Provide assistance and support to agencies represented on the Task Force in their activities related to the Great Lakes system.

j) Submit a report to the President by May 31, 2005, and thereafter as appropriate, that summarizes the activities of the Task Force and provides any recommendations that would, in the judgment of the Task Force, advance the policy set forth in section 1 of this order.

2. Membership and Operation.

a) The Task Force shall consist exclusively of the following officers of the United States: the Administrator of the Environmental Protection Agency (who shall chair the Task Force), the Secretary of State, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Housing and Urban Development, the Secretary of Transportation, the Secretary of Homeland Security, the Secretary of the Army, and the Chairman of the Council on Environmental Quality. A member of the Task Force may designate, to perform the Task Force functions of the member, any person who is part of the member's department, agency, or office and who is either an officer of the United States appointed by the President or a full-time employee serving in a position with pay equal to or greater than the minimum rate payable for GS-15 of the General Schedule. The Task Force shall report to the President through the Chairman of the Council on Environmental Quality.

b) The Task Force shall establish a "Great Lakes Regional Working Group" (Working Group) composed of the appropriate regional administrator or director with programmatic responsibility for the Great Lakes system for each agency represented on the Task Force including: the Great Lakes National Program Office of the Environmental Protection Agency; the United States Fish and Wildlife Service, National Park Service, and United States Geological Survey within the Department of the Interior; the Natural Resources Conservation Service and the Forest Service of the Department of Agriculture; the National Oceanic and Atmospheric Administration of the Department of Commerce, the Department of Housing and Urban Development; the Department of Transportation; the Coast Guard within the Department of Homeland Security; and the Army Corps of Engineers within the Department of the Army. The Working Group will coordinate and make recommenda-

tions on how to implement the policies, strategies, projects, and priorities of the Task Force.

3. Management Principles for Regional Collaboration of National Significance. To further the policy described in section 1, the Task Force shall recognize and apply key principles and foster conditions to ensure successful collabora-tion. To that end, the Environmental Protection Agency will coordinate the development of a set of principles of successful collaboration.

Sec. 4. Great Lakes National Program Office. The Great Lakes National Program Office of the Environmental Protection Agency shall assist the Task Force and the Working Group in the performance of their functions. The Great Lakes National Program Manager shall serve as chair of the Working Group.

Sec. 5. Preservation of Authority. Nothing in this order shall be construed to impair or otherwise affect the functions of the Director of the Office of Management and Budget relating to budget, administrative, regulatory, and legislative proposals. Nothing in this order shall be construed to affect the statutory authority or obligations of any Federal agency or any bi-national agreement with Canada.

Sec. 6. Judicial Review. This order is intended only to improve the internal management of the Federal Government and is not intended to, and does not, create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or in equity by a party against the United States, its departments, agencies, instrumentalities or entities, its officers or employees, or any other person.

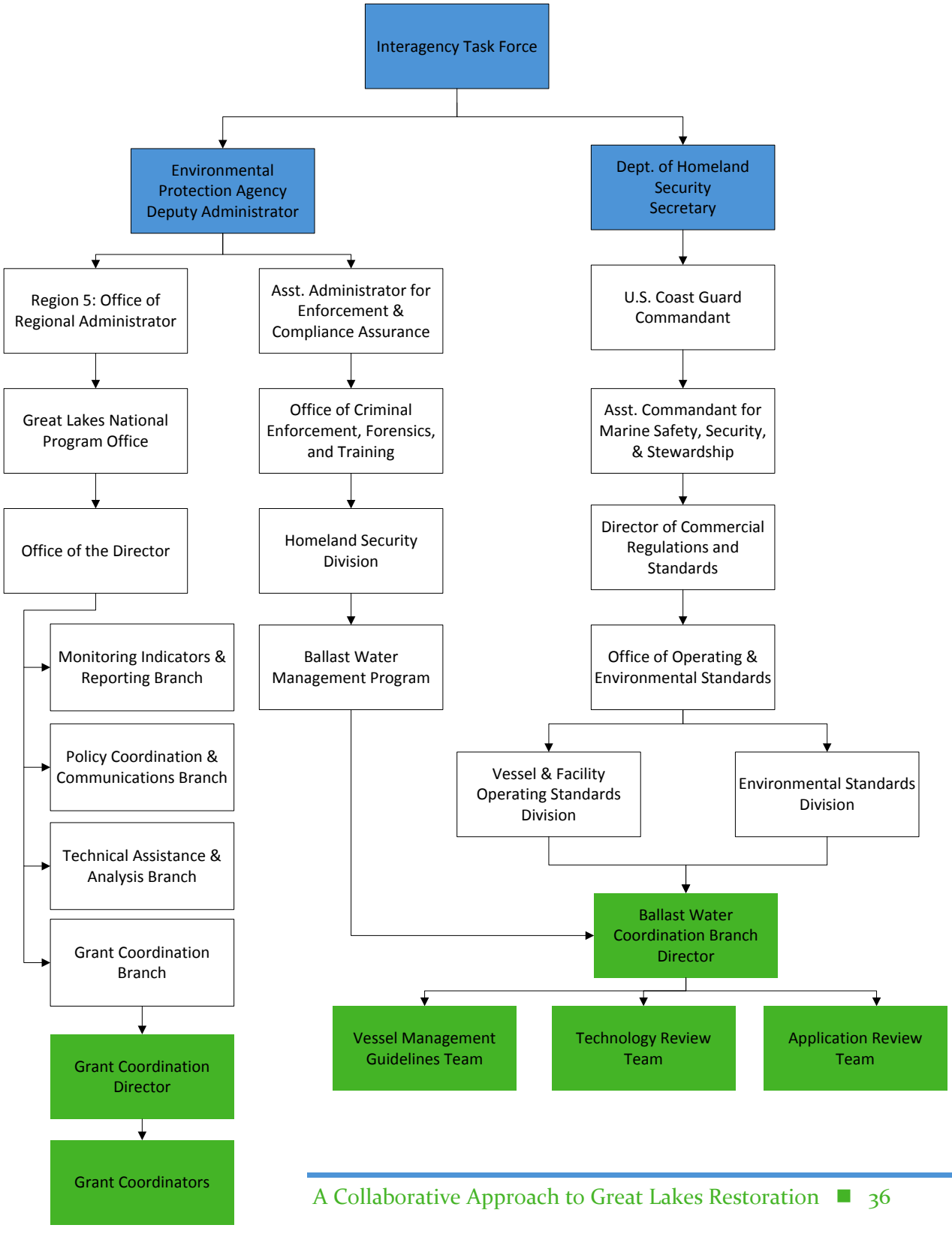
THE WHITE HOUSE,

/s/ George W. Bush

E. Funding Comparisons: The Act, GLRI, and GLRC

	Great Lakes Collaboration Implementation Act (the Act) Authorized Funding	Great Lakes Regional Initiative (GLRI) Appropriated Funding	Great Lakes Regional Collaboration (GLRC) Restoration Cost Estimates
Ballast Water Management	$14 million/yr	$13 million/yr	$13.2 million/yr
Toxic Substances and Areas of Concern	$160 million/yr	$54 million/yr	$77-188.7 million/yr
Wastewater Discharges	$65 million/yr	$56 million/yr	$288.7 million/yr
Wetland Degradation	$75 million/yr; $20 billion to re-volving loan fund	$10 million/yr; $200 million to re-volving loan fund	$15 billion total

F. Program Design Organizational Chart



G. Existing Organizational Structure

Overview of the Great Lakes National Program Office:

Bringing together Federal, state, tribal, local, and industry partners under the guidance of the EPA and Region 5 Office of the Regional Administrator, the Great Lakes National Program Office (GLNPO) guides key stakeholder efforts to protect, maintain, and restore the chemical, biological, and physical integrity of the Great Lakes. Created in 1977, the GLNPO currently has 46 staff members and the fiscal year 2009 budget was $61 million (D. Cowgill, personal communication, October 16, 2009). The staffing pattern is defined by high numbers of scientists and environmental protection specialists with several program specialists and liaisons to other agencies and groups. Most pertinent to our proposed program, there are currently no staff members who are assigned to advertise, evaluate applications for, process and disburse grants. Those responsibilities have traditionally been distributed among the current staff based on their expertise. With an increase in federal funding through the Act, however, the need for more dedicated grant staff to develop criteria to allocate funding effectively will be essential (D. Cowgill, personal communication, October 16, 2009). This will be fulfilled with the addition of the Grant Coordination Branch in the GLNPO.

Overview of the U.S. Coast Guard Environmental Standards Division

The U.S. Coast Guard Environmental Standards Division's mission is centered on developing and maintaining standards, regulations, and guidelines for industry, the states, and the public, to implement laws and treaties on marine environmental protection. Through numerous services it simultaneously provides to the public and the close alignment it has with the duties outlined in the Act focused on ballast water enforcement, the Environmental Standards Division, in conjunction with the Vessel and Facility Operating Standards Division, has the capacity to house a more focused Ballast Water Management Coordination-Branch.

H. Program Design Staffing Plan and Line-Item Budget

Grant Coordination Branch Staffing and Line-Item Budget

Under the supervision of the Grant Director (GS-13) and four Grant Coordinators (GS-9) employees of the Grant Coordination Branch will spend 100% of their time performing tasks related to the fulfillment of the Act. GLNPO officials have indicated that they have sufficient space in the current facility to accommodate the Grant Coordination Branch, therefore, the budget does not include the cost of new offices.

The Act authorizes $300 million for grant programs in the areas of toxic substance remediation, wastewater infrastructure improvement, and wetland research and restoration . Program administration will be paid for out of these authorizations during Year 1, with the remaining $299.5 million in authorizations to be distributed to eligible grantees starting in year 2.

Other Than Personnel Service expenses include workstation and office requirements, and an estimated one travel day per employee per month to grant sites. Site visits will enhance stakeholder outreach and provide a consistent way to evaluate grant progress after money is allocated during Year 2. A breakdown of OTPS costs is provided in below.

Grant Coordination Branch Costs

Personnel Services		
Grant Director (GS-13)	(100% FTE)	$89,000
Grant Coordinator (GS-9)	(100% FTE x 4)	$208,000
Fringe Benefits		$108,000
Total Personnel Costs		**$405,000**
Other Than Personnel Services		
Travel		$15,000
Supplies		$25,000
	Total OTPS Costs	**$40,000**
	Total Grant Coordination Costs	**$445,000**

Ballast Water Management Coordination Branch Staffing and Line-Item Budgets

Ballast Water Management Coordination Branch Central Staff

The Ballast Water Management Team Coordinator will be responsible for organizing and attending the meetings for the Advisory Teams, recording and publishing the outcomes of the meetings and representing the Teams to other stakeholders. The Coordinator must have a strong managerial background with

special emphasis in coastal management issues. The Ballast Water Management Team Coordinator will attend all meetings and represent and report for the Teams to the Chief of the Environmental Standards Division and the Vessel and Facility Operating Standards Division of the U.S. Coast Guard in Washington D.C.

The Ballast Water Management Coordination Branch Central Staff will consist of the Ballast Water Team Coordinator (GS-13) and the Ballast Water Group Legal Counsel (GS-13). The Central Staff will be supported by an administrative assistant (GS-6). These employees will spend 100% of their time on tasks relating to the Act. Salaries were calculated in accordance with the General Service schedule for the Washington D.C. area. The Act authorizes $31.75 million annually for implementation of measures designed to prevent the introduction of invasive species into the Great Lakes. Program administration costs in the first year represent 4% of the authorized funds. The additional authorized monies will be applied to enforcement actions, reporting, eradication, monitoring, outreach and other expenses in subsequent years.

Other Than Personnel Service costs include the cost of outfitting these new employees with workstations including office furniture, computer terminals, stationary and other miscellaneous office costs. The budget also includes a limited amount for traveling order to conduct an initial survey of Great Lakes conditions related to ballast water discharges. A breakdown of costs for the Ballast Water Management Coordination Branch Central Staff is shown below.

Ballast Water Management Central Staff Office Costs

Personnel Services		
Program Manager (GS-13)	(100% FTE)	$89,000
Legal Counsel (GS-13)	(100% FTE)	$89,000
Administrative Assistant (GS-6)	(100 % FTE)	$38,000
Fringe Benefits (36.25%)		$79,000
Total Personnel Costs		**$295,000**
Other Than Personnel Services		
Supplies		$16,000
Travel		$4,000
	Total OTPS Costs	**$20,000**
	Total Ballast Water Central Office Costs	**$315,000**

Ballast Water Management Coordination Branch Advisory Teams Staff

The housing of these Teams within the Environmental Standards Division and Vessel and Facility Operating Standards Division will build off of the U.S. Coast Guard's extensive experience collaborating with the EPA, the Aquatic Nuisance Species Task Force, shipping industry representatives, and other key stakeholders who will be involved in development of ballast water management standards. Additionally, the Environmental Standards Division has already released draft ballast water management guidelines very similar to those in the Act, giving Advisory Team work a strong baseline for development of supplementary guide-

lines. Working groups for other topics exist within the other divisions of the U.S. Coast Guard, which indicates that they have internal protocol to facilitate such activities.

The participating representatives in the Advisory Teams will not be new hires; they will be existing staff that will attend these meetings as part of their normal duties. Contractors will not be employed in the functions of the Teams, given that the highest levels of expertise in ballast water management and interagency interactions are found in the U.S. Coast Guard and the EPA (D. Cowgill, personal communication, October 16, 2009). The private sector has not had incentive to properly manage ballast water standard without existing, consistent standards for the government, however their potential untapped expertise may be accessed under new regulation. The most important aspect of developing and enhancing existing ballast water expertise in the U.S. Coast Guard is so that the expertise remains accessible in-house.

Vessel Management Plan Guidelines Advisory Team: While each agency will have discretion to choose their representative, we recommend that they select staff members who have expertise in the area of existing ballast water management guidelines and the ecological needs of the Great Lakes. The group as designed consists of two invasive species biologists (GS-11), three ballast water engineers (GS-10), one environmental engineer (GS-10), two ecologists (GS-11), two environmental outreach and education specialists (GS-9), two fish and wildlife biologists (GS-11), a maritime regulator (GS-10), and the Vessel Check Safety Program Coordinator (GS-12). It is estimated that most members will dedicate 50% of their time to these working groups, with the exception of the Vessel Check Safety Program Coordinator, who will spend 25% of his/her time consulting with the working group on how to make the regulations enforceable. Additionally, a trade organization representative such as a representative of the Lake Carriers' Association, as well as regional and local NGOs, may sit with the working group at his/her own agency's expense.

There are few OTPS associated with this Team. Federal staff allocated to the agency will typically be existing employees with previous experience promulgating regulations. Further, it is typical for members of working groups to maintain their workspaces in their home agencies and communicate for the most part electronically. Therefore, no additional funds are needed for new office space or other office expenses associated with hiring a new employee. Some funds are set aside for specialized supplies and limited travel. Significant monies are allocated to international coordination and conferences in keeping with the Act's focus on collaboration and in recognition of the importance that international cooperation has in preventing introductions of invasive species. A cost breakdown for the Vessel Management Guidelines working group can be found below.

Vessel Management Plan Guidelines Advisory Team Costs

Personnel Services		
Invasive Species Biologist (GS-11)	(50% FTE x 2)	$63,000
Ballast Water Engineer (GS-10)	(50% FTE x 3)	$85,000
Environmental Engineer (GS-10)	(50% FTE)	$29,000
Ecologist (GS-11)	(50% FTE x 2)	$63,000
Environmental Outreach (GS-9)	(50% FTE x 2)	$52,000
Fish and Wildlife Biologist	(50% FTE x 2)	$63,000
Shipping Regulator (GS-10)	(50% FTE x 2)	$57,000
Vessel Safety Check Coordinator (GS-12)	(25% FTE)	$19,000
Fringe Benefits (36.25%)		$155,000
Total Personnel Costs		**$582,000**
Other Than Personnel Services		
Supplies		$10,000
Travel/Meetings		$15,000
International Coordination/Conferences		$250,000
	Total OTPS Costs	**$275,000**
	Total Vessel Management Guidelines Costs	**$857,000**

Technology Review Advisory Team: The Program Design calls for the group to employ one ballast water engineer (GS-10), one Ballast Tank Computational Modeler (GS-11), one Environmental Research Laboratory Scientist (GS-11), one maritime administrator (GS-10), one Environment and Compliance Administrator (GS-10), one Transportation Training Specialist (GS-9), one Ship Technology Evaluation Manager (GS-12), two Ballast Water Treatment Specialists (GS-11), two Invasive Species Biologists (GS-11), one Invasive Species Response Coordinator (GS-11), and one representative from the National Invasive Species Council (GS-11). It is anticipated that the working group will take 50% of the time of its members. As with the Vessel Management Advisory Team, a representative of the Lake Trade Carriers' Association and local NGOs may be invited to participate in meetings or discussions of relevant cases, at the expense of his/her agency. In the case of Technology Review specifically, it will be pertinent to invite non-profit environmental group stakeholders as well as industry representatives to dispel any myth of Federal government appeasement of regulation that is more easy to implement for industry.

Other than Personnel Services costs include quarterly international conferences during which Advisory Team members will present the findings of their research with regional stakeholders in the U.S. and Canada as well as with representatives of the International Maritime Organization. A breakdown of Technology Review Team costs is shown below.

Technology Review Advisory Team Costs

Personnel Services		
Ballast Tank Computational Modeler (GS-11)	(50% FTE)	$32,000
Ballast Water Engineer (GS-10)	(50% FTE)	$29,000
Maritime Administrator (GS-10)	(50% FTE)	$29,000
Environmental Research Scientist (GS-11)	(50% FTE)	$32,000
Transportation Training Specialist (GS-9)	(50% FTE)	$26,000
Environment and Compliance Administrator (GS-11)	(50% FTE)	$32,000
Shipping Technology Evaluation Manager (GS-12)	(50% FTE)	$37,281
Ballast Water Treatment Scientist (GS-11)	(50% FTE x 2)	$63,000
Invasive Species Biologist (GS-11)	(50% FTE x 2)	$63,000
Invasive Species Response Coordinator	(50% FTE)	$32,000
National Invasive Species Counsel Rep.	(50% FTE)	$32,000
Fringe Benefits (36.25%)		$144,000
Total Personnel Costs		**$541,000**
Other Than Personnel Services		
Supplies		$10,000
Travel/Meetings		$40,000
International Coordination/Conferences		$250,000
	Total OTPS Costs	**$300,000**
	Total Vessel Management Guidelines Costs	**$841,000**

Application Review Team: The membership of this Team, as prescribed by the Act, will include representatives from the U.S. Coast Guard, EPA, and Department of Treasury. It will be comprised of only 5-10 members, to expedite the approval process. Because this Advisory Team will not begin meeting until after the vessel management guidelines are promulgated, the members who developed the management guidelines will shift to this Team. This will allow them to use their expertise in the new guidelines to evaluate the proposed vessel management plan applications for certification. A number of ships will need to be certified in a short period during the implementation phase, so the Team will need to meet on a semi-monthly basis at the beginning of the implementation phase in the second year. Such meetings may cover the development of standards for the reviewing process and the assignment of cases for review. Meetings may become less frequent, perhaps quarterly, as the number of incoming applications decreases.

I. Performance Management Year 1 Indicators

Program Objective 1: Award grants to projects/organizations that will meet remediation and restoration goals

input indicator	output	output indicator	outcome	outcome indicator
staff time (hours) and program costs (dollars)	develop grant allocation strategy	allocation strategy completed by 2nd quarter	improved water quality in monitored areas	number of grants allocated in monitored areas
	enhance collaboration through IATF & grant partner agencies	number of meetings held & number of agencies represented		
	release grant RFP's	number of RFP responses by end of 4th Quarter		
	manage Grant Helpline	number of logged calls versus number of resolved inquiries		

Data Collection, Reporting & Feedback

Weekly: Weekly reporting through Grant Coordination Branch staff meetings will provide immediate signals for midcourse corrections that will improve the process of grant distribution. For example, relaying information concerning ratio of calls logged to resolved inquires would enable the Senior Grant Coordinator to rate the effectiveness of the Helpline and adjust the amount of public outreach.

Quarterly: A quarterly report by the Senior Grant Coordinator will summarize the Branch's progress toward achieving outputs, and will be shared with the GLNPO Director and the IATF. The report would detail the progress made, for example, the number of RFP responses to date and amount of grant money allocated, enabling senior staff to evaluate the program schedule.

Annually: An annual report by the Senior Grant Coordinator would compile the progress summarized in the quarterly reports for the GLNPO Director, the IATF, and the EPA Administrator to ensure that the policy requirements in the Act are met. An annual outlook at progress would also provide feedback on effectiveness and allocation of program funding. For example, the annual report would demonstrate effective use of program funding and showcase advancements towards policy goals for senior staff.

Program Objective 2: Develop feasible and enforceable Vessel Management Plan Guidelines

input indicator	output	output indicator	outcome	outcome indicator
staff time (hours) and program costs (dollars)	ensure collaborative effort through Vessel Management Plan Guidelines Advisory Team & IATF	number of meetings held & number of agencies represented	reduction of invasive species via ballast water	percentage of vessels navigating in waters of U.S. with approved Vessel Management Plans
	outreach to elected officials & public	number of relevant stakeholders contacted		
	release for public comment Proposed Rule for Vessel Management Plan Guidelines	Proposed Rule released by end of 4th Quarter		

Data Collection, Reporting & Feedback

Weekly: The Ballast Water Team Coordinator will communicate weekly with members of the Ballast Water Management Coordination Branch Advisory Teams to determine both agency sentiment and need for meeting frequencies, and provide informal weekly reports to the U.S. Coast Guard Environmental Standards Division Director (in his/her position as direct contact with the U.S. Coast Guard Commandant and IATF) as to whether or not changes in process are needed.

Quarterly: The Ballast Water Team Coordinator will develop a report for the U.S. Coast Guard Environmental Standards Division detailing the participation frequency of agencies in meetings of the Ballast Water Vessel Management Plan Guidelines Advisory Team. This report will also detail the productivity of meetings by referencing meeting minutes kept by the Ballast Water Team Coordinator. This will serve to provide feedback regarding meeting effectiveness by evaluating the number of agreed upon guidelines and guidelines that were developed during the meetings. It will also track progress toward first-year milestones. The assistant to the Ballast Water Team Coordinator will scan for information (e.g. regional news, blogs, websites, etc.) regarding public sentiment toward vessel management guidelines, which will be summarized and included in quarterly reports to further serve as feedback for effectiveness of process and progress.

Annually: The Ballast Water Team Coordinator will provide a an annual report with the approval of the Environmental Standards Division and action plan to the Coast Guard Commandant, IATF and the EPA Administrator with an analysis of quarterly indicators, progress towards milestones, coordination efforts, and a plan for continued progress toward the Act's policy requirements – including a revised performance management plan. An annual report would also provide feedback on effectiveness of allocated program funding to aid high-level decision makers in determining whether or not to continue program funding.

Program Objective 3: Program Objective III: Complete Ballast Water Management Technology Review

input indicator	output	output indicator	outcome	outcome indicator
staff time (hours) and program costs (dollars)	ensure collaborative effort through Technology Review Advisory Team & IATF	number of meetings held & number of agencies represented	reduction of invasive species via ballast water	percentage of vessels navigating in waters of U.S. with approved technology
	outreach to elected officials & public	number of relevant stake-holders contacted		
	release Draft Technology Review	Proposed Rule released by end of 4th Quarter		

Data Collection, Reporting & Feedback

Weekly: The Ballast Water Team Coordinator will discern participating agency sentiment through informal communication with members of the Technology Review Advisory Team, and provide informal weekly reports to the GLNPO Director to determine whether or not changes in process are needed.

Quarterly: The Ballast Water Team Coordinator will compile a report for the U.S. Coast Guard Environmental Standards Division, detailing the participation frequency of agencies in meetings of the Technology Review Advisory Team, the number of key stakeholders contacted, the technologies reviewed to date, and an account of progress towards milestones. This report will also provide a summary of meeting minutes archived by the Ballast Water Coordinator with a statement regarding the level of collaboration and coordination. This will serve to provide feedback regarding the effectiveness of meetings by evaluating meeting outcomes and progress toward first-year milestones.

Annually: The Ballast Water Advisory Team Coordinator will provide an annual report and action plan to the Coast Guard Commandant, IATF and the EPA Administrator with an analysis of quarterly indicators, progress towards milestones, coordination efforts, and a plan for continued progress toward the Act's policy requirements – including a revised performance management plan. An annual report would also provide feedback on the effectiveness of allocated program funding to aid high-level decision makers in determining whether or not to continue program funding.

J. Literature Review

1. Invasive Species:

Webster, M. (2008). Invasion of the aliens creatures. *OnEarth Magazine*. Retrieved Sept. 11, 2009, from http://www.onearth.org/article/invasion-of-the-alien-creatures.

Type of source: Magazine (online).

URL: http://www.onearth.org/article/invasion-of-the-alien-creatures.

Annotation: Statement of the Natural Resources Defense Council's (NRDC) opposition to the shipping industry's legal challenge to Michigan's 2007 requirement for the treatment of ballast water.

1.A. Invasive Species: Ballast Water Management:

Katz, D. (2008). A watery problem: ballast water threatens Great Lakes. *Fraser Forum*, 17.

Type of source: Journal.

URL: Found through Proquest.

Annotation: The author examines the implementation of ballast water management in the Great Lakes Region, specifically the St. Lawrence Seaway. The pros and cons of a number of a number of ballast water treatment technologies are provided, but the article recommends that shipping companies be able to apply any technology that will meet baseline standards defined by the U.S. and Canadian governments. This recommendation is based on the determination that there are a wide variety of ship types and configurations that may make a technology more suitable, and that certain cargo types have special sensitivities to certain treatment technology.

United States Coast Guard. (2009). *Ballast water management.* Retrieved Sept. 11, 2009, from http://www.uscg.mil/hq/cg5/cg522/cg5224/bwm.asp.

Type of source: Website.

URL: http://www.uscg.mil/hq/cg5/cg522/cg5224/bwm.asp.

Annotation: On August 28, 2009, the United States Coast Guard posted a Standard Notice of Proposed Rulemaking (NPRM) in the Federal Register regarding their proposed rule for voluntary ballast water management guidelines as required by the National Invasive Species Act of 1996. This website provides an overview of the U.S. Coast Guard's ballast water policies, and also provides a link to the full text of the proposed rule along with public comments. There is apparent overlap between existing and proposed U.S. Coast Guard Policies and H.R. 500.

Hall, N. (28, July 2009). Minnesota appeals court upholds the state's new ballast water permit despite challenge from environmental group. Message posted to http://www.greatlakeslaw.org/blog/.

Type of source: Blog entry.
URL: http://www.greatlakeslaw.org/blog/.
Annotation: In Minnesota a challenge by and environmental group was turned down by the state's supreme court. It allows ships to delay ballast water management technologies until 2016. However, despite the legal setback, the state is setting up a new program for ballast water management.

1.B. Invasive Species: General Management:

Glassner-Shwayder, K. (2000). *Briefing paper: great lakes nonindigenous invasive species.* U.S. EPA.
Type of source: Report.
URL: http://www.glc.org/ans/pdf/briefpapercomplete.pdf.
Annotation: This report outlines steps for the development of regional policy on the prevention and control of Great Lakes nonindigenous invasive species. It proposes steps for the EPA to take a more proactive role in the federal initiative against such species. The report delineates the proposed role of both federal and regional/state governments in management and implementation of an eradication and monitoring program, as well as suggestions for education and outreach programs. Though somewhat outdated, many of the fundamental issues continue to be relevant.

National Academy of Sciences. (2008). *Great lakes shipping, trade, and aquatic invasive species: special report 291*. Washington D.C.: National Academies Press. Retrieved November 27, 2009, from http://www.nap.edu/catalog.php?record_id=12439#orgs.
Type of source: Book.
URL: http://www.nap.edu/catalog.php?record_id=12439#orgs.
Annotation: The book discusses comprehensively the causes, on-the-ground situation and possible solutions that could be implemented to deal with this seemingly unsolvable problem. It first, provides a background on the significance of the St. Lawerence Seaway as a means of entrance for AIS. Then there is a discussion of the characteristics of the aquatic invasive species that affect the Great Lakes. The ballast water vector is discussed separately. Finally the committee authors detail their methodology and their recommendations to address AIS in the Great Lakes.

2.A. Past Legislation: National:

Executive Order No. 13,340, 3 Code of Federal Regulations. 29043 (2004).
Type of source: Executive Order.
URL: N/A.
Annotation: On May 18, 2004 Former President George Bush drafted an Executive Order entitled the "Establishment of Great Lakes Interagency Task Force and Promotion of a Regional Collaboration of National Significance for the Great Lakes." The Executive Order acknowledges the resources provided by the Great Lakes to the United States and Canadian populations and the subsequent need for an integrated approach in addressing environmental problems in the region. The Executive Order specifies the need for the Federal Government to become more involved in local and regional efforts when addressing environ-

mental issues in the Great Lakes Region. It is anticipated that the Federal Government will work with the Great Lakes States, tribal and local governments, communities, and other stakeholders to develop a regional collaboration when addressing environmental and resource problems surrounding the Great Lakes.

2.B. Past Legislation: Binational:

Protocol Amending The 1978 Agreement Between the United States of America and Canada on Great Lakes Water Quality, United States-Canada, November 18, 1987, Treaties and Other International Acts Series 11551. Retrieved September 10, 2009, from http://epa.gov/greatlakes/glwqa/1978/articles.html#PROTOCOL AMENDING THE 1978.

Type of source: Treaty.

URL: http://epa.gov/greatlakes/glwqa/1978/articles.html#PROTOCOL AMENDING THE 1978.

Annotation: This treaty establishes a collaborative agreement between the United States and Canada in their efforts to protect, restore, and maintain the integrity of the Great Lakes Region. The Parties, in conjunction with other agencies, agree to develop programs, practices, and "specific objectives," physical, chemical, and biological parameters, which would aid in the understanding of the impacts of human activity within the region and the most effective ways of preventing, mitigating, and abating those impacts. The Parties aim to develop a coordinated network of data between local, state, provincial, and federal governments, as well as public and private industries. The agreement establishes the International Joint Commission (IJC), which conducts a periodic review of the region's progress. The IJC reports on the data gathered and coordinated by the Great Lakes Water Quality Board and the Great Lakes Science Advisory Board, which are also established by the agreement. The periodic review allows for modification as impacts are mitigated, as conditions are altered, or if there is a new body of knowledge to be assessed. The agreement was the first to initiate multi-agency coordination and is progressive in its attempts to standardize acceptable, though minimal, pollution parameters. The agreement is still in effect and is often referenced in other pieces of legislation to encourage international cooperation.

3. Funding:

U.S. Environmental Protection Agency (2009). 2010 annual performance plan and congressional justification. Retrieved October 21, 2009, from http://www.epa.gov/budget/2010/tab_04_epm.pdf#page=113.

Type of source: Report.

URL: http://www.epa.gov/budget/2010/tab_04_epm.pdf#page=113.

Annotation: The EPA outlines its proposed budget and congressional justification for FY 2010. Justifications for the Great Lakes programs, including program goals are found starting on page 113. Significantly on page 121 the budget outlines how many new FTE (63 because GNLPO are being rolled into EPA budget as part of GLRI, 31 for new EPA staff) are included in the budget for FY2010. The document also contains a summary of the various programs on which EPA is collaborating with other agencies.

4.Cost-Benefit Analysis:

Krantzberg, G., & de Boer, C. (2006). A Valuation of the Ecological Services in the Great Lakes Basin Ecosystem to Sustain Healthy Communities and a Dynamic Local Economy: Prepared for the Ontario Ministry of Natural Resources by the Dofasco Centre for Engineering and Public Policy, McMaster University. Retrieved 9/10/09 from http://www.eng.mcmaster.ca/civil/facultypages/krantz2.pdf.

Type of source: Report.

URL: http://www.eng.mcmaster.ca/civil/facultypages/krantz2.pdf.

Annotation: The authors evaluate the economic value of the Great Lakes Region in the context of an ecological resource. The authors estimate that the region is responsible for approximately 30% of combined Canadian and U.S. GDP. They value ecological services including nutrient cycling, flood control, climate control, soil productivity, forest health, genetic vigor, pollination, and pest control at $70 billion dollars annually. Economic threats are outlined in the executive summary. Potential loss in value from invasive species alone is estimated to be up to $134 billion dollars. A number of potential economic benefits from ecological restoration are discussed, but not quantified.

5. Restoration:

Sproule-Jones, M. (2002). Restoration of the great lakes: promises, practices, performances . UBC Press/ Michigan State University.

Type of source: Book (online).

*URL:*http://books.google.com/books?id=PC_pbQYTG4EC&printsec=frontcover&source=gbs_v2_summary_r&cad=0#v=onepage&q=&f=false.

Annotation: The author discusses restoration of the Great Lakes: the goals of restoration, how it was carried out and the degree of success reached. It is an historical background (since 1985) on the institutional arrangements in U.S. and Canada and respective State admnistrations bordering with the Lakes.

Hunter, P. (2009) EPA unveils plan to restore great lakes to health. *ENR,* 263(4) 18.

Type of source: Journal.

URL: N/A.

Annotation: This is a short article discussing EPAs meetings to restore the health of the Great Lakes. They currently have a $475 million draft plan waiting for congressional approval. The EPA is aware that pollution discharge into the Great Lakes has decreased, but only 1 out of the 31 pollution hotspots have been restored; therefore, remediation action is essential. Funding for these restoration projects will be distributed via grants.

Environmental Protection Agency. (1998). Realizing remediation: a summary of contaminated sediment remediation activities in the great lakes basin. EPA Great Lakes Contaminated Sediments Program. Retrieved July 25, 2009, from http://www.epa.gov/glnpo/sediment/realizing/index.html.

Type of source: Report (online).

URL: http://www.epa.gov/glnpo/sediment/realizing/index.html.

Annotation: Discusses the how industry polluted sediments considerably during the 1960s and 1970s. 1987 was an important year when the Great Lakes section of the Clean Water Act created the Great Lakes National Program Office under the EPA. Also in this year, the U.S. and Canada ratified their 1972 treaty. ARCS is a program that came out of these 1987 developments. It has been responsible over th last two decades for identifying remediation sites, create restoration plans and carrying them out.

Flesher, J. (15, September 2009). The great lakes toxic cleanups lagging badly. *Associated Press*.
Type of source: Newspaper.
URL: http://abcnews.go.com/US/wireStory?id=8584515.
Annotation: In this report, the author mainly discuss about the amount of money that President Barack Obama has requested in order to clean the Great Lakes, specifically the $475 million dollars that are included in his 2010 budget. The plan estimates the total cleanup price at $2.25 billion in federal money, with state and local governments giving an additional $1.2 billion. The Great Lakes rescue. New York Times editorial. August 31st 2009. This editorial talks mainly about the $475 million dollars that are going to be invested in the Great lakes area. However, it tries to show the weaknesses in the Great Lakes restoration plan as well as mentioning this plan as "a small down payment on a project that could ultimately cost $20 billion".

5.A. Restoration: Wetlands:

Smardon, R. (2009) *Sustaining the world's wetlands: setting policy and resolving conflicts.* Springer publication.
Type of source: Book (online).
URL: http://books.google.com/books?id=Hf4bxSi9JD4C&source=gbs_navlinks_s.
Annotation: This publication presents many examples on how policy is created and the ways in which conflicts are resolved in wetland management, culminating in suggested strategies for the future of wetland management. Special emphasis is given on policy and management analysis.

Hall, N. (18, June 2009). Clean water restoration act passes out of senate committee, big step towards passage. Message posted to http://www.greatlakeslaw.org/blog/.
Type of source: Blog entry.
URL: http://www.greatlakeslaw.org/blog/.
Annotation: This article shows that other attempts are currently being made within the legislature to allow the Clean Water Act to include wetlands expliciting as "waters of the United States." It discusses how the bill has made it out of committee with a 12-7 vote.

6. Wastewater Infrastructure:

S. Rep. No. 111-47, 111st Cong., 1st Sess. (2009).
Type of source: Committee Report.

URL: http://thomas.loc.gov/cgi-bin/cpquery/47?&sid=cp111p0OD6&l_f=1&l_file=list/cp111cs.lst&hd_count=50&l_t=71&refer=&r_n=sr047.111&db_id=111&item=47&sel=TOC_1038&.
Annotation: This is only other bill that ever addressed wastewater treament facility needs in GLR. The Clean Water Act's Construction Grants Program addressed sewer water discharges.

7. Management & Implementation:

Environmental Protection Agency (2009). Great Lakes Restoration Initiative Proposed 2010 Funding Plan. Retrieved 10/21/09 from http://www.epa.gov/glnpo/glri/GLRIProposed2010FundingPlan050509.pdf.

Type of source: Report.
URL: http://www.epa.gov/glnpo/glri/GLRIProposed2010FundingPlan050509.pdf.
Annotation: The document outlines the main programs that will be implemented and a summary of the major program measures that will be used for each of the programs, major challenges, a summary of the science behind the environmental problems and the political justification for each program.

Landers, Jay. (2005). Great lakes restoration strategy recommends eight priorities. *Civil Engineering,* 75 (9), 27-29.

Type of source: Journal.
URL: N/A.
Annotation: This article discusses the need for federal, local, and state agencies to collaborate to address 8 issues affecting the Great Lakes. The eight areas of concern are aquatic invasive species; habitat conservation and species management; nearshore waters and coastal areas; severely degraded portions of the Great Lakes ("areas of concern"); non-point-source pollution; toxic pollutants; environmental data; and sustainability. An effective strategy will require time, money, and effective civil engineering.

MacKenzie, S. H. (1996). Integrated resource planning and management: the ecosystem approach in the great lakes basin. Washington, DC: Island Press.

Type of source: Book.
URL: Call Number: QH76.5.G72 M33 1996 (in business library).
Annotation: Book that goes over successes and failures of the approach we will attempt.

Kiy, R. (1998). Environmental management on north america's borders (environmental history series , No 14). College Station: Texas A&M University Press.

Type of source: Book (online).
URL: Available through Columbia library as an e-book.
Annotation: This book has a section on how effective transboundary management achieved progress for the Great Lakes ecosystem.

***Great Lakes Regional Collaboration Strategy: Can It Be Implemented To Restore and Protect the Great Lakes?*, 109th Cong., 2d Sess. 1-173 (2006).**

Type of source: Government hearing.

URL: http://web.lexis-nexis.com/congcomp/document?_m=fe9636d49eda9643fe13d9d2b445da71&_docnum=6&wchp=dGLzVtb-zSkSA&_md5=e10f80f7eea4c8d677f9723e8731f7fd.
Annotation: Hearing on feasibility of the study we cite.

***Great Lakes Restoration: How? How Soon?*, 109th Cong., 2d Sess. 1-102 (2006).**
Type of source: Government hearing.
URL: http://web.lexis-nexis.com/congcomp/document?_m=1a810ea3c5eff3d8ffdc992c41ec34ae&_docnum=2&wchp=dGLzVtb-zSkSA&_md5=34ea2c1db9a901c81add97273b9c09c1
Annotation: Hearing on what is planned for the restoration.

Great Lakes Regional Collaboration. (2005). *Great lakes regional collaboration strategy to restore and protect the great lakes*. Retrieved July 5, 2009, from http://www.glrc.us/strategy.html.
Type of source: Report (online).
URL: http://www.glrc.us/strategy.html.
Annotation: The most comprehensive and current plan for the restoration of the Great Lakes. This is the platform that current Great Lakes legislation is being launched from.

Rabe, Barry G. 1996. An empirical examination of innovations in integrated environmental management: The Case of the Great Lakes Basin. Public Administration Review, 56 (4) 372-381
Type of source: Journal.
URL: N/A.
Annotation: Managing an ecosystem as large as the Great Lakes is a difficult task and requires support from across all levels of government. However because of the number and diversity of stakeholders, efforts to approach environmental management have been wide ranging. Thus greater integration across state and federal programs is needed to better identify problems and coordinate efforts solve them.

University of Michigan. (27, June 2008). *Preparing for climate change in the great lakes region workshop*. Retrieved September 16, 2009, from http://www.miseagrant.umich.edu/climate/climate-adapting-workshop-summary.html.
Type of source: Workshop summary.
URL: http://www.miseagrant.umich.edu/climate/climate-adapting-workshop-summary.html.
Annotation: Workshop summary that discusses broad-scale policies that can influence adaptation. He pointed out that climate variability bolsters the case for implementing sustainable/sensible, long-term strategies that protect the Great Lakes ecosystem

8. Political Landscape:

Miller, J. (7, February 2008). Lakes cleanup would give $50B lift to economy. *MLive, Ann Arbor Business Review*.
Type of source: Newspaper.
URL: http://www.mlive.com/business/index.ssf/2008/02/lakes_cleanup_would_give_50b_l.html.

Annotation: n this review published in a Great Lakes Region local business paper, the correspondent reports favorably on the cost benefit analysis which our group previously reviewed. The emphasis is on the fact that investing in cleanup of the Great Lakes, specifically implementing the Great Lakes Regional Collaboration's recommendations, would bolster the local and national economies. It also mentions that congresspeople from the Great Lakes Region sit on several key committees, which increases the chance for appropriation of funds for cleanup projects, including those authorized in HR 500.

Palmer, A. (18, May 2009). Fiscal 2010 appropriations: interior. *CQ Weekly,* pp. 1155.
Type of source: Newspaper.
URL: http://www.cq.com.monstera.cc.columbia.edu:2048/display.do?dockey=/cqonline/prod/data/docs/html/weeklyreport/111/weeklyreport111-000003123313.html@allnews&metapub=CQ-WEEKLYREPORT&searchIndex=2&seqNum=2.
Annotation: While this article from Congressional Quarterly, a magazine that reports on legislative activities, does not mention HR 500 specifically, it indicates that there is widespread support for cleanup efforts in the Great Lakes. The President's office has also apparently made Great Lakes cleanup and protection priorities. However, it also states that some Republican congresspeople oppose such activities because they involve additional government spending.

Royce, S. (13, April 2006). The greater the better. *Michigan Daily News*.
Type of source: Newspaper.
URL: http://www.michigandaily.com/content/daily-greater-better.
Annotation: This article, written pertaining to the version of the bill proposed in 2006 and published in the Michigan Daily News, expresses enthusiasm for cleanup and protection efforts. It mentions the bipartisan coalition of lawmakers from throughout the Great Lakes Region that support the bill, and emphasizes the degraded state of the lakes and the need for action to protect them. It also states that Michigan is particularly affected by toxic waste sites.

Sisson, R. (5, October 2009). McCain will preserve the great lakes. *MLive, Kalamazoo Opinion*.
Type of source: Newspaper.
URL: http://www.mlive.com/opinion/kalamazoo/index.ssf/2008/10/mccain_will_preserve_the_great.html.
Annotation: This opinion article which appeared in a Michigan newspaper states that both presidential nominees supported HR 500. The fact that both candidates explicitly stated that they wish to support the bill, and made that claim in a swing state, indicates that there was popular support for the bill in the region.

Great Lakes rescue. (31, August 2009) . *New York Times,* pp. A28.
Type of source: Newspaper.
URL: http://www.nytimes.com/2009/09/01/opinion/01tue3.html?_r=2&ref=opinion.
Annotation: Great Lakes Restoration Initiative gained new political endorsement from President Obama.In June, the House gave the program the entire $475 million the White House wanted. The Senate should do likewise. Hopefully the Great Lakes will at last get the help they need. Barack Obama, of Illinois, is the first president since Michigan's Gerald Ford to come from a heartland state that depends heavily on the Great

Lakes for its economic well-being. Hopes have thus been raised that the Great Lakes will at last get the help they need.

Egan, D. (26, February 2009). $475 million in plan for great lakes. Conservationists hail proposal for restoring resource. *The Journal Sentinel.*

Type of source: Newspaper.

URL: http://www.jsonline.com/news/wisconsin/40357712.html.

Annotation: Discusses how Obama has proactively approached Great Lakes Restoration. Now that the $475 million has been granted (see Great Lakes rescue, 2009) it seems to show that broad political support for a restoration is there. How much is difficult to assess.

Senator Carl Levin's Office. (30, April 2009). Levin and voinovich introduce great lakes legacy act of 2009. Retrieved September 15, 2009, from http://levin.senate.gov/newsroom/release.cfm?id=312319.

Type of source: Press release.

URL: http://levin.senate.gov/newsroom/release.cfm?id=312319.

Annotation: The press release iterates the introduction of a new Great Lakes Legacy Act bill that proposes to increase funding three fold from $50 million/year to $150 million/year. The introduced legislation follows a successful Great Legacy Act from 2002. Many federal bills have been introduced this year, with the interests of Great Lakes restoration in mind.