

Annual Report of the **Great Lakes Fishery Commission**

*Although the Asian carp is looming,
invasion into the Great Lakes is not inevitable...*

2002

Intensifying old battles, fighting new ones



From the Chair
Bernie Hansen

2002 PROVED TO BE A SUCCESS as we intensified our battle against the sea lamprey. Thanks to an additional \$1.3 million in funding this year from the U.S. government, we added additional streams to the list of those already being treated. This increase in funding enabled the commission to enhance support for alternative control methods, such as barriers and traps, and to heighten its research into new sea lamprey control techniques that shift from expensive lampricides to new control methods such as pheromones.

This year, the commission proudly extended its Partnership in Ecosystem Restoration and Management (PERM) program to the University of Guelph. PERM is a multi-institutional arrangement that connects agencies like the GLFC to leading scientists and researchers at universities. Under the PERM-like agreement with the University of Guelph, the commission will support two scientists who will lead the research into sea lamprey and fish behavior at barriers and traps. Specifically, their research will focus on increasing the effectiveness of alternative controls while looking to reduce the impact on non-target species. We are excited about this agreement because it allows us to better direct our research efforts and work more closely with a leading Canadian institution.

For 48 years the commission has been successfully battling the invasive sea lamprey, a problem that was unforeseeable at the beginning of the 20th century. But today, we are starting off the new millennium with foresight, making efforts to protect our Great Lakes from future invaders. Along with other agencies, the commission has been very active this year in addressing the imminent threat and impending invasion of the Asian carp. Two species of Asian carp – the silver and bighead carps – are making their way up the Mississippi River and through the Chicago Sanitary and Ship Canal, leading them to the waters of Lake Michigan. If allowed to enter the system, these fish will likely become a permanent, destructive part of the ecosystem.

The danger that Asian carp pose are multi-fold: first, they are filter feeders which enable them to suck up vast quantities of microscopic food. Their passage into the Great Lakes would be devastating – like the lamprey and zebra mussel – as they out-compete native fish for food sources. Second, these carp are not an appealing sport or commercial fish and could be seen in numbers greater than those of the Great Lakes yellow perch, bass, or walleye. It is essential that the commission and other stakeholders work to keep this invader out of the Great Lakes.

Although the Asian carp is looming, invasion into the Great Lakes is not inevitable; in April of 2002, an electrical dispersal barrier on the Chicago Sanitary





26lb bighead carp, Illinois River, IL. June 2002
Photo: USFWS



Silver carp, Illinois River, IL. An average-sized female silver carp can produce millions of eggs several times a year

Photo: T. Lawrence

and Ship Canal designed to keep invasive species out of the Great Lakes was installed and activated. A coalition of Great Lakes entities and policy makers provided funding for a back-up generator at the existing barrier and are urging congress to permanently fund this barrier as well as allocate money for a second, more sophisticated barrier. In addition, under the leadership of Advisor Phil Moy, the commission is facilitating the development of a rapid response plan should the carp be seen near the barrier. The commission's Council of Lake Committees and Law Enforcement Committee are identifying routes by which live Asian carp are imported and have been working with jurisdictions within the basin to develop and promulgate regulations to ban the possession of live carp.

After so many invaders have successfully entered the Great Lakes, many entities are working together to prevent yet another harmful invasion. The havoc wreaked to the environment after the invasions of sea lamprey, zebra mussels, round gobies, and a multitude of other exotic species has taught us that in the case of invasive species, an ounce of prevention is certainly worth a pound of cure.



Photo: NYSDEC

SEA LAMPREY CONTROL

Within the Great Lakes ecosystem management strategy, integrated sea lamprey control continues to be a crucial component. The commission's quest to better understand the Great Lakes ecosystem has lead to an increase in research to expand our knowledge about this ever-changing environment and the challenges it poses. Together with the Department of Fisheries and Oceans (DFO), the U.S. Fish and Wildlife Service (USFWS) and its other partners, the commission continues to develop, implement, and analyze alternative approaches and new technologies. Therefore, in conjunction with, and defined by *the Convention on Great Lakes Fisheries* and the *Strategic Vision for the First Decade of the New Millennium*, the commission remains committed to expanding its resources and expertise to become more efficient and effective at reducing sea lamprey populations. As a result of this commitment, the commission and its partners have reduced the sea lamprey populations in the Great Lakes by 90%.

In 2002, DFO and the USFWS—the two agencies contracted to conduct the field work for the sea lamprey control program—jointly:

- treated 57 tributaries with lampricides;
- surveyed 326 Great Lakes tributaries, inland lakes and lentic areas to assess control effectiveness, plan future TFM treatments, and estimate production capacity of streams;
- operated assessment traps in 75 tributaries to estimate spawning populations; and,
- conducted 2,272 outreach activities that required 226 staff days.

Continued evaluation of sea lamprey populations relative to fish community objectives set for each lake is used to assess the success of the control program. These reports are the foundation of sea lamprey management decisions made by the commission. In 2002, the lamprey management program met the fish community objectives in Lakes Erie, Ontario and Michigan. However, in the northern waters of Lake Michigan, lamprey wounding rates on lake trout continued to increase. In Lake Huron, the fish community objectives were not met due to continued high production of transformers from the St. Marys River. Sea lamprey-induced mortality of lake trout in Lake Superior was higher than the proposed target.

THE STERILE MALE RELEASE TECHNIQUE TASK

FORCE continued to coordinate the implementation of the technique in the St. Marys River. The task force is working with the Assessment and Lampricide Control Task Forces and other researchers on stock recruitment variation and determination of the effectiveness of the technique in the St. Marys River. In preparation of a formal review of the technique, cost estimates for the control strategy in the St. Marys River are being assembled. The theoretical reduction from trapping and sterile male release combined was estimated at 94% during 2002.

THE BARRIER TASK FORCE, with the U.S. Army Corps of Engineers, continued coordination activities to further 16 barrier projects underway using Section 1135 of the Water Resources Development Act and other Corps authorities. The task force also provided guidance to Agent Barrier Coordinators in areas of mitigation, operation, maintenance, and construction. Other Task Force activities included staff skills mix, and staffing. The task force also began an evaluation of the adequacy of agent barrier workload prioritization and a revision of the Barrier Implementation Strategy.

THE ASSESSMENT TASK FORCE again used the empirical stream treatment-ranking model to determine priority streams for lampricide treatment. Transformer production predictions were made for all streams quantitatively assessed during 2002 as well as for all other streams treated in the last 3 years. The task force continued to implement recommendations of the adult assessment review by: redistributing trapping effort from small to large streams; estimating the parasitic populations in Lake Huron by marking and releasing parasitic lampreys; and, estimating the transformer productions in Lake Superior by marking and releasing transformers into select tributaries. In the St. Marys River, the task force continued to evaluate control efforts by estimating the larval sea lamprey populations and repeating a spawner movement study in an effort to increase trap efficiency. The Task force assisted with several collaborative ventures including the long-term sterile male release, compensatory mechanisms, and lampricide treatment efficiency studies. A peer review of larval assessment was conducted during October 2002.

THE LAMPRICIDE CONTROL TASK FORCE continued to implement options for reducing lampricide use in individual treatments but concurrently coordinated an enhanced treatment program in all of the Great Lakes. The task force coordinated an ongoing treatment effectiveness study in 4 state-designated lake sturgeon streams and continued to implement lake sturgeon treatment protocols.

Risk assessment projects focused on coordinating environmental risk management strategies to protect and avoid disturbance to federal and state-listed endangered species and other non-target organisms.



Sterile male sea lampreys are released into streams during the spawning season.
Photo: USFWS



FISHERY MANAGEMENT, RESEARCH, AND ENVIRONMENT

The Great Lakes Fishery Commission is dedicated to fully examining Great Lakes issues and fulfilling the conservation goals of the *Convention on Great Lakes Fisheries*. The commission relies on the science, well-constructed analysis, and recommendations provided by the Board of Technical Experts, Habitat Conservation Committee, Sea Lamprey Integration Committee, Lake Committees and their technical committees, Law Enforcement Committee, and Great Lakes Fish Health Committee to facilitate an ecosystem-based approach to resource management.

Based on recommendations from these committees, the commission, in 2002 approved research projects under the following categories:

Fishery Research Program

- Exotic invertebrates, food-web disruption, and lost fish production
- Coordination of research on fish habitat in the near-shore and tributary environments of the Great Lakes
- Bloater buoyancy basic biology
- Assessing ecological fitness of fish communities of the world's large water bodies
- Effects of egg and fry predators on lake trout recruitment in Lake Michigan
- Effect of ambient pressure on oxygen uptake in bloaters
- Ecosystem-based assessment of fish habitat in coastal wetlands of the Great Lakes
- A bi-national GIS database of coastal wetlands for Lake Ontario and the St. Lawrence waterway
- Lake trout ecology in Little Moose Lake
- Ecology of infectious diseases in Great Lakes fishes
- Quantifying the impact of exotic invertebrate invaders on food web structure and function in the Great Lakes

Sea Lamprey Research Program

- Function, production, and release of a sea lamprey male pheromone
- Fertility assessment in male and female lamprey
- The effects of larval pheromone on adult behavior
- Electoreception in the sea lamprey
- Lamprey movement and population size in Lake Champlain and its tributaries
- Molecular cloning of lamprey enzyme (petromyzonol sulfotransferase) and enzymatic synthesis of lamprey pheromone (petromyzonol sulfate)
- Seasonal and diel bathythermal habitat use and overlap of sea lampreys and lake trout
- Development of genetic markers and a morphological key for native lampreys
- Regulation and manipulation of metamorphosis in sea lampreys
- Performance evaluation of fishways at sea lamprey barriers
- Elemental composition of statoliths of sea lamprey
- Recruitment variation in Great Lakes sea lamprey populations

Coordination Activities Program

- Predicting identity, spread, and impact of future nonindigenous species in the Great Lakes
- Risk Assessment Workshop
- Fish health management of cool and warmwater fishes
- A Great Lakes Coregonid-Diporeia Workshop
- Review of procedures for estimating wild production of chinook salmon
- An analysis of ship mediated biological invasions
- Compilation and analysis of Lake Superior salmonine diets
- Development of a lakewide electronic database for lower trophic level reporting in Lake Erie
- Evaluation of interstate movements, spawning site fidelity, spawning population abundance, and sources of mortality of Lake Michigan yellow perch
- Effects of low level aquatic contaminants on lake trout reproduction

Other

- Sea lamprey larval parentage, adult reproductive success, and larval dispersal
- Fish Passage/Bypasses Workshop
- The effects of thiamine deficiency on swim-up fry behavior in Great Lakes salmonids
- Evaluation of the GLFC interim policy on barrier placement
- Development of a management plan for Great Lakes lake sturgeon
- Effect of a thiamine deficiency on spawning migration of salmonids in the Great Lakes Basin
- Development of a fish biomass time series in the Bay of Quinte ecosystem

The commission recognizes the importance of taking into account the interconnection and interaction between all components within the ecosystem when approaching conservation management. In the *Strategic Vision of the First Decade of the New Millennium*, the commission reiterates its dedication to the values and ideology of sound science that has bettered the Great Lakes ecosystem and fishery for the past 50 years. Garnering expertise from a host of partner agencies and organizations, the commission is intent on taking leadership in the development and pursuit of strong and innovative research and management programs.

In support of its commitment to healthy Great Lakes ecosystems, the commission, in 2002, undertook a number of initiatives. For instance, the commission:

- allocated money to synthesize radio-labeled pheromone (3KPZS) for use in the field trials of pheromones;
- initiated a partnership with Lotek Wireless and provided funding for new technology development, such as the freshwater release mechanisms for archival tagging;
- joined the International Joint Commission in requesting a reference from governments to stop invasive species from entering the Great Lakes through ballast water;
- funded additional staff to increase lamprey capture at trap sites; and,
- developed a cost-sharing partnership with the U.S. Army Corps of Engineers to install new lamprey traps.

PARTNERSHIPS

Lake Committee Action Highlights of 2002

Partnerships between the Great Lakes Fishery Commission, provincial, state, tribal and federal partners ensure stewardship of the Great Lakes fishery resource. Under the *Joint Strategic Plan for Management of Great Lakes Fisheries*, these entities meet annually to discuss the state of the fishery and to strategize on ways to achieve their joint objectives. The following are highlights of the 2002 Lake Committee actions (full summaries are on each lake committee's homepage at www.glfc.org/lakecom.php).

Representatives of the **LAKE SUPERIOR COMMITTEE** are developing a collaborative work effort with the Lake Huron Committee as it establishes environmental objectives; members of the collaboration will evaluate the applicability of the Lake Superior plan. The LSC identified its needs from the U.S. Geological Survey's large vessel program, which included: annual lake-wide estimates of forage fish biomass using both bottom trawls and acoustics, lake-wide estimates of total fish biomass in the offshore sections of the lake; mapping of bottom substrate; and, development of a database that will be available to all agencies. Additionally, the LSC approved the brook trout, walleye, and lake sturgeon rehabilitation plans.

THE LAKE MICHIGAN COMMITTEE urgently discussed the status of the electrical barrier in the Chicago Sanitary and Ship Canal. Members expressed concern that invasion of the Asian carp and other aquatic species via the Mississippi River system is likely unless action is taken. LMC agencies were encouraged to support permanent funding for upkeep and improvement to the barrier system.

THE LAKE HURON COMMITTEE adopted a lake trout stocking plan for U.S. waters of Lake Huron. The Lake Huron Technical Committee provided the LHC with a final draft of the lake trout study plan. Members requested clarity on various aspects of the plan including its effects on the resource and ecosystem and the recommended design of the pulse-stocking plan.

THE LAKE ERIE COMMITTEE continued to endorse the coordinated Percid Management Strategy adopted by the committee in 2000. The LEC will maintain the TAC of 3.4 million, walleye, which was established for a three-year period to halt walleye stock decline. Based on indications that yellow perch abundance has increased in recent years, the LEC agreed to a lake-wide yellow perch TAC of 9.333 million lbs for 2002. The committee remained concerned about the effects of exotic species, stock structure uncertainties, and recruitment variability on yellow perch populations.

THE LAKE ONTARIO COMMITTEE committed to investigating the dramatic population decline of the American eel from the upper St. Lawrence River/ Lake Ontario ecosystem. Stressors including barriers, turbine mortality and over-harvest of all life stages have adversely affected the eel populations and the committee agreed to urge Ontario to reduce the commercial quota to 25% of previous levels. Management action was taken to reduce eel mortality and encourage safe, effective upstream and downstream migration.

THE COUNCIL OF LAKE COMMITTEES supported the proposed USCG vessel inspection agreement between the GLFC and the Great Lakes states that called for non-federal fishery management and research vessels to undergo annual safety inspections. The CLC discussed appropriate management responses to the potential incursion into Lake Erie of the parasite *Heterosporis* and the invasion of Asian carp into the Great Lakes Basin. The CLC supported the U.S. Army Corps of

The American eel spawn in the Sargasso Sea and live in the St. Lawrence River/Lake Ontario ecosystem, making them one of the Great Lakes' few catadromous species.

Photo: J. Casselman, OMNR



Engineers' study on the first phase of construction of a second electric barrier in the Chicago Sanitary and Ship Canal.

THE LAW ENFORCEMENT COMMITTEE charged its sub-committees to establish appropriate combined enforcement teams to monitor and enforce lake sturgeon harvest in the St. Marys River system and Lake St. Clair, and requested that the CLC provide a rationale regarding the disparate harvest regulations for lake sturgeon in the Great Lakes. In addition, the LAW committee strongly urged the U.S. Fish and Wildlife Service to add all species of Asian carp to the Injurious Species list, under the Lacey Act.

THE COMMITTEE OF ADVISORS urged the GLFC to carefully review the U.S. Army Corps of Engineers' reconnaissance report about improving Great Lakes Navigation. To this end, the commission requested that the Corps thoroughly address the following:

- The cost and benefits – including environmental costs – of enhanced infrastructure and associated activities. There is potential for a multi-billion dollar price tag with little investigation of alternatives that may be less environmentally destructive.
- The proposed increased size of the locks. Allowing access to larger container ships from new ports may provide an increased risk of invasive species entering the Great Lakes.
- Impact of enhanced shipping on the physical environment, specifically on fish habitat.

Advisors expressed deep concern about the potential for Asian carp to invade the Great Lakes and vigorously urged the commission to obtain the necessary funds to augment current and future efforts to block migration of these fish. In conjunction with the advisor's recommendations, the commission worked with members of congress, the U.S. State Department, U.S. Environmental Protection Agency, International Joint Commission, and U.S. Army Corps of Engineers to secure allocation of funds to further address this threat.



Juvenile lake sturgeon, Lake St. Clair, MI.
Photo: J. Finster

Budget

The commission received the following contributions from the governments of the United States and Canada (shown in U.S. dollars) for 2002:

	U.S.	CANADA	TOTAL
Sea Lamprey Management and Research	\$ 11,576,300	\$ 2,631,700	\$ 14,208,000
General Research, Committee and Scientific Support, and Administration	\$ 1,371,700	\$ 1,246,700	\$ 2,618,400
TOTAL	\$ 12,948,000	\$ 3,878,400	\$ 16,826,400

The commission gratefully acknowledges an additional contribution of \$170,000 from The State Department for exotic invasions.

The commission's U.S. and Canadian trust funds received donations from Kerby Elementary School, of Grosse Pointe Farms, Michian, and Dick and Mary Reuss.



Great Lakes Fishery Commission

The Great Lakes Fishery Commission was established by the Convention on Great Lakes Fisheries (between Canada and the United States) in 1955 to improve and perpetuate fishery resources.

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Awards and Honors

This year, the commission recognized and honored the efforts of three individuals who made outstanding contributions to the Great Lakes.



The Buzz Besadny Award for Fostering Great Lakes Partnerships recognizes those who exemplified extraordinary commitment to building strong and lasting partnerships in Great Lakes resource management. This year's recipient, **Mark Ebener** (left) of the Chippewa/Ottawa Resource Authority, was honored for his tireless efforts to develop working partnerships within the Great Lakes management community. Also pictured: Commissioner Roy Stein.



Commissioner Bill Beamish (center) presented Dorance Brege (left) of the U.S. Fish and Wildlife Service, and Wayne Westman (right) of the Dept. of Fisheries and Oceans, with the **Vern Applegate Award for Outstanding Contributions to Sea Lamprey Control**, which recognizes those who have furthered the cause of sea lamprey control on the Great Lakes. Dorance and Wayne were commended for improving the quality of the sea lamprey program through their leadership and undying energy during their many years of service.



The commission was honored to receive the **Outstanding Achievement Award** from the *American Institute of Fishery Research Biologists*. This award, presented to Commissioner Bill Beamish (center) by Dora Passino-Reader, Regional Director, recognizes the commission's achievement and competency in fishery science. Also pictured: Commissioners Roy Stein (L) and Bill Taylor (R).

The commission also honored Joe Day for his service to the commission. Joe retired from the commission in February, 2002 after five years of dedicated involvement, hard work and commitment.

Additionally, Larry Schleen and David Haight were recognized for their contributions to the health of the fish communities and ecosystems of the Great Lakes during their 65 years of combined service at the Department of Fisheries and Oceans.



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