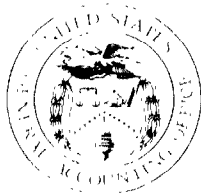


March 1992

GREAT LAKES FISHERY COMMISSION

Actions Needed to Support an Expanded Program



**National Security and
International Affairs Division**

B-246878

March 9, 1992

The Honorable John Glenn
United States SenateThe Honorable Robert W. Davis
House of RepresentativesThe Honorable Henry J. Nowak
House of Representatives

The Great Lakes Fishery Commission conducts programs to control the sea lamprey—an eel-like parasite that attacks fish populations in the Great Lakes. As requested, we reviewed the Commission's programs to determine (1) if the Commission uses an ecosystem management approach¹ that considers the potential harmful effects of sea lamprey control actions, (2) what progress the Commission has made in adopting nonchemical methods to control the sea lamprey, and (3) if the Commission could effectively spend increased funding on research for alternative control methods.

Background

The United States and Canada created the Commission in 1955 because of concern over the decline in Great Lakes fish stocks. The presence of the sea lamprey (see app. I) was considered a major factor in drastically reducing lake trout and whitefish stocks. Harvests of these species by commercial fishermen in 1955 were down two-thirds from 1940.

The Commission has achieved good results in reducing sea lamprey populations. According to Commission officials, applications of chemicals have reduced the number of sea lampreys in the lakes.² As a result, fish populations have increased from 1955 levels. Sea lamprey control has helped to develop a sports fishery valued at roughly \$2 to \$4 billion and maintain a small commercial fishing industry.

The Commission oversees programs to control sea lamprey populations, maximize the productivity of fish stocks, and further the knowledge of the

¹An ecosystem management approach considers the whole environment and recognizes that all living organisms, including humans, are connected to their environment and to each other.

²In 1991, sea lamprey populations in Lakes Superior, Michigan, Erie, and Ontario were estimated to be 5 to 10 percent of the 1955 levels. Sea lamprey populations in Lake Huron were estimated to be 25 percent below the 1955 levels.

Great Lakes fishery. A Board of Technical Experts made up of U.S. and Canadian fishery experts assists the Commission in managing a portion of its research activities. The United States and Canada share the costs of administration, sea lamprey control, and research.

The Commission has relied on two chemicals called lampricides—TFM and Bayer 73³—to control sea lamprey. TFM is a selective chemical that kills sea lamprey larvae. Bayer 73 is added to the TFM to enhance its properties. Lampricides are applied to streams to kill larvae before they mature and enter the lakes. The goal is to apply lampricides without damaging populations of other aquatic life. The Commission is required by law to re-register the two chemicals with the Environmental Protection Agency. The re-registration process will require the Commission to show that the chemicals meet new, more stringent guidelines for environmental safety.

Results in Brief

The Commission endorses an ecosystem management approach to its programs and is developing a strategic plan that considers potential impacts on the ecosystem. The Commission receives input from numerous government, academic, and other fishery experts to ensure that a variety of views are considered in developing and implementing Commission activities.

Because of environmental concerns and evidence that sea lampreys are spawning in areas that cannot easily be treated with chemicals, the Commission intends to develop nonchemical control methods and reduce the use of chemicals to 50 percent of 1991 levels by the year 2000. Developing alternative methods may require costly and lengthy research. For example, one technique under study may need at least 10 more years of testing to determine its effectiveness. To date, the Commission has not invested much of its resources to develop alternative control methods or conduct basic research that could lead to such methods.

The Commission proposed a large increase in its budget for fiscal year 1992 and again for fiscal year 1993 to, among other things, increase research activities to develop alternative control methods. However, the Commission lacks a comprehensive research strategy to fully support a substantially increased research budget. Furthermore, the Commission's informal procedures for managing its research program would be inadequate for managing a much larger program.

³TFM is a mononitrophenol containing halogens. Bayer 73 is a type of salicylanilide.

In addition to the questions you asked, we found that the Commission may have to spend roughly \$8 million over about 4 years to re-register lamprey control chemicals with the Environmental Protection Agency. The Commission has not budgeted for this cost or established an administrative system to oversee the re-registration process.

Commission Considers the Ecosystem in Its Management Approach

For some time, the Commission has sought input from fishery experts and managers throughout the Great Lakes Basin regarding the impact of its activities on the ecosystem. In 1985, we reported⁴ that the Commission's committee meetings were attended by representatives from the United States, Canada, and recreational and commercial sectors. The Commission has established many committees and subcommittees with representation from the various fishery management agencies and interests in the Great Lakes (see app. II). Also, its research involves the foremost fishery experts.

The Commission is formalizing its commitment to an ecosystem management approach. Since 1990, the Commission has been developing a strategic vision for its activities. A draft of its strategy reaffirms the Commission's commitment to integrated sea lamprey management first formalized in 1982, and supports, for each of the Great Lakes, objectives that the Commission believes are ecologically, socially, and economically sound. The Commission expects to approve the strategy in mid-1992.

As part of its ecosystem management approach, the Commission is attempting to develop new sea lamprey control methods. Although lampricides have not been shown to produce long-term detrimental effects, they can temporarily suppress populations of some sensitive vertebrates and invertebrate species such as mayflies. The Commission has set a goal of reducing the use of lampricides to 50 percent of 1991 levels by the year 2000.

Concerned with the potential effects of lampricides, Commission officials said they seek to treat only those stream areas where significant numbers of sea lamprey larvae can be eliminated before entering the lakes. The Commission requested \$7.1 million in its fiscal year 1992 budget for stream treatments, an increase of \$1.9 million from 1991. The Commission proposed the increase because it believes that the sea lamprey population, especially in Lake Huron, is growing.

⁴U.S.-Canadian Joint Effort Helps to Revitalize Great Lakes Fishery (GAO/NSIAD-85-106, July 8, 1985).

Some Canadian fishery officials believe the Commission has not adequately justified the need for additional treatments. For example, one official said the Commission had not done adequate population assessments and lacked sufficient evidence on the sea lamprey populations and the streams that promote sea lamprey growth. Commission officials would like to perform more population assessments, but said that this would require more funding.

To address the problem of insufficient data and other fishery management issues, the Commission is developing a formal protocol, referred to as the Integrated Management of Sea Lamprey, for gathering and analyzing data on sea lamprey populations. According to Commission officials, the Commission will begin implementing the protocol in mid-1992. Under the protocol, the Commission plans to set targets and evaluate progress in controlling the sea lamprey based, in part, on a quantitative analysis of the level of control that provides the best economic return to the fishery. Information to implement the protocol has not been fully developed. Raw data exists for Lakes Michigan, Huron, and Ontario, but it has not been analyzed. Data has not been collected for Lakes Superior and Erie.

Development of Alternative Control Methods Is in Early Stages

Research for alternative sea lamprey control methods has been conducted for over 30 years. However, due to the success of the chemical control program, the Commission has allocated relatively few resources to developing alternate methods. For example, in fiscal year 1991, it spent \$8 million of its \$9.8 million budget on stream treatments, sea lamprey population assessments, and other activities associated with the chemical control program. The Commission allocated about \$1.1 million⁵ for research, of which less than \$250,000 was for alternative control methods.

The Commission defines alternative control as any method that reduces the use of lampricides. To date, the Commission has employed two alternative control methods: barrier dams and the sterile male release technique. The dams are designed to concentrate sea lamprey in one area of a stream for more effective treatment with lampricides. The dams have limited use because they impede the movement of some spawning game fish and water craft. The second method, first used in 1991, involves releasing sterilized male sea lamprey into streams in the hopes of reducing reproduction rates.

⁵According to Commission officials, about \$.7 million was for research at U.S. Fish and Wildlife facilities and about \$.4 million was for independent research generally conducted by U.S. and Canadian universities.

A similar technique has been used successfully on insect populations in other areas.

The movement to reduce chemicals in the environment, combined with the increased sea lamprey population in areas that are difficult to chemically treat, has convinced the Commission that it needs to expand research and testing to develop other control techniques. Evidence indicates that large numbers of sea lamprey are spawning in areas of the Saint Marys River, which connects Lake Huron to Lake Superior. The size of the river and the velocity of the water flow may not permit effective chemical treatment. The Saint Marys River is 23 times larger than the largest river that has ever been treated with lampricides.

According to Commission staff, research funding levels and time are the primary constraints to developing an effective alternative to lampricides. Research into alternative methods of control is expensive and time-consuming, and any method showing promise could be years from implementation. For example, a U.S. Fish and Wildlife official said that the sterile male release technique, developed over 22 years, will need at least 10 more years of testing before researchers know if it is effective.

Enhanced Research Budget Constrained

Funding for the Commission's programs totaled \$9.8 million for fiscal year 1991. The Commission proposed a fiscal year 1992 budget of \$18.2 million—an increase of \$8.4 million, or 87 percent, compared to fiscal year 1991. The proposed budget included \$1.5 million for two alternative control techniques—barrier dams and the sterile male release technique—and \$2.5 million for alternative control research.

Neither government gave the Commission the funding increases it proposed because of budget constraints. The Commission had proposed \$12.3 million for fiscal year 1992 from the United States. However, the proposed amount was reduced to \$6.3 million in the executive branch's budget request, and Congress appropriated \$7.8 million. Canada plans to provide \$3.2 million in funding in fiscal year 1992—the same amount provided in fiscal year 1991.

Although smaller than proposed, the fiscal year 1992 budget of \$11.0 million represents an increase of \$1.2 million over the prior year. According to Commission officials, about \$.5 million of the increase will fund additional stream treatment, and about \$.6 million will fund efforts to find an effective alternative control method. Of this, \$.2 million is for the

sterile male release technique and barrier dams, and \$.4 million is for unspecified alternative control research.

The Commission has again proposed a substantially increased budget for fiscal year 1993, about \$17.8 million. Commission officials said they need a significant budget increase to fund expanded alternative control research. However, the Commission has not established a comprehensive research strategy or the formal monitoring procedures needed to support a large research program.

Limited Planning for Research

The Commission has not developed a detailed strategic plan for its alternative control research. According to Commission officials, the \$2.5 million for alternative control research in the 1992 budget proposal was arrived at without detailed supporting data or information on how the funds would be spent. One Canadian official said that Canada did not support increased research funding for 1992 in part because the Commission did not explain in detail how the money would be used.

Recognizing the need to provide more direction to its research efforts, the Commission has prepared an informal list of research categories that could lead to development of an alternative control method. The list includes three proposed funding priorities for each category: high, moderate, and low. Although the list helps focus research efforts, we believe that additional information is needed to both guide research direction and evaluate the usefulness of the proposed expanded research program. Examples of useful information include estimated cost and general time frames for researching each alternative control method, the likelihood that research could lead to future control methods, the amount of research already conducted, and the possible environmental consequences. Commission officials said that it may be difficult to develop all the detailed information, particularly for basic research activities. However, they agreed that more detailed information was needed to support an expanded program.

Limited Tracking of Research

In our 1985 review, we noted some deficiencies in the Commission's internal controls for research. Most of the independent research conducted by universities for 1979 through 1984 was not completed by the proposed target date. Of 28 completed projects we reviewed, 5 were completed before or on the target date; the remaining 23, or 82 percent, were completed after the target date. We recommended that the Commission

require progress reports from researchers to improve their timeliness. The Commission agreed to implement our recommendation.

The timeliness of research projects has improved since 1985. Of the 30 projects completed or started during 1989 through August 1991, 20 had been completed and 10 were ongoing. Of the 20 completed projects, 10 were completed on time; the remaining 10 were completed after the original target date. Four were completed within 6 months of the target date; five were completed from 7 to 12 months late; and one was more than a year late. Although this was an improvement since our 1985 review, the Commission files lacked documentation explaining the delays experienced on all 10 research projects that were completed after the original target date.

An official from the Sea Grant Program, a program under the National Oceanic and Atmospheric Administration that funds and monitors large research activities, said that it is not unusual for fishery research to take longer than originally anticipated. However, the official said that formal monitoring processes minimize delays and ensure that the research is attempting to meet intended objectives. According to the Sea Grant Program official, research programs are most effective when an individual or office is responsible for monitoring the program's research activities and formal monitoring procedures are in place.

The Commission uses informal monitoring procedures to manage its small research program. It has assigned two staff responsibility for monitoring research projects. Because the staff members have other responsibilities, they have devoted limited time to monitoring research progress. Furthermore, they have not developed guidance on monitoring activities such as how often researchers should be contacted regarding research progress. The Commission's informal monitoring procedures for its existing research activities would be inadequate for the larger proposed research program.

Commission Has Not Prepared for Lampricide Registration Process

The Federal Insecticide, Fungicide and Rodenticide Act amendments of 1988 require that all chemicals registered with the Environmental Protection Agency before 1984 be re-registered under newer, more stringent guidelines for environmental safety. The two chemicals used by the Commission, TFM and Bayer 73, fall under this requirement.

Both chemicals are manufactured by German companies. Because of the high re-registration cost and the small revenue from the chemicals, the companies do not plan to re-register them. (In the case of TFM, the Commission is the only user in the world.) If the chemicals are not re-registered, the Commission will no longer be able to use them. Because there are currently no other effective means of sea lamprey control, the Commission believes it is essential that the chemicals be re-registered. As of December 1991, the Commission had not developed a list of tests required for re-registration or computed the costs and time frames for completion. Although the Commission has not attempted to estimate the costs, Commission staff told us that they believed the costs might be as much as \$4 million. The Commission did not include testing costs in its budget proposals for fiscal years 1991 or 1992.

To estimate the costs, we obtained a list of required studies from the Environmental Protection Agency and Agency officials' rough cost estimates for each study based on their prior experience. Using this data, we estimate that the cost may be about \$8 million over about 4 years to perform all the required studies and analyses. Environmental Protection Agency officials believe our estimate is the best available and appears reasonable.

To complete the numerous tests and studies required by the Environmental Protection Agency, the Commission will need a plan and system to contract for the research, ensure that requirements are met at the least possible cost, and closely coordinate activities with the Agency. The Commission has not established such a plan and system. Agency officials told us that the Commission has already missed a deadline in the re-registration process.

Commission officials acknowledged that they had not begun to plan for the necessary tests and studies to re-register the chemicals. They are waiting for more guidance from the Environmental Protection Agency on the required tests, and are hoping that some of the tests will be waived. They did not include the re-registration costs in funding requests because they planned to ask for supplemental funding for the re-registration process after it was clear how much it would cost. At its December 1991 meeting, the Commission decided that it would begin including the expected cost of the re-registration process in its budget proposal for fiscal year 1994.

To ensure long-term availability of lampricides, the Commission has attempted to locate additional suppliers but has had only moderate success. The Commission currently has a 1-year contract with its longtime

supplier of TFM. It has not obtained a long-term contract because it wants to encourage competition from other possible suppliers. Because the cost of re-registering TFM and Bayer 73 is high, ensuring their long-term availability is more important than ever.

The Commission has identified only one other interested potential supplier of TFM who has submitted a bid. The Commission accepted the bid and subsequently committed to place a partial order. However, the supplier cannot manufacture the chemical until it receives Environmental Protection Agency approval. The Commission anticipates that approval will be granted in early 1992.

Recommendations

We recommend that the Secretary of State, working in conjunction with appropriate officials from the government of Canada, ensure that the Great Lakes Fishery Commission take the following actions:

- Develop a comprehensive strategy for its alternative control research that describes, to the extent practicable, the projected research cost, the amount of research already available, the practicality, possible environmental consequences, and general research completion time frames for each proposed sea lamprey control method or area of research.
- Improve monitoring of research activities by appointing a full-time research administrative officer to establish a system to track project milestone and report dates and develop oversight procedures for an expanded research program.
- Develop a plan and system for re-registering the lampricide chemicals that includes an estimated budget by year.

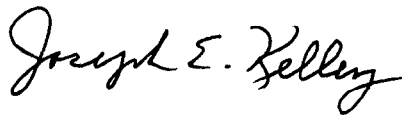
Scope and Methodology

We performed work at the Great Lakes Fishery Commission, the U.S. Fish and Wildlife Service, the Department of Fisheries and Oceans Canada, the Department of State, the Ontario Ministry of Natural Resources, the National Fisheries Research Center, and the New York Department of Environmental Conservation. We conducted interviews with fishery officials and visited fishery facilities in the United States and Canada, and reviewed research files at the Commission. We also interviewed experts on the Great Lakes and the activities of the Commission, including current and former commissioners and representatives of the U.S. and Canadian governments. Finally, we interviewed officials at the National Oceanic and Atmospheric Administration's Sea Grant Program and obtained information from the National Science Foundation.

We performed our review between May and December 1991 in accordance with generally accepted government auditing standards. As you requested, we did not obtain written agency comments on this report. However, we discussed a draft of this report with representatives of the Commission and the State Department and incorporated their comments where appropriate.

We are sending copies of this report to the Secretary of State, the Chairman and the Executive Secretary of the Great Lakes Fishery Commission, and other interested parties. We will also make copies available to others upon request.

Please contact me on (202) 275-4128 if you or your staff have any questions concerning this report. Major contributors are listed in appendix III.



Joseph E. Kelley
Director, Security and International
Relations Issues

The Sea Lamprey

Sea lampreys are native to the Atlantic Ocean and gained entry to Lake Ontario through the Erie Canal in the late-1800s. They moved into Lake Erie in the early 1920s and, by the 1930s, had spread to Lakes Huron, Michigan, and Superior. The sea lamprey attaches to fish with its sucking disk and rasping teeth and feeds on body fluids, often killing the fish.

Figure I.1: Fish With Sea Lampreys Attached

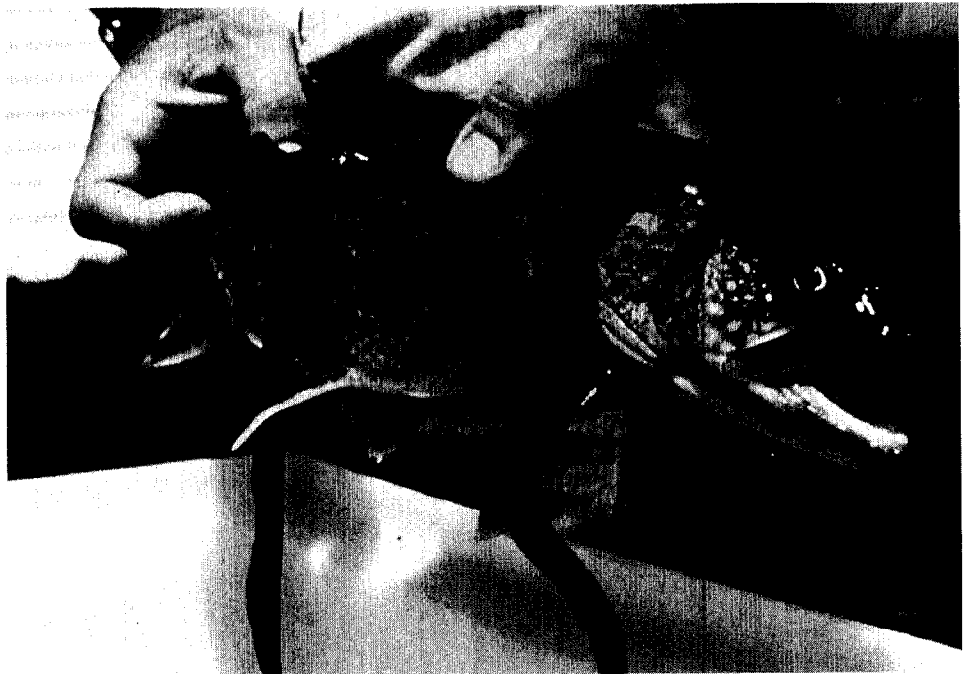
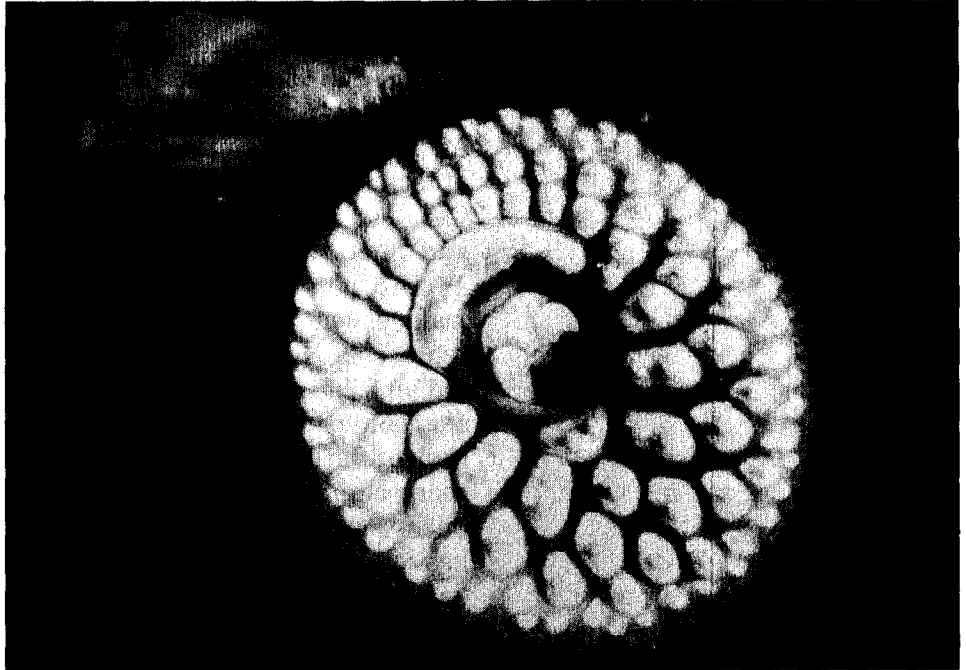


Figure I.2: Mouth of Sea Lamprey



Commission's Committee Structure

Fifteen committees support the Commission's programs. Three internal committees on Finance and Administration, Fisheries and Environment, and the Sea Lamprey have commissioners as members. Another three committees or boards—the Board of Technical Experts, the Habitat Advisory Board, and the Sea Lamprey Integration Committee—are made up of technical experts, researchers, sea lamprey control agents (U.S. and Canadian authorities that apply the lampricides), as well as policymakers and others with a broad overview of fishery and environmental matters. Another nine committees have members appointed by government fishery management agencies. The Committee of the Whole includes representatives of the control agents, state and provincial agencies, and Indian tribes. The Council of Lakes Committee has representatives from state and provincial agencies who also serve on individual committees for each of the five lakes. Finally, a committee on fish disease has members representing interests of control agents, fish health specialists, hatchery operations, and the fish culture industry, and a law enforcement committee has representatives appointed by natural resource agencies with enforcement responsibilities in the region.

The above committees also include members representing Ontario, Michigan, and Minnesota Commercial Fisherman; the International Joint Commission; Environment Canada; the U.S. Department of Agriculture; the U.S. National Marine Fisheries Service; Northern Trout and Wildlife Farms, Ltd.; and eight universities.

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