Alternative Funding Mechanisms for the Great Lakes Fishery Commission: Private Trust Fund vs. Annual Appropriations

by
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Abstract

The Great Lakes Fishery Commission (commission) is a bi-national organization established by the United States and Canada through the 1955 Convention on Great Lakes Fisheries. The commission has the responsibility to coordinate fisheries research, control sea lampreys, and facilitate implementation of *A Joint Strategic Plan for Management of Great Lakes Fisheries*. Historical analysis of the commission's work demonstrates that sea lamprey mitigation is a long-term problem for the Great Lakes fishery and control will require a steady source of funding indefinitely. Currently, the commission pursues funding through the annual appropriations process of the United States Congress. This form of funding can be unstable from year to year due to changing political and economic climates, and is thus, unreliable when addressing environmental issues in the long term. To address potential funding insufficiencies, the commission has established a private trust fund in recognition that funding, at times, could be inadequate to fully administer its control and research programs. This paper assesses the commission's private trust fund as a secure long-term mechanism of funding suitable for addressing the threat of financial insufficiency; examines the commission's infrastructure, past working history, and present status to determine its ability to function, partially or in whole, under a private trust fund mechanism; and, assesses the options the commission can adopt to capitalize this trust fund, and the political and social barriers in doing so.

1 Introduction

During the early 20th century, as humans opened the Great Lakes to foreign ships, a noxious, aquatic predator slipped in unobserved. The predator, *Petromyzon marinus* or sea lamprey gained access to the Great Lakes through the Welland Canal. The lakes provided sea lampreys with an endless supply of food and an environment free of predators. The sea lamprey spread throughout the entire Great Lakes system, making the lakes their home and ravaging the indigenous fishery populations. People who fished the lakes and depended on a healthy lake environment learned too late that their way of life was disappearing. With the arrival of the sea lamprey, the ecosystem began to change forever. By the 1940s, fish harvests had fallen to nearly zero and tribal and commercial fishery operations ground to a halt. Canada and the United States could only grasp at straws as the lamprey did its damage, as no viable method to control the pest existed.

By the 1950s, Canada and the United States realized that a coordinated response to the sea lamprey would be essential if the fishery was to survive and recover. The resulting 1954 *Convention on Great Lakes Fisheries between the United States of America and Canada* (Appendix A) created the Great Lakes Fishery Commission (commission) and imparted it with the mission to develop and implement a sea lamprey control program. The situation demanded a vigilant and sustained effort as sea lampreys had become a permanent problem in the Great Lakes. The commission needed to plan for the long-term and deliver a continual program.

Nature of invasive species

In suitable habitat, invasive species reproduce quickly and efficiently. Invasive species are defined by Mills, et al. (1993) as "successfully reproducing organism[s] transported by humans into regions where they did not previously exist..."[1] and where introduction is likely to cause economic or ecological harm, or harm to human health.[2] Variables that increase an invasive species' ability to thrive in a new environment include the ability to survive in unfavorable conditions, high reproductive capability, adaptability to new environments, and their ability to disperse rapidly.[3] In their native habitats, these same species evolve with other species as part of a balanced ecosystem and their populations are kept in check through predator and prey relationships, as well as resource limitations and spatial differences in habitat. An example of this natural relationship is the Atlantic Ocean, where the sea lamprey are native; there they have natural predators which feed on them, and the sea lampreys' food source is limited to a smaller amount of fish within a greater habitat. Nevertheless, when aquatic and terrestrial species are transported to ecosystems outside their established range it results in the disruption of native populations and undermines the existing ecosystem structures. If an invasive species spreads, it becomes difficult to manage and nearly impossible to eradicate.[4]

In addition to ecosystem health being compromised by invasive species, other effects on the region of invasion include harm to the economy (reduced commercial and tribal fisheries), to tourism (diminished recreational fisheries) and, human health (pathogens and viruses on beaches or through human/animal contact). The cost of invasive species to the economy is exemplified by the Canadian and the United States' efforts to control the zebra mussel - an exotic mollusk that invaded the Great Lakes in the

1980s. By the year 2000, the zebra mussel cost Americans and Canadians a minimum of 5 billion U.S. dollars in the form of ecological damage and mitigation expenses.[5] In the case of the zebra mussel, there are no control measures to reduce their populations, only efforts to mitigate the damage they cause by clogging industrial intake pipes, fouling hulls on ships, and affecting beaches, navigation structures, and harbors.

Similar to the zebra mussel, the impact of sea lamprey populations in the Great Lakes has been devastating. The difference in the two species is that the lamprey has a life-cycle that provides opportunities for population control. The commission's sea lamprey control program has been successful in controlling lamprey populations; however, eradication is impossible because of the lamprey's prolific spawning capacity in the numerous streams throughout the Great Lakes Basin. Sea lamprey control, and not eradication, is currently the only viable course of action financially and ecologically. For the Great Lakes, the goal in suppressing the lamprey is to allow the rehabilitation of the fisheries.

The commission, stewardship, and funding

The commission's activities are certainly an example of long-term stewardship; its work is and will continue to be integral to Great Lakes fishery management into the foreseeable future. To be successful in its mission, the commission needs to endure changes in political climate and evolve with governance philosophies. More importantly, institutions that have been established for the purpose of long-term stewardship must have sufficient, reliable funding.

Currently, the commission is funded by Congress and Parliament through annual appropriations. Annual appropriations, however, are not a stable source of funds over the

long-term. Annual appropriations are vulnerable to changing political and economic conditions (such as the relationship between Congress and the president), the extent of concern of politicians and citizens, and the general state of government finances. Long-term stewardship must continually compete in the budget process with other needs, programs, and interest groups. The degree of funding, therefore, varies with the amount of pressure from local and state governments, as well as from elected federal officials. The current reliance on annual appropriations for the commission is a short-term solution to the long-term problem of addressing invasive species, specifically the sea lamprey.

In 1996, recognizing the potential for reduced funding to erode the gains achieved with sea lamprey control, and recognizing that budget allocations did not always incorporate increases for inflation, the commission established private trust funds in Canada and the United States. The private trust funds allow the commission to accept donations to supplement the budget. The intent of the trust funds has been to hedge against budget crises and, then, to be able to deliver a steady or improved level of sea lamprey control over the long-term. Capitalizing the trust funds has been a slow and difficult process for the commission, because significant amounts of money are needed to create a critical mass of capital that will provide perpetual funding. Beyond private donations, the commission has not established a mechanism to capitalize its private trust funds and is, therefore, interested in options to this end.

This paper will analyze the strengths and weaknesses of utilizing a private trust fund as a long-term funding mechanism for supplementing or replacing the commission's annual appropriations process to fund their sea lamprey control and research programs. This paper will also assess various means by which the commission could potentially

capitalize its private trust funds and what potential barriers and support could result from these actions.

Though there are a variety of long-term funding mechanisms (see appendix E) this paper focuses on private trust funds for a number of reasons. First, in 1996 the commission established a private trust fund to create a stable source of funding to supplement any financial shortfall due to the current funding regime. Second, the private trust fund consists of a basic legal structure that establishes well-defined, enforceable rules for how and by whom funds can be managed.[6] In fact, a private trust fund's central feature is the trust agreement – a written document that dictates the rules of use and management of funds, and clarifies legally, the relationship among the various entities and actors involved.[7] A private trust fund's legal structure will allow proficient oversight and accountability. Third, the commission would like to assess the potential utility of this trust fund, exploring how the trust fund can be utilized by the commission. Depending on the degree of capitalization of the fund, and how it would be capitalized, the commission could potentially supplement its current control programs and research, or even use the trust fund as an alternative source of funding all together from annual appropriations. Fourth, long-term environmental stewardship is increasingly becoming an issue as long-term problems plague natural resources and the environment. New and innovative techniques to perpetually fund the mitigation of key problems are needed if regions like the Great Lakes are to have healthy ecosystems.

This study will also address the reality that a private trust fund could provide, as an alternative mechanism of funding, financial and programmatic autonomy from what is now an established oversight regime on the part of the federal government. Therefore,

this study analyzes the commission's accountability mechanisms and discusses the impact of a trust fund on continued oversight by the parties to the *Convention on Great Lakes Fisheries*. The premise of the analysis is that a private trust fund can provide a stable source of funding, so that long-term stewardship is possible without compromising accountability or oversight of the commission.

1.1 Outline of Study

In section 1.2, this study's research question and research parameters are defined. The subject matter that will help define and answer the research question is outlined and criteria are established for evaluating the commission's capacity of accountability and responsibility in using a private trust fund mechanism. Section 2 takes a historical look at the Great Lakes as a resource and its importance to the growth and support of the region, both economically and human health perspectives. This section outlines the region's dependence on natural resources, the historical use of the resources, what has lead to the increase in invasive species, and recognizes the impact that invasive species can have on the region's economy. Section 2 devotes particular attention to the sea lamprey, its effects on the region's ecosystem and economic viability, and why the mitigation measures of sea lamprey are essential.

Section 3 examines the commission as an organization established to mitigate the sea lampreys' negative environmental effects, and explains the commission's accountability structure and how it fulfills the criteria of transparency and responsibility. In section 4, the commission's current funding structure with annual appropriations, is recognized as unstable, having the potential to interfere with the long-term programs of the commission. Section 4 also analyzes the perpetual nature of environmental issues and

why annual appropriations are not necessarily conducive to dealing with perpetual environmental problems. In section 5 the private trust fund is analyzed for its potential as a funding solution for long-term environmental problems. Section 5 further examines the private trust fund as it applies to the commission and whether such a fund will benefit the commission's operations (and thus the Great Lakes resource). Section 6 discusses some of the options the commission can utilize to capitalize its trust fund, assessing the appropriateness of each option; the section also examines some of the political and social barriers that the commission may encounter with the capitalization of its private trust fund and whether or not the private trust fund can feasibly be capitalized and utilized. In conclusion, section 7 presents an analysis of the effectiveness of a private trust fund and the feasibility of capitalizing it by both federal means and private means.

1.2 Methodology

This research addresses the feasibility of capitalizing and of utilizing a private trust fund as a mechanism for sustainable funding for perpetual environmental mitigation measures. The research employs previous research and theoretical models of trust fund designs developed by the Resources for the Future (RFF), a Washington, D.C. think tank which studies the economic policy of environmental issues. Using their research as a guide, this research builds standards that an organization must follow to successfully establish a trust fund as a funding mechanism that will fulfill long-term stewardship criteria. Additionally, it looks at the commission's background, history, and mechanisms of establishment and oversight to assess if they meet the criteria established above to effectively utilize a trust fund. And finally, an examination of the annual appropriations process, under which the commission is currently funded, to determine if it is suitable for

funding long-term environmental stewardship activities and whether or not the commission should proceed with the enhancement of its private trust fund for the purpose of supplementing or replacing annual appropriations, thus creating a more effective long-term source of funding.

Research Methods

This study was designed to help the commission assess the feasibility and appropriateness of funding and utilizing its private trust fund. The following question was designed to help guide the research team throughout the investigative process: *Should the commission proceed with the capitalization of its private trust fund*?

To answer this question, five sub-questions were developed:

1. What are the short-falls of using annual appropriations for long-term environmental stewardship?
2. What are the options for capitalizing a private trust fund?
3. What are the potential political, social, and financial benefits and problems for the commission, should their private trust fund be capitalized?
4. Who in Congress would champion (and who would oppose) an effort to capitalize the commission's trust fund? and,
5. How would the commission maximize this fund's use?

These questions will be addressed in a manner that will allow the commission to make an informed decision about the capitalization and use of their private trust fund.

Major Areas of Study

There are six major areas of study that will assist in this research. Investigating these areas allowed a systematic analysis of the alternative funding mechanisms available in the United States for perpetual environmental problems. These areas of study are:

1. The importance of the Great Lakes region, resources, and environment to the people of the Great Lakes region;
2. Historical and current work of, and the current funding mechanism of, the commission;

3. Structure used to ensure financial and programmatic oversight of the commission;
4. Long-term financial mechanisms appropriate for addressing long-term problems;
5. Potential benefits and barriers when applying alternative financial mechanisms; and,
6. How this research can be applied to the commission.

By examining the importance of the Great Lakes, the commission's ability and charge to protect the lakes, and the dichotomy between the inadequacy of the annual appropriations funding mechanism and the requisite long-term environmental stewardship, will give a comprehensive background in which to better assess the necessity and appropriateness of utilizing a private trust fund.

After assessing annual appropriations, this study will briefly look at trust funds as alternative funding mechanisms. This study focuses on private trust funds, however, it briefly touches on both federal and state trust funds (see appendix E). During this research, the authors designed a mechanism for future studies of other organizations' use of trust funds (see Figure 1, US and Canada Case Study Questions). This case study questionnaire will assist future research in determining the success of trust fund utilization and capitalization. In short, this mechanism will help understand how and why trust funds are established, how they are perceived socially and politically, and some of the barriers that must be negotiated.

Figure 1: US and Canada Case Study Questions

Case Study Questions:

- What is the trust fund addressing?
  - Is the problem important and coherently defined?
  - To whom is the issue important?
  - Can the problem be solved effectively by the organization?
- What was the motivation for seeking a trust fund?
- How does the trust fund operate?
  - Is the trust fund public?
  - Is the trust fund private?
  - Who governs the funds within the trust?
  - Who decides where the funding is appropriated?
- How was the fund capitalized?
  - Was the fund capitalized with one or multiple installments?
  - Why was the fund capitalized one way or the other?
- Key players
  - Who supported the trust fund and what power did they have?
    - Who pushed for the trust fund politically?
      - Business interests?
      - Agency interests?
      - Private interests?
    - Who supported the fund in Congress and why?
  - Who was against the trust fund and what power did they have?
    - Who was against the trust fund politically?
      - Business interests?
      - Agency interests?
      - Private interests?
    - Who was against the fund in Congress and why?
- If the trust fund was successfully established:
  - Why did the organization succeed in acquiring the funding?
  - Has the trust fund solved funding problems/issues that existed before the fund was established?
  - Has the trust fund enabled the organization to carry out its mandate more effectively?
- If the trust fund was not successfully established, why?

At the inception of this project, the commission asked that a feasibility analysis be carried out about the prospects of growing its existing trust fund. The case study questionnaire, therefore, was used to a limited degree, answering only the first four questions about the commission's private trust fund establishment. Because the commission's trust fund is minimally and privately funded, there is little benefit in asking

the questions about capitalization, support, and success of the trust fund. These questions will need to be assessed on a hypothetical basis, and will be addressed in this paper.

Understanding how an institution with a trust fund remains accountable to Congress and applicable government bodies was an essential aspect of this research. To evaluate accountability, the research analysis weighed the accountability principles established by Bauer and Probst (2000) in their paper *Long Term Stewardship of Contaminated Sites.*[8] In their paper, Bauer and Probst research the effectiveness of a range of trust fund mechanisms intended to fund the long-term stewardship and involvement in contaminated site cleanup. This research then assessed whether the commission could maintain accountability based on the application of their criteria. From Bauer and Probst, four key conditions of accountability were extrapolated:

- Clear rules, roles, and responsibilities;
- Public information;
- Enforceability; and,
- Permanence.

These four conditions are addressed in section 3 and assess how the commission fulfills each condition of accountability. This will allow further discussion on how the commission can function utilizing different funding mechanisms, specifically the private trust fund.

Finally, with an understanding of the appropriations process, trust funds in general, and the commission's specific situation, analysis concludes with an assessment of the political potential for the commission to succeed in capitalizing its trust fund.

The analysis of the political landscape allows speculation into the reasons why a Great Lakes legislator might or might not be pre-disposed to support the capitalization of a private trust fund for the commission. This analysis answers the question: *Who in*

Congress would support the commission's mission to utilize a trust fund to supplement or replace annual appropriations?

2 Background of the Great Lakes Resource

The Great Lakes Basin contains one-fifth of the earth's supply of fresh, unfrozen, surface water. The lakes have 9,000 miles of shoreline, more than 5,000 tributaries, and 30,000 islands.[9] The five lakes that compose the Great Lakes are Lakes Superior, Michigan, Huron, Erie and Ontario. Four major rivers interconnect the lakes (St. Marys, St. Clair, Detroit, and Niagara Rivers) and the St. Lawrence River and seaway link the Great Lakes with the Atlantic Ocean. Great Lakes water has been an essential factor in the development of the region, guiding settlement and establishing the economy.

Economic history of the Great Lakes

Long before European exploration, Native Americans living in the region used the natural water routes to develop transportation and trade networks. Europeans migrated into the region and altered the system by developing canals and channels, and expanding the waterways. By the 20th century, the system contained a seamless pathway for transportation, ushering in significant economic development and industrialization.

The Great Lakes region consists of eight states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin), a Canadian province (Ontario) and multiple Native American and First Nation tribes. Today, the Great Lakes region's economy, in both the U.S. and Canada, is heavily dependent on the natural resources of the lakes. The continual flow of material, resources and information makes the regional economy an "economic force in the global arena".[10] Indeed, the Great Lakes basin represents nearly 11% of total employment and 15% of manufacturing employment for the two nations.

A major component of the Great Lakes economy is the world-class freshwater resource. Business and holiday travel as well as outdoor recreation account for billions of dollars in annual revenue to the region.[11] The Great Lakes states attract 40% of foreign visitors coming to the U.S,[12] and with more than 100,000 square miles of navigable water, recreational boating is worth more than $2 billion per year (1992 figures)[13] and is increasing annually. The U.S. Departments of Interior and Commerce conducted a survey in 2001 indicating that an estimated 1.85 million fisherman purchased license to fish on the Great Lakes.[14] Great Lakes anglers spent (in 2002) $4.5 billion, while recreational boaters in the Great Lakes spent more than $2 billion.[15] Tourism and recreation are threatened by long term negative trends such as climate change, pollution and invasive species. In short, the economic and environmental vitality of the Great Lakes depends on the ecological health of the system.

The impact of invasive species

The increase in human activity in the Great Lakes region allows the expansion of non-native species of animals and plants. Most notable of these pathways has been shipping canals and other shipping activities. As a major route for goods opened up, so did the routes for invasive species.[16]

Invasive species are one of the most significant threats to biodiversity. Their success depends on their ability to survive in unfavorable conditions, their ability to adapt to new environments, their high reproductive capacity and their wide-spread reproductive dispersal capabilities.[17]

Once invasive species become established, controlling their spread (if even possible) is both technically difficult and expensive. The concept of eradication of an

invasive species, once established, is realistically a fantasy. Preventing new introductions is a priority in the Great Lakes region, with policy makers and stakeholders realizing that biological invasions will cost the ecosystem and the citizens of the Great Lakes dearly, should prevention fail.

One of the most destructive of the invasive species – the sea lamprey – made opportunistic use of shipping canals, particularly the Welland and Erie Canals. With the construction of these canals sea lampreys passed easily into the Great Lakes. They quickly spread throughout the basin and made the lakes their permanent home. The sea lamprey problem was severe: it altered the Great Lakes ecosystem forever and changed the way of life in the region.

2.1 Sea Lamprey

Sea lampreys, a particularly aggressive invasive species in the Great Lakes, are a parasite in the marine environment. They attach to fish with a suction cup mouth, file through the scales and skin with a sharp, file-like tongue, and feed on the fish's blood and body fluids. Unlike many of the other aquatic invasive species in the Great Lakes, the sea lamprey's life cycle includes a spawning phase in which they swim up stream (similar to that of Pacific salmon) to spawn and die. During the next phase, called the larval stage, the lampreys inhabit the substrate of these streams, filter-feeding for between 3-6 years, until they transform into the parasitic phase. The lampreys then move into the open waters of the lakes and feed on fish for between 12-18 months before returning to spawn. This life cycle lends the opportunity for the management and control of this species population due to the predictability of their location during their lifecycle, and the

relative ease of treating or controlling a stream (smaller waterway) rather than an entire lake.

By the 1940s, sea lampreys had devastated the commercial and recreational fisheries within the Great Lakes. Though the sea lamprey was not the first invasive species in the Great Lakes, it has been one of the most devastating. The sea lamprey has attacked an important aspect of the Great Lakes economy: the fishery. As the sea lamprey has no natural predators in the Great Lakes, their destruction of native fish went unchecked.

Sea lampreys' destruction of the Great Lakes fishery is unparalleled. Each sea lamprey can kill up to 40 or more pounds of fish in its lifetime. Under some conditions, only one in seven fish will survive a sea lamprey attack. The lamprey's ability to feed on any fish in the Great Lakes makes it an especially injurious species, preying on all species within the Great Lakes such as catfish, salmon, chubs, lake trout, whitefish, burbot, walleye, rainbow trout (steelhead), and even sturgeon.[18] Many of these fish are or were important not only to the diversity of the lakes' ecosystem, but to the commercial and sport fishery of the region.

Recognizing the magnitude of the decline in the fishery, Canada and the United States agreed to a treaty – the 1954 *Convention on Great Lakes Fisheries Between the United States of America and Canada* (Appendix A) – to address the sea lamprey and other problems. The governments concluded that only an aggressive, coordinated effort would save the Great Lakes from complete collapse. To achieve its goals, the convention created the commission to combat and suppress the sea lamprey.

3 The Great Lakes Fishery Commission

The Great Lakes economy depends on the Great Lakes' natural resources to stay healthy. The commission's major charges are to control sea lamprey populations and coordinate and conduct a research program that assists in making the control program more effective, and to better understand the Great Lakes resources and fish communities. The nature of these charges inherently extends perpetual responsibility for conducting sea lamprey control and research operations onto the commission.

The *Convention on Great Lakes Fisheries between the United States of America and Canada* (Convention) established the Great Lakes Fishery Commission in 1955. The Convention was developed to address the decline in productivity of some of the Great Lakes fisheries, to advance fishery research, and to prevent further harm to, or deterioration of, these fisheries caused by the sea lamprey.[19] The Convention recognized that there is a need for joint and coordinated efforts by both countries sharing the resource as essential to effectively develop control and mitigation programs. The Convention also directs the commission to coordinate and implement effective research, conservation, and management programs for the Great Lakes ecosystem. Article IV of the Convention dictates the commission's major responsibilities as:

> *(a) to formulate a research program[*] or programs designed to determine the need for measures to make possible the maximum sustained productivity of any stock of fish in the Convention Area which, in the opinion of the commission, is of common concern to the fisheries of the United States of America and Canada and to determine what measures are best adapted for such purpose;*
> *(b) to coordinate research made pursuant to such programs and, if necessary, to undertake such research itself,*

[*] Details regarding the research programs and sea lamprey management strategies employed by the GLFC are included in Appendix D.

(c) to recommend appropriate measures to the Contracting Parties on the basis of the findings of such research programs;
(d) to formulate and implement a comprehensive program for the purpose of eradicating or minimizing the sea lamprey populations in the Convention Area; and
(e) *to publish or authorize the publications of scientific and other information obtained by the Commission in the performance of its duties*[20]

The Convention serves as a legal mechanism, providing guidance and oversight by both the governments of the United States and Canada to ensure that the commission fulfills it charge in developing and implementing coordinated fisheries management programs for the benefit of the Great Lakes region. The Convention is a bilateral agreement that perpetuates collaboration between the two countries to protect and enhance the Great Lakes fishery.

By July 1, 1956 the commission had been organized and assumed its two major responsibilities: to develop coordinated programs of research in the Great Lakes and to subsequently recommend measures which permit the maximum sustained productivity of stocks of fish of common concern; and to formulate and implement a program to eradicate or minimize sea lamprey population in the Great Lakes.

Arguably the commission's most substantial charge – eradicating or suppressing sea lamprey populations – is a long term program, lasting indefinitely. The commission's *Vision Statement on Integrated Management of Sea Lamprey* states that the Commission will provide an integrated sea lamprey management program that supports the Fish Community Objectives for each of the Great Lakes and that is ecologically and economically sound and socially acceptable.[21] Prior to 1982, the commission's focus was on eradicating sea lampreys, but when it became clear that eradication was not an option given the current technology, the commission adopted an integrated-pest-management

approach aimed at controlling the population to tolerable levels. To eradicate the population, the commission was primarily applying lampricides in Great Lakes tributaries, and the commission determined that it would be a better balance to not exterminate, but rather, control the population.[22] Although the commission has shifted focus from eradication to control, it cannot discard the mandate – if the sea lamprey population is not controlled continuously, the Great Lakes ecosystem will never regain its health.[23]

To administer a perpetual program, a stable long-term source of funding is required. Without funding, it would be impossible for the commission to carry out its obligations of long-term stewardship on the Great Lakes. As with any funding regime, especially a long-term funding mechanism, it is essential that the entity spending the money have financial and operational transparency and accountability. After all, no government would continuously fund, nor abdicate its oversight over any entity to which it continuously funds, were it conducting an inadequate or inefficient program.

3.1 Policy and Vision: the Guiding Principles

This section will describe the policies, vision, and oversight mechanisms that guide the commission. These oversight mechanisms contain the major principles under which the commission operates. They were designed to govern the commission, lending accountability, credibility, and transparency. These mechanisms allow the commission to achieve the ethical and responsible stewardship necessary to continue as an organization that is legitimate in the public and governments' eyes. These mechanisms are essential in the financial and operational credibility of the commission, lending comprehensive oversight.

Strategic Vision of the Great Lakes Fishery Commission for the First Decade of the New Millennium

The rules, roles and responsibilities that guide the commission are outlined in the Convention and guided by a vision statement in the commission's *Strategic Vision of the Great Lakes Fishery Commission for the First Decade of the New Millennium*. The Commission's vision is organized around three broad vision statements. The statements propose milestones to measure progress in achieving the vision. The three vision statements are:[24]

1. Healthy Great Lakes Ecosystems
   The commission shall encourage the rehabilitation and conservation of healthy aquatic ecosystems in the Great Lakes that provide sustainable benefits to society, contain predominately self-regulating fish communities, and support fisheries with increasing contributions of naturally reproducing fish. Conserving biological diversity through rehabilitation of native fish populations, species, communities, and their habitats has a high priority.[25]
2. Integrated Management of Sea Lamprey
   The commission will provide an integrated sea lamprey management program that supports the Fish Community Objectives for each of the Great Lakes and that is ecologically and economically sound and socially acceptable.[26]
3. Institutional/Stakeholder Partnerships
   The commission will encourage the delivery of complementary programs focused on healthy Great Lakes ecosystems and integrated management of sea lampreys through
   - Leadership from the Lake Committees in development and pursuit of Fish Community Objectives,
   - Coordination of fish management programs,
   - Development of coordinated research programs
   - Recognition of Fish Community Objectives by environmental agencies as these agencies implement their programs, and
   - Strengthened and broadened partnerships among fish management agencies, environmental agencies, and non-agency stakeholders.[27]

The vision is utilized by the commission and its partners to gauge what actions need to be taken to enhance the health of the Great Lakes resource. In short, it is a tool that guides the resources that the commission has toward effective management and stewardship of the Great Lakes.

A Joint Strategic Plan

The *Convention on Great Lakes Fisheries* binds both federal governments to jointly act for the benefit of the Great Lakes. Nevertheless, day-to-day fishery management is the domain of the eight Great Lakes States, the province of Ontario, and the first nation tribes. With the numerous organizations and agencies involved in Great Lakes management, there was a need to better facilitate cooperative fisheries management. Thus, the non-federal entities requested that the commission facilitate and implement *A Joint Strategic Plan for Management of Great Lakes Fisheries*[28] (Appendix C). The participants are all signatories to the Joint Strategic Plan, and it is implemented through committees of the commission, in particular the Lake Committees, which are considered the "action arms" of the Joint Strategic Plan.

In a notable example of transparency and cooperation, the Joint Strategic Plan, is signed by 14 entities[†] that are working together to bring consensus to multi-jurisdictional, bi-national natural resources issues. In recognition of stressed natural resources within the Great Lakes, *The Joint Strategic Plan* was initiated to address Great Lakes issues, including:

- Lost Fishing Opportunities
- Instability of Fish Communities
    - Sea lamprey
    - Over harvest
    - Invasion and introductions
- Inadequate environmental quality
    - Land uses

[†] Canada Department of Fisheries and Oceans, Chippewa-Ottawa Treaty Fishery Management Authority, Great Lakes Indian Fish and Wildlife Commission, Illinois Department of Conservation, Indiana Department of Natural Resources, Michigan Department of Natural Resources, Minnesota Department of Natural Resources, National Oceanic and Atmospheric Administration – National Marine Fisheries Service, New York State Department of Environmental Conservation, Ohio Department of Natural Resources, Ontario Ministry of Natural Resources, Pennsylvania Fish and Boat Commission, U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources

    - Water uses
    - Atmospheric inputs
- Competition and conflicts among
    - Users of the fishery resources
    - Allocation among jurisdictions
    - Commercial fishing versus sport fishing
    - Native people versus other users
- Access to the resource
- Climate change[29]

Furthermore, *The Joint Strategic Plan* establishes four strategies for fisheries management:[30]

- **Consensus:** The agencies, through the Plan, have agreed that consensus must be reached on all management practices that affect multiple jurisdictions prior to activities being initiated. Any changes in management practices must be agreed upon by the other agencies; provisions for conflict resolution are contained in the Plan. To help achieve consensus, common Fish Community Objectives have been developed.

- **Accountability:** The Plan promotes accountability by calling for the production of agency meeting minutes, agency reports concerning each lake's initiatives, Lake Committee reports, and reports of commission activities.

- **Information Sharing:** Each signatory affirms their commitment to "establishing common standards for data access, collection, analysis, and sharing."[31]

- **Ecosystem Management:** To facilitate an "ecosystem approach" to management, the Plan links environmental interests with fishery management. The Plan calls upon agencies charged with implementing the Great Lakes Water Quality Agreement with fisheries agencies. "Through ecosystem management, agencies agree to actively promote the needs of desired fish communities."[32]

The Joint Strategic Plan's four strategies provide a powerful mechanism that ensures cooperation, various levels of oversight and transparency, and creates an effective and efficient collaboration dedicated to facilitating Great Lakes ecosystem health. Without the plan, the various state, provincial, tribal, and federal management agencies would manage the resource in their own separate ways, resulting in chaos.

Through *the Joint Strategic Plan*, the commission addresses the complex issues of the extensive interconnectedness within the ecosystem as well as the social ramifications such as non-native species; toxic chemicals in fish; and non-point pollution sources. This approach broadens the commission's understanding of the "beneficiaries of management" from commercial, subsistence, and recreational fishermen to all other stakeholders (potentially all clients in the Great Lakes basin and beyond). This approach also demonstrates the spirit of cooperation, essential for an effective sea lamprey control program and a comprehensive research program.

3.2 Financial Oversight

Financial oversight of the commission's appropriations and budget are naturally integrated into the structure of the commission through the Convention. The Convention allows for responsible oversight of the commission's financial credibility and well being; it implicitly governs the commission through congressional and executive oversight. Congress appropriates funding only after assessing the benefits and efficacy of the commission and its importance to the Great Lakes. Additionally, the commission undergoes an independent financial audit annually to ensure accountability and transparency.

3.3 Structure of the Great Lakes Fishery Commission[33]

The duties of the commission are specified by the Convention. Article IX of the Convention makes clear that the commission must report to the federal governments to account for its activities. Additionally, the article states that the commission must annually submit the discharge of its duties and recommendations or advise to the governments about matters relating to the Convention when necessary.

Great Lakes Fishery Commission's oversight structure

The commission follows a fundamental concept of adopting and advocating an ecosystem approach to management and research of the Great Lakes fisheries. The commission's approach realizes that the Great Lakes region works as a system, with interconnectedness between ecosystem components (land, water and air) and the welfare of its inhabitants. All aspects of the ecosystem (e.g., nutrients, fish, habitat, chemical contaminants, climate, and human use) interact with each other, and, therefore, must be evaluated on their system-level effects. The commission adheres to a systemic approach to decision-making that is consistent with the *Great Lakes water Quality Agreement, A Joint Strategic Plan for Management of Great Lakes Fisheries,* and the *Convention on Great Lakes Fisheries Between the United States and Canada.*[34]

When the governments of Canada and the U.S. created the commission, specific mechanisms were developed to ensure accountability of the use of the public money it appropriates. To maintain this accountability, both the commission's decision-making processes and where funding is allocated remain transparent. The following mechanisms ensure that the commission achieves transparency and accountability:

I. Administrative/Operational Oversight
    a. Guiding Documents:
        i. The Great Lakes Fishery Act 1956
        ii. *Convention on Great Lakes Fisheries Between the United States of America and Canada*
        iii. *Strategic Vision of the Great Lakes Fishery Commission for the First Decade of the New Millennium*
        iv. Joint Strategic Plan

    b. Great Lakes Fishery Commission Structure
        i. Commissioners
        ii. Advisors
        iii. Commission appointed Boards
        iv. Provincial, State and tribal Agency-Appointed Committees

v. Contract Agents and Partners

c. Information dissemination
    i. Guiding Documents
    ii. Annual reports/Annual Meeting
    iii. Special reports
    iv. Press releases
    v. Presence at regional outdoor shows
    vi. University conference speeches
    vii. Meetings
    viii. Congressional testimony
    ix. Internet website

II. Financial Accountability
    a. Budget
        i. Congressional oversight (Appropriations)
        ii. Parliamentary oversight
        iii. Executive: Fisheries and Oceans Canada and U.S. Department of State
    b. Audit
        i. Commissioners
        ii. Private firm (Deloitte and Touche)
        iii. Government Accountability Office
        iv. Auditor General of Canada

The above mechanisms are all in place to ensure accountability and credibility. Much of the oversight is by the federal government (e.g. the Convention, guiding documents, commissioners appointed by executive branch, parliamentary oversight) and other oversight mechanisms have evolved as the commission has deemed appropriate (e.g. The Strategic Vision, private accounting firm audit, committees). This combination of self-regulation and government oversight ensures finances and operations are conducted appropriately, and furthermore, that both finances and operations are conducted with efficiency.

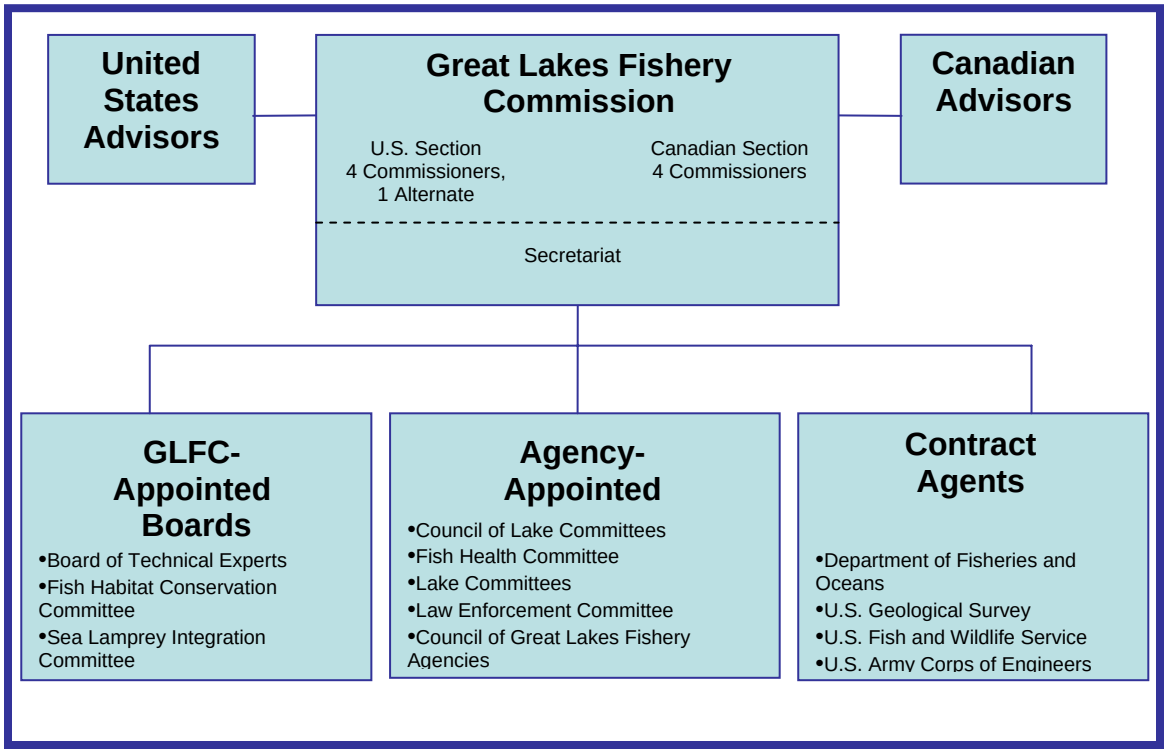

Figure 3.1: Structure of the Great Lakes Fishery Commission.

Advisors

The *Convention on Great Lakes Fisheries between Canada and the United States* established the commission with two sets of advisors from the US and Canada. The *Great Lakes Fisheries Act* authorized the appointment of the US advisors to the commission. Advisors are appointed from each of the Great Lakes states from a list that is provided by the Great Lakes state governors. The advisors represent and consider the interests of the regions' stakeholders, including the commercial fish industry, state agencies, sport fishers, and the public-at-large. The advisors examine and consider "all proposed recommendations, programs, and activities relating to [the lake they represent]."[35] The US Advisors Terms of Reference further outlines that the US advisors shall provide recommendations and/or suggestions pertinent to the commission's duties, which are outlined in the Convention (Appendix A, Article VI).

The Canadian advisors are co-nominated formally and in writing by the Canadian Minister of Fisheries and Oceans and the Ontario Minister of Natural Resources, they are then submitted for appointment. Similar to the US advisors, the Canadian advisors represent the commercial fishing industry, sports fishing interests, and the public-at-large. The Canadian Advisors Terms of Reference also states that the advisors must represent the Aboriginal community, academia, and environmental interests. "The role of the Canadian advisors is to inform the Canadian Section of the GLFC about the various issues before the GLFC." (Appendix A, Article VI). The advisors are to assist the commission's Commissioners in making informed decisions about the objectives of the commission and related to sea lamprey control and management of Great Lakes fish populations. The advisors also must consider issues that are referred to them by the Canadian Commissioners and other matters which are believed to be of importance to the Great Lakes fishery, including environmental, biological, or social. The advisors are one component of the commission's oversight infrastructure – their participation ensures the commission's actions and operations are in the best interest of the fishing industry and public.

Commissioners

The commission is comprised of four Canadian commissioners and four American commissioners (plus one US Alternate Commissioner). Commissioners are executively appointed by the Privy Council of Canada and the President of the United States respectively; Canadian Commissioners serve at the Council's pleasure or two-year terms, while the US Commissioners serve six-year terms. The United States requires, and the Canadians ensure, that there is at least one federally employed commissioner on

the Board. The U.S. Commissioners appoint an advisory committee for each of the Great Lakes, giving consideration to state agencies with jurisdiction over fisheries, the commercial fishing industry, the sport fishing industry, and the public at large. The commissioners are the decision making body, utilizing data, information, and suggestions from the advisors and committees; the commissioner's also serve as a sort of federal oversight having been appointed executively.

Secretariat

The commission's secretariat is located and operates its program management responsibilities from its home offices in Ann Arbor, Michigan. The full-time staff consists of citizens, academics, researchers and experts from both countries. Using equal contributions from each country, the secretariat staff provides support for the commissioners, various fishery and lake committees, scientific research, and sea lamprey management and research activities. Scientific, committee, and administrative costs are shared equally between the governments. The commission's major work on sea lamprey control and research is funded based on the historic lake trout and whitefish value from commercial catches as well as the "real apportionment of the Great Lakes between the United States and Canada".[36] Therefore, the U.S. funds 69% and Canada 31% of sea lamprey control operations.[37] Funding from the two governments goes through the commission's secretariat, where its staff (upon consensus based decisions between the committees, advisors, and commissioners) manages the funding for all operations, control, research, and collaborative activities. The secretariat works under the guidelines of the Convention, the federal government, and independent financial auditing measures.

Contract agents and partners

Much of the work on fisheries management and sea lamprey control cannot be accomplished without effective partnerships. The commission partners with various research institutions to implement fisheries and sea lamprey research. The commission also works with such entities as the United States Fish and Wildlife Service, Department of Fisheries and Oceans, Canada, and the Army Corps of Engineers to implement actual sea lamprey control techniques on the tributaries and lakes within the basin. These partnerships make it possible to perform the commission's charge comprehensively.

In 2004, the commission worked with many different entities in the Great Lakes region on research, fisheries science, and control programs. A list of partners that work with the commission consists of approximately 40 entities. This list does not include various state, local, federal, and regional organizations that the commission collaborates with on a regular basis, such as the International Joint Commission, Great Lakes Commission, Great Lakes United and the National Oceanic and Atmospheric Administration, among others. The extent to which the commission fosters partnerships and collaboration is testament to the credibility of the organization and effectiveness of its operations.

Funding requirements

Funding of the commission's lamprey control and research programs requires adequate funding so that lamprey populations do not increase (and ideally decrease) from year to year. This requires the funding to purchase Trifluoromethyl-4-Nitrophenol (TFM, the chemical lampricide) and pay for the appropriate organizations to conduct their charge of treating streams against sea lamprey populations. Additionally, the growing

research and alternative sea lamprey control program that the commission oversees, necessitates adequate funding so that sea lamprey control efforts increase in effectiveness and efficiency.

The financial need of the commission, to sustain regular operations and increase the effectiveness of its programs (through research and alternative sea lamprey control) follows normal economic trends. As increased demand for better and more efficient sea lamprey control efforts requires that funding keep abreast of inflation, or preferably increase so that progressive research can take place. Without appropriate funding in any one year, the commission may not have the resources to accomplish its sea lamprey control program; should this occur and control efforts are reduced, sea lamprey populations would increase, thereby negatively affecting the Great Lakes fishery and ecosystem.

The funding the commission receives from the United States government, as shown in Table 3.1 below, is granted through the congressional annual appropriations process. Within the commission's secretariat, the legislative liaison, administrative officer, executive secretary and in cooperation with senior scientists and sea lamprey officers, develop budget summaries annually to account for projected costs of running an effective control and science program. The projected costs are calculated from numerous collaborative meetings between the advisors, commissioners, and control agents. The secretariat then informs members of congress about the importance of the Great Lakes and the essential operations the commission and its partners conduct to protect them. Done on an annual basis, the commission spends a large amount of time securing funding for its operations. As will be discussed at length in section 4 of this paper, the process of

annual appropriations is not seen as a suitable perpetual form of funding for the work done by the commission, and thus, an alternative funding mechanism, such as the private trust fund, has been established.

Table 3.1. Commission Funding Summary – 1984 through 2003[38]

	United States	Canada	Total
1984	$4,354,000	$2,204,889	$6,558,889
1985	$4,424,000	$2,194,132	$6,618,132
1986	$4,730,000	$2,194,874	$6,924,874
1987	$4,662,000	$2,265,320	$6,927,320
1988	$4,549,000	$2,251,922	$6,800,922
1989	$4,549,000	$2,387,502	$6,936,502
1990	$6,441,000	$3,283,440	$9,724,440
1991	$6,441,000	$3,302,995	$9,743,995
1992	$7,780,000	$3,473,084	$11,253,084
1993	$8,944,000	$3,407,662	$12,351,662
1994	$10,558,000	$3,439,203	$13,997,203
1995	$8,803,000	$4,297,427	$13,100,427
1996	$8,353,000	$4,186,771	$12,539,771
1997	$8,353,000	$4,287,674	$12,640,674
1998	$8,353,000	$3,445,287	$11,798,287
1999	$8,170,328	$4,649,752	$12,820,080
2000	$9,461,500	$5,089,617	$14,551,117
2001	$11,733,172	$2,940,571	$14,673,743
2002	$13,118,000	$3,878,400	$16,996,400
2003	$12,168,000	$3,869,800	$16,037,800

The commission's budget summary: (the outline of funds needed to sustain the commission's efforts). The funding requirements also support *A Joint Strategic Plan for Management of Great Lakes Fisheries*.

Measures of success and success to date

The commission is regularly called upon to justify its expenditures concerning sea lamprey management.[39] The commission must account for monies spent versus effectiveness of the programs it initiates; during the past 50 years, the commission has developed mechanisms to assist the measurement of success of its programs. In appendix E, the commission's programs are discussed in detail; however, the measure of success needs to be outlined to ensure the effectiveness of the commission's actions. There are a

number of mechanisms that measure the successes and failures of the commission's programs and are initiated through both internal and external measures.

Fish Community Objectives

The fish community objectives were developed by each lake committee for each lake consisting of members of each country. The purpose of these objectives is to provide a common goal for fisheries management action, and to measure the success and relationship between the decrease in measured sea lamprey populations and increase in fish populations. These objectives are reported to the commission and its partners annually at the Lake Committee meetings.

Economic Injury Levels

To best measure its effectiveness, the commission uses the basic principle in pest management, the concept of economic injury level. Economic injury level is based on setting target population levels for a pest species and is defined as "the level of pest density which causes economic loss equal to the cost of controlling that pest."[40] This measure of a pest species accounts for the trade-off between the costs to control a species and the benefits of control. Costs go beyond financial expenditures including environmental costs such as mortality of non-target organisms during treatments and the degradation of habitat associated with treatments.[41] The commission's adoption of the economic injury level policy has led to the development of a computer-assisted program that allocates stream treatments "to kill the maximum number of juvenile sea lampreys for a given level of control cost."[42]

Control of the St. Marys River

The St. Marys River, which separates Sault Ste. Marie, Canada and Sault Ste. Marie, MI, connects Lake Superior and Lake Huron. The river is a wide, deep river and harbors prime spawning habitat for sea lamprey. Because conventional methods of TFM treatments do not work in this environment (cost and mechanics of an operation of this magnitude would be unfeasible and ineffective) the commission developed a solid, pellet form of TFM called granular Bayulcide. This chemical is disbursed over a wide area of the river by helicopter and boat. The solid chemical reaches the bottom (sea lamprey habitat) and releases the chemical at sediment-water interface, thus, killing larval lamprey. This method has proven effective and studies have shown this method to be working by reducing spawning efficacy in the St Marys. The development of this innovative control mechanism has been signaled as progress within the program of sea lamprey control.

Development of Alternative Control Technologies

A measure of the commission's increased control and science programs is evident. Over the past decade, scientists funded by and working for the commission have developed new pheromone studies, a data archival tagging system (see Bergstedt et. al. 2003),[43] genome project that will have a seismic impact on the understanding of sea lamprey biology (see Li and Kruger),[44] sterile-male-release program, and increased the technology of low head, adjustable barriers and electric barrier systems (see appendix E). All of these developments have, or will likely, increase the effectiveness and the cost of sea lamprey control within the Great Lakes. Uninterrupted, substantive funding must be

kept stable (parallel with inflation), or increase for progressive scientific and control efforts to continue.

Permanence

The commission has been fortunate enough to be, for all intents and purposes, regarded as a permanent institution. The establishment of the commission in 1955 by the Convention of Great Lakes Fisheries stipulates in Article XII that after eight years from the establishment of the commission, the parties would jointly review the activities of the commission to determine the "desirability of continuing, modifying or terminating"[45] the convention. The commission is still here today after 50 years of service to the Great Lakes region. The only other stipulations to terminating the Convention, and thus the commission, is in Article XIII, section 3, where it is states that "Either Contracting Party may, by giving two years' written notice to the other Contracting Party, terminate this Convention at the end of the initial ten-year period or at any time thereafter."[46] The commission has been effective to a degree that both the U.S. and Canada have deemed appropriate and necessary. The commission has kept its credibility through being effective in its mission. Both the U.S. and Canada continue to fund the commission as well as continue to harbor the establishment of federal organizational partnerships with the commission. Great Lakes federal governments of Canada and the United states, all eight Great Lakes states, the tribes and first nations of the Great Lakes, and environmental and industry organizations and groups all continue to actively partner and support the commission due to its effectiveness in Great Lakes ecosystem stewardship.

3.4 Conclusion

The commission is structured in a manner that creates responsibility and guidance. In delivering its program, the commission relies on input and advice from boards it appoints, lake committees, citizen advisors, and state, provincial, tribal, and federal agency officials. In particular, the commission formulates its programs based on information and advice from their Board of Technical Experts, Great Lakes Fish Habitat Conservation Committee, Sea Lamprey Integration Committee, the Lake Committees, and the Great Lakes Fish Health Committee. All of the boards and committees are made up of fishery and management experts from research institutions, government organizations, academia, and tribal resource agencies. The commission receives further advice from the Committee of Advisors, made up of U.S. and Canadian Citizens.[47]

The programmatic and financial aspects of the commission are also well documented and under constant oversight. This oversight ensures that the commission works effectively with monies given to it from the federal government. Section 3 showed that the monies given to the commission have, in the past 50 years, proven to be a good use of federally allocated money: decreasing sea lamprey populations, while increasing fishery populations and, thus, increasing the Great Lakes economy, while at the same time contributing to the health of the Great Lakes ecosystem. The commission uses its funding to extend its charge to keeping the Great Lakes healthy in more than just sea lamprey population reduction, by advocating for healthy ecosystems, blocking of future invasive species, and increasing research around the region. The above section discusses the historical and current work that the commission has accomplished over the past 50 years, and is currently engaged in, assessing that the commission is indeed an effective

organization. The funding that is required to continue such work, however, will need to be long-term, for a decrease in any of the previously mentioned programs will be detrimental to the control and mitigation of sea lamprey populations. A lack of funding would also decrease the continued lamprey and fisheries research as well as further efforts to keep other invasive species from entering the Great Lakes.

4 Funding and Environmental Issues

This section clarifies the dichotomy between the instability of annual appropriations due to changing political climates and the need for stable funding for addressing perpetual environmental problems, such as invasive species. This section begins by analyzing the annual appropriations process, which is the current financial mechanism that funds the commission's sea lamprey control program and scientific research to advance lamprey control techniques. The analysis will address this mechanism's susceptibility to political and economic fluctuations, identifying it as an inherently vulnerable source of funding. The second part of this section will analyze the nature of environmental stewardship and the fact that certain environmental issues, like invasive species, are long-term problems with the potential to last indefinitely. Finally, this section will explore the discrepancy between the weaknesses of the annual appropriations process and the need to address perpetual environmental issues.

4.1 Annual Appropriations

The annual allocation is deemed one of the most consequential annual processes within the Congress of the United States.[48] There are two types of legislation in the United States that allow federal monies to be spent: an authorization bill which allocates discretionary funding on an annual basis and requires an authorization bill for continued funding; and mandatory (direct) programs, which receive funding without additional legislation for annual funding (e.g. Social Security). Like other government agencies and programs of its nature, the commission is funded through annual appropriations of discretionary funds and, therefore, must follow a two-year budget process to obtain its

funding. Below is an example of discretionary funding process by which organizations such as the commission follow. The schedule for fiscal year 2007 was:

- ☐ Summer 2005: Agencies submit their FY 2007 proposals to Office of Management and Budget ((OMB) part of the office of the president) based on broad strategic guidance from OMB in May 2005.
- ☐ Fall 2005 Agencies negotiate with OMB over their FY 2007 proposals
- ☐ January 2006 Agencies finalize their requests
- ☐ February 2006 President releases proposed FY 2007 budget
- ☐ February-May 2006 Agency officials and others testify at congressional budget and oversight hearings; authorizing committees try to write and pass authorization bills
- ☐ Spring 2006 Congress approves its FY 2007 budget resolution (internal congressional document written by Budget Committees establishing broad spending and revenue targets for the entire budget; contains broad instructions for various committees); the FY 2007 budget resolution is unfinished because the House and Senate cannot agree on a compromise one.
- ☐ Various committees receive instructions from the budget resolution to draft reconciliation bills (bills that change entitlement programs or tax laws; so named because they reconcile differences between current policy and the budget resolution.)
- ☐ Appropriations Committees receive 302(a) allocations (total amount of discretionary spending, by functional category, from the budget resolution).
- ☐ Appropriations Committees determine 302(b) allocations (total discretionary spending divided among the individual appropriations bills; these can differ between the House and Senate initially, and change constantly.) (Even without a budget resolution, the House can begin drafting and voting on its 11 appropriations bills.
- ☐ June-September 2006 Appropriations subcommittees write appropriations bills (bills that fund discretionary programs; the only bills that Congress is required to pass annually), staying within 302(b) allocations. Numerous adjustments to the President's budget are made. The bills are amended and then approved by the full Appropriations Committees in each chamber. Then, the bills go to the House or Senate floors and are amended and then approved by the full House or Senate.
- ☐ September 2006 The House and Senate take their separate versions of appropriations bills to conference (a committee to resolve differences between the House and Senate versions of a bill), give final approval to the conference report (compromise bill) and send the bill to the President for his/her signature (deadline: September 30; rarely met). If the President vetoes a bill, then the process starts over.
- ☐ October 1st, 2006 Beginning of fiscal year 2007; discretionary programs must have a signed appropriations bill or they must shut down. To give Congress and the President more time, a continuing resolution (temporary appropriations bill covering all unsigned appropriations bills, for a limited

period of time; also known as a CR) is enacted to allow programs to operate. (The last 2006 appropriations bill was signed into law on December 30)[‡]

The funding cycle itself is very involved, and in the case of the commission requires many staff hours to complete, especially due to the process of informing congress that the commission's program is worthy of federal monies sufficient to conduct its full programs.

Discretionary vs. mandatory funding

The federal budgetary process is complex. It has many rules, roles, procedures, players, and stages that effect how federal money is allocated. It is made difficult more-so by its shear size of around $2 trillion annually.[49] Of this $2 trillion annually, about a quarter, or $500 billion, is considered discretionary money. The budget's political importance is due to its size as well as a "principal means by which the government establishes priorities and defines programs."[50] The $500 billion is subject to annual congressional action; it is allocated through thirteen committees and subcommittees. The chairs of these subcommittees are commonly referred to as the Cardinals of Capital Hill, in recognition of their authority and power to apportion funds to favored areas or activities, and the respect afforded them by members of congress and executive officials.[51]

The other $1.5 trillion is governed by statutory rules (direct spending), or mandatory programs, over which these committees have no control. Mandatory programs are enacted by law, and obligate the federal government to make specified mandatory funds available until the law expires based on its provisions, or until

[‡] Schedule of annual appropriations process from: Koizumi, Kei. 2006. A Presentation on the Federal Budget for the 2006 WISE Program. American Association for the Advancement of Science. Washington, DC.

subsequent laws terminate the program or reauthorize it.[52] Programs under direct spending include such programs as Social Security, Medicaid, crop insurance, pensions for veterans and other entitlements and interest on the government's debt; programs under mandatory spending are outside of the "Cardinal's" domain.[53] Because funding these programs is mandatory, when there is a political push to decrease government spending, discretionary programs are all the more susceptible. In fact, participants in the general (discretionary) appropriations budget process, whether a public or private entity, government agency or politician, strive to get their program removed from the general discretionary budget process so that they need not compete for appropriations every year.[54]

The political and economic factors which inform the federal budgeting process consist of numerous, complex factors. To measure the impact on the budgetary process, and thus annual appropriations, this section will discuss the affects of the economy as well as any political considerations that influence the budget. This is not an attempt to dismiss all other factors that affect the budgetary process, but rather to take a relatively basic overview of how funds appropriated to organizations, such as the commission, suffer from economic and political sensitivities.

The commission is provisioned by Congress through discretionary funding of the annual appropriations process. It falls under the Committee on Appropriations, the Science, State, Justice, and Commerce Appropriations Bill: under the State Department account "International Fisheries Commissions." Annually the commission informs congress about the funding required for the commission to conduct its mandate of sea lamprey control and research on the Great Lakes.

Effects of changing political and economic climates on discretionary funding

The funding that is most affected by socially and politically changing climate is discretionary funding. When mandatory programs, or in more extreme cases, the defense budget, need money, the entire budget can shift so that the amount of money that would normally be allocated to, say, domestic discretionary funds, decreases. This brings up two issues with this funding mechanism: first, much of the government (as well as organizations that would be affected by such budget cuts) concentrated solely on encouraging the Appropriations process to not decrease their spending due to the importance of their programs. This turns much of the effort that would normally be used to run the government, and conduct important work, into an unproductive fight for funding; and second, the reduction in overall government funding negatively affects the program potential of organizations that rely on federal annual appropriations.

An example of this comes from talking points from the Heritage Foundation and the Center on Budget and Policy Priorities concerning George W. Bush's 2005 budget. The Foundation points out that "President Bush's 2005 budget request takes a first step by proposing freezes or near-freezes in most non-defense discretionary programs. These programs, however, represent less than one-fifth of federal spending, and cannot provide sufficient savings to close a $500 billion deficit. Entitlement programs, which comprise two-thirds of all federal spending and are currently growing 7 percent annually, must also be reformed."[55]

An extreme example of a monumental shift in political focus is the change that occurred as a result of the terrorist attacks on September 11, 2001. After September 11, 2001, the budget for homeland security grew to $64 billion in FY 2002, and was

increased by another $42.4 billion in FY 2003.[56] This demonstrates that a drastic change in appropriations for changing political times can affect other sectors in the United States government that are essential to its ability to function.

In an effort to appear fiscally responsible to their constituents, rather than borrow additional funds to pay for major funding increases to some annual programs, congress often chooses to reduce the funding for other programs. It is important to note that the reductions in other sectors due to re-allocation of typically stable annual appropriations, adversely affects the progress and quality of life of citizens. For example, a decrease in infrastructure spending would negatively affect the construction industry, trucking, traveling etc; a decrease in funding for the commission, in this case, could lead to the reduction of sea lamprey control, an increase in sea lamprey animals and thus a decline in the fishery, commercial and recreational fishery, and tourism.

Partisan effects on annual funding

There are two potential points in the appropriations process where funding for an agency or program can be reduced: 1) the administration refusing funds, and 2) congress refusing funds (in the House and/or the Senate). One example of this was in Fiscal Year (FY) 2002, when the administration did not allot all of the monies requested by the commission to run its full programs. The commission, as with other agencies around the nation, found themselves in similar situations, and there was, thus, an attempt to restore funding by attaching a funding request onto the homeland security bill,[57] which was well funded, and in a good position to be passed by Congress due to a favorable political climate, and the perception of the bill to appropriately address the then issues of national security.

As mentioned previously, it is the goal of recipients in the general discretionary budgetary process to be removed from the discretionary funding process so that there is no need to compete for annual funding each year. Special interest in a program can lead to earmarked funds, specifically for their program, with a legal framework instituted so as to prohibit the allocated money from being spent on anything not related to the program.

4.2 A discussion of long-term stewardship and perpetual problems

The term stewardship can be complicated by numerous definitions used by numerous sectors in society. For the purpose of this paper, the term "stewardship" refers to the efforts made by the commission to mitigate the negative effects that the invasive sea lamprey can inflict (the potential to transform the entire Great Lakes ecosystem) if their populations are left unchecked. The term "long-term" has similar difficulties when trying to define it. This paper defines long-term stewardship as being activities that promote the health of an environmental system for at least 75 years, or establishing a funding mechanism that will endure for as long as stewardship activities will be needed.

Most environmental problems in and around the Great Lakes will not go away within one generation and thus need to focus on procuring long-term funding. In this paper perpetual funding and long-term funding mean the same thing, as three generations would constitute perpetual. The funding mechanism being studied, a private trust fund, is designed to last in perpetuity.

Therefore, "long-term stewardship" and "long-term funding" are interchangeable with "perpetual stewardship" and "perpetual funding," or more accurately, the ability to conduct stewardship, or draw upon funding, for as long as these activities are needed to address the sea lamprey problem.

Much of this research found that the term "long-term stewardship" was defined using terrestrial, nuclear, contaminated sites; most searches and literature on this topic referred to the Department of Energy (the Bauer/Probst paper also uses this definition; assessing long-term funding mechanisms for DOE nuclear contaminated sites) and nuclear sites it is associated with. Preliminary searches did not expose anything other than long-term stewardship in this context, as definitions of long-term stewardship were rather narrow in their definitions: "Activities necessary to maintain long-term protection of human health and the environment from hazards posed by residual radioactivity and chemically hazardous materials."[58] For the purpose of this research, the definition of "long-term stewardship" is being extended beyond the narrow definition which uses only radioactive or chemically hazardous material. It can be argued that most environmental entities are working on long-term problems within the environment and while other environmental concerns such as invasive species may not have a specifically agreed-upon life span, they are sure to last many generations while having significant impacts on human health and the environment.

Longevity of long-term stewardship

The Great Lakes region currently has a plethora of environmental issues that need to be addressed on a long-term basis. Sewage pollution from large cities' aging sewage systems pollute and close many swimming beaches in the region annually; mercury contamination bio-accumulates in the aquatic ecosystem (especially fish) in the Great Lakes, potentially causing ill-health effects not only in the environment, but to the human population who utilize many of the contaminated resources; air and water quality issues continue to be of concern within the region; and the focus of this paper, invasive species

have damaged the fisheries populations, the overall lake ecosystem, and the commercial and recreational fishery.

Organizations around the Great Lakes that were established for the purpose of dealing with environmental problems, such as invasive species, on a long-term basis do not have funding structures that can reliably address issues on a perpetual nature. Few environmental organizations acknowledge the long-term nature of their issues from a funding standpoint. In fact, this research found that, although there are some trust funds established within the basin, most funding structures look two or three years in advance at most, many using the annual appropriations mechanism (either state or federal) or through the use of grants (which can dictate direction of research as well as limit longevity to, at times, a few years). These mechanisms are inadequate over the long-term, and at best, move organizations' environmental agendas slowly and inconsistently. Some may argue that it only takes small amounts of funding annually to slowly clean up an environmental "mess" such as a polluted site. Nevertheless, some environmental issues, for example, invasive species, should control measures be inadequately funded for even one season, can cause an upward spike in the population, setting back previous efforts and causing more environmental harm.

This aspect sets the commission and the issue of invasive species apart from many other environmental issues. Contamination, for example, will not get worse should a gap in annual funding take place, rather, clean-up will slow down, whereas populations of lamprey will increase with a decrease, or gap, in annual funding. It was from this background from which this research began; acknowledging that environmental issues within the Great Lakes will not be solved in one person's lifetime, and at times, progress

could be reversed should unstable funding occur. Many problems will be in the Great Lakes forever and there need to be mechanisms, both institutional and financial to perpetually confront these issues; or there is the potential that the problems will get worse, even potentially irreversible, or the entire collapse of the fishery.

It is the commission's charge to reduce the population of sea lampreys in hopes of restoring the fishery, while doing so in a manner that benefits the Great Lakes ecosystem as a whole. The commission's management of the sea lamprey's population will lead to the restoration, or partial restoration, of natural conditions (fish populations) that once existed in the Great Lakes. The term "long-term" refers to the perpetual nature of invasive species. As such, the nature of the sea lamprey leads scientists to believe that the commission's mission is sea lamprey population reduction and not eradication. This being said, the commission's charge is sea lamprey population control indefinitely.

4.3 Disconnect between perpetual problems and annual appropriations

This section is a synthesis of the above sections, 4.1 and 4.2, and demonstrates that the annual appropriations process limits the ability of organizations dealing with perpetual problems to effectively address those problems. This section will identify the US appropriations structure and process as a vulnerable funding mechanism as it pertains to long-term stewardship of perpetual environmental problems such as the invasive species sea lamprey.

It is necessary to have continual funding for long-term environmental problems, such as the sea lamprey; however, there is a disconnect between current, unstable federal appropriations and what is essential to address those environmental problems. The overarching challenge is to establish effective financing and oversight that will endure as

long as stewardship activities are needed to mitigate the effects of sea lamprey populations. Because invasive species are permanent, stewardship must be in perpetuity. Though institutions do not endure forever, the need for stewardship is a permanent feature of Great Lakes management. Bauer and Probst define permanence to mean an institution that can endure for at least 75 years, arguing that this spans three generations, greater than an individual's adult lifetime, and ". . . therefore longer than one's planning horizon for retirement, and long enough to force consideration of one's grandchildren . . ."[59]

Bauer and Probst's research proposes that establishing an effective trust fund to address long-term environmental stewardship and clean-up, needs to take place from inception (the planning stages of a trust fund and institution); further asserting the need to stipulate permanence within the structure of the trust fund's formation. This research adopts Bauer and Probst's reasoning, agreeing that establishing an effective trust requires planning at inception, and the need for permanence, to establish effective long-term stewardship.

Therefore, due to the sensitive nature of invasive species and their potential to again wreak havoc on a multi-billion dollar fishery that millions of US and Canadian citizens rely on, not to mention part of the US economy, it is suggested that the commission have a perpetual source of funding so that the devastation caused by the sea lamprey does not happen again.

4.4 Conclusion

The Annual Appropriations process is not conducive to long-term stewardship activities. The appropriations process was designed to make monetary contributions on an annual basis. Should there be a funding shortfall during a single year, it creates a

stress on organizations and entities that rely on that funding. For the commission not to receive adequate funding, for a single year, could mean that the gains from the sea lamprey control program could be lost from its inability to fully complete a control regime. To ensure that this does not happen, there needs to be assurance that sufficient annual funding is acquired. One manner in doing so is to create a perpetual funding mechanism that would ensure financial stability.

The commission is unique in that its charge of lamprey mitigation relies on constant and progressive control and research measures to suppress lamprey populations. The inherent nature of a live, reproducing population (especially one as prolific as an invasive species), needs constant control efforts. Annual appropriations, because of the potential to fluctuate in changing political climates, can lead to uncertain funding patterns.

Long-term stewardship activities will be required for many decades, if not hundreds or thousands of years. Thus, a robust and reliable stewardship system will have to endure fluctuating political and economic climates, and will need a sustainable source of funding to support that system. Assuring funding over such long periods is an unprecedented and daunting problem, one that calls for innovative solutions, or innovative adaptations of familiar solutions.[60] In conclusion, invasive species should be a recipient of perpetual funding, essential for their effective management. The current funding mechanism of annual appropriations, due to its potential of fluctuation, therefore, is insufficient in doing so.

5 Alternative Mechanisms of Funding

To address the insufficiency between funding and long-term stewardship, both the inadequacy of annual appropriations and the perpetuity of some environmental issues must be addressed. This section describes the private trust fund as a mechanism to bridge the discrepancy between perpetual environmental problems and the insufficient funding regime of annual appropriations. In response to the potential failure of the annual appropriations funding mechanism concerning long-term stewardship of sea lamprey populations and the health of the Great Lakes, this section will identify alternative funding mechanisms that address funding stewardship in perpetuity. Specifically, the focus of this section will be on the private trust fund, an underutilized mechanism that has already been established by the commission. The private trust fund will be examined as a potential long-term solution to address long-term environmental problems, particularly invasive species.

A continued rate of funding, that does not change annually, is one measure used for addressing the disconnect between annual funding and perpetual environmental issues in this paper. The mechanism that best achieves this is a perpetual fund such as the private trust fund.

5.1 The Private Trust Fund

Though there are various funding mechanisms that could potentially serve as a source for perpetual funding, this research focuses on the private trust fund for two major reasons: first, the commission asked that a feasibility analysis be carried out regarding the prospects of growing the trust fund it had established in 1996 to serve as a supplemental or alternative source of long-term funding. This research is attempting to discern if the

actions by the commission to utilize such a mechanism are appropriate and feasible. Second, the private trust fund appears to be the most effective and pertinent mechanism for long-term funding of environmental issues available to the commission.

Structure and function: private trust fund

A private trust fund is a financial arrangement for managing property, whether that property is money, land, or other economic assets (both real and personal property under legal terms).[61] The nature of a private trust fund is such that the parameters can be defined by the trustees and identified beneficiaries. It is under this pretense that a private trust fund is identified as being an appropriate tool for an organization like the commission. As the commission has established an effective operating structure and oversight components, the implementation of a trust fund would also be directed by the existing parameters and structure under which the commission currently runs.

Defining a trust

The rules outlining a long-term funding mechanism like a private trust fund and the roles and responsibilities of each party involved must be explicit. These criteria ensure that the program is transparent and operates effectively. Literature provides some guidance about how transparency and accountability can be ensured. In particular, Bauer and Probst (2000) describe how accountability and transparency are heightened when organizations have a written and legally binding agreement, signed by all involved parties, that delineates what activities must be undertaken and when. The commission's connection, structure, public participation processes, and financial accountability practices (described in section 3) satisfy the criteria established by Bauer and Probst. The trust funds established by the commission also follow these criteria, and have been

developed to adhere to the already established oversight criteria in the convention, as well as the criteria outlined in section 1.

A trust fund refers to the vesting of income or property in perpetuity for charitable purposes. The definition of charitable purpose is broad enough to cover activities other than direct relief of distress due to poverty or calamities. It includes education, medical relief, and the advancement of any other object of general public utility such as promotion and preservation of the arts. This definition is appropriate for addressing environmental issues, as they too are for general public utility, especially a resource such as the Great Lakes, which can be considered one of the ultimate public "utilities" providing clean water, recreational and commercial fishing, transportation, and overall vitality to the millions of residence of the Great Lakes region, and the U.S. and Canada.

Enforceability of a trust

Without a system that enforces compliance, there will be little confidence in the trustee. Lacking confidence, the trustee loses credibility that a trust can perform its mission or manage funds well.[62] Enforceability ensures that the trust fund is implemented using oversight guidelines for a well managed fund and the criteria that are met by these guidelines include the roles, responsibility, and transparency of the trustee. A trust's guidelines should include not only operational direction, but financial oversight to ensure that the trustee does not mismanage funds. Essential to the effective functionality of a trust fund is that the "enforceability" criteria are in place when creating a trust fund, and that all participants are aware or involved in its development and oversight.

Other trust fund options

Two additional long-term funding mechanisms were briefly compared against each other and the private trust fund during this research: the state, and the federal trust fund. Under different circumstances, the federal and state trust funds prove valuable, but do not meet the criteria essential for operating the commission in a sustainable manner, nor for purposes of long-term funding. In short, these alternative funds: a) do not fulfill the criteria for providing long-term, secure funding for environmental issues; and, b) deserve further research, but will not be given further treatment in this paper. The analysis of state and federal trust funds conducted for this study can be found in Appendix E.

5.2 The structure of the commission's private trust fund

The central feature of a private trust fund, and one that ensures transparency, guidance, and enforceability is a written document that spells out the rules for the use and management of property and clarifies the relationship among different actors and organizations.[63] Clarification is essential, and a major challenge. The above description defines the criteria for a lawful and effective trust fund – this subsection, addresses whether or not the commission fulfills those criteria within its own trust fund structure.

Effects on the commissions's structure upon changing the funding mechanism

What are the potential changes that could take place should the structure of the commission's funding change from that of annual appropriations, to that of a private trust fund mechanism? The purpose of this section is to assess whether a private trust fund would alter (negatively or positively) the efficacy of the commission in doing its job of suppressing sea lampreys and overseeing an effective research program.

When the commission established its private trust fund, the goal was to develop a supplemental source of funding for their perpetual mission. According to the commission, "The purpose of the [trust fund] is to provide enhanced support for sea lamprey management and fishery research programs, the same reasons for which the Commission was formed. The [trust fund] enable[s] interested parties to make tax deductible contributions in accordance with tax regulations in each country."[64]

For the purpose of the commission's funding structure, it is possible to separate the funding mechanism from the operations of the commission. In other words, changing the funding mechanism, in theory, from annual appropriations to a trust fund, only changes the source of funding and not the commission's operations or function. The structure will continue to be in place and will continue to be monitored by already existing oversight measures to ensure effective and efficient management. Mechanisms of oversight, which have been addressed in this paper, include executive oversight through the commissioners (appointed by the President and Parliament), the Convention, and internal and external audits (both financial as well as operational). The commission's private trust fund was established using the existing oversight and management parameters by which the commission currently follows; therefore oversight would continue as it has in the past. Specifically, the parameters of the trust fund, as outlined in the Great Lakes Fishery Commission Trust Fund agreement:

Identical to the *Convention on Great Lakes Fisheries*, the purposes of the Trust activities are:

a) To formulate a research program or programs designed to determine the need for measures to make possible the maximum sustained productivity of any stock of fish in the Convention Area which, in the opinion of the Commission, is of common concern to the fisheries of the United States of America and Canada and to determine what measures are best adapted for such purposes;

b) To coordinate research made pursuant to such programs and, if necessary, to undertake such research itself;
c) To recommend appropriate measures to the Contracting Parties on the basis of the findings of such research programs;
d) To formulate and implement a comprehensive program for the purpose of eradicating or minimizing the sea lamprey populations in the Convention Area; and
e) To publish or authorize the publication of scientific and other information obtained by the Commission in the performance of its duties.[§]

Oversight will remain constant under this new funding mechanism.

The commission's private trust fund, as in any trust, is defined by a trust deed. In the case of the commission, the trust deed uses the exact wording from the *Convention on Great Lakes Fisheries Between the United States and Canada*, Article IV. This article outlines the commission's charge and in the case of the trust fund, how the trust fund will be executed, which is to say, under the same oversight of the current parameters under which the commission currently functions. Therefore, any money that is accrued in the commission's private trust fund will be used exactly as if it were given to the commission through annual appropriations, and monies in the trust fund will have the same oversight. The commission would run as it has in the past, using the funding from the trust fund to conduct its mission under the Convention, vision, commissioners and usual protocol and guidelines.

During the previous 50 years, the commission has accomplished financial credibility by keeping all records and actions transparent through various means such as publishing all spending, activities, and research annually. All financial decisions go through the executively appointed commissioners (both Canadian and US); a majority (90%) of funding goes to the commission's mission of sea lamprey suppression and the

[§] This is from the Great Lakes Fishery Commission Trust Fund document, created to lawfully guide the commission's trust fund monies. This excerpt is also from the *Convention on Great Lakes Fisheries Between the United States of America and Canada* (see appendix A).

rest generally goes to program management, support of the Joint Strategic Plan, and to scientific study for future, more efficient suppression methods for mitigating sea lamprey populations.

Another important aspect of maintaining a private trust fund is to have a successful mission statement that is not only transparent to the initial funding organization, but also to its benefactors. In this case, the commission is the trustee, the US and Canadian governments are the funding organizations, and the citizens of the Great Lakes region are the benefactors. The nature of a private trust fund, established by law is such that the commission would be the trustee, therefore, mandating responsibility of all funding given to the commission. One concern that critics have about trust funds is the issue of accountability and responsibility of the fund's trustee. Clarity is essential to ensuring that the program being funded is transparent, efficient, and effective. As the commission has been working effectively under guidelines mandated by convention for a half century, it is logical for them to outline their strategy and where the funding will be utilized. It appears that the commission has no intention of changing their financial distribution structure, as evidenced by their private trust fund legally following the same rules established by the Convention. In short, the funding mechanism could change, but the structure and function will continue.

Potential legal barriers in capitalizing a private trust fund from federal sources

Further analysis into the feasibility of congressional support of a private trust fund led to previous studies on this subject. In particular, Bauer and Probst address the potential legality of funding a private trust fund using federal sources and they voice a strong opinion that long-term funding mechanisms are appropriate for addressing long-

term stewardship of natural resource issues. During their study, they ask that further investigation of whether or not the federal government has the "legal authority to finance . . . private-charitable trust funds, in this case, for financing and oversight of long-term stewardship."[65] This led to a similar question; reassessing the original research question from "How can the commission capitalize its trust fund through federal funds?" to "Can the commission capitalize its trust fund through federal funds?" Their conclusion to the above concern is that if the federal government does not have such authority, that it should be obtained, as they believe that private trust funds are beneficial to the long-term stewardship of the environment and natural resources. Again, the scope of this study does not address the legality of the federal government's ability to capitalize a private trust fund; however, this paper will address the potential ramification assuming it is legal.

5.4 Conclusion

This section demonstrated that a private trust fund meets the criteria for creating a long-term, clearly structured, enforceable and permanent funding mechanism to address perpetual environmental stewardship, as defined by the commission, to address invasive species and ecosystem management on the Great Lakes. It further demonstrated that the commission's private trust fund has been established in accordance with these criteria, meeting the standards suitable and appropriate for creating a sustainable long-term funding mechanism.

6 Option and recommendations

This research has characterized the private trust fund as an effective long-term funding mechanism appropriate for addressing long-term environmental stewardship. Further, this research has demonstrated that the performance of a trust fund will be dependent on how that specific trust is structured and through what appropriate legal guidelines it will become a responsible and enforceable funding mechanism. The commission, from its inception, has been under the direction of such legal guidelines, directing its operations and serving as oversight for effective control and responsible financial operations. These guidelines, in the form of the Convention, constitute the guiding principles that the commission must follow. The private trust fund that the commission developed in 1996 also follows the guidelines of the Convention and, thus, follows the necessary structure outlined in this document to serve as an effective and responsible funding mechanism. Therefore, it has been established that the commission under its current operational and financial guidelines, when both utilizing its current funding regime (annual appropriations), and for its potential utilization of its established private trust fund, needs only to assess how to capitalize their trust fund and to what effect capitalizing that fund might have on their operations and political relationships.

Two questions logically arise from the realization that a private trust fund is a useful and beneficial mechanism, and both must be answered by the commission prior to embarking on a mission of capitalizing its trust funds, they are:

1. *How does one capitalize the trust fund to a degree that annual interest accrued equals that which the Great Lakes Fishery Commission can utilize to practically supplement or run, partially or in full, its control and/or research programs?*

2. Would the capitalization of the private trust fund create a break in funding flow that would inhibit the commission's ability to control lamprey at any point?

These two questions will be addressed in sections 6.1 and 6.2 respectively, identifying future research essential to the commission's efforts in capitalizing their private trust fund. It must be noted here, and will be reiterated, that any action taken to establish capital into the commission's trust fund, must be initiated with a serious study of how capitalization of their trust fund will affect the funding relationship with the federal government, and whether or not there could be adverse ramifications or benefits concerning funding of the commission. It is the intention of the next two sections to identify a variety of potential fund raising mechanisms the commission can use, the advantages and disadvantages of using each mechanism, and the crucial question of how a capitalized trust fund might effect the relationship between the commission and congress.

6.1 Potential sources for capitalizing the commission's private trust fund

Thus far, the research in this paper has concluded that the private trust fund is a long-term funding mechanism suitable for the commission to utilize to run its programs. It will now assess the potential options the commission can take to begin capitalizing the trust fund. Here, we refer to the question: *How does one capitalize the trust fund to a degree that annual interest accrued equals that which the Great Lakes Fishery Commission requires to run, partially or in full, its control and/or research programs?* Capitalizing the commission's private trust fund can be done in a variety of ways, from private sources (individual citizens or companies) to federal funding (contingent on the legality of federal monies being allocated into a private trust fund). The below

suggestions are not in any specific order and all will need to be further assessed for their practicality and appropriateness under the current, and if possible, future political, economic, and social climates within the Great Lakes region as well as at the federal level.

Each option below consist of a myriad of legal, political, and/or logistical complexities, and therefore each option deserves its own dedicated research, beyond the scope of this paper, to fully assess its feasibility and appropriateness for use by the commission.

- One manner in which the commission could capitalize its private trust fund could be to set aside a certain percentage of their environmental program costs (from their annual appropriations allocation) each year and invest that into their trust fund.[66] The rate at which the fund is capitalized is wholly dependant on the commission's ability to invest a part of its annual appropriations, while still conducting an effective control and research program. Nevertheless, the conflict immediately arises that the commission initially created their trust fund due to congressional appropriations not meeting inflation, or being insufficient due to the political climate. In short, the commission's current funding regime has been insufficient to implement their full control and research programs, and therefore, will likely not have enough extra funding to invest into the trust fund without affecting the commission's programs. Although, in the long-term, slowly capitalizing the trust fund would be beneficial, it would need to be assessed by the commission, if every year, capital could be taken out of their already insufficient funding regime, thus potentially hurting the resource further by not allowing the commission to conduct its full control and research program.

- Another option for capitalizing the commission's private trust fund would be to accept private donations. This option may be the easiest of all of the options in this section, and is currently practiced by the commission. The amount of money annually collected through this means, however, to date has been inadequate, and does not amass enough interest to make a practical difference in supplementing the control operations or research program of the commission during a financial shortfall.[**] On a small scale, this practice of donation has not been questioned, however, should the commission actively seek larger contributions, a question of responsibility could emerge. Because the sea lamprey was introduced into the Great

[**] Currently, companies and friends of the GLFC have contributed small amounts of money into the GLFC account, more as a gesture of contribution to the health of the Great Lakes ecosystem as a whole. These monies, currently total $146,405 from donations between 1996 to the present and are practically insufficient to support the commission's operations in part or in full.

Lakes by federally mandated and funded canals, and the federal governments of the United States and Canada have agreed to fund the mitigation of sea lamprey populations (through the Convention), any solicitation on the part of the commission to capitalize the private trust fund could potentially be met with disagreement from other entities within the Great Lakes (e.g. commercial and recreational fisherman, tribes, shipping, public, etc). This tends to be a problem of perception and a question of whose responsibility it truly is to fund the mitigation of sea lamprey. Though it would benefit all stakeholders were they to contribute to the fund, precedence has already been set with the federal government funding the commission for the past 50 years. As the Great Lakes waters are divided into state, provincial, tribal and local waters, it would be difficult to find a stakeholder willing to "pay" for the stewardship of others, especially in a resource of common use. The potential for the free-rider to piggy back on other's willingness to help would be pervasive. As the Convention has outlined that there are federal monies available to address the problem of fisheries decline due to sea lamprey control, other stakeholders may not feel it is their duty to contribute. In short, an active campaign within the Great Lakes region to accrue monies to fill the commission's private trust fund would need to be done carefully, possibly framed in a manner that espouses future research, rather than control.

- The commission can attempt to fundraise through various means (selling items, holding fund raisers). This option has the same problems as option 2; attempts by the commission to accrue money from the citizens of the Great Lakes could look politically inappropriate, as the federal government is already funding the commission. Attempts to bolster funding would again have to be framed carefully, in terms of research growth, or a more difficult approach, describing the inadequate annual funding regime of annual appropriations, and how the commission needs to supplement their under funded programs. An additional problem that could arise is the funds required and the energy (e.g. staff time) it would take to implement such a program. The commission would need to assess if the trade off of staff time dedicated to capitalizing their private trust fund would out-weigh current efforts to encourage the federal government to adequately fund the commission annually.

- The commission could attempt to encourage the federal government to allocate a one time, large sum, to the commission's private trust fund. Should the appropriate amount of money be allocated (e.g. an appropriate allocation would have to be sufficient to accrue interest in the amount that would fully fund the commission annually). This amount of money would ensure that, at a suitable interest rate, the commission will be able to perform its annual duties in perpetuity and without further annual federal funding.[††] This option could capitalize the trust fund to a point that would adequately fund the commission's programs annually.

- Congress can provide a budget authority over multiple years, providing outlays as it deems appropriate. The governments could capitalize the commission trust fund over 2 or more years that will eventually fill the commission's private trust fund so that it

[††] The option has been discussed by Bauer and Probst as a suitable; however, the legality of this option is not clear.

can accrue interest to the level that it can perform its annual duties in perpetuity and without further annual federal funding. This option would require the commission be funded appropriately while the trust fund accrued the appropriate interest. Or that the federal government would need to over fund the commission, ensuring it had enough money for its operations as well as a substantial amount to fill the trust fund.

- An option that is already used for state trust funds is the use of stamps and stickers on boating or hunting license and Great Lakes fisheries use. This option needs further investigation as a potential alternative. It appears that this funding process would be difficult on a state level, as money accrued by one state could be viewed, by the state sponsoring the stamp, as unfairly contributing to a already federally funded program.

Any of the above funding solutions can be used to partially fill the commission's trust fund so that the fund will be able to supplement operations or research rather than replacing annual appropriations altogether. The above suggestions for capitalizing the commission's private trust fund were developed from informal interviews and discussions with commission staff and upon looking at trust fund literature and fund raising literature; it is not an exhaustive list of funding options. Each suggestion has potential problems as well as its benefits. For example, the first suggestion is that the commission could embark upon its own fund raising campaign. Though this is a viable option it has several setbacks:

- Dedicated or increased staff, staff time, and/or staff energy. This would be taken away from staff time that is currently utilized for the purposes of maintaining an invasive species mitigation program and research program.
- Would fund raising activities be allowed under the guidelines of the commission?
- Small gains vs. large efforts. Though we have not investigated all potential funding options, it is assumed that merchandise would be one of them. The market for these would likely bring in minimal dollars. The commission has invested in the development of a fresh water "pop-off" archival fish tag with a private sector company. If this technology is developed successfully, it could generate considerable revenue for the commission's trust fund.[67]
- Outsourcing talent and production. Should the staff of the organization not have the appropriate talent to design marketable merchandise, the commission would likely have someone design it; furthermore, merchandise would have to be made by other organizations. In addition to costing money, time and energy, the gains (as mentioned above) would be minimal for trying to supplement a trust fund to a degree that it would be practical.

- Social and political views. The commission is a federally funded entity. There could be a negative social perception that the commission was trying to get more than it deserves from the community (as tax dollars fund the commission). This perception, whether real or not could be detrimental to the commission's efforts.
- Legality. Is the commission allowed to "profit" from sales of merchandise or other fundraising activities? Are there local, state, federal laws that need to be addressed?

The ability to initiate the above options will depend on the resources (financial and personnel) available to the commission in any one year. Efforts will range from managing a fund raising campaign (whether it is merchandise oriented or not), lobbying for special stamps on licenses, or initiating congress in a discussion on their willingness to appropriate large sums of money into the commission's trust fund. A larger issue arises, however, with the capitalization of the commission's trust funds, and that is one of financial independence from congress. Earlier it was mentioned that Congress does not like to lose the power of the purse. It is thus the interest of the commission to assess whether they see the federal government and other stakeholders becoming threatened by the commission's perceived or real financial independence from the appropriation's committees.

6.2 How will capitalization of the private trust fund effect the "normal" funding structure of the commission?

Making long-term funding and stewardship commitments can be a highly political issue, typically inviting strong opposition and conflict, as interest groups that currently have political influence try to institutionalize it.[68] The process by which the commission engages in the establishment of an independent, long-term source of funding, could potentially create an atmosphere of unease between the commission and congress. The conflict would likely stem from congress' influence over funding, or the "power of the purse," becoming drastically diminished should the commission gain financial independence or strength through the capitalization of their trust fund. This relationship

between the commission and the federal government's appropriation's committees is a subject that this section will cover, and will be guided with the crucial question: "*Would the capitalization of the private trust fund create a break in funding flow that would inhibit the commission's ability to control lamprey at any point?"* It is important to realize that, should the commission begin to, or succeed in, funding their private trust fund, congress may view this as a threat of losing their power of funding over the commission. Whether this is a real or perceived threat, actions taken by Congress could include reducing the appropriations annually to the commission. Should the commission's trust fund not be capitalized sufficiently, then its ability to supplement, or cover the costs, should Congress cut funding to any degree, may be inadequate, thus threatening, or greatly reducing, the ability to conduct its research and control programs (e.g. the trust fund would be unable to produce enough in interest to cover operational costs, or to meet the shortfall of the governments cuts). The amount to which the commission can fill its trust fund to use as supplemental funding of the commission's programs, while still receiving annual appropriations, needs to be calculated so that at no time does federal funding decrease or become unavailable and thus threaten the commission's program. Therefore, this section will address some potential reactions of congress concerning the theoretical capitalization of the commission's trust fund and assess whether it is feasible to increase the long-term funding proficiency of the commission through the capitalization of their trust fund (and thus creating a better, more effective long-term funding mechanism), without threatening its ability to execute its control, program management, and research programs.

Potential political reactions to a capitalized private trust fund

To understand the reaction of congress towards a financially independent Great Lakes Fishery Commission, it is necessary to briefly revisit the political process under which discretionary funding operates, the power that Congress has, and what that power means, and the ramifications of the independence on said power.

Dick Munson, Executive Director of the Northeast-Midwest Institute and author of The Cardinals of Capitol Hill, assessed that the appropriations committee would not be amenable to having the commission capitalize their trust fund, as congress would lose power over their district, and thus lose political capital that is often garnered through appropriating funds to their region with claims of progress. The commission's trust fund would be a mechanism that takes power away from them, creating an independent funding source.[69] Mr. Munson's comments are supported by testimony by Senator Bennett (R-UT), during a Capitol Hill Hearing of the Senate Committee on Environment and Public Works, May 24, 2000. 11 Feb. 2004. Senator Bennett testified against a trust fund bill (not a private trust fund), stating: "I'm troubled with the idea of setting up yet another trust fund with a dedicated source of revenue for that trust fund. That trend throughout the government as a whole bothers me because if we end up with a government of a series of trust funds, a dedicated revenue for dedicated purposes, we ultimately destroy the power of the Congress to allocate resources where they're most needed."[70] Establishing another trust fund could abrogate Congress's constitutional responsibilities and powers to allocate funding.

6.3 Conclusion

The commission's ability to capitalize their trust fund depends on a number of factors, foremost the resources available to the commission to conduct fund raising and also the calculation of how much their fund raising will benefit the trust fund: effort of fund raising methods vs. benefit to the trust fund. Under some circumstances, should the commission desire to capitalize the fund through federal means, the question of legality that must be answered. And finally, the commission will have to assess the political ramifications that would affect funding. To what degree can the commission's private trust fund be capitalized before affecting the federal government's willingness to continue fully funding the Great Lakes Fishery Commission; at what level of financial independence (from the private trust fund's capitalization) is the government's power-of-the-purse considered under threat? Will Congress react to a self-sufficient, independent funding mechanism by reducing their annual contributions to the Great Lakes Fishery Commission's trust fund? Finally, at what level of capitalization of the trust fund would offset a reduction in federal funding, and therefore begin self-sufficiency?

This paper concludes that there are two major avenues to capitalize the commission's trust fund, through federal means and other means (both described in section 6.1). Should the commission choose to attempt the capitalization, in all or part, through federal means, the commission would have to calculate the political feasibility of approaching the federal government, and it would have to calculate the consequences of continuing its control and research programs while this process took place (should the federal government agree to capitalizing the fund). Would the federal government give the full amount in one lump sum or in installments – and either way, would this funding

scheme allow for the commission to conduct its operations during the fiscal year that this took place without compromising either the trust fund's planned financial ability to fully fund the commission in the future, or the ability of the commission to conduct its control and research programs without a break. Should the commission wish to pursue other means of capitalizing the trust fund, the commission will need to assess the best approach (and its legality) in terms of benefits vs. efforts, while also gauging its final goal (e.g. supplemental or fully funding the program). Finally, the commission will need to assess the reaction of the federal government to the capitalization of their trust fund, realizing it could be viewed as a competitive, independent source of funding that could take power away from Congress and, therefore, create a reaction that would compromise future annual appropriations, hampering the ability of the commission to conduct its full control and research programs.

7 Conclusion/Discussion

For 100 years the sea lamprey has been living in the Great Lakes. By the 1940s and 1950s the once thriving fishery was destroyed; harvests in the Great Lakes fell to nearly zero and the way of life for millions in the region disappeared. Since its conception in 1955, the Great Lakes Fishery Commission has fought the spread and prominence of lampreys with success; reducing sea lamprey populations by 90% in most areas within the Great Lakes.[71] The success of the commission has been contingent on relatively stable annual appropriations during the previous 50 years; however, annual appropriations as a funding mechanism during that same time, have been unstable, and at times the commission has had inadequate resources to perform its duties to the fullest. This has also meant that there have been fluctuations in the populations of sea lamprey, which in turn negatively affect the Great Lakes fishery, ecosystem, and ultimately the region's economy.

Therefore, in 1996, the commission established a private trust fund to eventually capitalize it to a degree that it could either assist in the function of the commission's funding structure by accruing interest enough that it could supplement annual appropriations, bolstering the science research and augment the control efforts of the commission when the federal government gave adequate annual funding, or filling gaps when the federal government did not appropriate adequate funding; or should the trust fund be capitalized sufficiently, to serve as a surrogate funding source for the commission, due to the instability of the federal annual appropriations process.

Evidence shows that when the commission was established in 1955, the framers of the convention, and thus the commission, had criteria for creating a substantial and

effective long-term program. This translates, clearly, into a philosophy that is required for establishing a parallel funding mechanism to meet the long-term, effective ecosystem management and research programs that the commission has been engaged in for more than 50 years.

The focus of this research was to determine the feasibility of funding an already established private trust fund of the commission as an alternative funding mechanism to replace annual appropriations, which is deemed as an unstable source of funding. It has been established that the commission is a good candidate due to its current organizational structure, historical performance and the nature of the environmental and resource problems that the commission is addressing.

The private trust fund is an appropriate, stable mechanism that can assist in the perpetual funding of long-term environmental issues, such as the one that the commission has addressed during the last half-century. Established in a legal, transparent manner, the private trust fund can serve as a stable source of funding. This mechanism is important not only for the commission, but for other entities throughout the United States who are working on long-term environmental stewardship issues. The private trust fund can potentially serve as a constant, annual source of funding to address these issues.

This paper concludes that a properly capitalized private trust fund is an effective mechanism for an organization such as the Great Lakes Fishery Commission, in that it will provide a perpetual source of funding to control the invasive species sea lamprey, an animal that given current technologies, will forever be in the Great Lakes. The issue of how to capitalize the trust fund and what the potential ramifications, politically, would be of capitalizing the trust fund are actually the larger problem within this study, and had not

been foreseen prior to the development of the study. To determine the feasibility of capitalizing the commission's trust fund with enough money to practically supplement the commission's research program or control program, or to fully fund and operate the commission's overall programs indefinitely, the following issues must be addressed:

- Obtaining an appropriate amount of money in the private trust fund so that annual interest covers the commission's operating costs (and annual interest rates) perpetually; as well as future projected needs; and,
- Congress' relinquishing financial control over the commission, and thus reducing its political power of appropriations.

While the hypothesis at the beginning of this paper does hold true – that "a secure, long-term mechanism of funding, such as a private trust fund, will enable the commission to address the threat of financial insufficiency, while optimizing Great Lakes ecosystem health" it appears that it is not feasible to capitalize the trust fund fully due to what is perceived as political weakening of Congressional appropriations committees. Once a trust fund is capitalized, whether through public or private funds, congress could read this as a weakening of their powers, which could then have adverse effects of funding for future commission appropriations. Nevertheless, should the trust fund be adequately funded with a one time donation/allocation, and thus the necessary funds were being produced through the normal operations (interest) of the trust fund, annual appropriations (and therefore political maneuvering) could become obsolete.

These findings support the use of a private trust fund as a perpetual funding mechanism to address unremitting environmental issues, such as the invasive sea lamprey. Further studies, however, are needed to ascertain the degree in which such a mechanism would be used as a supplement to conventional federal funding and where it could be implemented as the sole source of funding in perpetuity. Another aspect of

future studies must also determine where the funding to capitalize the trust fund would come from: a federal source, private source(s), or a combination of the two.

There are various levels of perpetual problems that need the attention of long-term stewardship. For very obvious reasons, this paper focuses on the long-term stewardship of Great Lakes natural resources pertaining to the control of invasive species and specifically the sea lamprey. It is essential, however, to note that perpetual problems exist in other aspects of society that are susceptible to the same funding instability that the commission faces, with long-term stewardship needs and the lack of perpetual funding that they require, not in harmony.

It is the conclusion of this research that the private trust fund established by and for the Great Lakes Fishery Commission is an appropriate and suitable long-term funding mechanism. Funded at the appropriate levels, the commission's private trust fund will certainly act as a perpetual source of annual income to either supplement or fully fund the commission's control and/or research operations. Therefore, the commission will certainly need to investigate further the manner in which it attempts to capitalize their trust fund, and to what degree, to ensure that there are no undue political, social, or financial ramifications that could threaten the commission's sea lamprey control operations, research advancement, or future funding.

Appendix A: Convention on Great Lakes Fisheries between the United States of America and Canada

Convention on Great Lakes Fisheries between the United States of America and Canada

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The Government of the United States of America and the Government of Canada,

- Taking note of the interrelation of fishery conservation problems and of the desirability of advancing fishery research in the Great Lakes,
- Being aware of the decline of some of the Great Lakes fisheries,
- Being concerned over the serious damage to some of these fisheries caused by the parasitic sea lamprey and the continuing threat which this lamprey constitutes for other fisheries,
- Recognizing that joint and coordinated efforts by the United States of America and Canada are essential in order to determine the need for and the type of measures which will make possible the maximum sustained productivity in Great Lakes fisheries of common concern,

Have resolved to conclude a convention and have appointed as their respective Plenipotentiaries:

The Government of the United States of America:
WALTER BEDELL SMITH, Acting Secretary of State of the United States of America, and

WILLIAM C. HERRINGTON, Chairman of the Delegation of the United States of America to the Great Lakes Fisheries Conference, and

The Government of Canada:
ARNOLD DANFORD PATRICK HEENEY, Ambassador Extraordinary and Plenipotentiary of Canada to the United States of America, and

STEWART BATES, Chairman of the Delegation of Canada to the Great Lakes Fisheries Conference,

who, having communicated to each other their respective full powers, found in good and due form have agreed as fellows:

ARTICLE I

This Convention shall apply to Lake Ontario (including the St. Lawrence River from Lake Ontario to the forty-fifth parallel of latitude), Lake Erie, Lake Huron (including Lake St. Clair), Lake Michigan, Lake Superior and their connecting waters, hereinafter referred to as "the Convention Area." This Convention shall also apply to the tributaries of each of the above waters to the extent necessary to investigate any stock of fish of common concern, the taking or habitat of which is confined predominantly to the Convention Area, and to eradicate or minimize the populations of the sea lamprey (*Petromyzon marinus*) in the Convention Area.

ARTICLE II

1. The Contracting Parties agree to establish and maintain a joint commission, to be known as the Great Lakes Fishery Commission, hereinafter referred to as "the Commission," and to be composed of two national sections, a Canadian Section and a United States Section. Each Section shall be composed of not more than three members appointed by the respective Contracting Parties.
2. Each Section shall have one vote. A decision or recommendation of the Commission shall be made only with the approval of both sections.
3. Each Contracting Party may establish for its Section an advisory committee for each of the Great Lakes. The members of each advisory committee so established shall have the right to attend all sessions of the Commission except those which the Commission decides to hold in camera.

ARTICLE III

1. At the first meeting of the Commission and at every second subsequent annual meeting thereafter the members shall select from among themselves a Chairman and a Vice-Chairman, each of whom shall hold office from the close of the annual meeting at which he has been selected until the close of the second annual meeting there after. The Chairman shall be selected from one Section and the Vice-Chairman from the other Section. The offices of Chairman and Vice-Chairman shall alternate biennially between the Sections.
2. The seat of the Commission shall be at such place in the Great Lakes area as the Commission may designate.
3. The Commission shall hold a regular annual meeting at such place as it may decide. It may hold such other meetings as may be agreed upon by the Chairman and Vice-Chairman and at such time and place as they may designate.
4. The Commission shall authorize the disbursement of funds for the joint expenses of the Commission and may employ personnel and acquire facilities necessary for the performance of its duties.
5. The Commission shall make such rules and by-laws for the conduct of its meetings and for the performance of its duties and such financial regulations as it deems necessary.

6. The Commission may appoint an Executive Secretary upon such terms as it may determine.
7. The staff of the Commission may be appointed by the Executive Secretary in the manner determined by the Commission or appointed by the Commission itself on terms to be determined by it.
8. The Executive Secretary shall, subject to such rules and procedures as may be determined by the Commission, have full power and authority over the staff and shall perform such functions as the Commission may prescribe. If the office of Executive Secretary is vacant, the Commission shall prescribe who shall exercise such power or authority.

ARTICLE IV

The Commission shall have the following duties:

(a) to formulate a research program or programs designed to determine the need for measures to make possible the maximum sustained productivity of any stock of fish in the Convention Area which, in the opinion of the Commission, is of common concern to the fisheries of the United States of America and Canada and to determine what measures are best adapted for such purpose;

(b) to coordinate research made pursuant to such programs and, if necessary, to undertake such research itself;

(c) to recommend appropriate measures to the Contracting Parties on the basis of the findings of such research programs;

(d) to formulate and implement a comprehensive program for the purpose of eradicating or minimizing the sea lamprey populations in the Convention Area; and

(e) to publish or authorize the publication of scientific and other information obtained by the Commission in the performance of its duties.

ARTICLE V

In order to carry out the duties set forth in Article IV, the Commission may:

(a) conduct investigations;

(b) take measures and install devices in the Convention Area and the tributaries thereof for lamprey control; and

(c) hold public hearings in the United States of America and Canada.

ARTICLE VI

1. In the performance of its duties, the Commission shall, in so far as feasible, make use of the official agencies of the Contracting parties and of their Provinces or States and may make use of private or other public organizations, including international organizations, or of any person.
2. The Commission may seek to establish and maintain working arrangements with public or private organizations for the purpose of furthering the objectives of this Convention.

ARTICLE VII

Upon the request of the Commission a Contracting Party shall furnish such information pertinent to the Commission's duties as is practicable. A Contracting Party may establish conditions regarding the disclosure of such information by the Commission.

ARTICLE VIII

1. Each Contracting Party shall determine and pay the expenses of its Section. Joint expenses incurred by the Commission shall be paid by contributions made by the Contracting Parties. The form and proportion of the contributions shall be those approved by the contracting Parties after the Commission has made a recommendation.
2. The Commission shall submit an annual budget of anticipated joint expenses to the Contracting Parties for approval.

ARTICLE IX

The Commission shall submit annually to the Contracting Parties a report on the discharge of its duties. It shall make recommendations to or advise the Contracting Parties whenever it deems necessary on any matter relating to the Convention.

ARTICLE X

Nothing in this Convention shall be construed as preventing any of the States of the United States of America bordering on the Great Lakes or, subject to their constitutional arrangements, Canada or the Province of Ontario from making or enforcing laws or regulations within their respective jurisdictions relative to the fisheries of the Great Lakes so far as such laws or regulations do not preclude the carrying out of the Commission's duties.

ARTICLE XI

The Contracting Parties agree to enact such legislation as may necessary to give effect to the provisions of this Convention.

ARTICLE XII

The Contracting Parties shall jointly review in the eighth year of the operation of this Convention the activities of the Commission in relation to the objectives of the Convention in order to determine the desirability of continuing, modifying or terminating this Convention.

ARTICLE XIII

1. This Convention shall be ratified and the instruments of ratification shall be exchanged at Ottawa.
2. This Convention shall enter into force on the date of the exchange of the instruments of ratification. It shall remain in force for ten years and shall continue in force thereafter until terminated as provided herein.
3. Either Contracting Party may, by giving two years' written notice to the other Contracting Party, terminate this Convention at the end of the initial ten-year period or at any time thereafter.

IN WITNESS WHEREOF the respective Plenipotentiaries have signed the present Convention.

DONE at Washington, in duplicate, this tenth day of September, 1954.

For the Government of the United States of America:
(Signed) WALTER BEDELL SMITH

(Signed) Wm. C. HERRINGTON

For the Government of Canada:
(Signed) A. D. P. HEENEY

(Signed) STEWART BATES

Appendix B: Great Lakes Fishery Act of 1956

GREAT LAKES FISHERY ACT OF 1956[72]

16 U.S.C. §§ 931-939c, June 4, 1956, as amended 1986.

Overview. The Act sets forth procedures for carrying out programs under the 1954 Convention on Great Lakes Fisheries.

Selected Definitions. Commission: Great Lakes Fishery Commission. Convention: September 10, 1954 Convention on Great Lakes Fisheries, between the U.S. and Canada. Great Lakes: Lake Ontario (including the Saint Lawrence River from Lake Ontario to the forty-fifth parallel of latitude), Lake Erie, Lake Huron (including Lake Saint Clair), Lake Michigan or Lake Superior. Great Lakes state: Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania or Wisconsin. § 931.

Commissioners and Advisory Committees. The Act directs the President to appoint four Commissioners, who will not be compensated, to represent the U.S. on the Commission. One Commissioner must be an official of the U.S. government and three must be individuals who reside in different Great Lakes states and are knowledgeable regarding the fisheries of the Great Lakes, except one must also be an official of a Great Lakes state. § 932.

The U.S. Section is to appoint an advisory committee, composed of not more than four members, for each of the Great Lakes. Selections will be made from a list composed by the governor of the state, giving consideration to: state agencies having jurisdiction over fisheries; the commercial fishing industry of the lake; the sport fishing of the lake; the public at large. A member may be appointed to more than one committee. No compensation will be given to advisory committee members, except not more than five members of all committees may be paid transportation expenses and per diem by the U. S. government incident to attending each meeting of the Commission or the U.S. Section. § 933.

Implementation. In order to carry out obligations under the Convention, the U.S. Section is authorized to: acquire real property; construct, operate and maintain projects designed to facilitate compliance with Convention provisions relating to the sea lamprey control program; enter into contract or agreement with a state, public or private agency, or individual for the construction, operation or maintenance of a project. § 935.

The Secretary is authorized to transfer lamprey control projects to the U.S. Section and to act on behalf of the U.S. Section to carry out the provisions of the Act. § 936.

Notification. At least 30 days before approving a proposal to utilize a lamprey control measure or install a device on a stream, the U.S. Section must give notice to the official agency having jurisdiction over fisheries in each state in which the stream flows. § 938.

When the Commission recommends a conservation measure, the Secretary of State will give a copy of the recommendation, with comments, to the governor of each Great Lakes state for consideration. Other public agencies will also be informed. § 939.

Other Provisions. Agencies of the U.S. government are authorized to cooperate with the U.S. Section to conduct research programs and related activities on a reimbursable basis, and to enter into agreements to assist in carrying out the program for control of lamprey production. § 939a.

The Act will not prevent a Great Lakes state from making or enforcing laws as long as they do not conflict with the Convention or the Act. § 939b.

Appropriations Authorized. Congress authorized to be appropriated funds necessary to carry out the provisions of the Act. § 939c.

Appendix C: A Joint Strategic Plan for Management of Great Lakes Fisheries

BACKGROUND

This Joint Strategic Plan for Management of Great Lakes Fisheries1 was first proposed in December 1980 and adopted in 1981 as a commitment to interjurisdictional coordinated fishery management based upon an ecosystem approach. Except for the addition of two ratifying Parties2 in 1989, the Plan remained unchanged until the Parties revised it in 1997.

The 1997 revisions were intended to strengthen the Plan based upon a review of progress made and by applying lessons learned in implementing the original Plan. They were approved by the Parties in accordance with the terms of the *Memorandum of Acceptance of the Joint Strategic Plan for Management of the Great Lakes Fisheries*, which provides that any changes to the Plan should be accomplished by consensus, utilizing procedures similar to those used in developing the Plan. Guided by the same principles and using the same "steering committee" approach that led to the original Plan, the Parties developed and adopted the 1997 revisions based upon their commitment to and definition of consensus embodied in the Plan.

The Original Plan -- 1981

In adopting the original Plan in 1981, the Parties recognized that varied interest groups had become active and influential in determining the uses and environmental management of the Great Lakes. At that time, the ecosystem approach to Great Lakes management already was accepted by the Great Lakes Fishery Commission and the International Joint Commission, and recognized that any impact on a part of the system may to some degree affect an entire lake, connecting channels, and even the entire basin. Hence, lakewide-basinwide perspectives were recognized as essential to effective management. In revising the Plan in 1997, the parties reaffirmed this ecosystem approach to Great Lakes management. Thus, they also reaffirmed their agreement that a strong, practical, strategic Great Lakes fisheries management plan is necessary to ensure the public=s fishery resources receive full recognition and consideration in the present and proposed activities of any user and that the Plan should prove particularly beneficial in coordinating environmental and fishery agency Great Lakes management efforts into a complementary process, thus helping to protect and, where possible, to enhance Great Lakes fishery resources.

The Parties viewed the Great Lakes Fishery Commission as the logical forum for their development of the original Plan and for the 1997 revision. The Commission provided the Parties with financial, logistical, and technical support, and played an important coordinating role, in particular through the Parties' utilization of the Commission's management committee structure, e.g., Lake Committees, Great Lakes Fish Health Committee.

While the Commission played an important international, interjurisdictional, coordinating role, the Plan was to recognize the constitutional and other legal responsibilities of the management agencies to manage their respective fishery resources. The Parties understood that: commitment to the Plan must be secured from high-ranking fishery agency officials; these officials and their staffs should be involved from the beginning so

that the product would be their plan and the originators would then become advocates and implementers; and the Plan must be strategic in scope, forming an umbrella under which operational plans could be developed for each of the lakes and connecting channels. Thus, all of the efforts to develop the original Plan and the 1997 revisions were designed to secure the prerequisite consensus of the Parties.

In developing the original Plan, high-ranking natural resource administrators from agencies with Great Lakes fishery responsibilities, with the support and assistance of the Commission's secretariat, determined the scope of the proposed activity; the roles and responsibilities of the Great Lakes Fishery Commission, participating agencies, interested agencies, interested organizations, and the public; and committee structure and terms of reference. By signing the Plan, they committed the involved agencies. An interjurisdictional Steering Committee was created and charged to: a) identify the broad key problem areas that must be addressed to comprehensively manage the Great Lakes fishery resources now and in the future; b) develop the planning process to be used for the Plan; and c) develop the framework of what should be included in the Plan.

The administrators eventually formed themselves into the Committee of the Whole, one member from each agency. They approved the proposed planning process and reserved for themselves final review of the Plan before submission to the Great Lakes Fishery Commission and the agencies. They also: decided the membership of the Steering Committee would include a representative from each state, the United States Fish and Wildlife Service, and the National Marine Fisheries Service, plus two each from the Province of Ontario and Canada Department of Fisheries and Oceans; named the members; and charged them to select cochairmen from Canada and the United States to carry out the planning process, to produce a plan by appointing work groups, reviewing products, communicating with jurisdictions and making whatever other effort was necessary to meet their charge.

The Steering Committee carried out its charge by forming workgroups to develop the draft common goal statement, major issue statements, and strategic procedures. In developing these, the Steering Committee relied upon responses to a questionnaire the was submitted to all Great Lakes fishery agencies, the results of a workshop funded by the Great Lakes Fishery Commission, and many documents such as individual fishery agency plans and other strategic fishery management documents from the various jurisdictions.

The efforts of the Committee of the Whole and Steering Committee resulted in the December 1980 draft Plan that was formally ratified by the original twelve Parties through the 1981 *Memorandum of Acceptance*.

1986 Plan Revision

A 1986 review of the Plan (Great Lakes Fishery Commission Special Publication 88-1) resulted in the Parties' invitation for two additional agencies to sign . In May 1989, the Chippewa-Ottawa Treaty Fishery Management Authority and the Great Lakes Indian Fish and Wildlife Commission joined the original twelve fishery agencies in endorsing and signing the *Memorandum of Acceptance* for the Plan. The 1986 review reaffirmed the wisdom and necessity of the Plan, and offered additional strategies that were not formally incorporated into the Plan but that have been acted upon. One such strategy was the institution of the State of the Lakes report system.

1997 Plan Revision

In 1995, the Parties agreed to review the collective progress in implementing the Plan. In so agreeing, they affirmed their commitment to the Plan and its consensus strategy -- the Plan would not be changed without reaching consensus. As was done in developing the original Plan, the Parties appointed an interjurisdictional Review Steering Committee to facilitate the Parties' review by identifying issues, ways to better implement the original Plan, or ways in which the Plan could be improved to better fulfill its intent and to meet new challenges.

One such challenge was the need to better coordinate and integrate fisheries and environmental ecosystem management initiatives, particularly regarding implementation of the Great Lakes Water Quality Agreement between the United States and Canada (WQA). The WQA, Annex 2, calls for the development of Remedial Action Plans (RAPS) and Lakewide Management Plans (LAMPS) embodying a systematic and comprehensive approach to restore and protect beneficial uses in Areas of Concern and in open lake waters. The Parties have attempted to meet this challenge by incorporating strengthened fisheries management/environmental management coordination Strategic Procedures into the Plan.

With the logistical, financial, and technical support of the Great Lakes Fishery Commission, the Review Steering Committee prepared a questionnaire to obtain input from those individuals associated with efforts to implement the Plan and those closely allied with related initiatives. From the survey's results, the Review Steering Committee identified a number of issues for consideration during the review process. The Committee prepared discussion papers on these issues that were considered at a workshop attended by many of the survey participants and others active in fishery and environmental management programs. Eventually, the Review Steering Committee prepared draft revisions to the Plan consistent with its charge. It provided its rationale for its recommendations in a background document that was presented to the Parties along with the draft revisions. The Parties adopted the proposed revisions, and incorporated them into the Plan as presented in this document. See Great Lakes Fishery Commission Special Publication 97-___.

The Plan recognizes that the Great Lakes Fishery Commission=s individual lake committees will be the major action arms for its implementation and for developing operational plans. The Commission's Great Lakes Fish Health Committee also plays an important role. At the same time, the Plan recognizes the continuing role of the Commission's Council of Lake Committees as a formal review group to evaluate recommendations made by individual lake committees to their members= agencies and to the Great Lakes Fishery Commission that may affect two or more lakes, or connecting channels.

However, the Plan also recognizes the need for the Parties themselves to ensure that they provide timely and effective direction in the Plan's implementation. It replaces the ad hoc Committee of the Whole and its Operations Subcommittee with a formally defined Council of Great Lakes Fishery Agencies, on which each Party is represented, to ensure mutual accountability of the Parties in the implementation and periodic review of the Plan and to provide guidance within the Plan's institutional arrangements, among other

responsibilities. The Plan contemplates that a Council representative will be a Fish Chief or equivalent and will have the authority to act on behalf of the appointing Party.
The Plan is designed to be a very practical tool for coordinating efforts of environmental management or natural resource offices and fishery agencies to provide mutual benefits and protection of the Great Lakes aquatic system. The Parties recognize the continuing imperative to accept and implement the Plan as quickly as possible to protect Great Lakes fishery resources from continued degradation and to eventually help restore some of the lost Great Lakes fishery resources.

COMMON GOAL STATEMENT FOR GREAT LAKES FISHERY AGENCIES

An essential first step in developing a common strategy for Great Lakes fishery agencies is to ensure that the agencies hold common goals. Goal statements were obtained from all the agencies and compared for commonalities, differences and conflicts. There are no overt conflicts of purpose among agencies and relatively few differences. Differences are largely matters of emphasis or coverage. Similarities of agency goals were used to formulate a goal statement which we believe adequately represents the aims of the various agencies with respect to the Great Lakes.

To secure fish communities, based on foundations of stable self-sustaining stocks, supplemented by judicious plantings of hatchery-reared fish, and provide from these communities an optimum contribution of fish, fishing opportunities and associated benefits to meet needs identified by society for:
wholesome food,
recreation,
cultural heritage,
employment and income, and
a healthy aquatic ecosystem.

The fishery resources of the Great Lakes are held in trust for society by government. The agencies responsible for them have been charged to manage the fishery resources and fisheries to provide continuing valuable contributions to society. These contributions include such benefits as a healthy aquatic environment, aesthetic and recreational values, scientific knowledge and economic activity as well as fish and fishing opportunities.
The fishery resources have been diminished and much altered through exploitation, degradation of habitat and the introduction or invasion of exotic biota. Much has been done to check, reverse or compensate for this degradation but much remains to be done. The fact that environmental considerations important to such efforts are often under the jurisdiction of other agencies could complicate the task facing the fishery agencies. Stresses affecting fishery resources rarely act singly, often have complex interactions and often impact several levels of the aquatic ecosystem so that remedial management must address problems on a comprehensive whole-system basis. A natural focus of the fishery agencies, therefore, is the maintenance and development of entire fish communities which can provide improved contributions to society. Such an ecosystem approach requires protection and rehabilitation of aquatic habitat and fishery management to ensure stable self-sustaining foundations, especially at forage levels, for the community while allowing for judicious stocking of hatchery-reared fish to complement or enhance natural

production at higher levels, meet public demands and rehabilitate depleted stocks of desirable species.

GREAT LAKES FISHERY ISSUES

Prior to the signing of the Plan in 1981, senior federal, state and provincial fishery managers were asked to respond to an AIssues Questionnaire@ by assigning a rating to each of the following 5 major issues. This was seen as a necessary step in the process of developing strategies to achieve a common goal. Issues were defined as impediments to achieving the goal.

The management agencies were polled to obtain an understanding of their concerns, and the Great Lakes Basin Commission was contracted by the Great Lakes Fishery Commission to conduct a workshop to provide input from other interested groups. The 1996 Plan Review Steering Committee concluded that the major issues have not changed dramatically but it is clear in the intervening 15 years some issues have become more and some less important. Few, if any, have been eliminated and at least one new issue has emerged.

Lost Fishing Opportunities

Since the turn of the century there has been a progressive depletion of many indigenous fish stocks due to overharvest, habitat loss, and exotic species.. Various individual stocks of highly valued lake trout, whitefish, lake herring, walleye, deepwater cisco, and lake sturgeon have collapsed and been replaced by other, often less valuable species. The loss of indigenous species such as blue pike, shortnose cisco, and Atlantic salmon, as well as other fish adapted to specific environments represents a loss of genetic material impossible to replace.

In 1981 and today, commercial yields of fish from many areas of the Great Lakes are still substantially below historic levels and commercial fishing enterprises which formerly relied on larger, high-market-value fish continue to depend on other species once considered of low value but now in significant demand (e.g., yellow perch).

In some areas, opportunities for recreational angling have been severely reduced and the tourist industry has suffered from the loss of sport fishing business, causing substantial reductions in employment and income. But in other areas, emphasis on stocking and innovative sport fishery management by fishery agencies have dramatically increased the economic value of the associated industry. Today, as in 1981, throughout most of the Great Lakes, the economic value of the recreational fishery far exceeds that of the commercial fishery but both sectors provide valuable income for Canadians and Americans.

Tribal fisheries are important to tribal cultural heritage and have high value for religious, medicinal, subsistence and economic reasons. The resurgence in recent decades of tribal fisheries resulting from a number of court decisions has been constrained by collapsed fish stocks..

In 1981, chemical contaminants were seen as one of the most serious problems facing Great Lakes fishery and environmental agencies. The problem remains despite the significant progress made in both countries in reducing point source inputs and as a result of new restrictive legislation. However, contaminated sediments and the long range

transport of persistent toxic chemicals into the Great Lakes basin remain as problems. Overall, levels of persistent toxic chemicals in most top predator fish have declined dramatically but there are still many contaminant advisories in both countries.

Instability of Fish Communities

Although rehabilitation of some fish stocks has continued over the past 15 years, some stocks remain depleted, some are still not self-sustaining and others still lack stability. Still others, though stable, continue to depend on management programs for their stability. Instability of Great Lakes fish stocks results from the following stresses:

Sea Lamprey

The parasitic sea lamprey, although significantly controlled in most areas, continues to have an adverse impact on the Great Lakes Ecosystem. Specifically, the development of larval populations in connecting channels and lake environments where traditional control technology is not effective (e.g., St. Marys River) has resulted in a resurgence of some sea lamprey populations. Implementation of new control techniques such as sterile male release hold promise for control in these areas. Nevertheless, as in 1981, the continued dependence of the control program on lampricides makes it vulnerable to problems in chemical supply and to attitudes towards pesticide, regulation, and licensing. The continuation and improvement of alternative methods of sea lamprey control is imperative.

Overharvest

In the past, inadequate assessment of fish stocks and poor control and monitoring of the harvest have led to depleted stocks and disrupted fish communities. The historic depletion of lake trout in southeastern Lake Superior and lake sturgeon basinwide are examples of this issue.

The present concern is that agency capabilities to assess sport, commercial, and forage stock status may be further compromised as a result of dwindling staff numbers due to downsizing and reduced program resources.

Invasions and Introductions

Invasions by numerous exotics such as alewives and rainbow smelt have disrupted ecosystems and fish communities. The introduction of other exotic fish can modify fish communities to the extent that fishing opportunities are severely altered or reduced. Purposeful introductions of top predators such as salmon and trout may complement fish community structures, stabilize certain stocks of forage species and provide new fishing opportunities. However, fishery managers also need to be vigilant that stocking of top predators does not destabilize the communities they seek to enhance.

This sub-issue ranks highly as one that has become more of a problem since the Plan was first signed. The zebra mussel, which was introduced into the Great Lakes from the ballast of a trans oceanic freighter, has forever altered the ecology, flow of energy, and possibly fish community in Lake Erie. The ruffe is expected to further change the dynamics of the Lake Erie fishery when it invades and establishes breeding populations.

Other recent invaders include two forms of goby, a large cladoceran (*Bythotrephes*) and numerous other fish species that probably have not yet established breeding populations.

Inadequate Environmental Quality

Degradation of water quality, destruction of physical habitat, and impairment of ecosystem components critical to the well-being of fish remain as major causes of impairment and destruction of Great Lakes fish communities and fisheries. In order to protect fishery habitats and ensure adequate spawning success, the environmental objectives of fishery agencies must be the same as or more stringent than those of environmental agencies. Thus, the actions of both are complementary and should be coordinated.

Chemical contaminants in fish throughout the Great Lakes basin have raised continuing concern for the health of those who eat Great Lakes fish, dampened the desire to fish for recreation and rendered large quantities of fish flesh unavailable to the consumer. Discoveries of contaminants such as PCB, mirex, dioxin and furans, dieldrin, mercury and DDT in fish have resulted in continuing restrictions on the consumption of some Great Lakes fish. Encouraged by the Great Lakes Fishery Commission, efforts have been underway for several years for jurisdictions to establish a common set of consumption advisories.

The ecosystem view of fishery management espoused by the fishery agencies, and reflected by the 1978 Canada-United States Great Lakes Water Quality Agreement and its 1987 Protocol, places particular emphasis on water quality and various habitat features that are required for normal functioning of fishes and unrestricted consumption of fish. Attempts to secure such an environment has placed fishery interests in conflict with the interests of other water resources and users. All agencies must address the threats to Great Lakes fishery resources posed by conflicting uses.

Land Uses. A wide variety of land uses adversely influence the quality of the fishery resource. Some agricultural and forestry practices and urban developments create problems of increased runoff, erosion, and loadings of nutrients, silt, and contaminants. Highway construction and maintenance causes siltation, herbicide and salt accumulations. Leaching from old industrial waste sites continues to pose problems relating to contaminants in the rivers and waters of the Great Lakes. Major efforts are underway in both countries to remediate these problems by cleaning up old dump sites.

Water Uses. Lakes and streams are used for a variety of purposes including: waste disposal; domestic, water power, industrial and agricultural water supply; navigation; recreation; and fishing. This variety of use leads to conflicts among users, water quality degradation and inter-agency conflicts, all of which interfere with the maintenance and improvement of productive levels of a water fishery resource. More recently there has been concern that excessive amounts of Great Lakes water will be diverted from the basin to areas short of fresh water.

A variety of activities destroy fish habitat in the Great Lakes basin. Unnatural variations in lake levels cause shoreline erosion, increased needs for navigational dredging, changes in wetlands and estuarine environments, and changes in the distribution and availability of in-lake spawning and nursery grounds. Drainage projects, canal construction, stream

channelization and power generation interfere with fish migrations and may adversely affect stream conditions. Impingement and entrainment at water intakes, particularly those associated with the power generating industry, kill large numbers of fish. Mineral extractions and mining cause direct loss and disruption of fish habitat, and probable loss of spawning shoals. Dredging, navigation and associated facilities cause erosion, siltation, changes in near-shore currents, and destruction of habitat. A prime example is the loss of the largest rapids in the entire St. Lawrence-Great Lakes system by construction of the St. Lawrence Seaway and power project in 1958. With that development New York and Ontario lost an excellent walleye fishery that has never been replaced.

Atmospheric Inputs. Research has shown there are major inputs of airborne nutrients and contaminants from industrial and other sources from areas hundreds and even thousands of kilometers outside the Great Lakes basin. Models suggest that Lake Superior may receive as much as 90% of its PCBs from airborne deposition and much of that from sources originating outside the basin. Excessive levels of toxaphene in some Lake Superior fish is believed to have resulted from sources outside the basin.

Competition and Conflicts among Users of the Fishery Resources

Difficulties in providing desired contributions of fish and fishing opportunities arise largely from the difficulty of identifying the harvestable surpluses and of allocating them to competing users. For most stocks of common concern, needed decisions will have to be based on the best scientific studies available. Fundamental to the allocation problem is an understanding of society=s needs and measures of values associated with those needs. The major user conflicts over Great Lakes fishery resources are summarized as follows.

Allocation among Jurisdictions. Protection of fish stocks from overexploitation by any or all user groups is a paramount responsibility of all fishery agencies. Fishery agencies need to make joint allocation decisions on stocks of common concern. Depletion and loss of important fish stocks will continue regardless of environmental improvements unless acceptable allocation systems are implemented.

Commercial Fishing versus Sport Fishing. Commercial and recreational fishermen often compete for fishery resources. The interests and activities of one group can adversely impact those of the other. Each group is opposed to allocation decisions which appear to be unfavorable to their specific interests. Similarly there are conflicts within each of these groups regarding species mix and allocation.

Native People versus Other Users. Rights and claims of use by aboriginal people can lead to allocation questions between jurisdictions and other fisheries interests.

Access to the Resource. The shoreline of the lower Great Lakes and tributaries has in some cases been forever altered through the construction of industrial complexes, residential development and other major works. Such practices have presented users of the fishery resources with formidable problems in gaining access to their fishery. As a

result, some agencies are faced with the task of creating access for anglers and providing mooring facilities for anglers and commercial fishermen.

New Emerging Issues:

Climate Change
There is concern that a warming climate may significantly alter the Great Lakes ecosystems in many ways. Changes could affect water quality, water quantity, and biological integrity causing, for example, favorable conditions for the invasion of more exotic species at the expense of indigenous species.

STRATEGIES FOR GREAT LAKES FISHERY MANAGEMENT

In recent decades, particularly under the Plan's auspices, fishery agencies have been successful in resolving, or partially resolving, some management problems. Certainly, the level of successful sea lamprey control in the Great Lakes is a monument to cooperative international effort. The establishment of a new salmonid sport fishery and the partial rehabilitation of the lake trout fishery are other proud accomplishments. However, the issues described earlier remain at least partially unresolved because they continue to generate problems which are intractable even with the Plan's processes in place.
To assist fishery and environmental agencies in dealing with these problems, efforts remain underway to identify underlying obstacles which have thwarted past efforts, to suggest broad strategies to resolve them and to propose a coherent set of procedures to initiate implementation. The fundamental strategies suggested are a consensus strategy, an accountability strategy, an ecosystem management strategy and a management information strategy.
These strategies are essentially the same strategies adopted at the Plan's inception in 1981. The ecosystem management strategy, incorporated as part of the 1997 revisions, simply is a refinement of the original environmental management strategy. It better reflects the Plan's underlying ecosystem-based approach to fisheries management and the need to influence all practices with potential to affect desired fish communities.

Consensus Strategy

There is no intent in the Plan to usurp or weaken the fishery agencies= legal responsibilities to their Great Lakes fishery resources. Through the signing of a memorandum of acceptance by all Great Lakes fishery agencies, the Plan does recognize the need for formal acceptance and implementation of the Plan by those agencies. The Plan also recognizes the absolute need for fishery and associated agencies to be flexible, particularly at the lakewide operational level, if the plan is to be successfully implemented. The consensus strategy proposed here should help develop such flexibility, not to mention providing significant help in obtaining financial and political support for individual agency initiatives.
A frequent obstacle to effective resolution of issues is a lack of cooperative agency action. Even when a clear common purpose is agreed upon, individual agencies are sometimes unable to perform effectively for want of adequate financial or political support. Clearly, the establishment of consensus (see Appendix I.E. for a definition)

among agencies would not only strengthen all of them in their individual requests for support of needed management initiatives but would also provide a good deal of incentive to act in accordance with the group interest and intent. Therefore:
Consensus must be achieved when management will significantly influence the interests of more than one jurisdiction.

Accountability Strategy

It is apparent that positive participation in the Consensus management process would be encouraged by application of management by objectives at the inter-agency level. This implies, of course, open disclosure of each agency=s individual programs and plans in terms of operational objectives, targets and performance. This would not only provide for mutual evaluation of any management proposals which might affect another=s interests but make a major contribution to the development of integrated operational programming employing the best available fisheries science and technology. Therefore:
Fishery management agencies must be openly accountable for their performance.

Ecosystem Approach to Fishery Management Strategy

In the context of ecosystem management, the Parties must influence and respond to all practices -- not just the fishery management activities of other Parties -- which affect fish communities. Great Lakes fishery management and environmental management agencies need to address the potential impacts of overlapping activities and decisions in an effort to coordinate and harmonize fishery and other environmental needs and objectives. The Great Lakes Fishery Commission and all Parties to the Plan will engage in a process of structured, multi-level, ongoing dialogue with federal, state, provincial, and tribal environmental agencies, e.g., through exercises such as lakewide management plans, remedial action plans, fish community objectives, state of the lake reports, etc. Also of particular concern is the protection of the aquatic ecosystem from introductions of non-native species contrary to the Plan's procedures. Therefore:
The Parties must exercise their full authority and influence in every available arena to meet the biological, chemical, and physical needs of desired fish communities.

Management Information Strategy

Information useful as a guide to management practice is a precious commodity. Where it exists, it is vitally important that it be readily available for application wherever appropriate. However, agencies involved in fisheries and environmental management on the Great Lakes have generated a variety of data which is often inadequate for measuring and predicting the effects of management decisions on a lakewide basis. Therefore:
Fishery agencies must cooperatively develop means of measuring and predicting the effects of fishery and environmental management decisions.
Because all Great Lakes fishery agencies share similar problems there should be basin-wide commonality in and accessibility to information collected and used to measure and predict the effect of decisions.
Many user groups are continuously imposing stresses on Great Lakes fishery resources, often without prompt response from fishery agencies. It is important that fishery management agencies make necessary decisions as quickly as possible and nothing in this

strategy should be construed as suggesting that urgent decisions can be delayed until enough highly-specific scientific information is available to ensure an airtight legal case.

STRATEGIC PROCEDURES

The strategic procedures are designed to achieve the common goal and implement the strategies set forth in the Plan. They also recognize the responsibility of managing the Great Lakes ecosystem through coordination between fishery management and environmental agencies. The Parties have chosen the Great Lakes Fishery Commission's Lake Committees and Council of Lake Committees as the primary vehicles to implement these strategic procedures. The Council of Great Lakes Fisheries Agencies will maintain and support the processes outlined in the Plan. The Great Lakes Fishery Commission will facilitate the Plan's implementation.

Consensus

1. *Fish Community Objectives* -- The Great Lakes Fishery Commission will maintain Lake Committees which will define objectives for the structure of each of the Great Lakes fish communities and develop a means of measuring progress toward their achievement. Upon request of a lake committee the Commission will support development of fish community objectives that are comprehensive and principle-based.
2. *Operational Plans* -- Each fishery agency should identify its plans, which may include joint lakewide fishery management plans, for achieving the fish community objectives identified by the lake committees.
3. *Changes in Practice* -- Each fishery agency should submit all substantive changes from existing practice to the appropriate lake committee before implementation.
4. *Consensus on Changes* -- Any agency proposal for change which other agencies believe will influence their interests may become the subject of negotiations within lake committees until consensus of affected agencies is achieved.
5. *Conflict Resolution* -- If consensus cannot be achieved, a Party may:

- request the Commission to arrange/facilitate an information exchange forum;
- seek advice of existing Plan committees;
- ask the Commission to arrange third-party mediation with any resolution being endorsed through normal Plan procedures; and / or
- ask the Commission to arrange a process involving a mutually acceptable third-party intermediary to make a non-binding recommendation.

Ecosystem Management

6. *Environmental Issues* -- The Lake Committees will identify environmental issues which relate to or may impede achievement of their fish community objectives and will work with other ecosystem initiatives, such as LaMPs, in developing and furthering plans for achieving, refining, and assessing progress on environmental and fish community objectives.
7. *Coordination with GLWQA / LaMPs* -- Lake committees will work with LaMPs to develop joint proposals to the Great Lakes Fishery Commission or other organization to identify environmental needs relative to fish community objectives, related management plans and assessments, and to thereby provide feedback on fish community objectives.

8. *Environmental Issue Resolution* -- Unresolved or emerging environmental issues may be referred by lake committees to the Parties, Council of Great Lakes Fisheries Agencies, or the Great Lakes Fishery Commission to represent fishery interests in these issues to the most appropriate body or process.
9. *Habitat Advisory Board* --The Great Lakes Fishery Commission will maintain an expert Habitat Advisory Board (HAB)to assist each lake committee, the Great Lakes Fishery Commission, and the Parties to develop ecosystem objectives and identify critical habitats essential to achieving its fishery objectives.
10. *Exotic Species* -- Fishery agencies shall collectively identify and promote procedures that will protect aquatic resources from unauthorized introductions of non-native species, e.g., via aquaculture and shipping.

Information Sharing

11. *Data Standards* -- The Great Lakes Fishery Commission will coordinate development and implementation of standards for recording and maintaining fishery management and assessment data, to ensure compatibility among the Parties and other agencies.
12. *Models* -- The Great Lakes Fishery Commission and the Parties will coordinate development and implementation of models for common use by the Parties and other agencies
13. *Information Access* -- The Parties are encouraged to maintain databases on the Internet. The Great Lakes Fishery Commission will maintain current Internet links to Party and others' databases to facilitate access, including a catalog of Great Lakes fishery assessment and research programs which are planned or in progress,
14. *Data Sharing* -- The agencies are encouraged to provide their data to other agencies upon request if the collecting agency has had reasonable time to verify and interpret the data (such time should not normally exceed one year for assessment data and three years for research data) and to collectively develop shared information services under the umbrella of the Great Lakes Fishery Commission

Accountability

15. *Decision Record* -- Consensus decisions shall be recorded appropriately, e.g., meeting minutes.
16.. *Agency Reports* -- The fishery agencies, separately or jointly, should measure and make annual reports to the Lake Committees of the progress made toward achieving their mutual committee objectives.
17. *Lake Committee Reports* -- Each lake committee will prepare an annual progress report and make recommendations to both the agencies and the Great Lakes Fishery Commission. In addition to annual reporting, on a rotational basis once every five years, each lake committee shall convene a special conference focused on the state of the lake. The product of this conference will be a formal report capable of serving as a 5-year report card on progress toward a comprehensive set of fish community objectives and related measures and indicators.
18. *Commission Report* -- The Great Lakes Fishery Commission=s Annual Report to the governments and the public shall include a summary of the lake committee reports and recommendations regarding fishery and environmental objectives, programs, and activities needing specific attention.

Plan Governance

19. ***Plan Changes*** -- All Parties must approve changes in or the addition of new Parties to the Plan.

20. ***Council of Great Lakes Fishery Agencies*** -- The Parties hereby establish the Council of Great Lakes Fishery Agencies. Each Party will have representation on the Council. The Council shall establish terms of reference. The terms of reference should reflect decision-making by consensus of the Parties to:

- ensure mutual accountability of the Parties;
- ensure accountability for the implementation and periodic review of the Plan;
- provide guidance and support to the Plan's institutional arrangements;
- ensure timely and effective information exchange between law enforcement and fishery managers;
- ensure that environmental objectives are articulated and reciprocal strategies with environmental agencies are developed;
- provide for non-Party participation by Environment Canada, U.S. Environmental Protection Agency, the International Joint Commission, and other agencies as appropriate; and
- inform and educate on a basin-wide perspective, including the development and implementation of a strategic communications framework that details the roles and responsibilities of the Parties and the Commission.

The Council and the Commission shall cooperatively determine the appropriate mechanisms for Commission support of the Council

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CONCLUSION

By endorsing the Plan, the Parties accept the challenges that it presents. Those challenges have not diminished since the original Plan was adopted in 1981. Many remain the same, others have taken new forms, and new ones have emerged.

Among the most important challenges are fiscal and institutional limitations. Rather than viewing these as obstacles, the Parties view them as opportunities -- opportunities to effectively cooperate and communicate in achieving mutually acceptable ecosystem protection goals and to use available human, infrastructure and fiscal resources efficiently.

The Plan has many implications in terms of commitment for the agencies, particularly for their personnel who serve on lake and other committees. Many of these implications have not been specifically addressed in this document because it is deemed highly desirable at this point that any future planning should involve discussion by those people who ultimately will carry the bulk of the work loads.

The Plan is in fact a proposal for the institution of a formal, on-going planning process in accordance with certain broad strategies and supported by proposals for their implementation. It is proposed that agencies should use their representation on Great Lakes Fishery Commission established individual lake committees as a means of representing their own interests and negotiating consensus decisions regarding joint concerns. Acceptance and implementation of the Plan requires considerable responsibility and activity for agency lake committee members and support staff. Where successful

implementation of the Plan is impeded by fiscal or personnel limitations, it may be necessary to supplement Lake Committee efforts through other collaborative initiatives under the umbrella of the Great Lakes Fishery Commission. In fact, it may be desireable to augment the resources of the Great Lakes Fishery Commission to provide the level of support necessary to implement the Plan.

LIST OF APPENDICES

Appendix A.

MEMORANDUM OF ACCEPTANCE OF THE JOINT STRATEGIC PLAN FOR MANAGEMENT OF GREAT LAKES FISHERIES

THIS MEMORANDUM OF ACCEPTANCE made and entered into this seventeenth day of June 1981, by and among the Canada Department of Fisheries and Oceans, the Illinois Department of Conservation, the Indiana Department of Natural Resources, the Michigan Department of Natural Resources, the Minnesota Department of Natural Resources, the National Marine Fisheries Service, the New York State Department of Environmental Conservation, the Ohio Department of Natural Resources, the Ontario Ministry of Natural Resources, the Pennsylvania Fish Commission, the United States Fish and Wildlife Service and the Wisconsin Department of Natural Resources.

WITNESSETH:

WHEREAS, the Parties hereto have long desired to adopt a Joint Strategic Plan for Management of Great Lakes Fisheries, and

WHEREAS, the Great Lakes Fishery Commission, acting through its Steering Committee of the Committee of the Whole, prepared such a Joint Strategic Plan for Management of Great Lakes Fisheries after years of efforts, deliberations, and consultations, and

WHEREAS, the Parties hereto have had the opportunity to review and change the drafts of the said Joint Strategic Plan, and

WHEREAS, the Parties hereto have agreed that the Joint Strategic Plan for Management of Great Lakes Fisheries, dated December 1980, represents the final product of the best

efforts of the Parties and serves the best interests of the Parties hereto and the peoples of their states, province and nations.

NOW THEREFORE, in consideration of the mutual benefits to be derived herefrom, the Parties hereby covenant and agree as follows:

1. The Joint Strategic Plan for Management of Great Lakes Fisheries, dated December, 1980, is hereby accepted and adopted by each and every Party signatory to this Memorandum of Acceptance.

2. The Parties hereto pledge their support to the Goals set forth in the Joint Strategic Plan for Management of Great Lakes Fisheries and commit themselves to resolving the Great Lakes Fishery Issues raised in the Plan by jointly, severally, and individually adopting the Strategies for Great Lakes Fisheries Management set forth in the Plan.

3. The Parties hereto accept the institutional arrangements and responsibilities as set forth in the Joint Strategic Plan and agree that changes to, or modifications of, the Joint Strategic Plan shall be accomplished by consensus, utilizing procedures similar to those used in developing and adopting the Joint Strategic Plan.

4. The Parties hereto agree to adopt and execute the Strategic Procedures set forth in the Joint Strategic Plan and commit themselves and their agencies and instrumentalities to carrying out these procedures.

5. Nothing in this Memorandum of Acceptance shall be construed as infringing on the sovereignty of any nation, province or state signatory to this document, but shall rather be construed as a commitment of the sovereign power of such nations, states and province to carrying out the Joint Strategic Plan hereby adopted.

IN WITNESS WHEREOF, the Parties have hereunto set their hands and seals, as of the date first written above at Ottawa, Ontario, Canada. CANADA

DEPARTMENT OF FISHERIES AND OCEANS

ATTEST BY _____s/D. D. Tansley

_____s/H. Douglas Johnston ITS

_____(TITLE)

ILLINOIS DEPARTMENT OF CONSERVATION

ATTEST BY _____s/David Kenney

_____s/Maurine E. Richter ITS

_____(TITLE) _____s/Bruce Muench

INDIANA DEPARTMENT OF NATURAL RESOURCES

ATTEST BY _____s/Joseph Cloud

_____s/Frank R. Lockard ITS

_____(TITLE)

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

ATTEST BY _____s/Howard A. Tanner

_____s/John A. Scott ITS

_____(TITLE) MINNESOTA DEPARTMENT OF NATURAL RESOURCES

ATTEST BY _____s/Joseph N. Alexander

_____s/Jerome H. Kuehn ITS

_____(TITLE)

NATIONAL MARINE FISHERIES SERVICE

ATTEST BY _____s/Terry Leitzell

_____s/Robert W. Hanks ITS

_____(TITLE)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ATTEST BY _____s/Robert F. Flacke
_____s/Bruce D. Shupp ITS
_____(TITLE)
OHIO DEPARTMENT OF NATURAL RESOURCES
ATTEST BY _____s/Robert W. Teater
_____s/Russell L. Scholl ITS
_____(TITLE) ONTARIO MINISTRY OF NATURAL RESOURCES
ATTEST BY _____s/Alan Pope
_____s/A. S. Holder ITS
_____(TITLE)
PENNSYLVANIA FISH COMMISSION
ATTEST BY _____s/Ralph W. Abele
_____s/Howard T. Hardie, Jr. ITS
_____(TITLE)
UNITED STATES FISH AND WILDLIFE SERVICE
ATTEST BY _____s/Galen L. Buterbaugh
_____s/G. Ray Arnett ITS
_____(TITLE)
WISCONSIN DEPARTMENT OF NATURAL RESOURCES
ATTEST BY _____s/Carroll D. Besadny
_____s/James S. Christensen ITS
_____(TITLE) _____s/James T. Addis

Appendix A.1.

ADDITIONAL SIGNERS TO THE MEMORANDUM OF ACCEPTANCE OF THE JOINT STRATEGIC PLAN FOR MANAGEMENT OF GREAT LAKES FISHERIES

The Chippewa/Ottawa Treaty Fishery Management Authority and the Great Lakes Indian Fish and Wildlife Commission join with the twelve earlier signers of the Joint Strategic Plan for Management of Great Lakes Fisheries in accepting and adopting the Plan as originally signed on 17 June 1981 at Ottawa, Ontario, Canada. The additional signers hereunto set their hands at Montreal, Quebec, Canada on the ninth day of May 1989.

CHIPPEWA/OTTAWA TREATY FISHERY MANAGEMENT AUTHORITY
ATTEST BY _____ _____ ITS
_____(TITLE)
GREAT LAKES INDIAN FISH AND WILDLIFE COMMISSION
ATTEST BY _____ _____ ITS
_____(TITLE)

Appendix B.

RESERVATION TO THE MEMORANDUM OF ACCEPTANCE FOR THE JOINT STRATEGIC PLAN FOR MANAGEMENT OF GREAT LAKES FISHERIES

The Wisconsin Department of Natural Resources conditions its execution of this Memorandum of Acceptance on inclusion of the following clause:

This Memorandum of Acceptance shall be construed in a manner which recognizes the administrative rulemaking process of the states, nations or provinces signatory to this Memorandum and shall support full compliance with such processes when a course of action of a Party in furtherance of the Joint Strategic Plan is interpreted as an administrative rule by their sovereign.
Counsel for the Wisconsin Department of Natural Resources, advises that the statement is not part of the agreement, but is to be used in construing the agreement. The statement constitutes a reservation to the agreement and does not require action by signatories.

Appendix C.

RESOLUTION BY GREAT LAKES FISHERY COMMISSION TO SUPPORT IMPLEMENTATION OF THE JOINT STRATEGIC PLAN FOR MANAGEMENT OF GREAT LAKES FISHERIES

WHEREAS, fishery resources and associated uses are among the most sensitive of all uses made of the Great Lakes and are an integral part and indication of ecosystem quality;
WHEREAS, fishery interests must organize to increase their effectiveness if they are to achieve a competitive position in relation to other user groups;
WHEREAS, to most effectively manage the fishery resources of the Great Lakes there must be cooperation among the jurisdictions with authority for resource management because effective management calls for greater capability than any single state, province of nation ca provide;
WHEREAS, only through cooperation can the mechanisms for protecting, rehabilitating and wisely using our fishery resources be strengthened;
WHEREAS, through the encouragement of its cooperators, the Great Lakes Fishery Commission accepted the challenge of sponsoring development of a Joint Strategic Plan for Management of Great Lakes Fisheries;
WHEREAS, the Fishery Commission provided the forum in which those agencies with mandated responsibility for the welfare of the Great Lakes fishery resource could develop the Plan;
WHEREAS, the Fishery Commission encouraged the Parties in their endeavors and shepherded the developers= efforts through the rewarding process in which a Plan was completed; and
WHEREAS, the Fishery Commission believes that the Plan provides a design for action and a framework within which all fishery interests can work to improve the fishery resource and its management;
THEREFORE, BE IT RESOLVED by the Great Lakes Fishery Commission at its meeting in Ottawa, Ontario, Canada on 17 June 1981, that it endorses the Joint Strategic Plan for Management of Great Lakes Fisheries, that it pledges support to the Parties in their efforts to implement the Plan, and that it will carry out its responsibilities specified in the plan to the best of its ability.
ATTEST
Chairman
GREAT LAKES FISHERY COMMISSION

Appendix D.

GLOSSARY

The following are working definitions for the purpose of implementing *A Joint Strategic Plan for Management of Great Lakes Fisheries**:

Community: any assemblage of biota that functions as a unit through metabolic transformations

Conservation: to avoid wasteful or destructive uses of natural resources
maintenance of the value of the resource and its inherent benefits
wise management

Fishery resources: fish stock recognized by man to be of current or potential value and that man can use for his benefit or gain

Goal: statement of intent to achieve a desired result which specifies societal benefits

Impaired: reduced ability to function as a unit

Issue: a public concern which impedes achievement of the goal

Objective: a measurable result to be achieved

Party: an agency that has ratified the Plan

Rehabilitate: to secure a desirable fish community which is self-sustaining, diverse and resilient to a prescribed level of stress

Exotic fish: a species non-indigenous to the Great Lakes (example: sea lamprey, alewife, smelt, brown trout, rainbow trout, splake)

Secure: to put beyond hazard of losing; to achieve and maintain

Stock: the part of the fish population which is under consideration from the point of view of actual or potential utilization (by more than one agency stocks of concern)

Strategy: a long-term broad scale (whole system) course of action essential to the achievement of the goal

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Appendix E.

DEFINITION AND CONCEPT OF CONSENSUS

As the Aconsensus@ process is critical to this Plan, it is imperative that all Parties operate under a singular concept and definition.

Webster=s dictionary defines consensus in the following way:

1. harmony, cooperation or sympathy, especially in different parts of an organism; group solidarity in sentiment and belief.

2. general agreement; collective opinion; the judgment arrived at by most of those concerned; to be in harmony or accord, especially in opinion, statement or sentiment; to express a willingness as to accept a proposition or carry out a particular action.

The Encyclopedia Americana identifies three forms of consensus. The definition of Aemergent consensus@ seems particularly relevant to the Joint Strategic Plan.

AEmergent consensus results from the crystallization of opinion after all points of review have been heard in the >market place of ideas=.@Y In theory, Aeach individual weighs the evidence and then draws a rational conclusion. The accumulation of judgment

constitutes public opinion. If the emergent majority is forceful enough, the minority adopts its view and the result is consensus.@
The Working Group believes this is how the Aconsensus@ process should work at the lake committee level in A Joint Strategic Plan for Management of Great Lakes Fisheries. For further clarification, we offer the following examples.
1.Q. How do you know you have consensus?
A. When no party to the negotiation objects to the opinion.
2.Q. How do you ensure adherence to the consensus decisions?
A. You cannot; however, you can provide inducements to adherence by: a) having the consensus formalized through the signing of a public document by a chief executive officer; b) the specter of public revelation.
3.Q. What happens if a consensus decision cannot be achieved?
A. The problem will be taken to the Great Lakes Fishery Commission for mediation or arbitration (non-binding) at the request of one or more of the parties in the dispute at the lake committee level.

APPENDIX F.
INSTITUTIONAL ARRANGEMENTS

Fishery Management Agencies (FMA)

develop measurements of contributions of Great Lakes Fisheries to society	initially
obtain public input	as necessary
develop plans for achieving lake management objectives	initially
manage fisheries to achieve lake objectives	continually
submit proposed policies, plans, and management decisions to appropriate LCs before implementation	annually
submit controversial management proposals to LCs for "consensus" decisions	as necessary
make negotiated decisions a matter of record	as necessary
provide fishery data to other agencies on request	as necessary
work together to develop compatible, automated information systems on Great Lakes fisheries data	continually
make annual reports to LCs	annually

Council of Great Lakes Fishery Agencies

ensure mutual accountability of the Parties	continuously
ensure accountability for the implementation and periodic review of the Plan	continuously

provide guidance and support to the Plan's institutional arrangements	continuously
ensure timely and effective information exchange between law enforcement and fishery managers	as necessary
ensure that environmental objectives are articulated and reciprocal strategies with environmental agencies are developed	as necessary
provide for non-Party participation by Environment Canada, U.S. Environmental Protection Agency, the International Joint Commission, and other agencies	as appropriate
inform and educate on a basin-wide perspective, including the development and implementation of a strategic communications framework that details the roles and responsibilities of the Parties and the Commission	continuously

Lake Committees

define objectives for the structure of each of the Great Lakes fish communities and develop means of measuring the progress towards achievement	as necessary
negotiate "consensus" decisions on those agency proposals which might influence another agency's interests	as necessary
identify environmental issues interfering with achievement of their fishery objectives	as necessary
make recommendations to the agencies and the GLFC	as necessary
prepare annual reports summarizing agency successes and failures	annually
prepare state-of-the-lake report	quintennially
handle issues affecting more than one lake through Council of Lake Committees	as necessary

Great Lakes Fishery Commission (GLFC)

facilitates conflict resolution when consensus cannot be achieved	as necessary
represents fishery interests to appropriate bodies	continually
works with FMAs to develop means of predicting the effects of fisheries and environmental decisions	continually
submits an annual report on status of Great Lakes fisheries including recommendations on needs	annually
maintains Habitat Advisory Board to work with LCs (and environmental agencies, etc. as necessary) to formulate environmental objectives compatible with LCs fishery objectives	continually
refers environmental issues to the HAB	as needed
maintains management committees including Lake Committees, Council of	continually

APPENDIX G.

Affirmation of Agency Consensus for 1997 Revisions

WHEREAS the commitment to interjurisdictional coordinated fishery management based upon an ecosystem approach is necessary to protect and enhance Great Lakes Fishery resources; and

WHEREAS agencies with Great Lakes fishery management responsibilities adopted a Joint Strategic Plan for Management of Great Lakes Fisheries [the Plan] in 1981 and revised it in 1986; and

WHEREAS in 1996 the agencies agreed to undertake a review of their commitment and performance in implementing the Plan with the goal of updating strategic procedures to meet the Plan=s promise in meeting today=s challenges, and authorized a Review Steering Committee to facilitate this review and, where appropriate, to recommend revisions to the Plan; and

WHEREAS after thorough review through a survey, a workshop and written comments from the agencies and their personnel and from other agencies and individuals, the Review Steering Committee has recommended the 1997 Proposed Revisions to the Plan.

THE UNDERSIGNED, on behalf of their agencies, hereby:

1. Reaffirm their agencies= commitments made in the Memorandum of Acceptance of a Joint Strategic Plan for Management of Great Lakes Fisheries [17 June 1981];
2. Affirm their agencies= consensus to adopt the 1997 Proposed Revisions to the Plan; and
3. Affirm their agencies= intent that the June 1997 Plan is effective immediately and supersedes previous versions of the Plan.

CANADA DEPARTMENT OF FISHERIES AND OCEANS
ATTEST BY _____s/ _____s/
ITS _____(TITLE)
CHIPPEWA/OTTAWA TREATY FISHERY MANAGEMENT AUTHORITY
BY_____ ATTEST s/
_____ ITS_____ s/ (TITLE)
GREAT LAKES INDIAN FISH AND WILDLIFE COMMISSION
BY_____ ATTEST s/
_____ _____ s/ (TITLE)
ILLINOIS DEPARTMENT OF CONSERVATION
ATTEST BY _____s/ _____s/
ITS _____(TITLE)
INDIANA DEPARTMENT OF NATURAL RESOURCES
ATTEST BY _____s/ _____s/
ITS _____(TITLE)
MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ATTEST BY _____s/ _____s/
ITS _____(TITLE) MINNESOTA DEPARTMENT OF NATURAL RESOURCES
ATTEST BY _____s/ _____s/
ITS _____(TITLE)
NATIONAL MARINE FISHERIES SERVICE

ATTEST BY _____s/ _____s/
ITS _____(TITLE)
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ATTEST BY _____s/ _____s/
ITS _____(TITLE)
OHIO DEPARTMENT OF NATURAL RESOURCES
ATTEST BY _____s/ _____s/
ITS _____(TITLE) ONTARIO MINISTRY OF NATURAL RESOURCES
ATTEST BY _____s/ _____s/
ITS _____(TITLE)
PENNSYLVANIA FISH COMMISSION
ATTEST BY _____s/ _____s/
ITS _____(TITLE)
UNITED STATES FISH AND WILDLIFE SERVICE
ATTEST BY _____s/ _____s/
ITS _____(TITLE)
WISCONSIN DEPARTMENT OF NATURAL RESOURCES
ATTEST BY _____s/ _____s/
ITS _____(TITLE)

APPENDIX H.

RESOLUTION BY GREAT LAKES FISHERY COMMISSION

TO SUPPORT IMPLEMENTATION OF
THE JOINT STRATEGIC PLAN FOR MANAGEMENT OF A GREAT LAKES FISHERIES
AS REVISED IN 1997

WHEREAS the 1955 Convention on Great Lakes Fisheries directs the Great Lakes Fishery Commission to study issues, publish, and advise on measures relative to fish stocks of common concern; and

WHEREAS the Convention and related enabling legislation encourage partnerships in furtherance of the Convention; and

WHEREAS in 1981 the Commission endorsed the Joint Strategic Plan for management of Great Lakes Fisheries, pledged its support to the Parties in their efforts to implement the Plan, and committed to carry out its responsibilities specified in the Plan to the best of its ability; and

WHEREAS the Commission reaffirmed its commitment to the intent, processes, and goal stated in the Plan, and to the partnerships required for its successful achievement, in the Strategic Vision of the Great Lakes Fishery Commission for the Decade of the 1990s; and

WHEREAS the Parties unanimously adopted 1997 Proposed Revisions to the Plan and so amended the Plan;

THEREFORE, BE IT RESOLVED by the Great Lakes Fishery Commission during its meeting in Ottawa, Canada on 10 June 1997 that it endorses the Joint Strategic Plan or Management of Great Lakes Fisheries as amended in 1997, that it pledges its support to

the Parties in their efforts to implement the Plan, and that it will carry out its responsibilities specified in the Plan to the best of its ability.
BY_____ s/ Charles C. Krueger ATTEST _____
ITS_____ s/ F.W.H. Beamish (TITLE)

Leaders of state, provincial, tribal and federal agencies with responsibility for Great Lakes fishery resources directed the establishment of the Joint Strategic Plan for Management of Great Lakes Fisheries. For additional copies of this document, copies of a public information brochure about the Plan, or specific information on Great Lakes fisheries write to the following agencies:

Fishery Management Agencies

Chairman Chippewa-Ottawa Treaty Fishery Management Authority
186 Three Mile Road
Sault Ste. Marie, MI 49783
Executive Administrator
Great Lakes Indian Fish and Wildlife Commission
P.O. Box 9 Odanah, WI 54861
Chief, Div. of Fish and Wildlife Resources
Illinois Dept. of Conservation
Lincoln Tower Plaza
524 S. Second Street Springfield, IL 62701
Chief of Fisheries
Indiana Dept. of Natural Resources
402 W. Washington, rm. W-273
Indianapolis, IN 46204
Chief, Fisheries Division
Michigan Dept. of Natural Resources
Box 30028 Lansing, MI 48909
Chief of Fisheries
Minnesota Dept. of Natural Resources
500 Lafayette Rd., Box 12 St. Paul, MN 55155
Chief, Bureau of Fisheries
New York State Dept. of Environmental Conservation
50 Wolf Rd., Rm. 518
Albany, NY 12233
Head, Fish Section
Ohio Dept. of Natural Resources
1840 Belcher Dr., G. 3
Columbus, OH 43224
Director, Fisheries Branch
Ministry of Natural Resources
Box 7000
Peterborough, ON K9J 6X2
Chief, Fisheries Division

Pennsylvania Fish and Boat Commission
450 Robinson Lane
Bellefonte, PA 16823
Director, Bureau of Fish Management
Wisconsin Dept. of Natural Resources
P.O. Box 7921
Madison, WI 53707

Federal Agencies

Director General, Central Region
Canada Dept. of Fisheries and Oceans
501 University Crescent
Winnipeg, MB R3T 2N6
Regional Administrator, Northeast Region
National Marine Fisheries Service
1 Blackburn Drive
Gloucester, MA 01930
Director, Region 3
U.S. Fish and Wildlife Service
Federal Building,
Fort Snelling Twin Cities, MN 55111
Director, Region 5
U.S. Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035

For general information contact:

Great Lakes Fishery Commission
2100 Commonwealth Blvd., Suite 209
Ann Arbor, MI 48105-1563

Appendix D: Commission Management & Control of Sea Lamprey

The Convention directs the commission to coordinate and implement effective research, conservation, and management programs for the Great Lakes ecosystem. Article IV of the Convention dictates the commission's major responsibilities as:

(a) to formulate a research program or programs designed to determine the need for measures to make possible the maximum sustained productivity of any stock of fish in the Convention Area which, in the opinion of the commission, is of common concern to the fisheries of the United States of America and Canada and to determine what measures are best adapted for such purpose;
(b) to coordinate research made pursuant to such programs and, if necessary, to undertake such research itself,
(c) to recommend appropriate measures to the Contracting Parties on the basis of the findings of such research programs;
(d) to formulate and implement a comprehensive program for the purpose of eradicating or minimizing the sea lamprey populations in the Convention Area; and,
(e) *to publish or authorize the publications of scientific and other information obtained by the Commission in the performance of its duties*[73]

To accomplish its goals and address these responsibilities, the commission employs a variety of research programs and sea lamprey management techniques.

Science Programs

Under the Convention (Appendix A) article IV, section a and b, the commission is charged with formulating research needs and to undertake such research as necessary. The research that is conducted under the commission's research programs are done by researchers from a variety of institutions including University of Michigan, University of Guelph, University of Waterloo, Michigan State University, and The Ohio State University. Two research programs are managed by the commission: the fishery research program and the sea lamprey research program. The fishery research program conducts research and develops recommendations for achieving a healthy Great Lakes ecosystem through ecological and social sciences.[74] The sea lamprey research program is designed to provide the information needed to fully implement integrated management of sea lampreys, as well as develop new effective strategies for their control. The sea lamprey control program focuses on the biological, ecological, and management-related research on sea lamprey and their effects on fish communities and the fisheries.[75]

Fishery Research Program

The Board of Technical Experts (BOTE) committee oversees the Fishery Research Program, ensuring the information needed to achieve a healthy ecosystem, through appropriate research, is undertaken. Research priorities under the Fishery Research Program are identified by the lake committees, the Council of Lake Committees and Great Lakes Fish Health Committee.

The Fishery Research Program supports projects under broad themes that describe topics important to achieving Great Lakes ecosystem health. The research program's theme areas identify key research questions and hypotheses that can become the focus of specific projects. The development for these areas is provided by the core group of BOTE and members-at-large.

Sea Lamprey Research Program:

The Sea Lamprey Research Program is overseen by the Sea Lamprey Research Board. The purpose of the program is to conduct research to promote the development of innovative and progressive ideas about sea lamprey population control. The committee overseeing the research also ensures its dissemination at their bi-annual meetings and coordinates the transfer of the science to the management of sea lamprey. Research under this program strives to develop new techniques that will make sea lamprey control more effective and efficient – thus reducing lamprey populations to historic lows. One example of the research taking place under the commission's sea lamprey research program, and are in the field study phase, are pheromones.

Pheromone studies:

Studies being conducted through partnerships with researchers at various academic institutions such as Michigan State University in Lansing, MI, are conducting seminal studies about pheromones. Pheromones are a chemical substance released by animals and fish to signal each other. Certain pheromones communicate different messages; in one study, sea lamprey pheromones released by larval lampreys living in streams, signal parasitic adults living in the lakes, that the stream is suitable for spawning. Another pheromone being studied is that of fully mature males signaling their sexual receptiveness to females. Pheromones are seen as a potentially powerful new tool in the fight against sea lamprey; researchers and managers are currently synthesizing the pheromones to attract spawning adults into streams unsuitable for spawning; the sex pheromone could potentially be used to interfere with mate selection once adults are in streams.

Sea Lamprey Management/Control

The main charge of the commission is to suppress sea lamprey populations in a quest for rehabilitating the fishery stocks in the Great Lakes for the commercial and recreational fisheries. The commission works in cooperation and in partnership with the Department of Fisheries and Oceans Canada, the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service to undertake sea lamprey control. The program institutes several techniques in an effort known as "integrated sea lamprey management."[76] Components of this effort include sea lamprey assessment, lampricide control, sea lamprey barriers, sea lamprey traps and the sterile-male-release-technique. Under the commission's sea lamprey control program, lamprey assessment and lampricide control are components. Under the alternative sea lamprey control program, barriers, traps and sterile-male-release are components.

Sea Lamprey Assessment

Though not a program in itself, it is important to point out that the commission institutes a comprehensive assessment program to understand the ecology and population dynamics of sea lampreys[77] and their populations. The commission collects quantitative sea lamprey information to track long term trends in lamprey populations. This assessment program allows the commission to decide which streams, using which methods, to apply control measures. These assessments are also helpful and necessary in monitoring and gauging the effectiveness of the commission's control techniques, and to identify alternative means to control lamprey.

Sea lamprey assessment efforts focus on all of the stages of the sea lamprey's life cycle; from their larval stage in the streams, to their parasitic and spawning phases.[78] Depending on the life stage being assessed, biologists from cooperating agencies go into the field using a variety of tools and methods, including backpack electro-fisher, to assess larval sea lampreys in shallow stream waters; charter boat and commercial fisherman provide monitoring agencies with data on parasitic-phase sea lampreys in the open waters of the Great Lakes; and, mechanical traps to catch spawning sea lamprey in select streams, data that provides accurate measurements of lake-wide sea lamprey populations. Using high-technological computer-based tools, coupled with the collected assessment data, the commission develops models that forecast larval and adult sea lamprey populations and develop strategies for sea lamprey control.[79]

Sea lamprey control

Implementation of the commission's sea lamprey control programs is done by the US Fish and Wildlife Service and the Department of Fisheries and Oceans, Canada. These agencies are responsible for the application of TFM (3-triflouromethyl-4-nitrophenol), the chemical designed specifically for killing sea lamprey larvae in streams. The commission also works with the Army Corps of Engineers, developing part of the alternative sea lamprey program that uses technologies that move away from chemical use and rely on physical barriers. The Army Corps of Engineers establishes low-head or adjustable barriers that prohibit lamprey from reaching spawning habitat up stream.

The purpose of the Commission is to suppress or eradicate sea lamprey populations so that the Great Lakes can return to previously perceived healthy aquatic ecosystem. The program's focus on sea lamprey eradication, and later on sea lamprey population mitigation and control, led to scientific studies to find a mechanism that would kill sea lampreys. During the 1950s, under the direction of the U.S. Fish and Wildlife Service, scientists tested almost 6,000 compounds in hopes of identifying one that would be specific to sea lamprey.[80] In 1958, TFM was discovered as a compound effective in controlling sea lampreys without significantly impacting other species.[81]

Because sea lampreys spawn by migrating up streams, it allows the commission to have a target area of treatment. Sea lamprey larvae live in Great Lakes tributaries and streams for three to six years before transforming into a parasitic adult and migrating into the lakes to begin feeding on fish. For this reason, TFM is applied to streams where larval sea lampreys are found. Close to 175 Great Lakes streams are treated at regular intervals to kill larvae;[82] and depending on abundance, rate of growth and the age of the populations, tributaries are treated between three to ten year intervals.[83] Although TFM has proven to be a successful tool, the cost of the chemicals, as well as the public's

reluctance and skepticism about chemicals, is high. Therefore the commission has been seeking alternative methods of control with the goal of reducing chemical treatments in the Great Lakes region.

Alternative sea lamprey control

In the 1990s, the commission began developing alternative control technologies with the objective of achieving a 50% reduction in lampricide application, even though lampricides have proven to be remarkably successful.[84] Extensive testing into environmental safety on TFM and another lampricide (Bayluscide) that the commission uses, found them to have no long-term, detrimental effects to the ecosystem or human health.[85] Public apprehension, however, about pesticides and escalating costs of lampricides, as well as finding more efficient and effective methods of controlling lamprey, has compelled the commission to find alternative technologies for sea lamprey control.[86] With the goal of reducing lampricide use, the commission has focused on alternatives to chemical controls. The overall reduction in TFM to date has been 30%, short of the commission's proposed 50% reduction goal. Nevertheless, the commission has found that the reduction of the additional 20% to reach the goal will be difficult, because a further reduction in TFM use would risk sea lamprey control effectiveness within the Great Lakes. It is, therefore, the commission's goal to expand, develop and implement alternative mechanisms of control to those streams that would have been treated with TFM to obtain the same control results.

Barriers: Physically blocking the sea lamprey from entering their spawning grounds is an effective manner to reduce sea lamprey populations, as well as reducing the use of lampricides either completely or in part.

Some negative aspects are related to physical barriers in streams. Most structures in the past have been permanent, and although prohibiting the passage of sea lamprey, also prohibited the passage of native fish. The stream dynamics and ecosystem change also took place, as pools form both above and below fixed structures altering native free flowing ecosystems. New technologies are being developed however to address these factors, including new types of barriers that incorporate state-of-the-art fish passage devices that allow passage of native fish but capture or repel sea lamprey.

Low-head barrier dams are now the most common on the Great Lakes tributaries. These structures create a low drop (generally about two feet) that does not allow sea lamprey to proceed upstream. Because lampreys use their suction mouth to migrate upstream by attaching onto the substrate or structures, most low-head barriers are equipped with a lip to prevent this. Jumping pools are also included with these structures to allow migratory salmonids and other jumping fish to pass over the structure. Most low-head barriers are now equipped with vertical slots or fish passages that allow non-jumping fish to pass but not the poor-swimming sea lamprey.

Adjustable-crest barriers are similar to fixed low-head barrier dams but are improved by their ability to rise and fall using inflatable air bladders. This less intrusive design allows the stream to keep its free-flowing dynamics, and thus free fish passage, most of the year. During spawning season, the adjustable-crest is raised to prevent sea lamprey from passing. These adjustable-crest barriers are inflated to heights dictated by stream flow, and adjust to minimize alteration of the stream flow. Similar to the fixed

low-head barrier, these barriers have jumping pools to allow jumping fish passage and are usually outfitted with other fish passage mechanism for non-jumping fish.

Electrical barriers were some of the first barriers used in the Great Lakes in the early 1950s. Using alternating current (AC), the barriers were often ineffective due to flooding of the streams or power outages. New barriers are being experimented with using direct current (DC). These barriers, built into the stream bed, do not alter the stream flow and deter fish and sea lamprey into fish passage/sea lamprey traps near the side of the stream, allowing fish passage and capturing lampreys. These barriers, like the adjustable-crest, are used only in the spawning season, allowing free fish passage the remainder of the year.

Sterile-male-release

In 1991, biologists began experiments to determine whether sea lamprey sterilization could be an effective control mechanism to control sea lamprey populations in the Great Lakes. Biologists hypothesize that sterilized males lampreys would compete with fertile males for females during spawning, thus reducing the number of eggs fertilized. This technique has been successfully used around the world for reducing insect populations.[87]

This method requires that lampreys are caught. To do this, lamprey traps are established in a number of strategic locations throughout the Great Lakes region. Many of these traps are in association with the previously mentioned barriers; others are placed in stream flow regimes that attract lampreys, and which have structures to suit traps, these include power stations or other private facilities. Annually, the traps capture approximately 25,000 male sea lampreys.[88] Once trapped, the sea lampreys are transported to the United States Geological Survey (USGS) Hammond Bay Biological Station in the Northern lower-peninsula of Michigan. Here they are sterilized and monitored through a program implemented by the USGS. All of the lampreys caught, sterilized, and released are spawners (past their parasitic phase and not a threat to fish). The goal of this program is to increase the ratio of sterile to fertile males, thus creating an environment where sterilized males out-compete the fertile males mating with females; the result is nests of infertile lamprey eggs and a reduction of sea lampreys.

Trapping

Traps are designed to capture lampreys as they migrate upstream to spawn. As mentioned previously, the traps are often associated with barriers, though there are traps stationed at utility companies and other private structures. The male lampreys are used for the sterile-male-release-technique and most female lampreys are used for research.

Appendix E: Federal and State Trust Funds

These two trust fund mechanisms were brought to our attention during this study, both seemingly viable options to consider for long-term funding of an organization such as the Great Lakes Fishery Commission. Among further investigation, however, we found that these trust funds are inadequate on a variety of levels, and can be considered no more stable or reliable than annual appropriations.

Bauer and Probst, in their analysis of long term funding solutions, examine both state and federal trust funds and have assessed some of their weaknesses. For the purpose of establishing a reliable, long-term funding mechanism, both the state and federal trust funds fail at meeting the criteria for an organization like the commission, looking for a perpetual source of funding.

The Federal Trust Fund

The federal budget of the United States includes more than 150 trust funds, the second major account group in the federal budget and amounting to one third of total spending.[89] "Federal trust funds are created for specific and usually long-term purposes and have receipts earmarked for those purposes, as defined by specific legislation or trust agreements."[90] Federal trust funds, however, do not work in a similar fashion as private trust funds. Bauer and Probst best describe a federal trust as being a record-keeping device rather than actual money put away (banked) for use. They go on to say that, by law, any surplus "of a federal trust fund must usually be invested into U.S. Treasury securities," or rather, "that a [federal] trust fund's 'balance' is actually the debt that the Treasury owes that fund—debt on which the Treasury must pay the fund interest."[91] This turns out to be debt, Bauer and Probst explain, and is a government commitment, or obligation to pay; it is not cash or liquid assets and represents "an intra-governmental IOU."[92] The Federal Trust fund is vastly different from a private trust fund in that they are not pension funds and do not consist of real economic assets that can be drawn down in the future. Instead, they are claims on the Treasury that, when redeemed, will have to be financed by raising taxes, borrowing from the public, or reducing benefits or other expenditures. The existence of large trust fund balances, therefore, does not, by itself, have any impact on the Government's ability to pay benefits."[93]

Finally, the federal trust fund is not a suitable, stable mechanism appropriate for long-term funding. The federal government does not have a lawful duty to the beneficiaries (public); the government is not bound by any trust agreement. Therefore, the government can unilaterally change the terms of a trust fund's administration (both its revenues and its expenditures) by passing new legislation. The assets of a federal trust (as mentioned above, consisting of only claims on the Treasury) are both owned and managed by the government (the trustee), "so that the benefits and burdens of ownership are not legally separated, as they are with a private trust fund."[94] What this means is the funds of a federal trust fund can be re-appropriated at anytime, leaving funding at the mercy of political agendas and the economic climate, similar to the annual appropriations process.

Capital from a federal trust fund is controlled directly by the government; the government owns the assets and earnings of the trust fund and it can unilaterally raise or

lower future trust fund collections and payments, or change the purpose for which the collections are used, by changing existing law.[95]

The State Trust Fund

Another funding mechanism that we considered during this research was the state trust fund. State trust funds can be financed by federal appropriations, but the power lies within the state to appropriate funds from the trust. Hence, the state can unilaterally (similar to the federal trust fund) reallocate funds through legislation, which can potentially weaken the fund in times of economic uncertainty or political maneuverings. This would weaken the financial security of the fund over the long-term. Additionally, with eight states in the Great Lakes basin, matters could potentially become confused about funding allocation; especially should there be a need to re-allocate funds within one state with monies earmarked for the commission's common, bi-national fund.

One weakness of state trust funds, similar to the federal trust fund, is that they are susceptible to legislative action on the state level, thus reducing their financial security. This can be partially remedied through the state trust funds being created through a state constitutional provision; this would make it more difficult and time-consuming to change the structure and purpose of the trust fund compared to simply passing new legislation, which can be done when trust funds are established by law. A trust written into a state constitution will likely serve its original purpose well into the future, assuring its purpose and financial security over the long term more so than were it established under state legislation.[96]

The state trust fund is seen as a great alternative by Bauer and Probst, a hybrid between a federal and private trust fund. Should it be established properly (utilizing an aforementioned state constitution) it could serve as a secure long-term funding mechanism for environmental stewardship, it has the ability to be funded by federal appropriations (and is done so in many states), and due to the variations in state laws, it has degrees of ease in which they can be established in a state. For some of the same reasons that this mechanism seems like a good resource for natural resource stewardship in the commission's situation, it also makes it more difficult. One major source of difficulty being that the Great Lakes fishery spans the jurisdiction of eight states, multiple local jurisdictions, two countries, and many tribes (who have rights to the resource under convention).

It should be noted that Bauer and Probst's favorable spin on the state trust fund, may have to do with their methodology of assessing its usefulness in the context of cleaning up contaminated sites and not a multi-jurisdictional, common-pool-resource. For these reasons, we only touched on the state trust fund and can only point to a few of the potential problems that would make this mechanism more difficult to work with than a private trust fund:

- What would the relationship be between the state which legally holds the state trust fund and the Great Lakes Fishery Commission?
- What would the relationship be between the state which harbors the state trust fund and the other states?
- The relationship between the source (federal government or private sources) that capitalizes the state trust fund and the state which harbors the trust fund, the other states, the tribes, and the commission?

The relationships between a state trust fund and the other stakeholders within the Great Lakes basin, and partners of the Great Lakes Fishery Commission, would need to be worked out in great detail, and exceeds the scope of this paper. The above concerns need to be addressed to further assess the viability and usefulness of a state trust fund.

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