

Consideration of the Impact of Climate Change on Lake Levels in the Management Plan of Tribal Fisheries and Culturally Important Sites

Phase 1 Report
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EXECUTIVE SUMMARY

Coastal wetland ecosystems provide spawning grounds, food sources, and protective habitat for numerous fish species in the Great Lakes. While water level fluctuations within the Great Lakes are actually key to maintaining the biodiversity of coastal wetland ecosystems (Environment Canada & Wilcox 2002), long-term and sustained trends in water levels can result in a reduction of wetland biodiversity, placing considerable stress on the fish communities that depend up on these wetland ecosystems. Environmental drivers such as temperature, precipitation, run-off and evaporation play important roles in modulating Great Lakes water levels and are likely to experience changes in light of a warming climate. Considering that Great Lakes fisheries support a broad range of commercial, subsistence and recreational activities, communities which depend upon these fisheries must assess the implications of our changing climate on Great Lakes water level trends.

A number of unique challenges are faced by Indigenous Tribes within the Great Lakes Region with respect to the development of climate adaptation planning for their communities. The sovereignty and jurisdiction of Tribal governments, Tribal economic capacity, as well as cultural and spiritual considerations must be applied in any strategy that seeks to protect the Indigenous ways of life in the face of a changing climate. For this reason, Indigenous Tribes represent important collaborators in the Graham Sustainability Institute's Great Lakes Water Levels Integrated Assessment Plan (Graham Sustainability Institute 2014), a comprehensive effort to "develop information, tools and partnerships to help decision makers address the challenges and opportunities posed by the variability in Great Lakes water levels."

Through this project, we are working collaboratively with two federally-recognized Indigenous Tribes within the State of Michigan, the Little Traverse Bay Bands of Odawa Indians (LTBB) and the Grand Traverse Band of Ottawa and Chippewa Indians (GTB), to include the consideration of the impact of climate change on lake levels in the management plan of Tribal fisheries and in the protection of culturally important sites. An exciting element of this collaborative effort is that it provides a unique opportunity to address this topic with a blend of "western science" and "Indigenous science" approaches. Traditional Indigenous approaches to understanding natural science involve the observation of nature and the relations of elements of the natural system with other elements within the system, as opposed to the more linear measurement and theoretical approaches often applied as part of "western science".

The stated goal of Phase 1 of the Graham Sustainability Institute's Great Lakes Water Levels Integrated Assessment Plan is to provide an overview synthesis of the status, trends, causes and consequences of changing water levels as they relate to key issues in a particular locality. As such, this document provides a summary of our analyses to-date with regards to recent trends in atmospheric drivers, lake levels and observed impacts on the communities of our Tribal collaborators, with particular emphasis on the Tribal fisheries. In particular, we will discuss the promising linkage between the climate-related shrinking of the wintertime polar cold pool, the maximum extent of Lake Michigan ice coverage, Lake Michigan water levels and their subsequent impact on Tribal fisheries. We believe that this linkage will help guide the establishment of a set of plausible future climate scenarios, which can serve to direct our collaborative efforts in the development of adaptation plans to support future management of Tribal fisheries.

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