Tribal Resilience & Adaptation to Climate Change with Two -Eyed Seeing

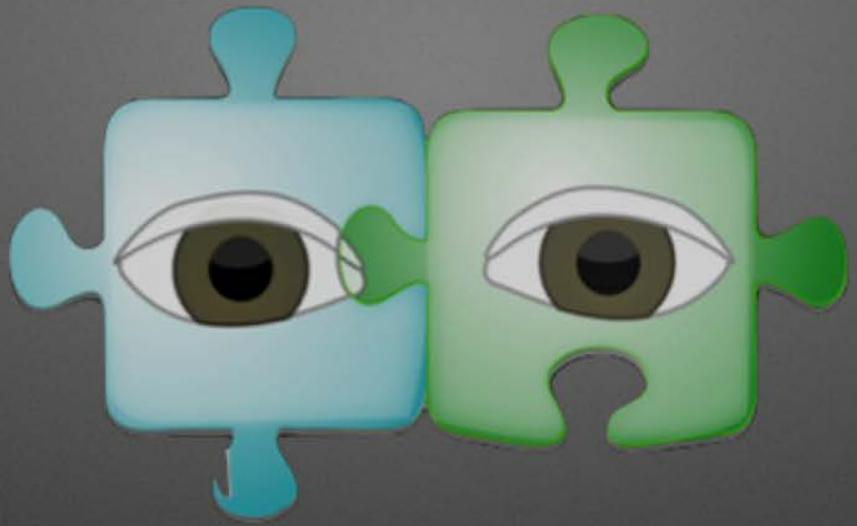
Sara Smith

Midwest Tribal Resilience Liaison
College of Menominee Nation - Sustainable Development Institute
Northeast Climate Adaptation Science Center

Robin Clark

Environmental Specialist
Inter-Tribal Council of Michigan Inc.

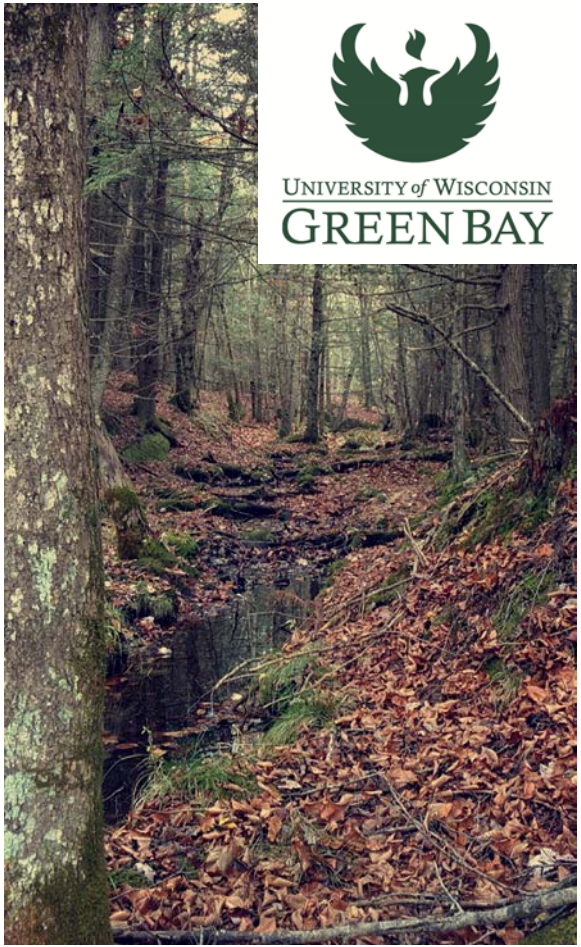
2018 Partners in Action Conference - Milwaukee, Wisconsin



Etuaptmumk: Two-Eyed Seeing

Albert Marshall

Institute for Integrative Science and Health, Cape Breton University. http://www.integrativescience.ca/Principles/TwoEyedSeeing/ Image: Basma Kavanagh

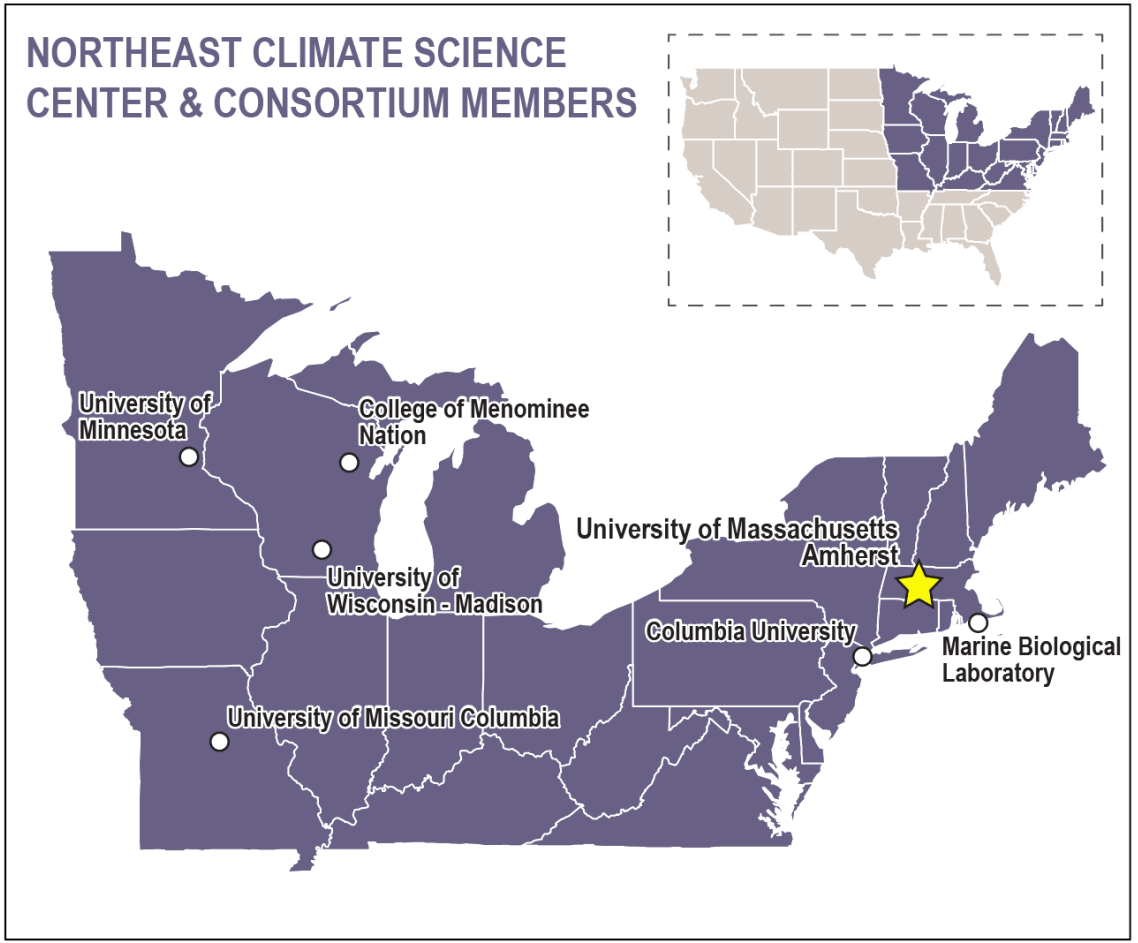


UNIVERSITY of WISCONSIN
GREEN BAY

COLLEGE OF ENVIRONMENTAL SCIENCE AND FORESTRY
ESF
1911
STATE UNIVERSITY OF NEW YORK

Liaison Position

- Facilitate and integrate coordination between the the NE CSC activities and the needs/climate change initiatives with Tribes in the Midwest
- Identify and address research gaps in climate, natural, and cultural resources as well as improve outreach and Tribal capacity building



Tribal Sectors Impacted by Climate

Image courtesy of the National Congress of American Indians (NCAI) www.ncai.org/tribalnations

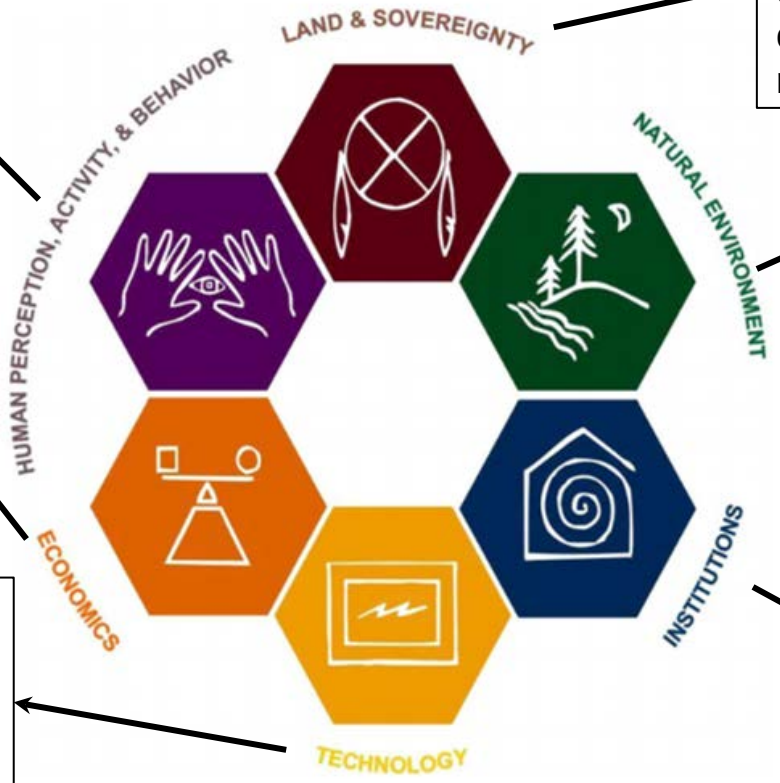
Model of Sustainable Development

Model of Sustainable Development

How do Tribal members view/understand climate change? What are their concerns? How might our cultural practices change?

How might parts of our economy (ex. Logging, fishing) be affected by the changing climate and increase in pests?

Is there some kind of technology that can help alleviate impacts? (Ex. water control structures, larger culverts, prescribed fire)



How will/has management over the land changed due to climate change? What about ceded lands - who is responsible?

Will our forest communities change? How will invasive species and diseases impact natural communities? What about the increase in vector borne diseases?

How might we collaborate with organizations and/or academic institutions to conduct research and build resilience?

Model of Sustainable Development

Goal and Objectives

★ Promote and support climate resilience and adaptation of Tribal communities within region

- Cultivate awareness of climate threats to cultural and natural resources to Tribal communities and promote tools for resilience and adaptation planning.
  - Northeast Indigenous Climate Resilience Network (www.nicrn.org)
  - Tribal Site Visits
- Cultivate integration of climate considerations and traditional knowledge into resource plans with Tribal communities.
  - Tribal Adaptation Menu, technical assistance, integration of TEK into research and planning
- Understand climate concerns, impacts, needs, and resilience strategies in Tribal communities.
  - Wild Rice (*Manoomin*)
- Foster information exchange and partnerships among CASCs, BIA, Tribal commun organizations, and institutions.

NORTHEAST INDIGENOUS CLIMATE RESILIENCE NETWORK

HOME ABOUT US CLIMATE CHANGE IN THE NORTHEAST PROJECTS & EVENTS RESOURCES CONTACT

NORTHEAST INDIGENOUS CLIMATE RESILIENCE NETWORK

Indigenous peoples face a wide range of vulnerabilities and opportunities regarding the impacts of climate change. The **Northeast Indigenous Climate Resilience Network (NICRN)** seeks to convene Indigenous peoples to identify threats to Indigenous self-determination and ways of life and to formulate adaptation and mitigation strategies, dialogues, and educational programs that build Indigenous capacities to address climate-related issues.

This website provides the latest tools and resources for Indigenous peoples and scientists to work together towards meeting the current challenges of climate change.

Tribal Site Visits -
Bay Mills and Sault Ste. Marie

Topics - Coastal / dune erosion, severe storms

Tribal Site Visits - Bay Mills and Sault Ste. Marie

Topics - Culverts, EAB, snowshoe hare

Tribal Site Visits - Fond du Lac & Keweenaw Bay Indian Community

Topics - Youth engagement, restoration, food sovereignty, and manoomin

Gaagige Bimaadiziwin
Gaawiin geyaabi naniizanasinoon

Tribal Site Visits - Lac du Flambeau & Red Cliff

Topics - Vulnerability assessments, adaptation planning, and community outreach

Tribal Adaptation Menu

This is a joint effort with NIACS, GLIFWC, 1854 Treaty Authority, ITCMI, College of Menominee Nation Sustainable Development Institute, and numerous Midwestern Tribes

- Draft will be presented at the Partners in Action Conference
  - **Tomorrow** Thursday July 19 8:30 AM - 11:45 AM in Salon C

Understand concerns and needs of Tribal communities and share understandings of climate impacts and resilience strategies on manoomin

- ★ Manoomin focal project
  - Beginning phases
  - Tribal profiles/stories on wild rice
    - How has the climate been affecting the rice? What changes are being seen? What can we do to become more resilient?

Yaw^ko

Sara Smith
Midwest Tribal Resilience Liaison
CMN Sustainable Development Institute
NE Climate Adaptation Science Center
St. Paul, MN 55108
C: 920-202-6278
O: 651-649-5134
Email: ssmith@menominee.edu

Inter-Tribal Forest Understory Adaptation Project

2017 - 2018

FY16 Bureau of Indian Affairs Tribal Climate Resilience Funding

Inter-Tribal Council of Michigan

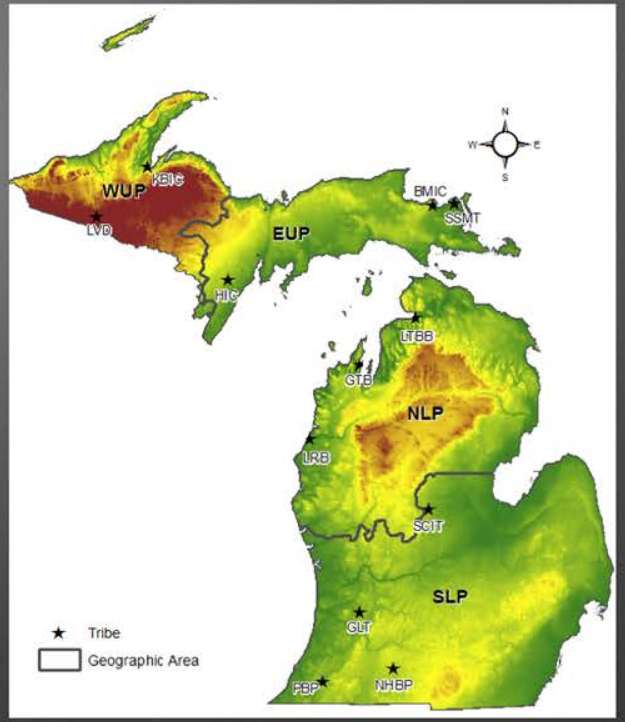
Consortium of Michigan Tribes
501 ©(3) non-profit organization founded in 1968

Mission:

1. To act as a forum for member tribes
2. To advocate for member tribes in the development of programs and policies which will improve economy, education, and quality of life; and
3. To provide technical assistance to member tribes.

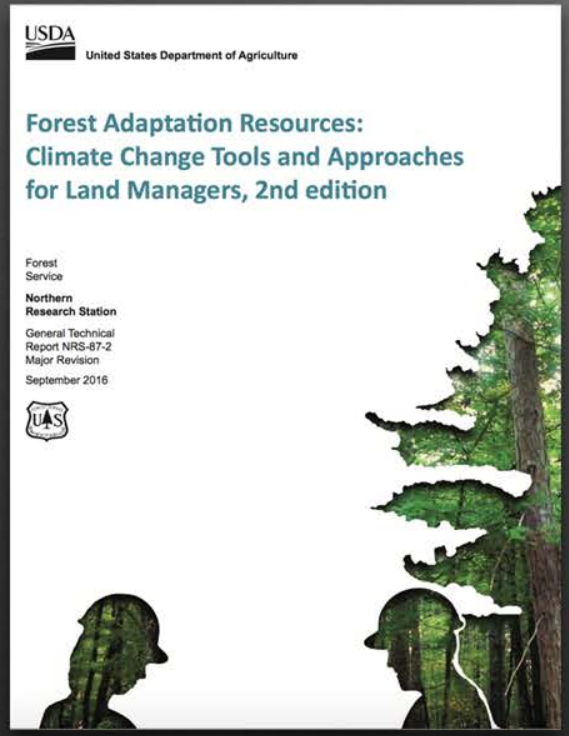
Project Partners:

Bay Mills Indian Community
Lac Vieux Desert Band of Lake Superior Chippewa
Pokagon Band of Potawatomi
Saginaw Chippewa Indian Tribe
Michigan Natural Features Inventory
Northern Institute for Applied Climate Science
Great Lakes Indian Fish and Wildlife Commission
Inter-Tribal Council of Michigan



How might forest understory plants respond to climate-driven change?

Why understory plants?



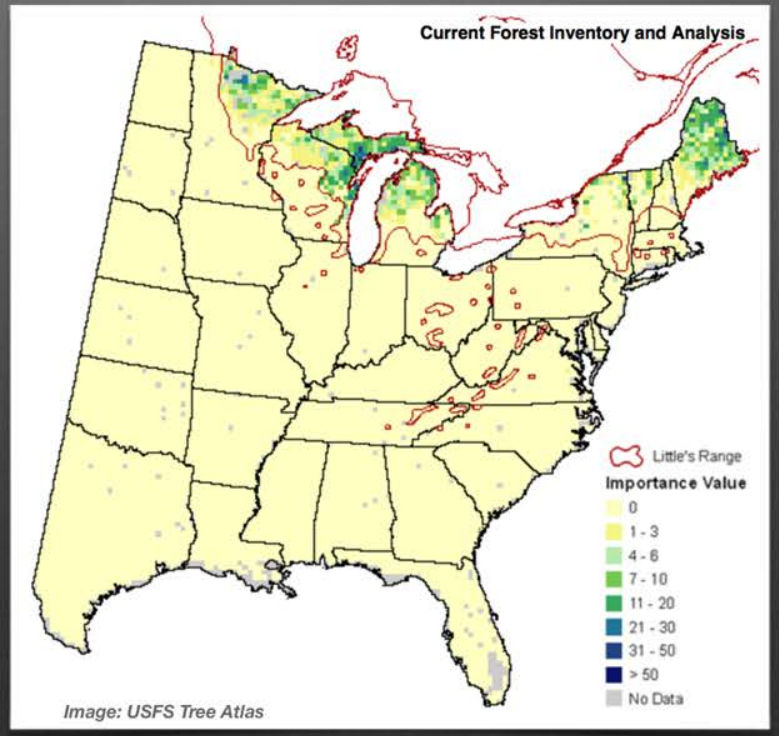


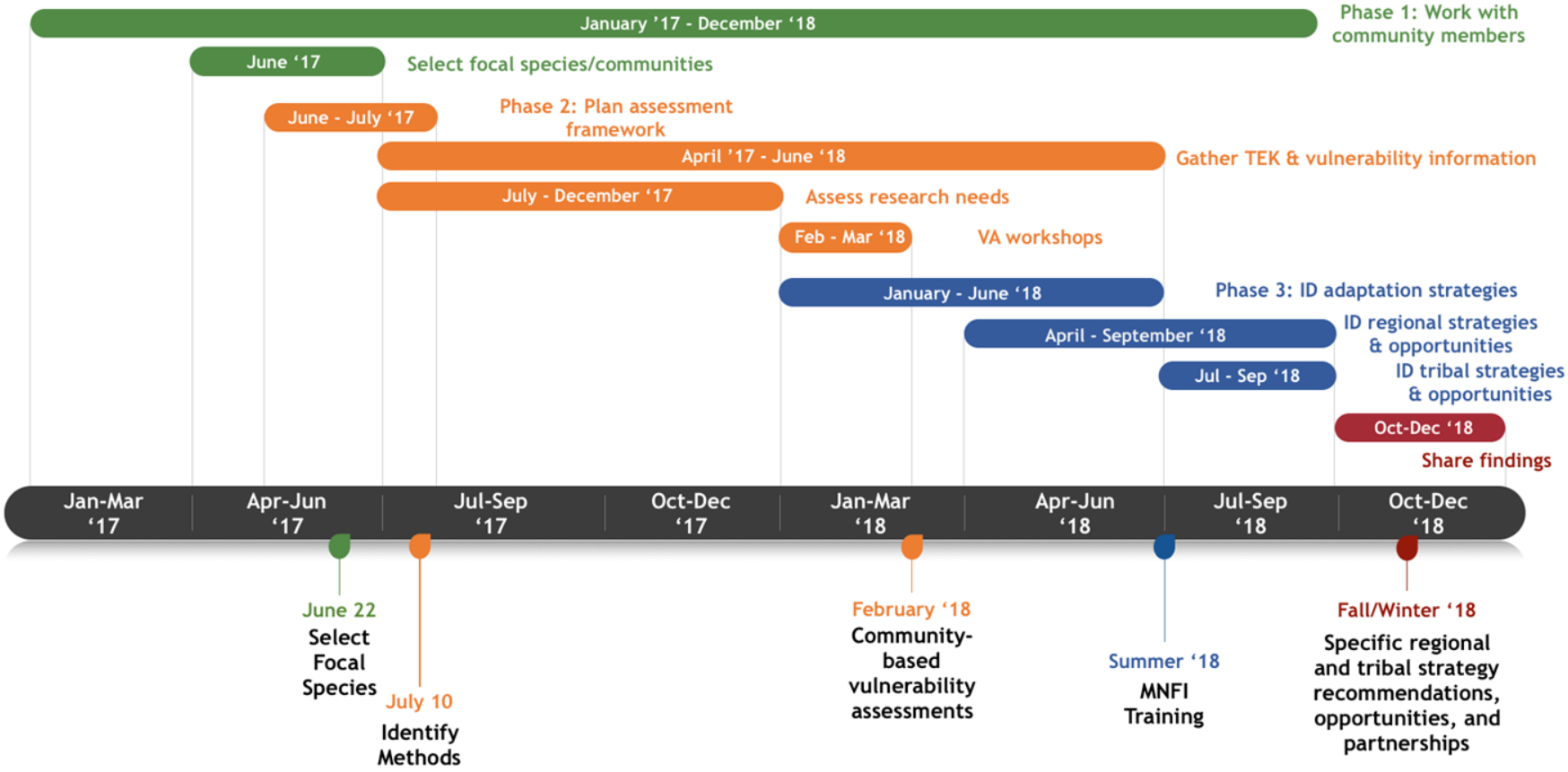
Image: USFS Tree Atlas

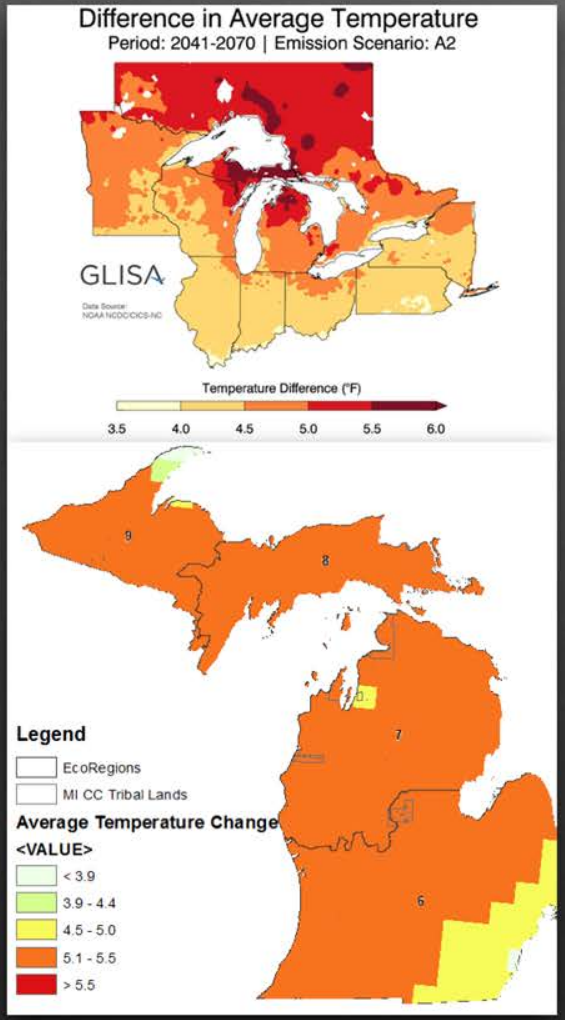
Project Goals

1. Work with tribal members to support our forests with Anishinaabe and western scientific ways
2. Better understand changes in select forest plants and communities
3. Identify ways to support these plants and communities at multiple scales

…so that current and future generations can continue to know and use them for a good life

Inter-Tribal Forest Understory Adaptation Project Timeline





CLIMATE CHANGE

AT A GLANCE

MICHIGAN TRIBAL CLIMATE ADAPTATION PROJECT

PAST: TEMPERATURE

The annual average temperature has increased by about 2 F° over the past century, with a 9-day decrease in frost days (cold season) between 1958-2012

PAST: PRECIPITATION

The annual average amount of precipitation has increased by about 11% over the past century, with a 37% increase in the number of heavy storms during the last 50 years.

FUTURE: TEMPERATURE

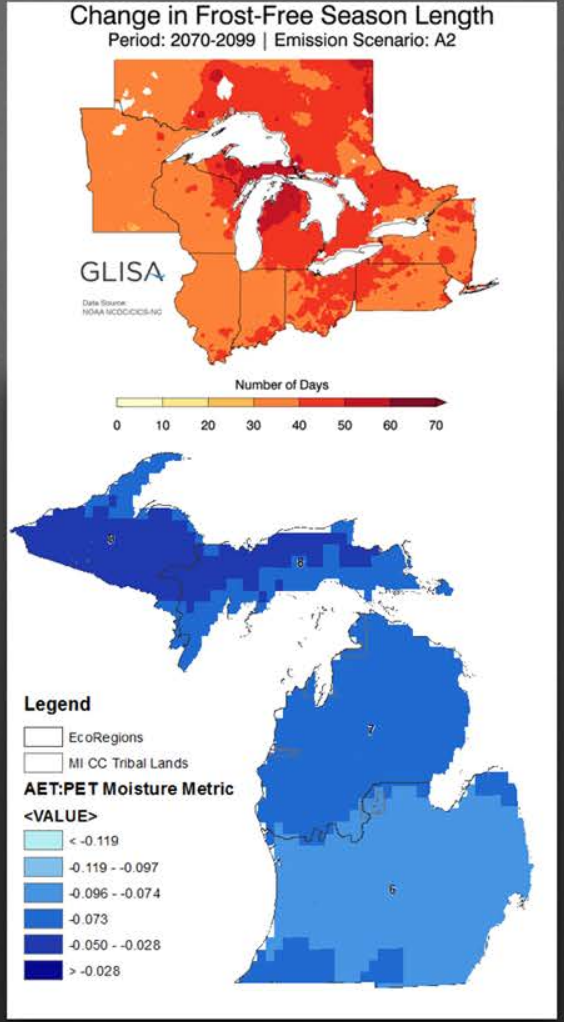
The annual average temperature may increase by about 4-6 F° by 2050, with an increase in the growing season of about 1 month.

FUTURE: PRECIPITATION

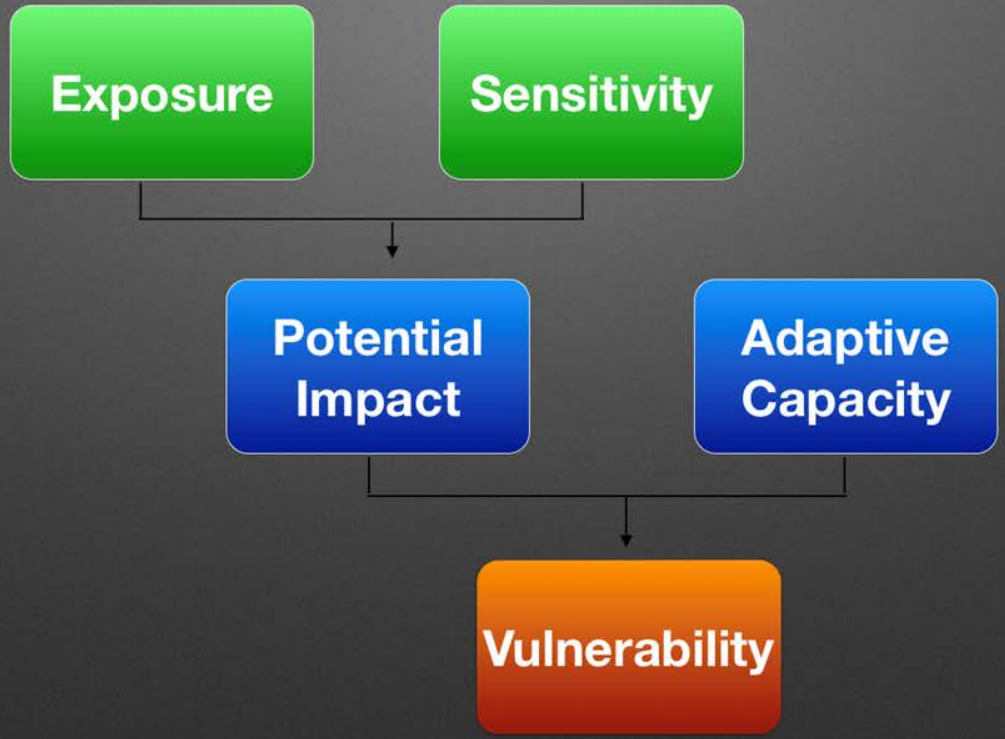
Heavy storms may continue to increase in number and intensity. Winter precipitation may fall more often as rain, while snow depth may decrease.

GREAT LAKES

Surface water temperatures have increased by about 3F° since 1995. Ice cover decreased by 62-79% between 1973-2010.



Standard Vulnerability Assessment



Glick et al. 2011

NatureServe's CCVI

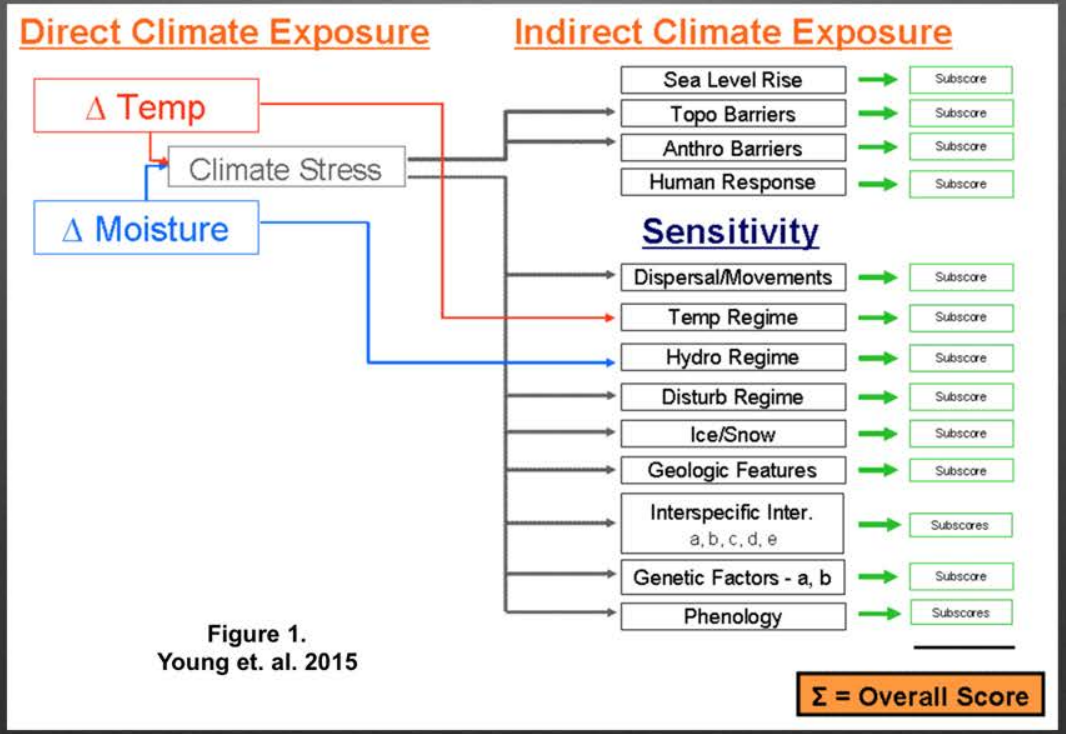
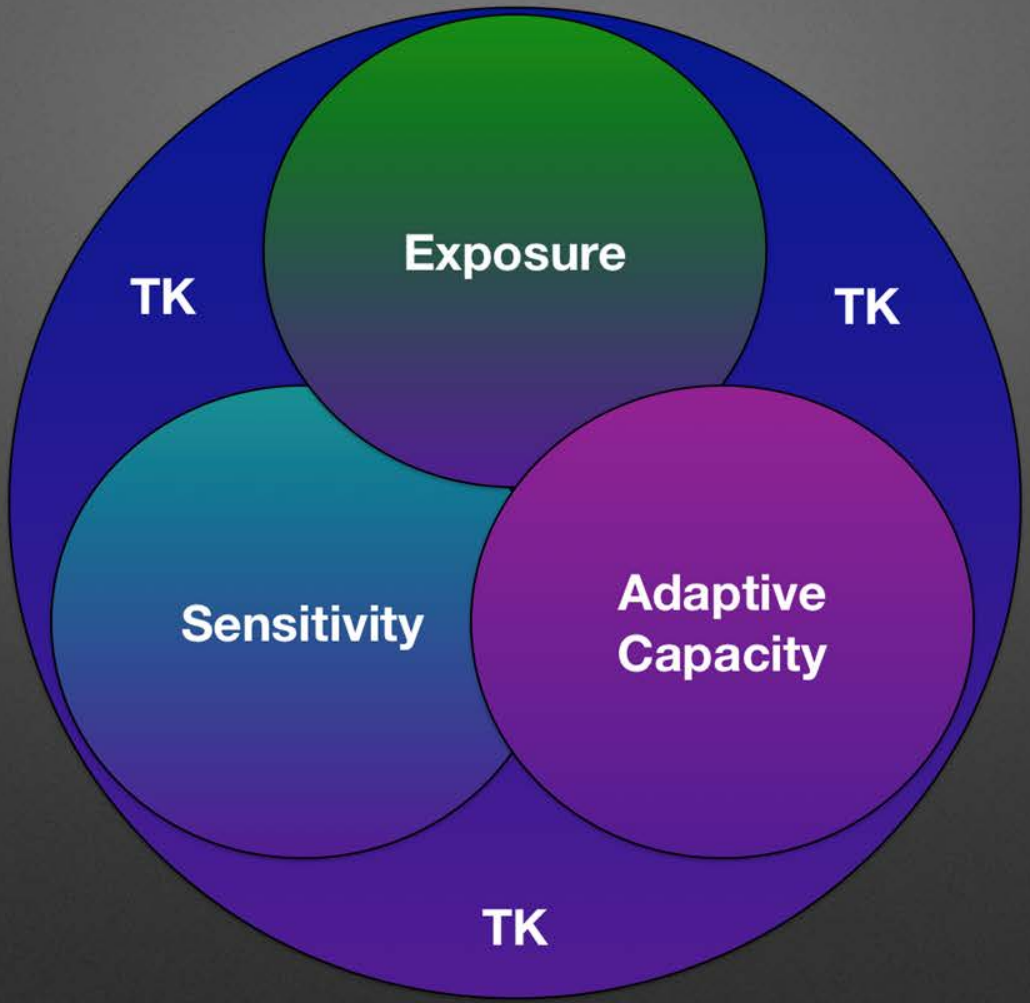
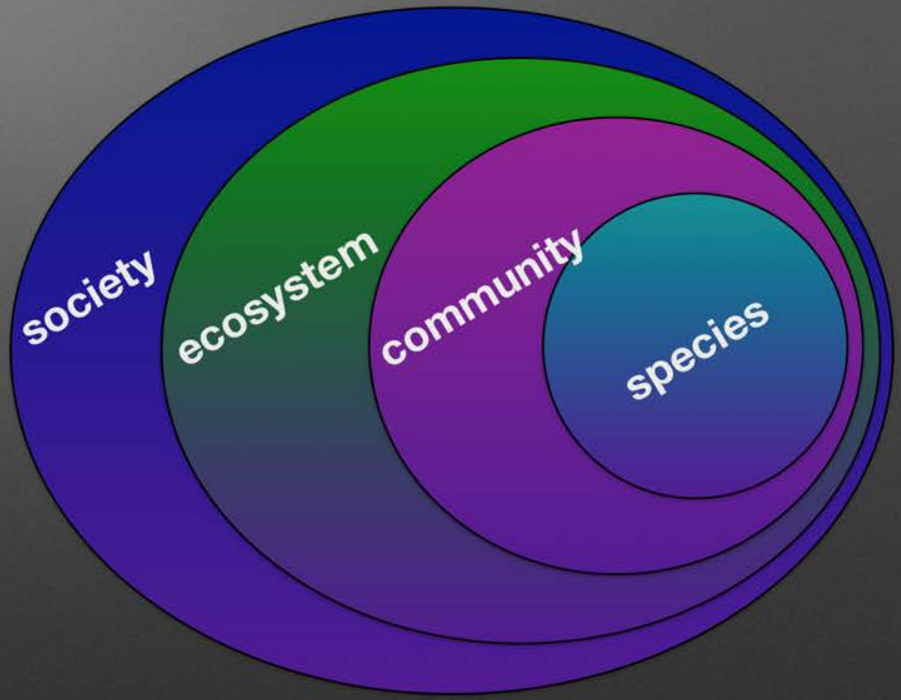


Figure 1.
Young et. al. 2015

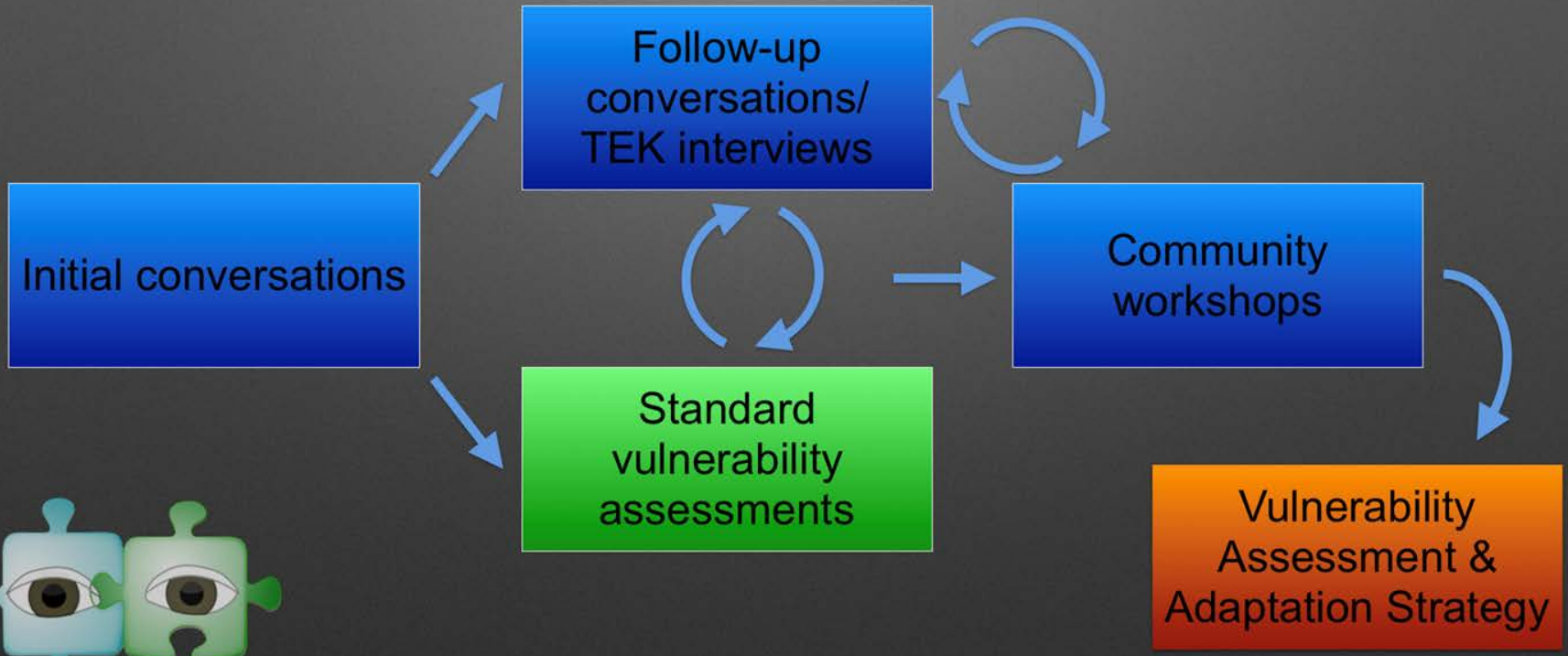

Exposure
TK
TK
Sensitivity
Adaptive
Capacity
TK

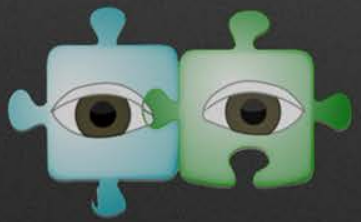
Defining Vulnerability

- Plant health
- Geographic distribution
- Forest community identity
- Tribal community access & knowledges



Project Methods





Two-Eyed Seeing image: Basma Kavanagh

Community Outreach

Tribal Natural Resource and ITCMI staff led:

- Informal conversations
- Interviews
- Community gatherings
- Community workshops

Focal Plants

Jiisens
Wild Ginseng

Mashkiigobag
Labrador Tea

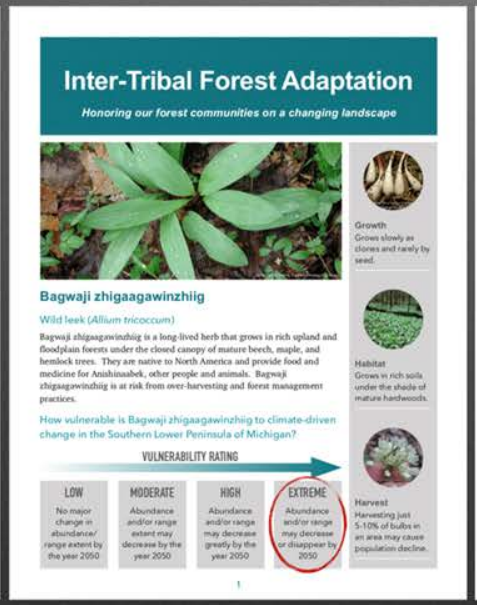
Miinagaawanzh
Blueberry

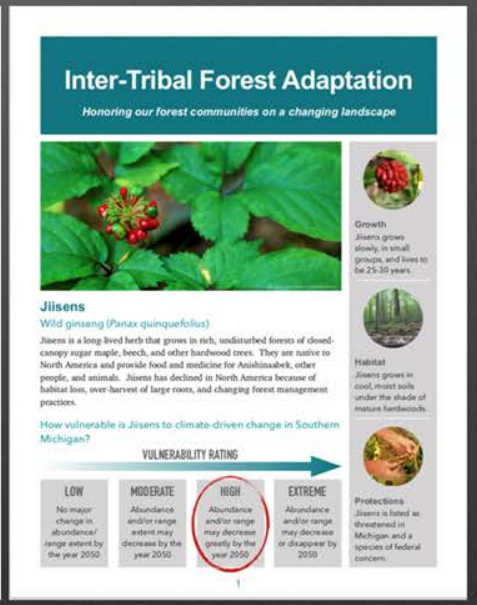
Bagwaji zhigaagawinzhiig
Wild Leek

Opin
Ground Nut

Anishinaabemowin	Common	Species
Bagwaji zhigaagawinzhiig - Bgwëtth zhegagozhik	Wild Leek	*Allium burdickii*
Mashkiigobag - Wézawbegëk	Labrador Tea	*Rhododendron groenlandicum*
Miinagaawanzh - Minmesh	Blueberry	*Vaccinium angustifolium*
Jiisens - Thisés	Wild Ginseng	*Panax quinquefolius*
Opin - Pen	Indian Potato	*Apios americana*

Draft Assessments





Bagwaji zhigaagawinzhiig

Wild leek (*Allium tricoccum*)

Bagwaji zhigaagawinzhiig is a long-lived herb that grows in rich upland and floodplain forests under the closed canopy of mature beech, maple, and hemlock trees. They are native to North America and provide food and medicine for Anishinaabek, other people and animals. Bagwaji zhigaagawinzhiig is at risk from over-harvesting and forest management practices.

How vulnerable is Bagwaji zhigaagawinzhiig to climate-driven change in the Southern Lower Peninsula of Michigan?

VULNERABILITY RATING

LOW	MODERATE	HIGH	EXTREME
No major change in abundance/ range extent by the year 2050	Abundance and/or range extent may decrease by the year 2050	Abundance and/or range may decrease greatly by the year 2050	Abundance and/or range may decrease or disappear by 2050

Growth
Grows slowly as clones and rarely by seed.

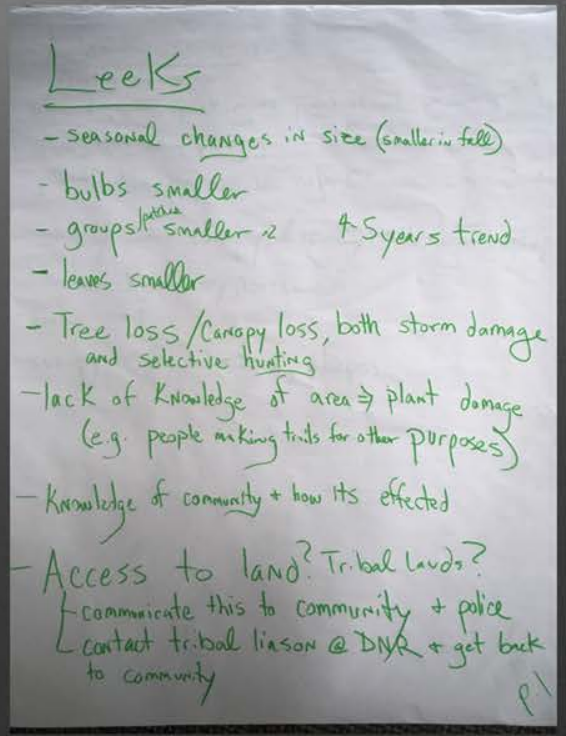
Habitat
Grows in rich soils under the shade of mature hardwoods.

Harvest
Harvesting just 5-10% of bulbs in an area may cause population decline.

Community Workshops

Agenda:

- Opening and introductions
- Field trip
- Review draft findings
- Define vulnerability as a group
- Group vulnerability assessment
- Strategies and next steps



Community Workshops

What is vulnerability?

- Health
- Habitat
- Community access
- What else?

Vulnerability

Vulnerability Rating

Extremely Vulnerable

Number of plants, habitat for these plants, and/or tribal community access to these plants may decrease or disappear by the year 2050

Highly Vulnerable

Number of plants, habitat for these plants, and/or tribal community access to these plants may decrease greatly by the year 2050

Moderately Vulnerable

Number of plants, habitat for these plants, and/or tribal community access to these plants may decrease by the year 2050

Less Vulnerable

No major decrease in number of plants, habitat for these plants, and/or tribal community access to these plants by year 2050; potential increase for some plants

Worksheets

Mashkiigobag - Wézawbegëk - Labrador tea Worksheet

1. Have you noticed any changes in Labrador tea?

- ☐ Flowers at different time
- ☐ Harvest at different time
- ☐ Leaves are larger
- ☐ Leaves are smaller
- ☐ Plants are taller
- ☐ Plants are shorter
- ☐ Grows in new areas
- ☐ Grows in less areas
- ☐ Patches are larger or thicker
- ☐ Patches are smaller or thinner
- ☐ _____
- ☐ _____

Why do you think these changes are happening?

2. Have you noticed any changes in the places where Labrador tea grows?

☐ Yes ☐ No ☐ Maybe

What changes have you noticed?

3. How easy is it to find and gather Labrador tea in southern or mid-Michigan now?

☐ Very easy ☐ Easy ☐ Medium ☐ Difficult

What makes it easier or harder?

4. Do you know of any ways to increase Labrador tea populations?

☐ Yes ☐ No ☐ Maybe

If so, please share:

Vulnerability Assessment

5. Please rate the vulnerability of Mashkiigobag/Wézawbegëk on the graph below with an 'X.'

Extremely Vulnerable
Number of plants, habitat for these plants, and/or tribal community access to these plants may decrease or disappear by the year 2050

Highly Vulnerable
Number of plants, habitat for these plants, and/or tribal community access to these plants may decrease greatly by the year 2050

Moderately Vulnerable
Number of plants, habitat for these plants, and/or tribal community access to these plants may decrease by the year 2050

Less Vulnerable
No major decrease in number of plants, habitat for these plants, and/or tribal community access to these plants by the year 2050
Potential increase for some plants

6. Why did you select this vulnerability rating?

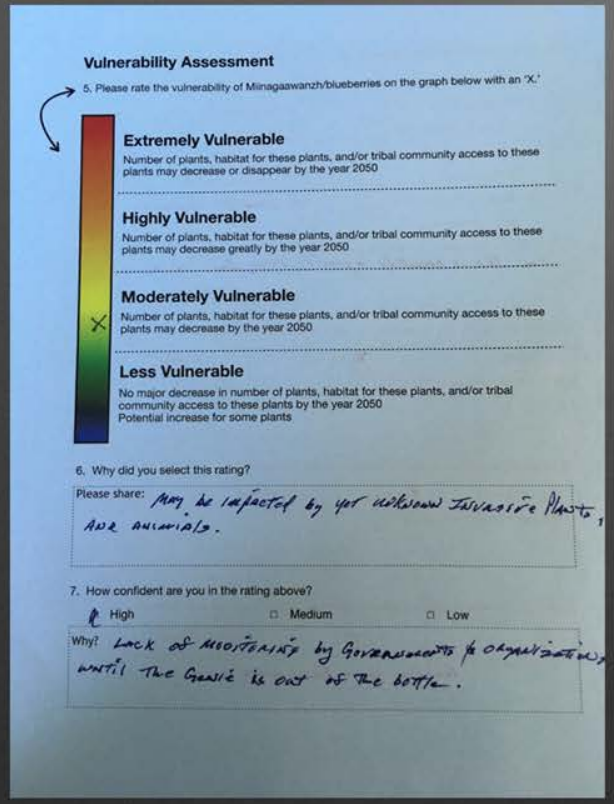
Please share:

7. How confident are you in the rating above?

☐ High ☐ Medium ☐ Low

Why?

Group Discussion & Consensus



Vulnerability Assessment

5. Please rate the vulnerability of Miinagaawanzh/blueberries on the graph below with an 'X.'

Extremely Vulnerable
Number of plants, habitat for these plants, and/or tribal community access to these plants may decrease or disappear by the year 2050

Highly Vulnerable
Number of plants, habitat for these plants, and/or tribal community access to these plants may decrease greatly by the year 2050

Moderately Vulnerable
Number of plants, habitat for these plants, and/or tribal community access to these plants may decrease by the year 2050

Less Vulnerable
No major decrease in number of plants, habitat for these plants, and/or tribal community access to these plants by the year 2050
Potential increase for some plants

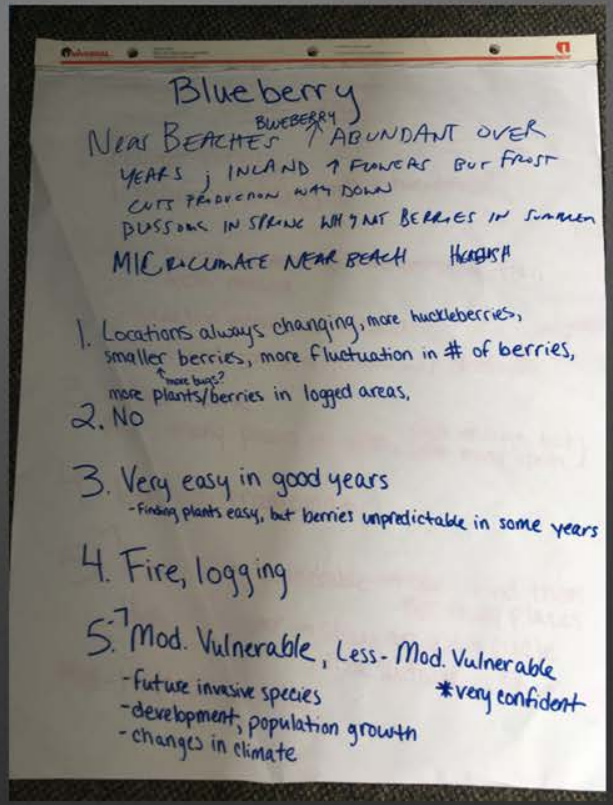
6. Why did you select this rating?

Please share: May be impacted by yet unknown invasive plants and animals.

7. How confident are you in the rating above?

☐ High ☐ Medium ☐ Low

Why? Lack of monitoring by governments & organizations until the genie is out of the bottle.



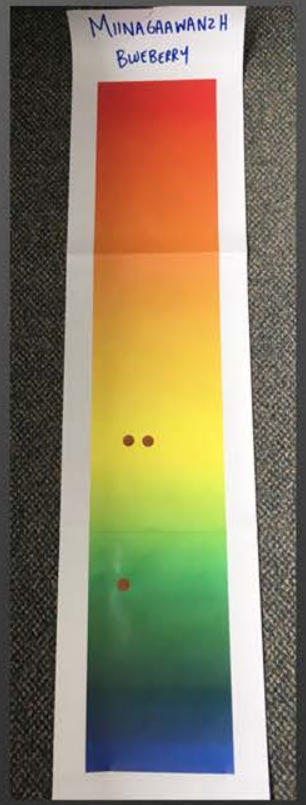
Blueberry

Near Beaches (Blueberry) ↑ abundant over years; inland ↑ flowers but frost cuts production way down

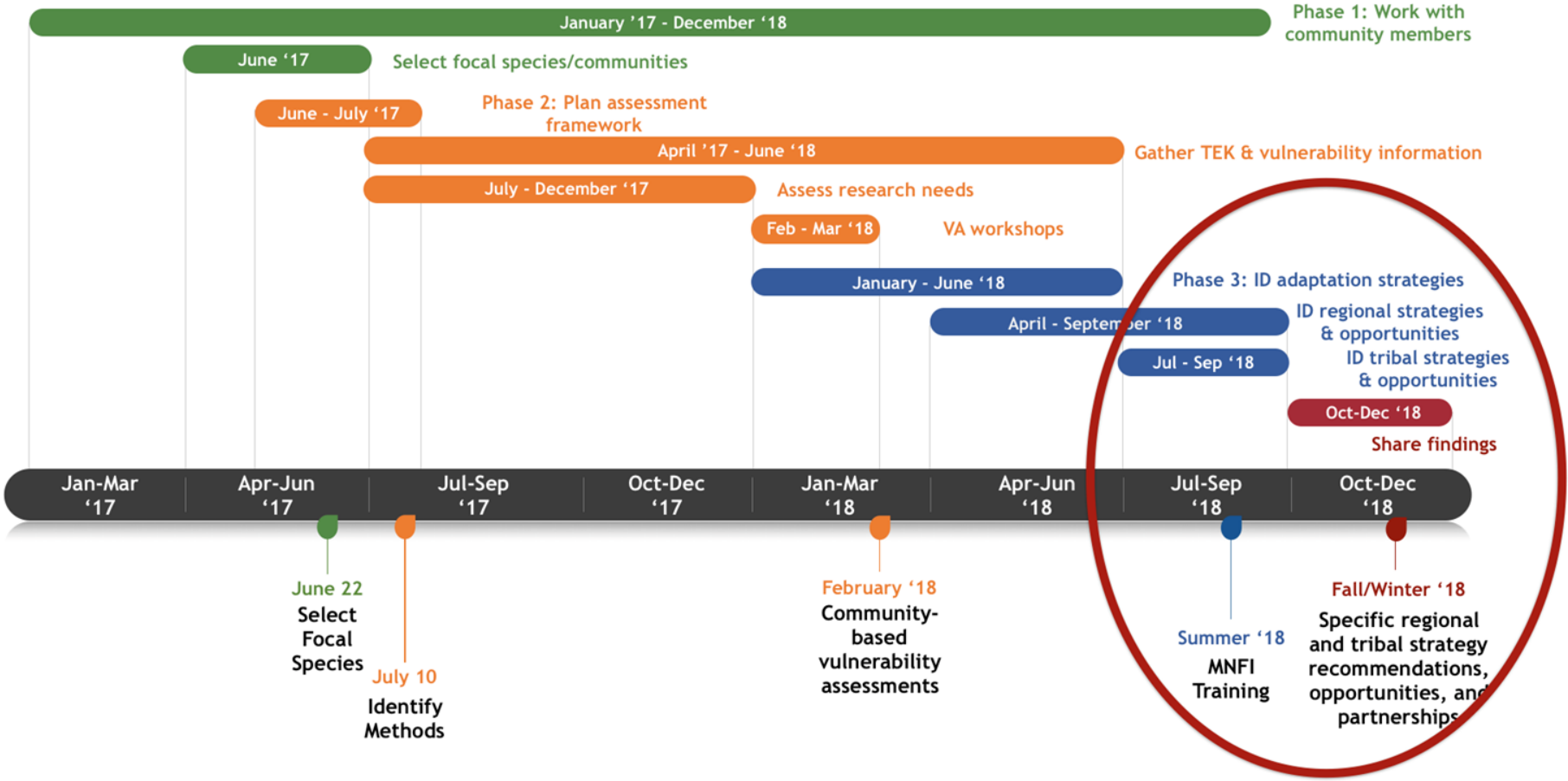
Blossoms in spring w/ not berries in summer

Micro-climate near beach

1. Locations always changing, more huckleberries, smaller berries, more fluctuation in # of berries, more plants/berries in logged areas. (more bugs?)
2. No
3. Very easy in good years
   - Finding plants easy, but berries unpredictable in some years
4. Fire, logging
5. Mod. Vulnerable, Less-Mod. Vulnerable *very confident
   - Future invasive species
   - development, population growth
   - changes in climate



Inter-Tribal Forest Understory Adaptation Project Timeline



Miigwech

Bay Mills Indian Community, Grand Traverse Band of Ottawa and Chippewa Indians, Gun Lake Tribe, Hannahville Indian Community, Keweenaw Bay Indian Community, Lac Vieux Desert Band of Lake Superior Chippewa Indians, Little River Band of Ottawa, Little Traverse Bay Bands of Odawa Indians, Nottawaseppi Huron Band, Pokégnek Bodéwadmik - Pokagon Band of Potawatomi, Saginaw Chippewa Indian Tribe, Sault Ste. Marie Tribe of Chippewa Indians, Great Lakes Indian Fish and Wildlife Commission, 1854 Treaty Authority, Northern Institute for Applied Climate Science, Michigan Natural Features Inventory, CMN Sustainable Development Institute, Great Lakes Integrated Sciences and Assessments, NE Climate Science Center, Bureau of Indian Affairs Tribal Climate Resilience Program Funding

When I was a young girl, my grandfather gave me a bowl he made and inside was a design that looked like a spider web. He told me that one day all the Native people would be spread out across the earth and that there would be war, sickness and much suffering—but, there would be a web, like a spider's, that would connect them all.

And through this web the Native people of the world would share stories that would make them strong again.

-Rita Pitka Blumenstein, Yupik elder, (2008)