TITLE: STATUS OF FOOD WEB DYNAMICS OF LAKE SUPERIOR FISHES IN 2021

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PROJECT DATES: Jan. 1, 2021 – December 31, 2023

RATIONALE: Healthy food webs are important to ecosystem health. Lake Superior natural resources agencies that are members of the Lake Superior Technical Committee of the Great Lakes Fishery Commission also serve as the Great Lakes Water Quality Agreement's Lakewide Action and Management Plan Aquatic Community Committee. State and Tribal partners have been conducting long term monitoring programs on fish populations to support progressive fisheries, ecosystem, and lake wide management. A key component is the monitoring of ecosystem health through analysis of fish diets. Fish diet data provides managers an understanding of the status of prey resources for fish production and sustainability. Predator and prey fish abundance is routinely measured through natural resource agency surveys in Lake Superior and diet data provide a mechanism to link the trophic levels and determine whether there are limitations in prey resources. However, diet data are not collected comprehensively by agencies because of funding limitations to analyze the samples. The Cooperative Science and Monitoring Initiative provides an opportunity for agencies to coordinate surveys and research through collaboration and provide a comprehensive status of the lake ecosystem. In order to effectively manage fisheries and the ecosystem, mapping trophic transfer through the ecosystem can help identify bottlenecks that can limit production, sustainability, and health of the system. Knowing the status of the food web will aid natural resource agencies with the management of fisheries by providing information on potential limitations or enhancements to production, particularly as it relates to the ongoing maintenance of a rehabilitated Lake Trout population.

OBJECTIVES: Measure the diet compositions of all fishes in Lake Superior to report the current status of the food web.

METHODS: State and Tribal natural resource agencies will provide in-kind contribution of staff hours, expenses, and equipment for the collection of fish stomachs from multiple length classes and will be frozen for subsequent laboratory analyses. Predator fish diets will be analyzed at laboratories at Northern Michigan University and Marquette Fisheries Research Station (MIDNR); prey fish diets will be analyzed at the laboratory at Lake Superior State University. Unidentifiable larval and juvenile coregonines will be taxonomically identified using Single Nucleotide Polymorphism genetic techniques. Standardized fish stomach dissection and reporting protocols established by the Lake Superior Technical Committee (GLFC) will be followed.

RELEVANCE: This project is relevant to Annex 2, 7, 8, and 10 of the Great Lakes Water Quality Agreement and Great Lakes Restoration Initiative, Action Plan III Focus Area 4 by providing scientific information pertinent to management, protection, and restoration of native species.

DELIVERABLES/PRODUCTS: A final report will be made by the project end date. We expect to publish at least one paper in a scientific journal within a year of the completion of the study. In addition, as results are obtained throughout the study they will be presented to Great Lakes Fishery managers and to other agencies that are interested in these data.