

FISHERY RESEARCH PRIORITIES FOR THE GREAT LAKES

Great Lakes Fishery Commission

Current as of October 2025

This listing was compiled based on input from the lake committees and their technical committees and from discussions within the Council of Lake Committees (for more information go to <https://www.glf.org/council-of-lake-committees.php>) and the Great Lakes Fish Health Committee (<http://www.glf.org/boardcomm/fhealth/fhealth.php>). Order of listing does **not** imply relative ranking of priorities for the Fishery Research Program funding.

I. Basinwide Priorities

II. Lake-specific Priorities

- A. **Lake Ontario Priorities**
- B. **Lake Erie Priorities**
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BASIN-WIDE FISHERY RESEARCH PRIORITIES

FOR THE GREAT LAKES

Great Lakes Fishery Commission

Updated October 2025

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Research Priorities

The following three high priority research areas should help the Great Lakes Fishery Commission in selecting proposals that are submitted to the Fishery Research Program. These priority areas (in no specific order) are:

Recruitment:

- Spatial, temporal and/or biophysical factors influencing recruitment success
- Relative contributions of native and naturalized populations (e.g. Chinook and Steelhead)

Food Web Dynamics:

- Linking prey availability to recruitment success and biomass trends
- Mapping spatial and seasonal prey distributions and their influence on predator foraging and sampling accuracy
- Understanding relative use of prey fish supply by native and naturalized predator fish

Habitat Restoration:

- What habitat types yield the greatest reproductive success and recruitment?
- What are species-specific bottlenecks (e.g. Walleye, Cisco, Lake Trout, Whitefish)?
- What amount and quality of habitat is needed to achieve measurable population gains?
- How does barrier removal affect connectivity and native fish community structure?

FISHERY RESEARCH PRIORITIES:

LAKE ONTARIO

Great Lakes Fishery Commission

November 18, 2015

The Lake Ontario ecosystem is extremely dynamic, and has experienced rapid and significant change in the last decade. The following research priorities were developed by the Lake Ontario Technical Committee, and are based on information required to assist in achieving and or evaluating the “Fish Community Objectives for Lake Ontario, 2013” (Stewart et al. 2014, <http://www.glfc.org/lakecom/loc/LO-FCO-2013-Final.pdf>).

The order of listing of the research priorities does not imply relative ranking of priorities for the Fishery Research Program funding.

GLFC Research theme area:

Re-establishment of Native Deepwater Fishes

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- Are there differences in thiamine levels between Lake Trout strains? Does one strain incorporate gobies in their diet more than others (e.g. could be determined by investigating variation in isotopic signature among strains)?
- Identify and assess Lake Trout spawning habitat and early life history processes
- Develop effective marking techniques for stocked coregonids for assessing stocking success (life stage, location, timing etc.).
- What is the status of historical lake trout spawning grounds, and what are the limiting factors impacting wild reproduction (cladophora, goby, dreissenids)?

Physical Processes and Fish Recruitment in Large Lakes

- Characterize Lake Herring spawning habitat, investigate early life history processes and identify bottlenecks to restoration of this species in the Bay of Quinte, Hamilton Harbour, Chaumont Bay and/or Irondequoit Bay.

Energy Dynamics of Great Lakes Food Webs

- Conduct lower trophic level modeling to synthesize data and identify key variables (e.g., primary production, Mysis, Dreissenids).
- What are the important linkages/drivers between lower trophic levels and the fish community and how do they operate? Can improved understanding of these linkages

facilitate risk-management and allow managers to predict changes in the fish community (e.g. alewife biomass)?

Non-theme Research

- Identify the most important contributing factors to apparent smallmouth bass recruitment impairment in Lake Ontario and the St. Lawrence River(e.g. fecundity, spawning habitat, egg/fry predation, prey availability for YOY, angler impacts, VHSV, Cladophora, etc.)?
- What factors are contributing to declining yellow perch populations?
- What determines the survival of Atlantic Salmon in the open lake environment?
- What are novel approaches to mitigating the impacts of mortality of American Eel in hydroelectric generation turbines during their downstream migration?
- Based on new insights into Chinook salmon survival/natural reproduction and lakewide alewife abundance, develop new models to predict overall trout and salmon abundance and predator:prey balance.
- Are there differences in the thiamine levels present in stocked vs. wild salmon and trout found in Lake Ontario? For wild and stocked Chinook at the same thiamine levels, do untreated embryos experience similar survival?
- There have been dramatic declines in benthic fish abundance and distribution in the Eastern Outlet Basin over the past two decades. What factors have contributed to this?

FISHERY RESEARCH PRIORITIES: LAKE ERIE Great Lakes Fishery Commission

Updated October 31, 2009

This listing was compiled based on input from the Lake Erie lake committee and its technical committee and from discussions within the Council of Lake Committees (for more information go to <https://www.glf.org/council-of-lake-committees.php>). Order of listing does **not** imply relative ranking of priorities for the Fishery Research Program funding.

Research Priorities

These Lake Erie Fisheries Research Priorities were developed to encourage progress towards meeting the published Lake Erie Fish Community Objectives (FCO's). We wish to emphasize here that specific FCO's must be interpreted in the context of the developed Goals for Lake Erie and the Guiding Principles used to frame specific objectives. Interested researchers should review the Lake Erie Fish Community Goals and Objectives (Ryan et al. 2003 link to http://www.glf.org/pubs/SpecialPubs/Sp03_2.pdf) for additional background information concerning these research priorities.

Bold font indicates the **highest priorities** and *italics font* indicates *medium priorities*. Remaining priorities are lower priorities.

Ecosystem Conditions Objective

- *How can we best monitor, manage, and maintain optimum mesotrophic conditions in the west, central, and nearshore east basin?*
- *How can we best develop bathy/thermographic (and other habitat) maps that facilitate our understanding of the size, dynamics, and impact of river or tributary plumes in Lake Erie?*
- *How can we best describe important habitat characteristics, complete mapping of Lake Erie habitat, and distribute this information to managers, researchers, stakeholders, and the public?*
- How can we best map or model known disease dynamics in Lake Erie?

Productivity and Yield Objective

- **What are appropriate biological reference points and fisheries reference points for fished populations and how can they be estimated?**
- **How can we best describe, map, evaluate and maintain suitable nearshore habitats that can support high quality fisheries for smallmouth bass, northern pike, muskellunge, yellow perch, and walleye using hydroacoustics/GIS software?**
- What is the influence of size or slot limits on fish population dynamics?
- What is the impact of fishing sanctuaries on fish populations of interest and are the goals of sanctuaries being met?
- How can we optimize the potential for sustainable harvests of highly valued fish species?
- What changes in catchability have occurred in the commercial and sport fisheries operating on Lake Erie over time?

- What are the spatial and temporal dynamics of invasive species in Lake Erie and what are their impacts on desired fisheries productivity and yields?

Nearshore Habitat Objective

- **How can we best describe, map, evaluate and maintain suitable nearshore habitats that can support high quality fisheries for smallmouth bass, northern pike, muskellunge, yellow perch, and walleye using hydroacoustics/GIS software?**
- *How can we best describe important habitat characteristics, complete mapping of Lake Erie habitat, and distribute this information to managers, researchers, stakeholders, and the public?*

Western Basin Objective

- **What are the stock structures of walleye, yellow perch, smallmouth bass and other desired fish?**
- **How can we identify, rehabilitate, conserve, or protect locally adapted stocks?**
- *How can we best provide sustainable harvest of desirable fish species of fish?*
- What are the stock/spawner-recruitment relationships in desired fish populations?
- What are the natural mortality (M) rates in desired fish populations?
- What are the limiting factors and causes leading to reduced or lost recruitment of desired fish species and what are the solutions to remedy this lost recruitment?

Central Basin Objective

- **What are the stock structures of walleye, yellow perch, smallmouth bass and other desired fish?**
- **How can we identify, rehabilitate, conserve, or protect locally adapted stocks?**
- *How can we best provide sustainable harvest of desirable fish species of fish?*
- What are the stock/spawner-recruitment relationships in desired fish populations?
- What are the natural mortality (M) rates in desired fish populations?
- What are the limiting factors and causes leading to reduced or lost recruitment of desired fish species and what are the solutions to remedy this lost recruitment?

Eastern Basin Objective

- **What are the stock structures of walleye, yellow perch, smallmouth bass and other desired fish**
- **How can we identify, rehabilitate, conserve, or protect locally adapted stocks?**
- *How can we best provide sustainable harvest of desirable fish species of fish?*
- What are the stock/spawner-recruitment relationships in desired fish populations?
- What are the natural mortality (M) rates in desired fish populations?
- What are the limiting factors and causes leading to reduced or lost recruitment of desired fish species and what are the solutions to remedy this lost recruitment?
- How can we best restore self-sustaining populations of lake trout to historic levels of abundance in the east basin?

Fish Habitat Objective

- *What are the best methods for evaluation, protection, and enhancement of fish habitat throughout the Lake Erie watershed?*
- How can we update the Great Lakes Spawning Atlas to reflect recent changes in the Lake Erie basin?

Genetic Diversity Objective

- **What are the stock structures of walleye, yellow perch, smallmouth bass and other desired fish**
- **How can we identify, rehabilitate, conserve, or protect locally adapted stocks?**

Food Web Structure Objective

- How can we best manage the food web structure of Lake Erie to optimize production of highly valued fish species?

FISHERY RESEARCH PRIORITIES:
LAKE HURON
Great Lakes Fishery Commission

Version September 2025

The following represents the latest effort by the Lake Huron Technical Committee (LHTC) to communicate focal areas for research into the fish community of Lake Huron.

Lake whitefish recruitment: Recruitment and abundance of *Diporeia* and lake whitefish have declined significantly following invasion and establishment of Dreissenid mussels in Lake Huron. The LHC recommends the following priorities:

1. What are the key drivers of spatial variation in Lake Whitefish recruitment in the Lake Huron basin or similar systems and considerations for stock conservation?
2. Research into invasive mussel control.

Upper trophic level demand and supply: Lake Huron supports a robust and diverse recreational fishery, including native species still experiencing recovery (walleye, lake trout) and naturalized salmonids (salmon and trout species) managed with varying stocking contributions. A better understanding of predatory-prey dynamics in Lake Huron's recreational fisheries will support management decisions aimed at balancing predator demand with prey supply.

1. What are the relative contributions of non-native naturalized and native predator fish to the total demand on prey fish supply and ecological function as top predators (via Ecopath with Ecosim, or other modeling approaches)?

Food web changes: Lake Huron has experienced significant food web changes following the invasion of Dreissenid mussels, which has led to the benthification of energy pathways and the subsequent invasion and proliferation of round goby, a benthivore which has become a prominent prey for piscivores. Further foodweb changes including increased water clarity and declining nutrients have created a novel food web that has persisted for nearly two decades. The LHC recommends the following priorities to better describe the continuing impacts of system change on the Lake Huron food web:

1. Effects of invasive species and associated ecosystem changes on the abundance and distribution of keystone zooplankton, such as *Mysis* and *Diporeia*, and their interactions with higher trophic levels.

FISHERY RESEARCH PRIORITIES: LAKE MICHIGAN Great Lakes Fishery Commission

Updated August 2025

This listing was compiled based on input from the Lake Michigan lake committee and its technical committee and from discussions within the Council of Lake Committees (**for more information go to <https://www.glfsc.org/council-of-lake-committees.php>**). Order of listing does **not** imply relative ranking of priorities for the Fishery Research Program funding.

Research Priorities

These Lake Michigan Priority Research Needs were developed to encourage progress towards meeting Lake Michigan Fish Community Objectives (FCOs; http://www.glfsc.org/pubs/SpecialPubs/Sp95_3.pdf). We emphasize that the specific FCOs need to be interpreted in the context of the Goals and Guiding Principles within which they were framed. Interested researchers should review the FCOs (Eshenroder et al. 1995), as well as the latest version of the State of Lake Michigan document (Holey and Trudeau 2005), for additional background information concerning these research priorities. Priorities are updated annually; copies of the most recent priority list, the Fish Community Objectives, and the State of Lake Michigan report are available on the GLFC web site (www.glfsc.org), from the chairperson of the Lake Michigan Committee (Tom Gorenflo - CORA), or from the chairperson of the Lake Michigan Technical Committee (Greg Wright – CORA). **The current list of priority research questions identified by the Lake Michigan Committee and Technical Committee is indicated below**, but any innovative research project that clearly will advance the achievement of FCOs will be given serious consideration for support by the LMC, even if not included on the specific list of priority research questions.

1. Whitefish – What are the mechanisms contributing to the collapse, and lack of recovery, of Diporeia?
2. Lake Trout/Telemetry – Determine movement patterns and spawning locations of both wild and stocked Lake Trout in the southern basin of Lake Michigan.
3. Alewife/Prey – What are spatial and seasonal patterns in prey distribution and how do those movements impact the ability to effectively sample prey biomass/composition?
4. Chinook/Steelhead – What are the reproductive contributions and drivers of annual variation of naturalized populations?

FISHERY RESEARCH PRIORITIES: LAKE SUPERIOR Great Lakes Fishery Commission

Updated October 30, 2025

This listing was compiled based on input from the Lake Superior lake committee and its technical committee and from discussions within the Council of Lake Committees (**for more information go to <https://www.glf.com/council-of-lake-committees.php>**). Order of listing **does** imply relative ranking of priorities for the Fishery Research Program funding.

Research Priorities

1. What are broad scale lake trout and lake whitefish movement patterns within Lake Superior, with particular focus on the western arm? Can these movement patterns be incorporated into SCAA models to improve management?

Context: Through various data sources, fisheries managers seek to understand vital rates within populations such as mortality and recruitment, with the intent of estimating both the trajectory and absolute value of populations. Bias can result from a poor understanding of movement patterns, influencing what is deemed a population and estimates of key parameters. SCAA models are used in many areas to monitor populations, but decisions about what data to include and how a population is defined has a heavy impact on output and model utility. Using modern methods to assess movement patterns of lake trout and lake whitefish will improve population monitoring and provide managers with better information for decision making.

2. How many acres of lake trout and whitefish spawning habitat exist in Lake Superior? Does habitat supply relate to carrying capacity?

Context: It is assumed that spawning habitat is not limiting in Lake Superior; however, quantifying that habitat has not occurred. Technology has vastly expanded our ability to map and quantify habitat types. The fisheries management community continues to have a poor understanding of the role habitat plays in limiting population size. Quantifying spawning habitat over discrete areas and relating its quality to population size will serve as a benchmark to assess future changes and help identify limiting factors to population growth that could improve management decisions and user expectations.

3. What factors drive whitefish and cisco recruitment?

Context: Successful fisheries management depends on a sound understanding of key population metrics. Recruitment is arguably the most important and most poorly understood of them all. Lake whitefish and cisco are critical to both the ecosystem within Lake Superior and the users who depend on them. A better understanding of the biotic and abiotic drivers of recruitment and its key bottlenecks will lead to a more holistic understanding of the Lake Superior ecosystem and improve management decisions.

**FISHERY RESEARCH PRIORITIES:
GREAT LAKES FISH HEALTH COMMITTEE
Great Lakes Fishery Commission**

October 2025

What factors may affect early rearing of Great Lakes salmonids focusing on the effects of thiamine deficiency, wild fish diet changes, contaminants such as PFOS/PFAS, and the impact of rising fall water temperatures on spawning success and adult fish health?

What diagnostic methods can be developed and validated to detect fish pathogens or pathogens of concern in the Great Lakes Basin? One pathogen of concern to the committee includes *Tetracapsuloides bryosalmonae* (T. bryo).

Development of a vaccine for *Flavobacterium psychrophilum* is very important to sustain the health of fish stocks in hatcheries around the Great Lakes. The Fish Health Committee encourages researchers to develop effective vaccines that can be successfully deployed in a hatchery setting.

How great are disease transmission risks from common fishery management practices such as fin clipping, or moving fish from outside the Great Lakes Basin via the bait industry or movement of fish or fish by-products?