

FISHERY RESEARCH PRIORITIES:

LAKE SUPERIOR

Great Lakes Fishery Commission

Version October 31, 2011

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 <http://www.glfrc.org/lakecom.php>). Order of listing does **not** imply relative ranking of priorities for the Fishery Research Program funding.

Research Priorities

A review of the fish community objectives for Lake Superior (link to http://www.glfrc.org/pubs/SpecialPubs/Sp03_1.pdf) and the Lake Superior State of the Lake Report (http://www.glfrc.org/pubs/SpecialPubs/Sp94_1.pdf) provides a useful context for the priorities listed below.

- 1) Are the current biological reference points for whitefish, lake herring (cisco), and lake trout, sustainable? We currently have maximum total annual mortality targets of 65% for whitefish and less than or equal to 45% for lean lake trout. For cisco we have recommended an annual target exploitation rate of 10-15%.
- 2) How does the relative importance of habitat and fish community structures influence our ability to rehabilitate depleted native species such as walleye, brook trout, lake sturgeon, and shortjaw in Lake Superior? Species-specific questions are listed below.
 - a. Do rainbow smelt suppress recruitment of walleye in Black Bay?
 - b. What are the direct or indirect effects of non-native species on brook trout rehabilitation?
 - c. Does hydropower and its flow regimes inhibit recovery and rehabilitation of lake sturgeon?
 - d. Does introgression or hybridization result in the loss of shortjaw?
- 3) What is the production potential of habitat zones of Lake Superior and how much is transferred across zones? More specifically: (1) are terrestrial inputs the primary source of energy for fish production in very nearshore and nearshore waters; and (2) what is the relative contribution of benthic vs. pelagic production within and across habitat zones?
- 4) What is the surplus production of siscowet populations and what are the ecosystem implications of substantially increasing the harvest of siscowets?
- 5) What are the life history characteristics and ecological interaction of siscowets in Lake Superior? For example, what is the reproductive life history of siscowets, and what are the characteristics of their spawning habitat? What interactions do siscowets have with lean lake trout? What role do siscowets have in the trophic interactions in Lake Superior?
- 6) Are un-accounted for changes in catchability affecting our ability to accurately estimate absolute and relative abundance of fish caught in bottom trawls and bottom-set gill nets, and if so, what factors are causing catchability to change?
- 7) What effects and on what scale are AIS affecting the Lake Superior fish community? More specifically, is *Bythotrephes* changing trophic pathways in Lake Superior, and if so are those pathways as efficient fisheries production? How does fluctuating sea lamprey abundance influence those trophic pathways?

- 8) What is the best tool (i.e. sea lamprey marking) for measuring efficacy of the sea lamprey control program?
- 9) Research to design of a barrier that blocks sea lampreys but passes non-target fishes.
- 10) What does a fully rehabilitated lake trout stock look like? Have lake trout reached density-dependence in Lake Superior?
- 11) What is the balance between prey availability and predator demand in Lake Superior?