

# A climate change vulnerability assessment in the upper Great Lakes integrating Traditional Ecological Knowledge

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## Introduction



Figure 1. Tribal member harvesting wild rice. Photo credit Dylan Jennings.

Climate change may impact the ability of tribal members to continue exercising treaty rights to hunt, fish, and gather resources they depend on for spiritual, cultural, medicinal, subsistence, and economic needs.

We are conducting a vulnerability assessment using western science combined with Traditional Ecological Knowledge (TEK) of tribal Elders and Harvesters. We believe using TEK to complement scientific ecological knowledge will provide us with a more holistic approach to species management and adaptation to climate change.

The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) is an intertribal natural resources agency composed of 11 federally recognized Ojibwe tribes. Those tribes reserved rights in territories ceded to the United States in the 1836, 1837, 1842, and 1854 treaties.

## What is TEK?

While there are many definitions of Traditional Ecological Knowledge, it can refer to knowledge gained from generations of indigenous peoples' connection and interactions with the environment. This knowledge system is based on direct observations of their local environment and is typically transmitted orally through aadizookaanan (sacred stories), dibaajimowinan (oral histories), and ceremonies.

## Vulnerability of select species

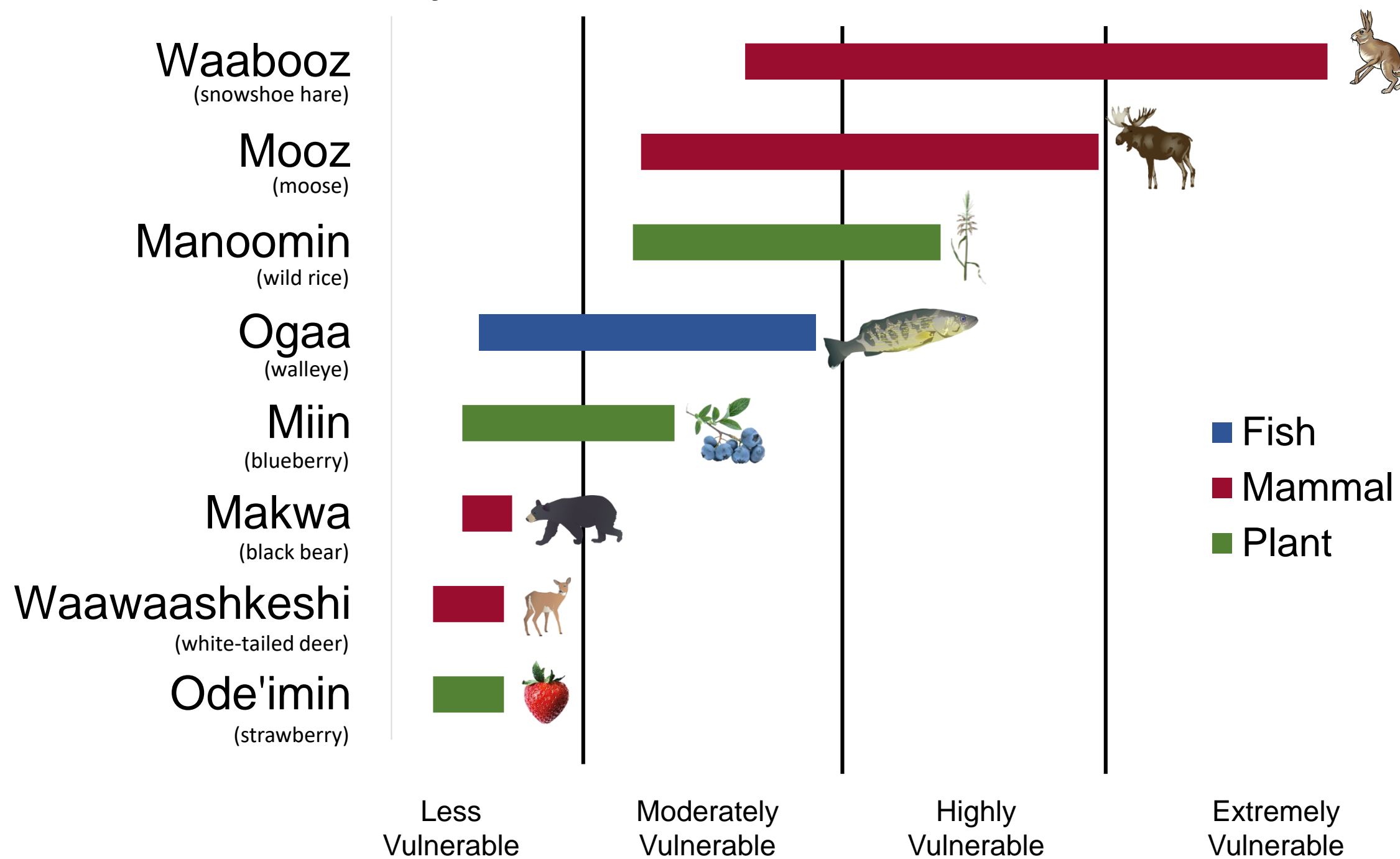
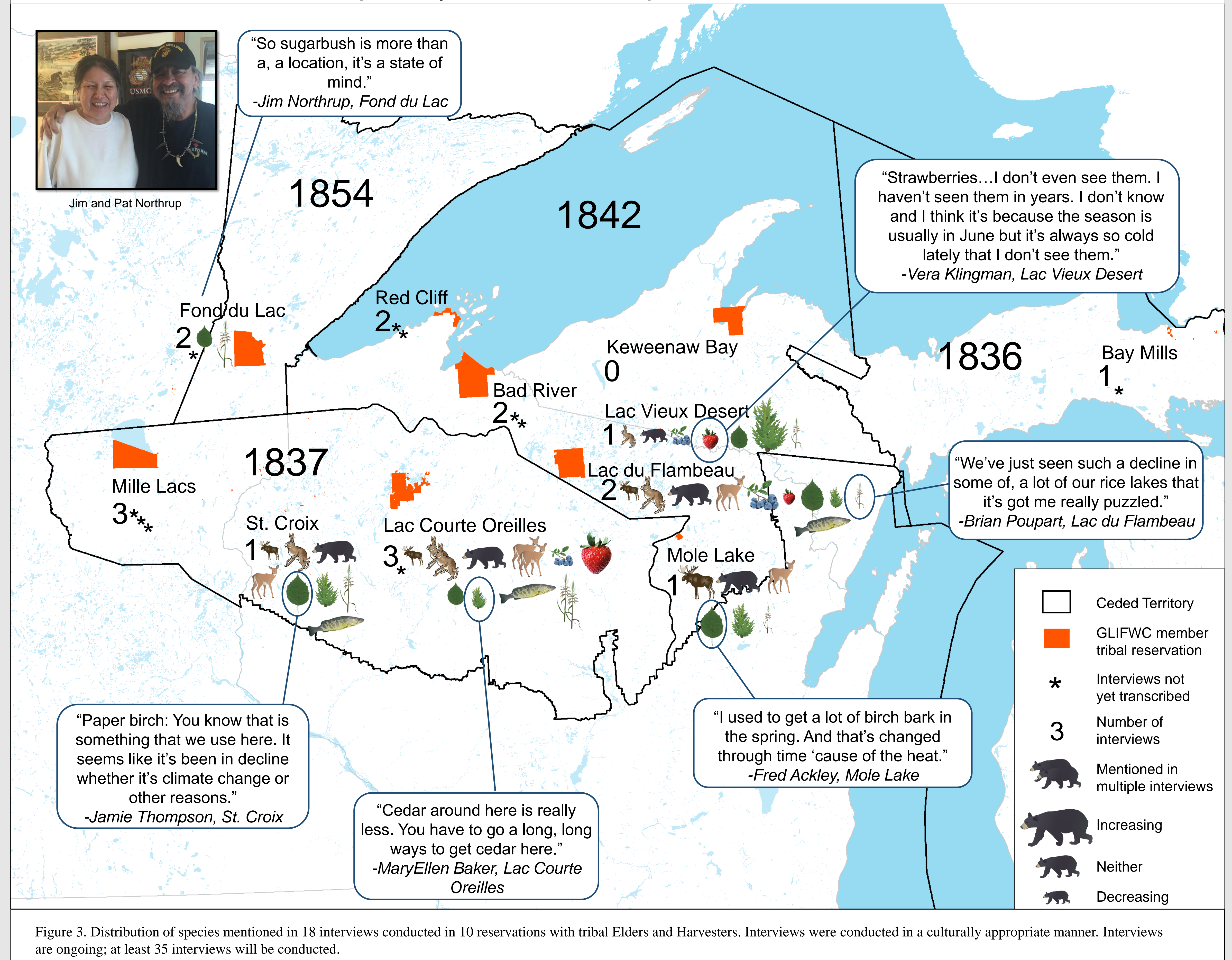


Figure 2. Climate change vulnerability by mid-century of species most frequently mentioned in TEK interviews. Assessment focused on the 1837 and 1842 Ceded Territories. Bar width indicates the best-case to worst-case scenarios projected by models dynamically downscaled using data from the latest IPCC report.

The 60 species included in this vulnerability assessment were chosen based on several criteria, including their mention in TEK interviews and/or being an actively harvested species of GLIFWC's member tribes. The assessment uses NatureServe's Climate Change Vulnerability Index (CCVI) tool (Young et al. 2015) and is based on a literature review in combination with expert reviews.

Of the species mentioned most frequently, waabooz is the most vulnerable, and ode'immin and waawaashkeshi are the least. This corresponds with results from TEK interviews.

## Most frequently mentioned species in TEK interviews



## TEK and Western Science

Overall trends in TEK interviews and western science-based assessments were similar in that the most vulnerable species were mentioned as decreasing in many places. However, TEK results provide a much richer perspective and contain more spatial variation. For example, ode'immin was found to be less vulnerable using the CCVI, but in the Lac Vieux Desert interview, ode'immin was mentioned as in decline. Also in Lac Vieux Desert, giizhik (northern white cedar) was described as thriving, when western science reports indicate giizhik is highly vulnerable (Janowiak et al. 2014). Place-based knowledge is important to consider when considering vulnerability to climate change.

The integration of TEK and western science strengthen the inferences we are able to make in this assessment. The conclusions and resulting GLIFWC and Ceded Territories Climate Change Adaptation Plan that we will develop will have more applicability and practicability for our member tribes. Additionally, the gathering and preservation of TEK is increasingly important as climate change continues.

As an organization we do our best to attribute information to the individuals who shared their knowledge in order to ensure their voices are accurately heard and the knowledge remains theirs.

## Literature Cited

Janowiak MK, LR Iverson, DJ Mladenoff, E Peters, KR Wythers, W Xi, R Ziel. Forest ecosystem vulnerability assessment and synthesis for northern Wisconsin and western Upper Michigan: a report from the Northwoods Climate Change Response Framework project. Gen. Tech. Rep. NRS-136. Newtown Square, PA: USDA, Forest Service, Northern Research Station. 247 p.  
Young BE, E Byers, G Hammerson, A Frances, L Oliver, and A Treher. 2015. Guidelines for using the NatureServe Climate Change Vulnerability Index Release 3.0. Arlington, VA: NatureServe.

## Acknowledgements

Chi miigwech to the many tribal members who have contributed teachings, stories, and knowledge. Without their guidance and input this project would not have been possible. We would also like to thank Esteban Chiriboga, GLIFWC Environmental Specialist, for his excellent preliminary work on this vulnerability assessment and Michael Notaro from UW-Madison for the contribution of climate data used in the assessment.

