

Impact of climate change on lake whitefish (*coregonus clupeaformis*) in the Laurentian Great Lakes and implications for harvest management

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Since 1980, populations of lake whitefish (*Coregonus clupeaformis*) have supported the most economically valuable and productive commercial fishery in the upper Laurentian Great Lakes (Lakes Huron, Michigan, and Superior; annual catch value = US\$16.6 million). Changes in regional climate variables are expected to increase surface temperatures of the Great Lakes by as much as 6 degrees C and result with substantially reduced ice cover. Additionally, the average wind speed over these lakes is expected to decline. These changes are predicted to impact the productivity and value of the lake whitefish fishery because the success of recruitment to the fishery has been linked with these climatically influenced factors. This research is developing a tool to optimize harvest management in a changing climate by examining the correlation of climate projections with the compensatory resilience of lake whitefish and their recruitment dynamics in the upper Great Lakes. Specifically, this tool will integrate the impact of climate change on the ecology and population dynamics of this species on a basin-wide scale. Currently, most management of lake whitefish in the Great Lakes occurs on a stock-by-stock basis without cross-jurisdictional cooperation. This type of management is not adequate for addressing large-scale environmental threats such as climate change; management must shift to more regional governance which encourages landscape-level conservation efforts. We anticipate the products of this research being particularly informative for ecologists, managers, policy makers, and stakeholders (e.g., commercial fishermen, seafood consumers, and community residents) and to assist in coordination of interjurisdictional fisheries conservation efforts and harvest strategies for lake whitefish and their ecosystems in the face of changing global climatic conditions.