A JOINT STRATEGIC PLAN
FOR MANAGEMENT OF GREAT LAKES FISHERIES

As Revised, 10 June 1997

Great Lakes Fishery Commission

Miscellaneous Publication 2007-01

The Great Lakes Fishery Commission was established by the Convention on Great Lakes Fisheries between Canada and the United States, which was ratified on October 11, 1955. It was organized in April 1956 and assumed its duties as set forth in the Convention on July 1, 1956. The commission has two major responsibilities: first, develop coordinated programs of research in the Great Lakes, and, on the basis of the findings, recommend measures which will permit the maximum sustained productivity of stocks of fish of common concern; second, formulate and implement a program to eradicate or minimize sea lamprey populations in the Great Lakes.

The commission is also required to publish or authorize the publication of scientific or other information obtained in the performance of its duties. In fulfillment of this requirement the commission publishes the Technical Report Series, intended for peer-reviewed scientific literature; Special Publications, designed primarily for dissemination of reports produced by working committees of the commission; and other (non-serial) publications. Technical Reports are most suitable for either interdisciplinary review and synthesis papers of general interest to Great Lakes fisheries researchers, managers, and administrators, or more narrowly focused material with special relevance to a single but important aspect of the commission's program. Special Publications, being working documents, may evolve with the findings of and charges to a particular committee. Both publications follow the style of the *Canadian Journal of Fisheries and Aquatic Sciences.* Sponsorship of Technical Reports or Special Publications does not necessarily imply that the findings or conclusions contained therein are endorsed by the Commission.

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November 2007

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Photo: M. Gaden

Signatories to *A Joint Strategic Plan for Management of Great Lakes Fisheries*
1997 Revision, Ottawa, Ontario

A JOINT STRATEGIC PLAN FOR MANAGEMENT OF GREAT LAKES FISHERIES

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New York State Department of Environmental Conservation
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U.S. Geological Survey
Wisconsin Department of Natural Resources

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A JOINT STRATEGIC PLAN FOR MANAGEMENT OF GREAT LAKES FISHERIES

Background

The original Joint Strategic Plan for Management of Great Lakes Fisheries (hereafter the original plan) (GLFC 1981) was proposed for acceptance in December 1980 and adopted by the ratifying parties (hereafter, the parties) in June 1981. The original plan represented, for the Great Lakes, the first formal commitment to a set of procedures intended to ensure that the actions of one fishery-management agency would not jeopardize the interests of a sister agency. The original plan also featured a goal statement that provided collective direction for fishery management. The original plan served the parties well, and, except for the addition of two more parties in 1989, remained unchanged until now.

The Original Plan of 1981

By adopting the original plan in 1981, the parties recognized that varied interest groups had become more active and influential in determining the uses of and the delivery of fishery management on the Great Lakes and that a more-coordinated, structured approach was needed. At the time, the ecosystem approach, which recognized that any impact on part of the system could affect a whole lake and even the entire basin, was already accepted by the Great Lakes Fishery Commission (hereafter, fishery commission) and International Joint Commission (IJC). Hence, lakewide and basinwide perspectives were already recognized as essential to effective management in the years leading up to the adoption of the original plan.

In formulating the original plan, the parties acknowledged that mandated and other legal responsibilities under which their agencies operated could not be abridged. The parties also understood that an enduring commitment to a plan could only be realized if officials from their fishery agencies were involved from the beginning in the plan's development so that the plan would be theirs, and they would become advocates and implementers. Such a plan, the parties realized, would need to be strategic in scope because formulation of a tactical type of plan for all of the lakes would be a daunting exercise likely to end in failure. The envisioned plan was intended to establish an umbrella under which tactical or operational plans could be developed for each of the lakes and connecting channels.

As requested by the parties, the original plan was developed under the aegis of the fishery commission, which provided the parties with financial, logistical, and technical support and played an important coordinating role, in particular, through the parties' utilization of the fishery commission's extensive committee structure. To initiate the planning process, the administrators of 12 natural-resource agencies with responsibilities for management of Great Lakes fisheries formed themselves into an oversight body called the Committee of the Whole. The committee, in turn, appointed a steering committee with one representative from each U.S. state, the United States Fish and Wildlife Service, and the National Marine Fisheries Service and with two representatives each from the Province of Ontario and Fisheries and Oceans Canada.

The steering committee was asked to select its own co-chairs, one from each country, and was charged to:

- Identify the key problem areas that must be addressed to comprehensively manage fishery resources now and in the future
- Develop a process for delivering a plan
- Develop the framework for what should be included in the plan

The Committee of the Whole approved the planning process proposed by its steering committee and reserved for itself a final review of the draft plan before it was to be submitted for review to the fishery commission and its affiliated agencies.

The steering committee formed various work groups that in the aggregate drafted a common goal statement, defined major issues, and developed strategic procedures. To produce what would be the framework of the envisioned plan, the steering committee relied upon responses to a questionnaire submitted to all Great Lakes fishery agencies, the results of a workshop funded by the fishery commission, and other material such as fishery-agency plans and agency documents. In December 1980, the steering committee delivered a draft plan to the Committee of the Whole, and it was then accepted informally. In June of 1981, the draft plan was formally ratified by the parties through a memorandum of acceptance (GLFC 1981).

1986 Review

In 1986, the parties undertook a review of the original plan, and the resultant findings were disseminated by the fishery commission (Dochoda 1988). The review did not result in any textual changes to the body of the original plan, but it did provide for the addition of two parties. In May 1989, representatives from the Chippewa-Ottawa Treaty Fishery Management Authority and the Great Lakes Indian Fish and Wildlife Commission added their signatures to the memorandum of acceptance [http://www.glfc.org/pubs/tribal_sigs_small.pdf]. Although the 1986 review did not result in changes to the body of the original plan, it did rejuvenate interest and resulted in major new commitments, such as the production by lake committees of state-of-the-lake reports.

Revised Plan of 1997

In 1995, the parties, now numbering 14, agreed to a second review of the progress in implementing the original plan. Unlike the review of 1986, this review resulted in changes to the body of the original plan. The impetus for another review was driven in part by a perceived need to better coordinate fishery and environmental management, especially with the initiation of the Lakewide Management Plan (LaMP) process called for in the Great Lakes Water Quality Agreement (GLWQA) and by a need to refine the procedures for settling conflicts between agencies. The revisions (summarized in Appendix E) that became part of the new plan (hereafter, the revised plan) were intended to strengthen the agreement and were based on a review of progress and lessons learned in implementing the original plan. While undertaking

this review, the parties reaffirmed once more their commitment to two vital aspects of the original plan—the ecosystem approach and management by consensus (defined in Appendix C). Also important, the same steering committee approach employed successfully in producing the original plan was used to undertake the revision.

The steering committee was charged with reassessing Great Lakes fishery issues, recommending improvements in the strategic procedures, and identifying other ways that the original plan could be improved. With support from the fishery commission, the steering committee prepared and distributed a questionnaire to gain input from those involved with implementing the original plan and those involved with related initiatives. The results of the survey were worked into discussion papers that then became the focus of a workshop attended by many who participated in the survey and by others from the fishery and environmental-management communities. Following the workshop, the steering committee prepared a report for consideration by the parties. This report identified proposed changes to the original plan and provided a rationale for them.

In 1997, the parties adopted the revised plan in accordance with the terms of the memorandum of acceptance (GLFC 1981), and a fifteenth party, the U.S. Geological Survey, became a signatory (Appendix A). In adopting the revised plan, the parties recognized once more the need to provide timely and effective direction for implementation. To better accomplish this need, the Committee of the Whole was replaced with a Council of Great Lakes Fishery Agencies. The council is composed of one representative from each party, but the appointments are typically at a lower level in each party's agency than were members of the Committee of the Whole. This change was intended to engage those more directly connected on a day-to-day basis with fishery management of the Great Lakes. With this change in oversight, the revised plan, like its predecessor, represents a collective will of the fishery-management agencies to protect and, where necessary, to rehabilitate the fisheries of the Great Lakes. The fishery commission, in passing a resolution to support the revised plan (Appendix B) became, in effect, part of this collective will.

Common Goal Statement

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 in agency goals were used to formulate a goal statement that is believed to represent adequately the aims of the parties 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 governments. The agencies responsible for them have been charged with managing 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 efforts 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 that can provide improved contributions to society. Such an ecosystem approach requires protection and rehabilitation of aquatic habitat and effective fishery management to ensure stable self-sustaining foundations, especially at the forage-fish level, for the community while allowing for judicious stocking of hatchery-reared fish to complement or enhance natural production of predatory fish, meeting public demands, and rehabilitating depleted stocks of desirable species.

Great Lakes Fishery Issues

Prior to the signing of the original plan in 1981, senior federal, state, and provincial fishery managers were asked to respond to an issues questionnaire by assigning a rating to each of five major issues discussed below. This query was seen as a necessary step in developing strategies to achieve a common goal. Issues were defined as those impediments that prevent achievement of a management goal. The input of other interested groups was secured via a workshop conducted by the now defunct Great Lakes Basin Commission and supported by the fishery commission.

The steering committee charged with undertaking this review concluded that the major issues have not changed dramatically in the intervening 15 years since the original plan was adopted, and the Committee of the Whole agreed with this assessment. The importance of some issues has changed, but none have been eliminated, and one new issue has emerged.

Lost Fishing Opportunities

Since the turn of the century, a progressive depletion of many indigenous fish stocks has occurred due to overharvest, habitat loss, and exotic species. Many of the most highly valued stocks of lake trout (*Salvelinus namaycush*), lake whitefish (*Coregonus clupeaformis*), lake herring (*Coregonus artedi*), walleye (*Zander vitreus*), deepwater ciscoes (*Coregonus* spp.), and lake sturgeon (*Acipenser fulvescens*) have collapsed and been replaced by other, often less-valuable, species. The loss of indigenous species such as blue pike (*Stizostedion vitreum glaucum*), shortnose cisco (*Coregonus reighardi*), and Atlantic salmon (*Salmo salar*), as well as other fish adapted to specialized environments, represents a loss of genetic resources impossible to replace.

In 1981 and yet 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 high-market-value fish, continue to depend on other species once considered of low value but now in high demand (e.g., yellow perch (*Perca flavescens*)).

In some areas, opportunities for recreational angling have been severely reduced and the tourist industry has suffered from a loss of sport-fishing business, causing substantial reductions in employment and income. But, in other areas, emphases on stocking and innovative sport-fishery management have dramatically increased the economic value of the associated industries. 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 benefits to Canadians and Americans.

Fisheries are an important part of tribal cultural heritage and have high value for religious, medicinal, nutritional, and economic reasons. The resurgence in recent decades of tribal fisheries, resulting from a number of court decisions, would be even greater were it not for depleted native-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 significant progress made in both countries in reducing point-source inputs and in improvements in regulation. However, little progress has been made in regard to contaminated sediments and the long-range transport of persistent toxic chemicals into the Great Lakes basin. Overall, levels of persistent toxic chemicals in most top-predator fish have declined dramatically, but contaminant advisories for sport-caught fish remain in both countries.

Instability of Fish Communities

Although rehabilitation of key components of Great Lakes fish communities has continued over the past 15 years, some constituent populations remain depleted, some are still not fully self-sustaining, and others remain unstable. Still, other populations, though stable, continue to depend on stocking for recruitment. Instability of Great Lakes fish communities results from the following stresses.

Sea Lamprey. The parasitic sea lamprey (*Petromyzon marinus*), although significantly controlled in most areas, continues to have an adverse impact on the Great Lakes ecosystem. The development of larval populations in connecting channels like the St. Marys River and in lake environments where traditional control technology is not effective has resulted in a resurgence of some sea lamprey populations. Implementation of new control techniques, such as sterile-male release, holds promise for control in these areas. Nevertheless, as in 1981, the continued dependence on lampricides makes control vulnerable to interruptions in the supply of lampricides, to negative public attitudes towards pesticides, and to regulatory and licensing hurdles. Because of these vulnerabilities, the search for alternatives to lampricide-based control is imperative.

Overharvest. In the past, inadequate assessment of fish stocks and poor control and monitoring of the harvest led to depleted stocks and disrupted fish communities. The historical 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-fish stocks may be further compromised as a result of dwindling staff numbers due to stagnant or dwindling budgets.

Invasions and Introductions. The invasion of exotic species, such as sea lamprey and alewife (*Alosa pseudoharengus*), was considered an important issue when the original plan was signed. The rate of invasion has increased since then and has led to an even-greater concern about the impact these unwanted exotics have had on fish stocks throughout the Great Lakes. By 1997, more than 140 exotic species were known to have established in the Great Lakes. Impacts associated with unwanted introductions are varied and potentially severe. Zebra and quagga mussels (*Dreissena polymorpha* and *D. bugensis*), introduced into the Great Lakes via ballast-water discharge from transoceanic freighters and discovered in 1988, have forever altered the ecology, flow of energy, and fish communities of the Great Lakes. The ruffe (*Gymnocephalus cernua*), a fish similar to the Eurasian perch, introduced into Duluth Harbor in the early 1980s and reported in Lake Huron in 1996, may affect warm-water fish communities. Other recent

invaders include two species of goby (Gobiidae), the spiny water flea (*Bythotrephes longimanus*) (a predacious cladoceran), and a lethal pathogen (*Myxobolus cerebralis*) of trout and salmon that causes whirling disease. Exotic species can modify fish communities to the extent that fishing opportunities are severely reduced. Introductions of top predators such as salmon and trout may complement fish-community structures, stabilize certain stocks of forage fishes, and provide new fishing opportunities. Fishery managers, however, need to be vigilant that such stocking does not destabilize the communities they seek to enhance.

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. 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 contamination of fish throughout the Great Lakes basin has raised continuing concerns 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 flesh have resulted in continuing restrictions on consumption of some Great Lakes fish. Encouraged by the fishery commission, efforts have been under way for several years for jurisdictions to establish a uniform set of consumption advisories.

The ecosystem approach espoused by the fishery agencies and the fishery commission, and reflected by the 1978 Canada-United States GLWQA and its 1987 Protocol, places particular emphasis on water quality and various habitat features that are required for normal functioning of fishes and for unrestricted consumption of fish. Attempts to secure such an environment have placed fishery interests in conflict with the interests of other water 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 influences the quality of the fishery resource. Some agricultural and forestry practices and urban development create problems of increased runoff, erosion, and loadings of nutrients, silt, and contaminants. Highway construction and maintenance causes inputs of silt, herbicides, and salt. Leaching from old industrial waste sites continues to pose problems relating to contaminants in the rivers and open waters of the Great Lakes. Major efforts are underway in both countries to clean up old dump sites.

Water Uses. Lakes and streams are used for a variety of purposes including: waste disposal; domestic, industrial, and agricultural-water supply; hydropower; navigation; recreation; and fishing. This variety of uses leads to conflicts among users, water-quality degradation, and interagency conflicts, all of which interfere with the maintenance and improvement of productive levels of fishery resources. 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 destroys 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 power generation, kill large numbers of fish. Mineral extractions and mining cause direct loss and disruption of fish habitat and probable loss of spawning shoals. Dredging and navigation cause erosion, silting, changes in nearshore 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. The Great Lakes receive major inputs of airborne nutrients and contaminants from industrial and other sources located hundreds and even thousands of kilometers from the basin. Models suggest that Lake Superior may receive as much as 90% of its PCBs from airborne deposition and much of that from sources outside the basin. Excessive levels of toxaphene in some Lake Superior fish is believed to have originated from outside the basin.

Competition and Conflicts among Users of Fishery Resources

Impediments to providing desired contributions of fish and fishing opportunities arise in part from the difficulty of identifying 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 available science. Understanding society's needs and measuring values associated with those needs are fundamental to understanding the allocation problem. 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 vs. 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 that appear to be unfavorable to their specific interests. Similarly, each group has internal conflicts regarding the desired mix of species and their allocation.

Native Peoples vs. Other Users. Rights and claims of use by aboriginal people have led to fishery-management disputes.

Access to the Resource

The shoreline of the Great Lakes and its tributaries, and especially that of the lower Great Lakes, has been forever altered through construction of industrial complexes, residential development, and expansion of public and private infrastructures. Such practices have presented users of fishery resources with formidable problems in gaining access to their fisheries. 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 Issue—Climate Change

Climate change may significantly alter the Great Lakes ecosystem in ways not yet well understood. The quality and quantity of the waters and the composition of food webs are likely to be affected. Rivers may be affected more than the deep lakes, which has serious implications for the ability of rivers to serve as fish spawning and nursery grounds.

Strategies for Great Lakes Fishery Management

In recent years, particularly following the implementation of the original plan, fishery agencies have successfully resolved, or partially resolved, several management problems. Certainly, the level of sea lamprey control in the Great Lakes is a monument to this 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 are intractable even with the benefit of having a strategic plan in place.

To assist fishery and environmental agencies in dealing with these problems, efforts remain under way to identify obstacles thwarting past efforts, to suggest broad strategies for their resolution, and to propose a coherent set of procedures for implementation. The fundamental strategies suggested here are a consensus strategy, an accountability strategy, an ecosystem-management strategy, and a management-information strategy.

These strategies are essentially the same as those adopted in the original plan. The ecosystem-management strategy, incorporated as part of this revision, was simply a refinement of the original environmental-management strategy. It better reflected the original plan's underlying ecosystem-based approach to fisheries management and the need to influence all practices having potential to affect attainment of the desired fish communities.

Consensus Strategy

The original and revised plans were not intended to usurp or weaken the legal responsibilities of fishery agencies to manage their fisheries. Through the signing of memoranda of acceptance by all Great Lakes fishery agencies, the original and revised plans recognized the need for formal acceptance and implementation. The original and revised plans also recognized the absolute need for fishery and associated agencies to be flexible, particularly at the lakewide

operational level, if a plan is to be implemented successfully. 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 among agencies would not only strengthen their individual requests for support of needed management initiatives but would also provide them with an incentive to act in accordance with the group's interest and intent. Therefore:

> *Consensus must be achieved when management will significantly influence the interests of more than one jurisdiction.*

Accountability Strategy

Positive participation in the consensus-management process will be encouraged by application of management-by-objectives at an interagency level. This implies, of course, open disclosure of each agency's individual programs and plans in terms of operational objectives, targets, and performance. Disclosure will not only provide for mutual evaluation of any management proposals that may affect another's interests but will 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-Management Strategy

In keeping with the spirit of an ecosystem approach, the parties should respond to all practices by authorities other than themselves that have potential to negatively affect fish communities. Great Lakes fishery- and environmental-management agencies should address the potential impacts of overlapping activities and decisions in an effort to coordinate and harmonize fishery and other environmental needs and objectives. The fishery commission and all of the parties should engage in structured, multi-level dialogue with federal, state, provincial, and tribal environmental agencies in exercises such as those devoted to production of LaMPs, Remedial Action Plans, and state-of-the-lake reports. The protection of the Great Lakes from introductions of non-native species, made contrary to the procedures identified in this document, is of particular concern. 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 is a precious commodity and must be made readily available for application wherever appropriate. However, agencies involved in fisheries and environmental management on the Great Lakes have generated a variety of data that are often inadequate for measuring and predicting the lakewide effects of their decisions. 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, they would all benefit from basinwide commonality in and accessibility to information collected and used to measure and predict the effects 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

Consensus Making

1. **Fish-Community Objectives**−The lake committees will define objectives for the structure of each of the Great Lakes fish communities and develop a means of measuring progress toward their achievement.

2. **Operational Plans**−Each fishery agency should identify its plans for achieving the fish-community objectives identified by 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 that other agencies believe will influence their interests may become the subject of negotiations within lake committees until a consensus among affected agencies is achieved.

5. **Conflict Resolution**−If consensus cannot be achieved, a party may seek advice from within the committee structure of the fishery commission, or a party may ask the fishery commission to arrange/facilitate a forum for information exchange, arrange third-party mediation with any resolution accepted only by a consensus of the affected parties, or provide a mutually acceptable third-party intermediary to make a nonbinding recommendation.

Ecosystem Management

6. **Environmental Issues**−Lake committees will identify environmental issues that may impede achievement of their fish-community objectives and will work within governmental initiatives, such as LaMPs, that provide opportunities for achieving, refining, and assessing progress on environmental and fish-community objectives.

7. **Coordination with GLWQA/LaMPs**−When participating in the LaMP process, lake committees will develop joint proposals, which focus on identifying environmental needs relative to their fish-community objectives, for submission to the fishery commission and other granting organizations.

8. **Environmental Issue Resolution**−Unresolved or emerging environmental issues may be referred by lake committees to the parties, the Council of Great Lakes Fishery Agencies, or the fishery commission, asking them to represent their interests before the appropriate controlling authority.

9. **Habitat Advisory Board**−The fishery commission will maintain an expert Habitat Advisory Board to assist the lake committees, the fishery commission, and the parties in developing ecosystem objectives and in identifying critical habitats essential for achieving fish-community objectives.

10. **Exotic Species**−Fishery agencies will collectively identify and promote implementation of procedures that prevent unauthorized introductions of non-native species.

Information Sharing

11. **Data Standards**−The fishery commission, to ensure compatibility among the parties and among other agencies, will coordinate the development and implementation of standards for recording and maintaining fishery management and assessment data.

12. **Models**−The fishery commission and the parties will coordinate the development and use of fishery models by the lake committees and other organizations.

13. **Information Access**−The parties are encouraged to maintain their databases on the Internet, and the fishery commission will maintain links to such databases and provide a catalog of fishery assessment and research programs, planned or in progress.

14. **Data Sharing**−Fishery agencies upon request are encouraged to provide their data to other agencies, if the collecting agency has had reasonable time to verify and interpret them (such time should not normally exceed one year for assessment data and three years for research data), and to collectively develop shared information services through the fishery commission.

Accountability

15. **Decision Record**−Consensus decisions made by lake committees or the Council of Lake Committees shall be made a matter of record.

16. **Agency Reports**−Fishery agencies, separately or jointly, should 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 fishery commission. In addition, each lake committee will convene, on a rotational basis once every five years, a special conference focused on the state of its lake. The proceedings of this conference will be a publishable report on progress towards achievement of fish-community objectives.

18. **Fishery Commission Report**−The fishery commission's annual report to the governments and the public will include a summary of lake committee reports and recommendations regarding fishery and environmental objectives, ongoing programs, and issues needing attention.

Plan Governance

19. **Plan Changes**−All parties must approve changes to this plan and new additions of parties.

20. **Council of Great Lakes Fishery Agencies**−The parties hereby establish a council of Great Lakes Fishery Agencies to represent their interests in implementing this revised plan. Each party will designate a representative to serve on the council, which will operate by consensus as defined in the memorandum of acceptance (GLFC 1981). The council, when writing its own terms of reference, will make every effort to

    - Ensure accountability among the parties for the implementation and periodic review of this revised plan
    - Guide and support the institutional arrangements created through this revised plan
    - Ensure timely and effective information exchange between law enforcement and fishery management
    - Develop strategies with environmental agencies to ensure that the environmental objectives of the lake committees become operational
    - Provide for input by Environment Canada, the U.S. Environmental Protection Agency, the IJC, and others, as appropriate
    - Develop and implement a strategic communications framework that details the roles and responsibilities of the parties and the fishery commission.

Epilogue

Both the original and revised plans were proposals for institutionalizing an ongoing planning process in accordance with certain broad strategies supported by procedures for their implementation (Appendix D). Within this process, the agencies are expected to use their participation on lake committees as a means of representing their own interests and of negotiating consensus decisions regarding common concerns. This revised plan, like its predecessor, has many implications in terms of commitments for the agencies, particularly for personnel who serve on lake and other committees. Many of these implications have not been specifically addressed in this document because any future planning should involve discussion by those people who ultimately will carry the bulk of the workload. Where successful implementation of the revised plan is impeded by fiscal or personnel limitations, lake committee efforts may need to be supplemented via other collaborative initiatives under the aegis of the fishery commission. In fact, it may be desirable to augment the resources of the fishery commission to provide the level of support necessary to fully implement this revised plan.

References

Dochoda, M. R. 1988. Committee of the Whole workshop on implementation of a joint strategic plan for management of Great Lakes fishes (reports and recommendations from the 18-20 February 1986 and 5-6 May 1986 meetings). Great Lakes Fish. Comm. Spec. Publ. 88-1. Ann Arbor, Mich.

GLFC (Great Lakes Fishery Commission, Editor). 1981. A joint strategic plan for management of Great Lakes fisheries. Available from http://www.glfc.org/pubs/jsp81.pdf [accessed 3 August 2007].

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	A fish stock recognized by man to be of current or potential value and that man can use for his benefit or gain.
Goal	A statement of intent to achieve a desired result that specifies societal benefits.
Impaired	The reduced ability to function as a unit.
Issue	A public concern that 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 that is self-sustaining, diverse, and resilient to a prescribed level of stress.
Exotic fish	A species non-indigenous to the Great Lakes (for example: sea lamprey, alewife, rainbow smelt (*Osmerus mordax*), brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*)).
Secure	To put beyond hazard of losing; to achieve and maintain.
Stock	The part of the fish population that 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

APPENDICES

Appendix A

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.

CHIPPEWA / OTTAWA TREATY FISHERY MANAGEMENT AUTHORITY

BY Bernard Bouschor
s/ Bernard Bouschor

ATTEST
Thomas K. Gorenflo
s/ Thomas K. Gorenflo

ITS Chairman

DEPARTMENT OF FISHERIES AND OCEANS

BY R J Pierce
s/ Ray J. Pierce

ATTEST
s/ John M. Cooley

ITS Regional Director General, Central and Arctic Region

GREAT LAKES INDIAN FISH AND WILDLIFE COMMISSION

BY _____
s/ James H. Schlender

ATTEST

_____
s/ Neil Kmiecik

ITS Executive Administrator

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

BY _____
s/ Brent Manning

ATTEST

_____
s/ Thomas Trudeau

ITS Director

INDIANA DEPARTMENT OF NATURAL RESOURCES

BY _____
s/ Larry D. Macklin

ATTEST

_____
s/ James T. Francis

ITS Director

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

BY _____
s/ K.L. Cool

ATTEST

_____
s/ Douglas B. Jester

ITS Director

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

BY _____
s/ Rodney Sando

ATTEST

_____
s/ Paul J. Wingate

ITS Commissioner

NATIONAL MARINE FISHERIES SERVICE

BY _____
s/ Andrew A. Rosenberg

ATTEST

_____
s/ Jon Rittgers

ITS Regional Administrator

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

BY _____
s/ John P. Cahill

ATTEST

_____
s/ Robert E. Lange

ITS Acting Commissioner

OHIO DEPARTMENT OF NATURAL RESOURCES

BY _____
s/ Donald C. Anderson

ATTEST

_____
s/ Gary Isbell

ITS Director

ONTARIO MINISTRY OF NATURAL RESOURCES

BY _____
s/ David Balsillie

ATTEST

_____
s/ Robert W. Beecher

ITS Assistant Deputy Minister

PENNSYLVANIA FISH AND BOAT COMMISSION

BY _____
s/ Delano R. Graff

ATTEST

_____
s/ Roger B. Kenyon

ITS Director, Bureau of Fisheries

UNITED STATES FISH AND WILDLIFE SERVICE

BY _____
s/ Gary Edwards

ATTEST

_____
s/ Dale Burkett

ITS Assistant Director, Fishery Resources

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

BY _____
s/ George E. Meyer

ATTEST

_____
s/ William H. Horns

ITS Secretary

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

The United States Geological Survey joins with the fourteen earlier signers of the Joint Strategic Plan for Management of Great Lakes Fisheries in accepting and adopting the Plan as amended on 10 June 1997 at Ottawa, Ontario, Canada. In witness thereof the additional signer hereunto sets his hand at Ottawa, Ontario, Quebec, Canada on the tenth day of June 1997.

UNITED STATES GEOLOGICAL SURVEY

BY Dennis B. Fenn

s/ Dennis B. Fenn

ITS Chief Biologist, Biological Resources Division

ATTEST

s/ Gregory J. Smith

Appendix B

RESOLUTION BY GREAT LAKES FISHERY COMMISSION

TO SUPPORT IMPLEMENTATION OF
A JOINT STRATEGIC PLAN FOR MANAGEMENT OF 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 to A Joint Strategic Plan for Management of Great Lakes Fisheries 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, i.e., will

- maintain Lake Committees;
- support development of fish community objectives that are comprehensive and principle-based, upon requested of a Lake Committee;
- arrange/facilitate an information exchange forum; seek advice of existing Plan committees; arrange third-party mediation with any resolution being endorsed through normal Plan procedures; and / or arrange a process involving a mutually acceptable third-party intermediary to make a non-binding recommendation, upon request of a Party to the Plan when consensus cannot be achieved;
- entertain joint proposals of Lake Committees and Lakewide Management Plans coordinators to identify environmental needs relative to fish community objectives, related management plans and assessments, and to thereby provide feedback on fish community objectives;
- represent, upon request of a Lake Committee, fishery interests on unresolved or emerging environmental issues to the most appropriate body or process;
- maintain an expert Habitat Advisory Board (HAB) to assist each Lake Committee, the Great Lakes Fishery Commission, and the Parties to the Plan to develop ecosystem objectives and identify critical habitats essential to achieving fishery objectives;
- coordinate development and implementation of standards for recording and maintaining fishery management and assessment data, to ensure compatibility among the Parties to the Plan and other agencies;
- work with the Parties to the Plan to coordinate development and implementation of models for common use by the Parties to the Plan and other agencies;
- provide its umbrella for agencies to collectively develop shared information services;
- consider recommendations from Lake Committees;
- include in the Commission's Annual Report to the governments and the public a summary of the Lake Committee reports and recommendations regarding fishery and environmental objectives, programs, and activities needing specific attention; and
- cooperatively determine with the Council of Great Lakes Fishery Agencies the appropriate mechanisms for Commission support of the Council.

BY Charles C. Krueger
s/ Charles C. Krueger

ATTEST

s/ F.W.H. Beamish

ITS Chairman

Appendix C—Definition and Concept of Consensus[1]

As the "consensus" 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 emergent consensus seems particularly relevant to the plan.

> *Emergent consensus results from the crystallization of opinion after all points of review have been heard in the market place of ideas. In theory, each 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 consensus process should work at the lake committee level in the plan. 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 fishery commission for mediation or arbitration (nonbinding) at the request of one or more of the parties in the dispute at the lake committee level. (Note: This procedure was nullified by Strategic Procedure 5 of the revised plan of 1997.)

[1] From GLFC (1981, see references).

Appendix D—Institutional Arrangements

Fishery management agencies

- Develop measurements of contributions of Great Lakes fisheries to society
- Obtain public input
- Develop plans for achieving lake management objectives
- Manage fisheries to achieve lake objectives
- Submit proposed policies, plans, and management decisions to appropriate lake committees before implementation
- Submit potentially controversial management proposals to lake committees for consensus decisions
- Make negotiated decisions a matter of record
- Provide fishery data to other agencies on request
- Collaborate to develop compatible, automated information systems
- Make annual reports to lake committees

Council of Great Lakes Fishery Agencies

- Ensures mutual accountability of the parties
- Ensures accountability for the implementation and periodic review of the Plan
- Provides guidance and support to the plan's institutional arrangements
- Ensures timely and effective information exchange between law enforcement and fishery management
- Ensures that environmental objectives are articulated and reciprocal strategies with environmental agencies are developed
- Provides for non-party participation by Environment Canada, U.S. Environmental Protection Agency, the IJC, and other agencies
- Informs and educates on a basinwide perspective, including the development and implementation of a strategic communications framework that details the roles and responsibilities of the parties and the fishery commission

Lake committees

- Define objectives for the structure of each of the Great Lakes fish communities, and develop means of measuring the progress towards achievement
- Negotiate consensus decisions on those agency proposals that might influence another agency's interests
- Identify environmental issues interfering with achievement of their fishery objectives
- Make recommendations to the fishery management agencies and the fishery commission
- Prepare annual reports summarizing agency successes and failures
- Prepare state-of-the-lake reports
- Handle issues affecting more than one lake through the Council of Lake Committees

Fishery commission

- Facilitates conflict resolution when consensus cannot be achieved
- Represents fishery interests to the appropriate bodies
- Works with fishery management agencies to develop the means of predicting the effects of decisions
- Submits an annual report on the status of Great Lakes fisheries, including recommendations on needs
- Maintains a Habitat Advisory Board to work with lake committees and environmental agencies in formulating environmental objectives
- Refers environmental issues to the Habitat Advisory Board
- Maintains management committees, including lake committees, the Council of Lake Committees, and the Great Lakes Fish Health Committee

Appendix E—Elements of and Major Changes to A Joint Strategic Plan for Management of Great Lakes Fisheries

Significant differences are in bold (source: Gaden, M. 2007. Bridging jurisdictional divides. Dissertation. University of Michigan).

	1981 (Original Version)	1997
Common Goal Statement	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, employment and income, and a healthy human environment.	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.**
Great Lakes Fishery Issues	• Lost fishing opportunities • Instability of fish communities (exotic species, over harvest) • Inadequate environment quality (land uses, water uses, atmospheric input) • Competition and conflict among users (allocation among jurisdictions, commercial v sport fishing, native v other users) • Access to the resource	• Lost fishing opportunities **(this version emphasized contaminated sediments and long-range transportation of persistent toxic chemicals)** • Instability of fish communities (exotic species, over harvest) **(this version emphasized the increase in the rate of introduction)** • Inadequate environment quality (land uses, water uses, atmospheric input) **(this version emphasized the establishment of uniform fish consumption advisories)** • Competition and conflict among users (allocation among jurisdictions, commercial v sport fishing, native v other users) • Access to the resource • **Climate change**
Strategies for Great Lakes Fishery Management	• Consensus • Accountability • Environmental Management • Management of Information	• Consensus • Accountability • **Ecosystem Management (this version emphasized the need for fishery agencies to work with nonfishery agencies)** • Management of Information

	1981 (Original Version)	1997
Dispute Resolution Procedures	If consensus cannot be achieved, the GLFC can hold a hearing and arbitrate differences, report its finding, and make recommendations for resolution to proper agencies.	**If consensus cannot be achieved, a party may (a) request the GLFC to arrange/facilitate an information exchange forum, (b) seek advice of existing plan committees, (c) ask the commission to arrange third-party mediation with any resolution being endorsed through the normal plan procedures, and/or (d) ask the commission to arrange a process involving a mutually acceptable third-party intermediary to make a non-binding recommendation.**
Definition of Consensus	• Harmony, cooperation, sympathy • Group solidarity in sentiment and belief • General agreement • Collective opinion • The judgment arrived at by most of those concerned • "Emergent consensus" results from a crystallization of opinion after all viewpoints heard • Consensus has been reached when no party to the negotiation objects to the opinion • Signing of a public document helps ensure adherence to the consensus decisions	Same as 1981 version
Strategic Procedures	1. Fish-community objectives developed; a means to measure progress outlined 2. Lake committees identify environmental objectives 3. Fishery commission supports Fish Habitat Advisory Committee 4. Each agency should identify its plans for achieving the fish community and environmental objectives 5. Each fishery agency should notify others of substantive changes in practice 6. If a change in practice affects others, it is subject to negotiation through the lake committees, until consensus is achieved 7. If consensus cannot be achieved, the GLFC can hold a hearing and arbitrate differences, report its findings, and make recommendations for resolution to proper agencies 8. Unresolved environmental issues may be referred by the lake committees to the GLFC so that the GLFC can represent the fishery interests before the appropriate bodies (e.g., IJC)	1. Fish-community objectives developed; a means to measure progress outlined 2. Each agency should identify its plans for achieving fish-community objectives 3. Each fishery agency should notify others of substantive changes in practice 4. If a change in practice affects others, it is subject to negotiation through the lake committees, until consensus is achieved 5. **If consensus cannot be achieved, a party may (a) request the GLFC to arrange/facilitate an information exchange forum, (b) seek advice of existing plan committees, (c) ask the commission to arrange third-party mediation with any resolution being endorsed through the normal plan procedures, and/or (d) ask the commission to arrange a process involving a mutually acceptable third-party intermediary to make a non-binding recommendation**

1981 (Original Version)		1997	
9.	Consensus decisions that require action by more than one agency shall be a matter of record	6.	Lake Committees will identify environmental issues that impede achievement of fish-community objectives
10.	Annual reports of progress toward fish-community objectives shall be made by the lake committees	7.	Lake committees will work with LaMPs to develop joint proposals to the GLFC or other organizations to identify environmental needs relative to fishery needs
11.	Each lake committee will prepare a progress report and make recommendations to agencies and the GLFC	8.	Unresolved environmental issues may be referred by the lake committees to the GLFC so that the GLFC can represent the fishery interests before the appropriate bodies (e.g., IJC)
12.	The GLFC's annual report will include a summary of lake committee actions	9.	GLFC will maintain a **Habitat Advisory Board**
13.	The GLFC will coordinate development of data standards, maintain a current inventory, and facilitate access to data	10.	Fishery agencies will collectively protect aquatic resources from exotic species
14.	Agencies are encouraged to share data with other agencies	11.	The GLFC will coordinate development of data standards, maintain a current inventory, and facilitate access to data
		12.	**The GLFC and the parties will coordinate development and implementation of models for shared use**
		13.	**All parties are encouraged to maintain databases on the Internet**
		14.	Agencies are encouraged to share data with other agencies
		15.	**Consensus decisions will be recorded through minutes**
		16.	**Each agency should make annual reports to the lake committees**
		17.	**Each lake committee will make an annual report to the GLFC. Once every 5 years, each lake committee will hold a state of the lake conference and write a report card.**
		18.	The GLFC's annual report will include a summary of lake committee actions
		19.	**All parties must approve changes to the plan or the new additions of parties**
		20.	**A CGLFA was established to ensure accountability and implementation, provide guidance, ensure timely information exchange, etc.**

Signatories	1.	Fisheries and Oceans Canada	1.	Chippewa-Ottawa Resource Authority (formerly Chippewa-Ottawa Treaty Fishery Management Authority)—**Signed in 1989**
	2.	Illinois Department of Conservation	2.	Fisheries and Oceans Canada
	3.	Indiana Department of Natural Resources	3.	Great Lakes Indian Fish and Wildlife Commission—**Signed in 1989**
	4.	Michigan Department of Natural Resources	4.	Illinois Department of Conservation
	5.	Minnesota Department of Natural Resources	5.	Indiana Department of Natural Resources
	6.	National Marine Fisheries Service (NOAA)	6.	Michigan Department of Natural Resources
	7.	New York State Department of Environmental Conservation	7.	Minnesota Department of Natural Resources
	8.	Ohio Department of Natural Resources	8.	National Marine Fisheries Service (NOAA)
	9.	Ontario Ministry of Natural Resources	9.	New York Department of Environmental Conservation
	10.	Pennsylvania Fish and Boat Commission	10.	Ohio Department of Natural Resources
	11.	U.S. Fish and Wildlife Service	11.	Ontario Ministry of Natural Resources
	12.	Wisconsin Department of Natural Resources	12.	Pennsylvania Fish and BoatCommission
			13.	U.S. Fish and Wildlife Service
			14.	**U.S. Geological Survey**
			15.	Wisconsin Department of Natural Resources