

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

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Outline

- Tribal collaborators and study area
- Perceived vulnerabilities of tribal communities
- Summary of analyses to date
 - Consideration of “plausible climate futures”
- Next steps

Tribal collaborators and study area



In 1994, the Little Traverse Bands of Odawa Indians were reaffirmed by the federal government.

In 1980, the Grand Traverse Band of Ottawa and Chippewa Indians was reaffirmed by the federal government.

In 1994, the Little River Band of Ottawa Indians were reaffirmed by the federal government.

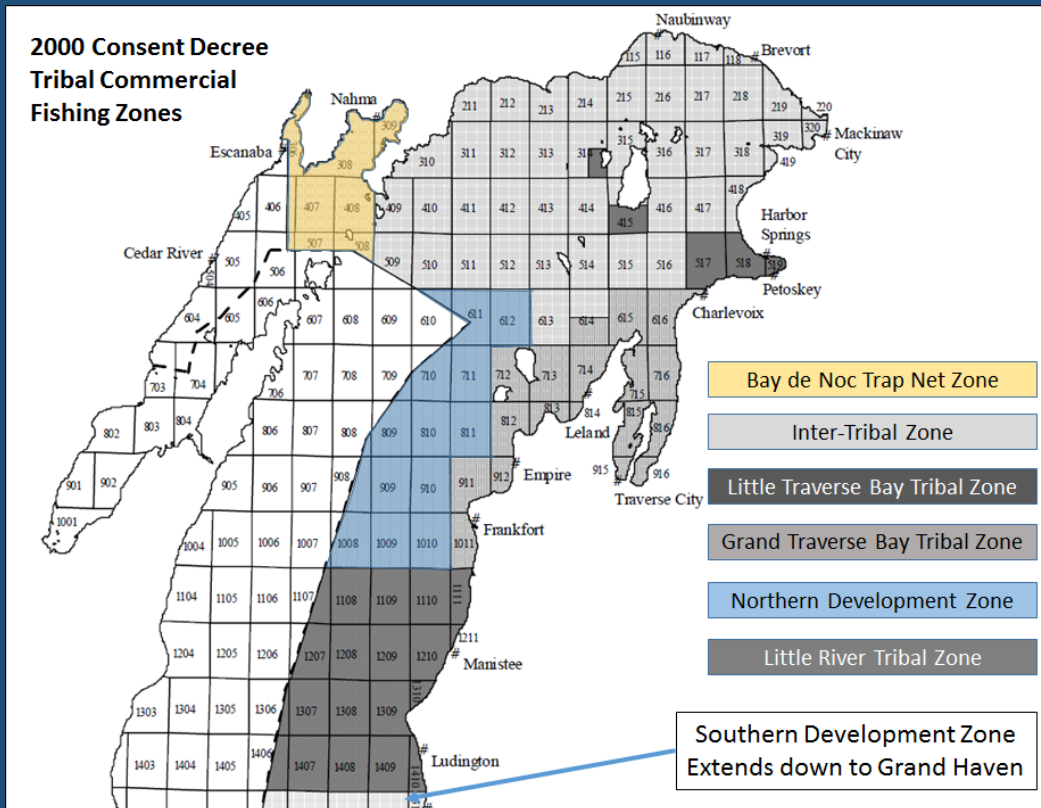
- Principal Contacts:
 - Jon Mauchmar and Jannan Cotto, Little Traverse Bay Bands of Odawa Indians
 - Carolan Sonderegger, Grand Traverse Band of Ottawa and Chippewa Indians

Vulnerabilities

- Previously observed impacts of low water levels
 - Access to fisheries
 - Traditional boat launch locations compromised
 - Exposure of tribal burial grounds
 - Exposure of ancient artifacts

Vulnerabilities

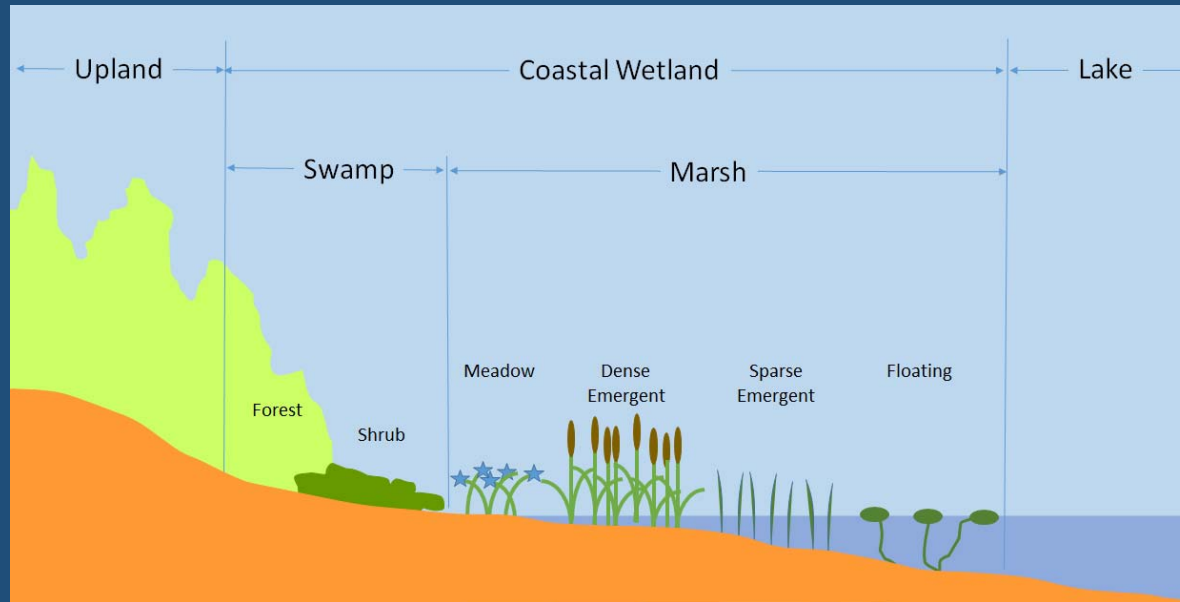
(Fishing and the 2000 Consent Decree)



- Tribal Fishery Uses
 - Commercial
 - Subsistence
 - Cultural
 - Recreational
- Important Species
 - Lake Whitefish
 - Lake Trout
 - Salmon
 - Perch
 - Lake Sturgeon

Wetland Diversity leads to productive spawning/nursery habitats and thus a diverse population of fish species

After Wilcox (2002, *Where Land Meets Water: Understanding Wetlands of the Great Lakes*)



Sutton's Bay - July 2015



Sutton's Bay - July 2015

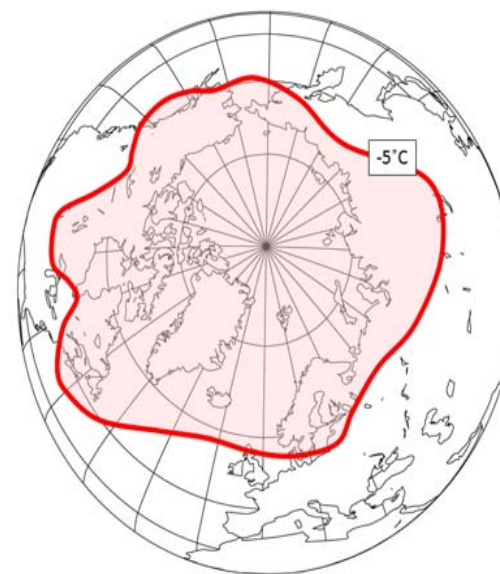
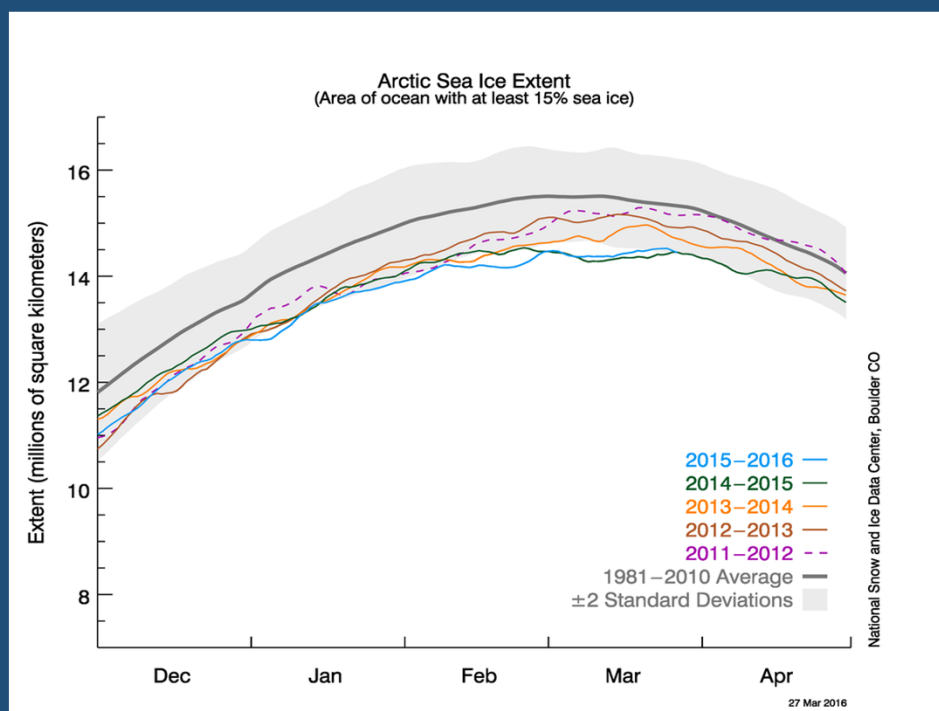


Contraction of the Northern Hemisphere, Lower-Tropospheric, Wintertime Cold Pool over the Past 66 Years

JONATHAN E. MARTIN

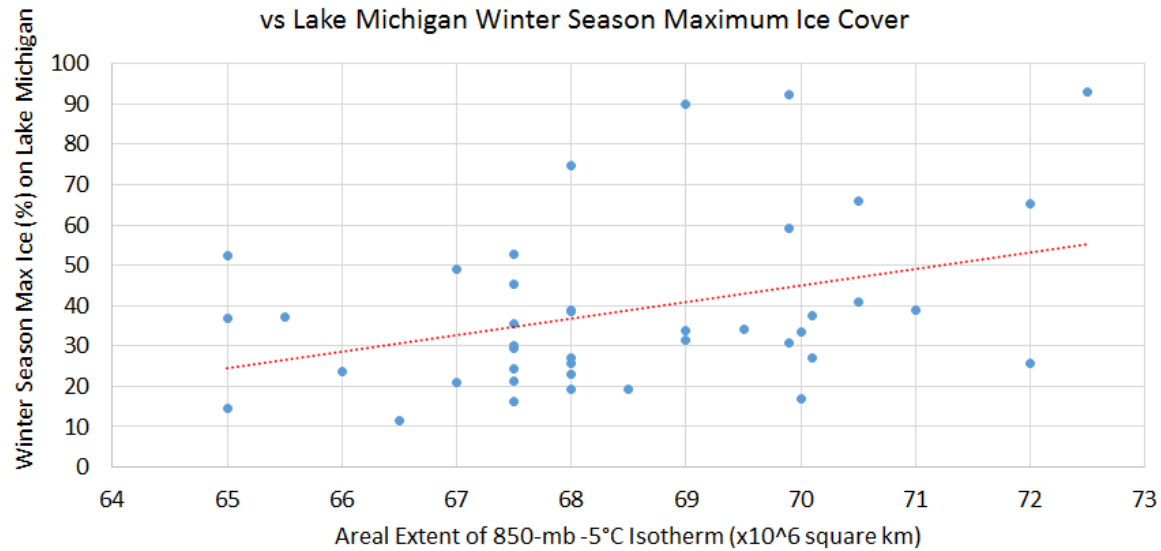
Department of Atmospheric and Oceanic Sciences, University of Wisconsin–Madison, Madison, Wisconsin

(Manuscript received 17 July 2014, in final form 29 January 2015)

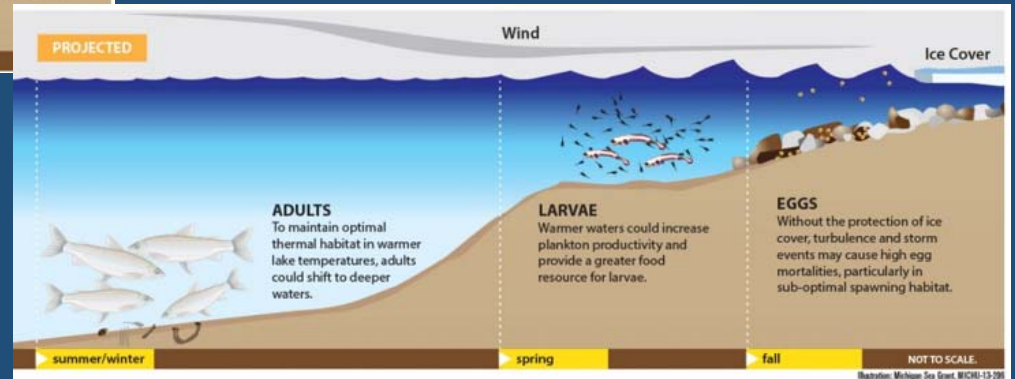
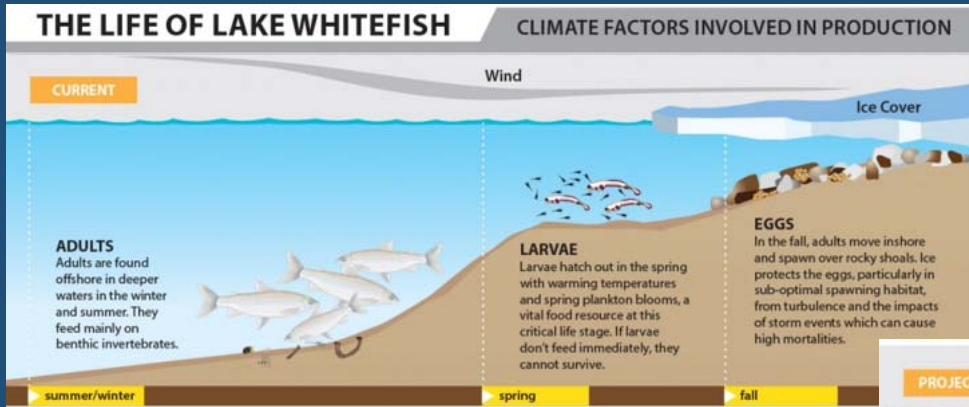


Example of the areal extent of region covered by a typical -5°C contour at the 850-mb level during the Northern Hemisphere winter season.

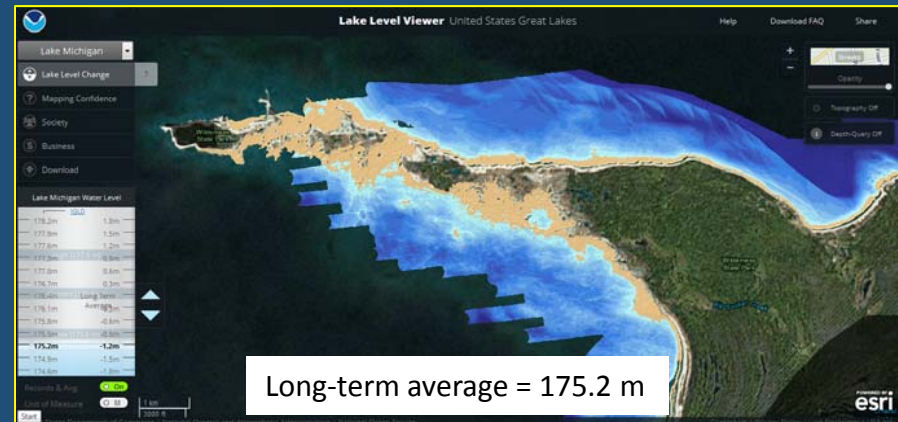
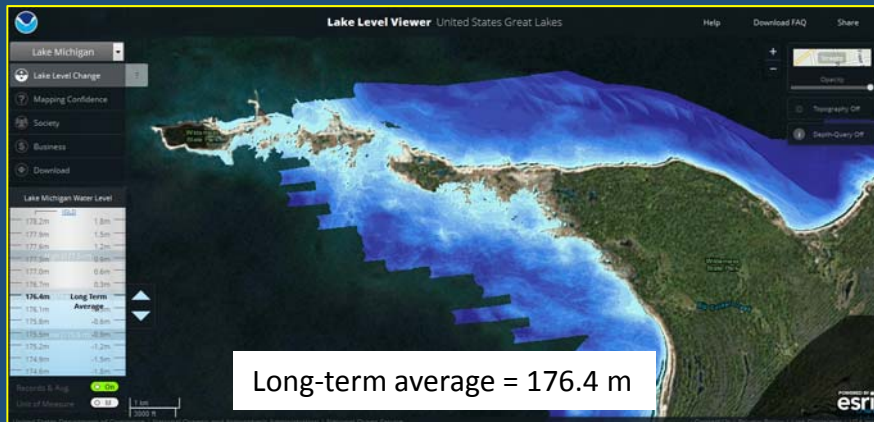
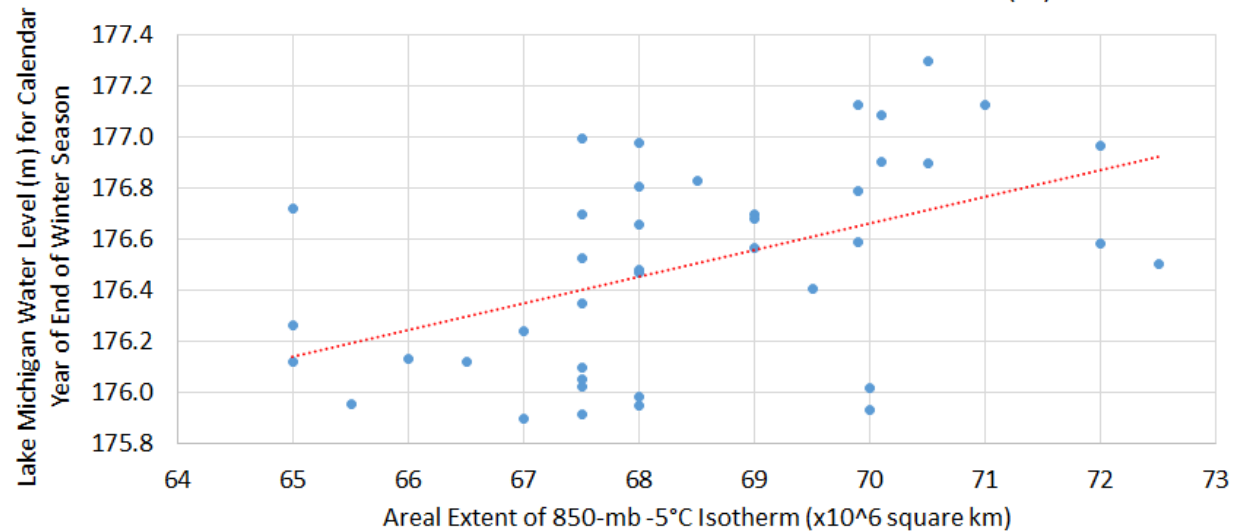
Winter Season Areal Extent Enclosed by 850-mb -5°C Isotherm vs Lake Michigan Winter Season Maximum Ice Cover



LTBB fisheries biologists see close relation between Larval fish survival and ice cover



Winter Season Areal Extent Enclosed by 850-mb -5°C Isotherm vs. Calendar Year of End of Winter Season Lake MI Lake Level (m)



OUR “WORST CASE” SCENARIO COULD RESULTS IN EXPOSURE OF LAND CURRENTLY SUBMERGED LAND IN THE WILDERNESS STATE PARK, FOR EXAMPLE.

Next steps

- Will be meeting with tribes later this month to share results with Natural Resources staff
 - LTBB: Exploring options for adaptation
 - GTB: Exploring options for community outreach
- Developing educational programs
 - Tribal youth programs
 - Consider both Traditional and Western Science approaches
 - Outreach to surrounding communities
- Addressing issues of self-autonomy
 - Example: Would require EPA approval to impose tribal air quality programs in areas of reservation land other than trust land.