

## Overview

- **Purpose:** To support the efforts of the Inter-Tribal Council of Michigan (ITCM) and its member-Tribes in obtaining a better understanding of the susceptibility of Tribal communities to extreme precipitation events.
- **Partner:** Inter-Tribal Council of Michigan; Bay Mills Indian Community; University of Michigan Graham Sustainability Institute
- **People:** Nine member-Tribes of the Inter-Tribal Council of Michigan
- **Impact:** GLISA and the ITCM co-hosted the 2017 Tribal Climate Workshop on the campus of the Bay Mills Community College in Brimley (MI). The partnership resulted in valuable discussions on plausible future climate scenarios related to extreme precipitation, created climate fact sheets for four custom ecoregions, as well as built working relationships led to a follow-up collaborative assessment of stormwater runoff on Tribal lands within the State of Michigan.

In light of the changing climate, the Inter-Tribal Council of Michigan (ITCM) and its member-Tribes conducted the Michigan Tribal Adaptation Planning Project (MTAPP), a collaborative analysis of observed and projected climate conditions at mid-century, followed by an assessment of Tribal resource vulnerabilities to such conditions. In July 2016, the Bad River Band of the Lake Superior Chippewa in northern Wisconsin declared a State of Emergency due to an extreme rainfall and flooding event, which resulted in \$25M in damages to roads and public infrastructure. Emergency services could not access the area due to infrastructure and roads inundated from the precipitation of the storm. As a result, the ITCM and its member-Tribes expressed the need for a better understanding of the susceptibility of Tribal communities to extreme precipitation events, and to learn about tools that could be utilized in climate adaptation planning efforts related to plausible future extreme precipitation events.

In support of the MTAPP project and as a result of the Bad River Band flooding event, the ITCM contacted the Great Lakes Integrated Sciences and Assessments (GLISA) team to develop climate localization documents for four different ecoregions in Michigan and to better understand changes in and impacts from extreme precipitation. These localization documents provided historical and projected trends in temperature and precipitation and supported their vulnerability assessment.

GLISA and the ITCM continued to collaborate and won a Catalyst Grant from the University of Michigan Graham Sustainability Institute to develop extreme precipitation scenarios and an accompanying workshop. To prepare for and frame the workshop, the ITCM worked with GLISA to develop four extreme precipitation scenarios and an accompanying [Extreme Precipitation Scenarios Guide](#) to illustrate multiple possible future impacts from extreme precipitation events across multiple seasons. Interactive feedback between GLISA and the ITCM ensured the relevance of the developed scenarios to extreme precipitation events that member-Tribes had experienced in the past. The four scenarios included: 1) extreme rain during a dry period in spring/summer; 2) extreme rain during a wet period in spring/summer; 3) extreme rain event over bare, frozen ground; and, 4) extreme rain event over deep snowpack.



Workshop participants engaging in the 'Game of Floods' exercise at the 2017 workshop.

A three-day workshop took place at the Bay Mills Indian Community College in October 2017 with representatives from nine of the twelve member-Tribes from ITCM, as well as staff from the Great Lakes Indian Fish & Wildlife Commission (GLIFWC), the Bad River Band of Lake Superior Chippewa, and the USGS Midwest/Northeast Climate Adaptation Science Center. Tribal members and staff used the precipitation scenarios to prompt discussion about how existing climate information can support member-Tribes' adaptation work. At the workshop, GLISA facilitated the [Urban Sustainability Directors Network \(USDN\) Game of Floods](#). The activity involved creating a fictional vulnerability assessment for a coastal city experiencing rising sea levels, which helped participants take on various roles as they created a vulnerability assessment for rising sea levels in a coastal city. Participants reported that by assuming fictional roles and making decisions about a hypothetical situation, they could discuss contentious issues without involving local concerns that could raise tensions. Additional workshop activities consisted of a creative exercise of mural drawings and talks discussing the roles of women as educators and caretakers of the water.

The workshop advanced ITCM and its member-Tribes' interest in sharing experiences around recent adaptation efforts, enhanced collaborative partnerships among ITCM member-Tribes with GLISA, fostered communication with Tribal representatives outside the ITCM, and supplemented Tribal capacity in adaptive resource management for future climate change. The workshop also led to an [additional project focused on collaboratively assessing stormwater runoff on Tribal lands](#) to inform best management practices. It initiated a new partnership between GLISA and the Bad River Band Tribe to co-develop climate information to support their FEMA pre-Hazard Mitigation Plan. A Tribal staff member joined GLISA's Practitioner Working Group and continues to serve in this capacity, although her affiliation has since changed.

*“GLISA's climate profiles and support for Tribal scenario workshops provided the participating Tribes with key information that managers use to make decisions about how harvesting activities for Tribal members should be managed, as well as what issues to be aware of regarding how climate change may affect Tribal-state-federal-local relationships.”*

*– Kyle Powys Whyte, Professor, School for Environment and Sustainability, University of Michigan in reference to information GLISA provided for workshops he led in his former appointment at Michigan State University that laid the foundation for ITCM's partnership with GLISA.*

## About GLISA Advancing Climate Knowledge for Adaptation and Resilience with Great Lakes Communities

Established in 2010, GLISA is a collaboration between the University of Michigan and Michigan State University, supported by the National Oceanic and Atmospheric Administration (NOAA). As one of 11 NOAA Regional Integrated Sciences and Assessments (RISA) teams, GLISA works at the boundary between climate science and decision-makers, striving to enhance Great Lakes communities' capacity to understand, plan for, and respond to climate impacts now and in the future. Our team of social and physical scientists collaborates to:

- Develop usable climate information tailored to stakeholder needs;
- Develop, implement, and evaluate resources and tools to apply climate information to decision-making;
- Facilitate collaborative activities, education, and training and support stakeholder networks; and,
- Investigate emerging climate issues and synthesize findings for practitioners.



### Great Lakes Integrated Sciences + Assessments (GLISA)

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Example of GLISA's boundary chain model of stakeholder engagement for the Great Lakes Climate Adaptation Network (GLCAN). Climate information is tailored and moves through different boundary organizations (links in the chain) to connect science to users. Adapted from Lemos et al. 2014.