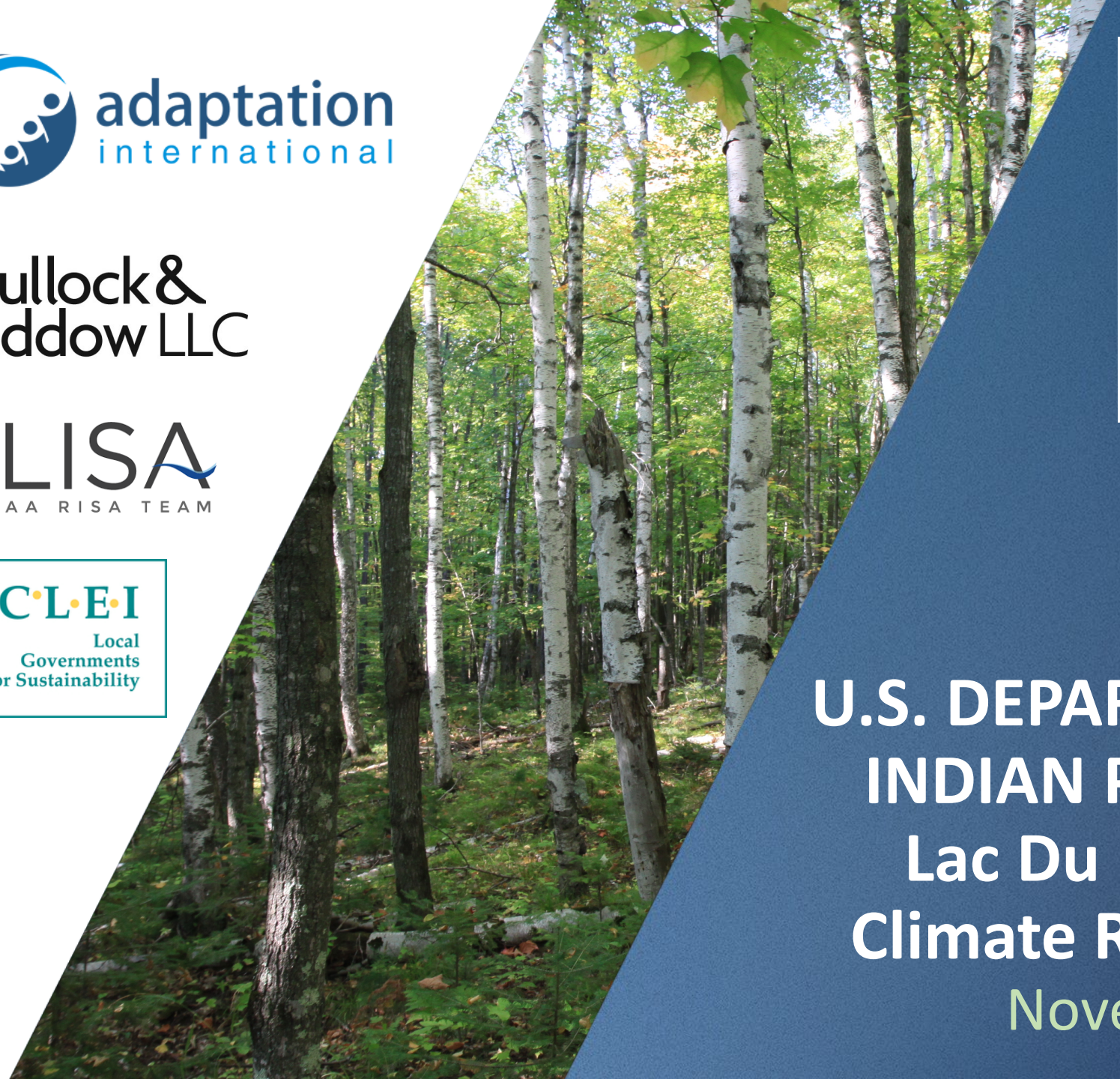

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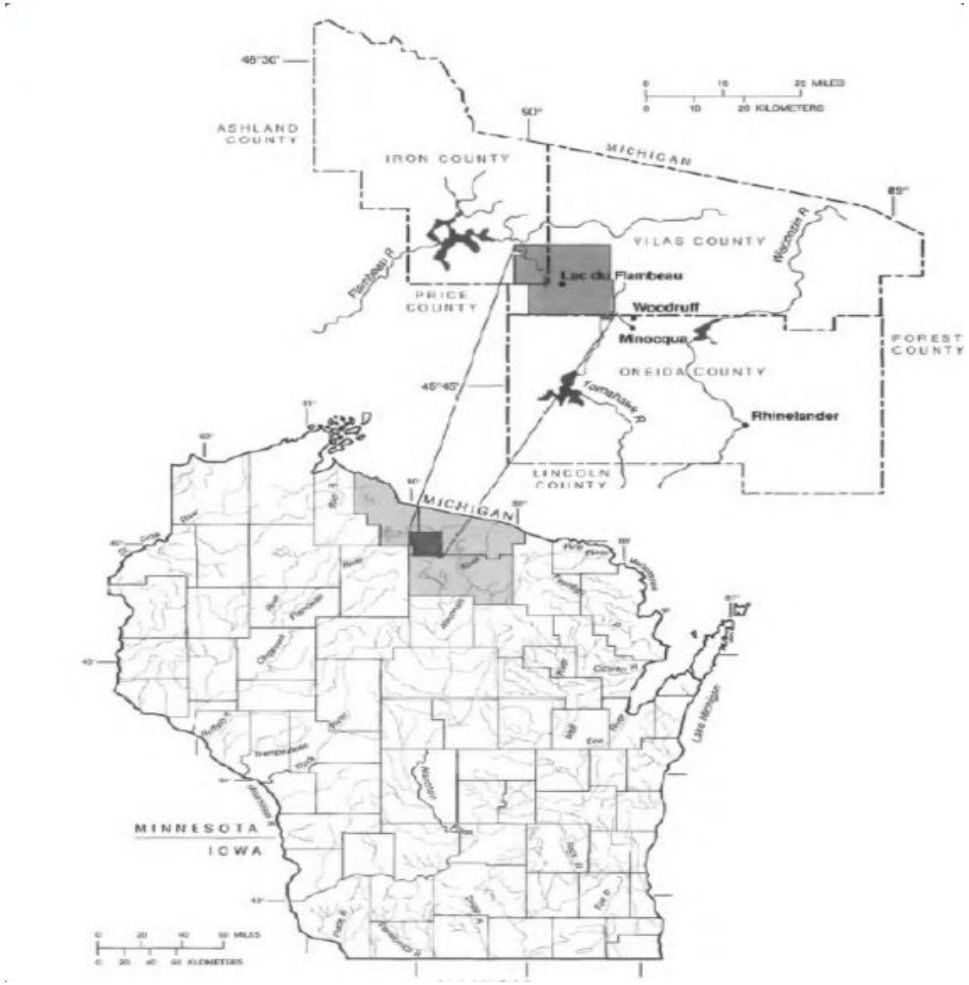
U.S. DEPARTMENT OF ENERGY INDIAN PROGRAM REVIEW
Lac Du Flambeau Tribe's Climate Resilience Initiative

November 21, 2019

Lac du Flambeau Band of Lake Superior Chippewa Indians: Location

Lac du Flambeau Ojibwe



OUR PURPOSE: We shall strive to improve the quality of life for the Lac du Flambeau Band of Lake Superior Ojibwe Nation.

Vision Statement

The Lac du Flambeau Tribal Council shall have the constitutional duty, working together to maintain a sustainable community for tribal members, descendants and future generations. The tribal government shall improve the quality of life by following a cultural and well-balanced approach within all tribal programs and entities. Healthy lifestyles, wellness, family values and spirituality shall guide our long-range planning and implementation. The tribal government shall protect our sovereignty and treaties, while moving forward for present and future generations.

Value Statement

The Lac du Flambeau Band of Lake Superior Chippewa Indian's are committed to following our ancestors seven teachings. These values will be used to carry out our mission and vision for our community so that we can move forward in a good way for the seventh generation. They are:

Honesty- to walk through life with integrity is honesty;

Humility- to know that you are a sacred part of creation is to know humility;

Love- to know love is to know peace;

Wisdom- to cherish knowledge is to know wisdom;

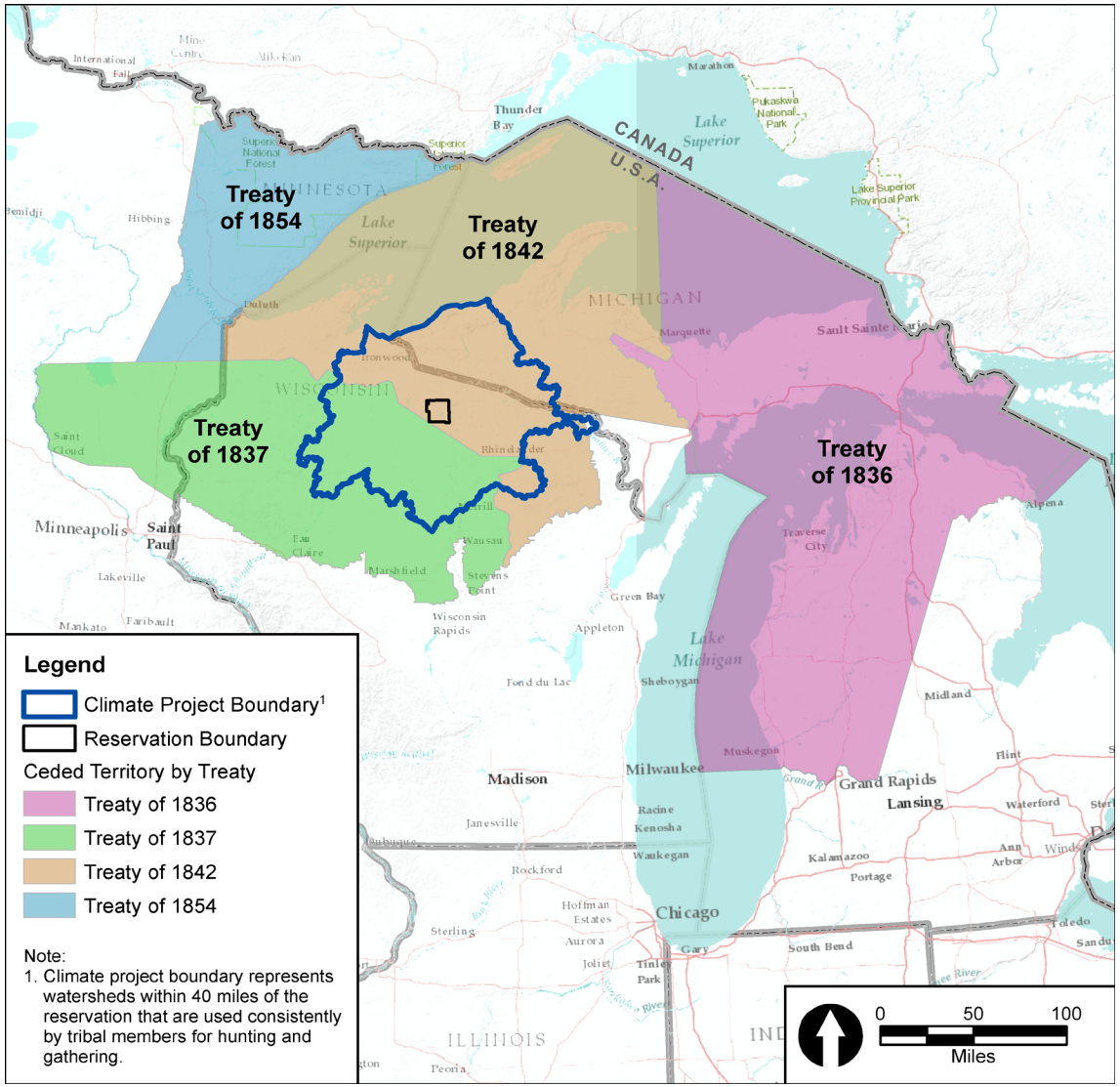
Courage- to face life with bravery is to know courage;

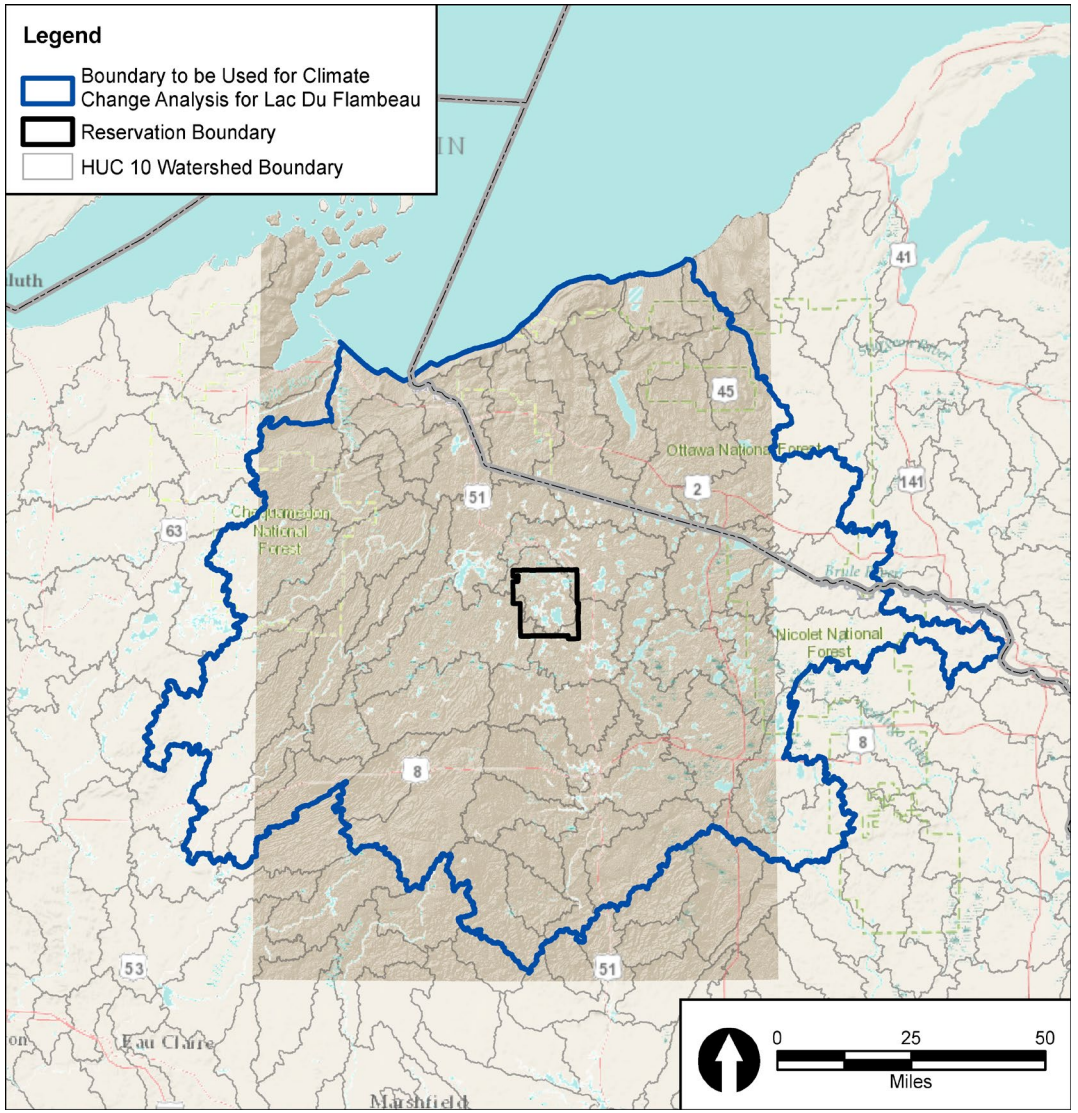
Respect- to honor all creation is to have respect;

Truth- is to know all of these things;

In order to fulfill the obligations to our treaty resources, community members and property, the Lac du Flambeau Band of Lake Superior Chippewa Indians must develop resilience strategies to effectively reduce and limit the impacts of a changing climate.

Lac du Flambeau Indian Reservation (Waswagoning)





Lac du Flambeau Indian Reservation

86,500 Acres

260 Inland Lakes

71 Miles of Stream/Rivers

24,000 Acres of Wetlands

42,000 Acres of Forest

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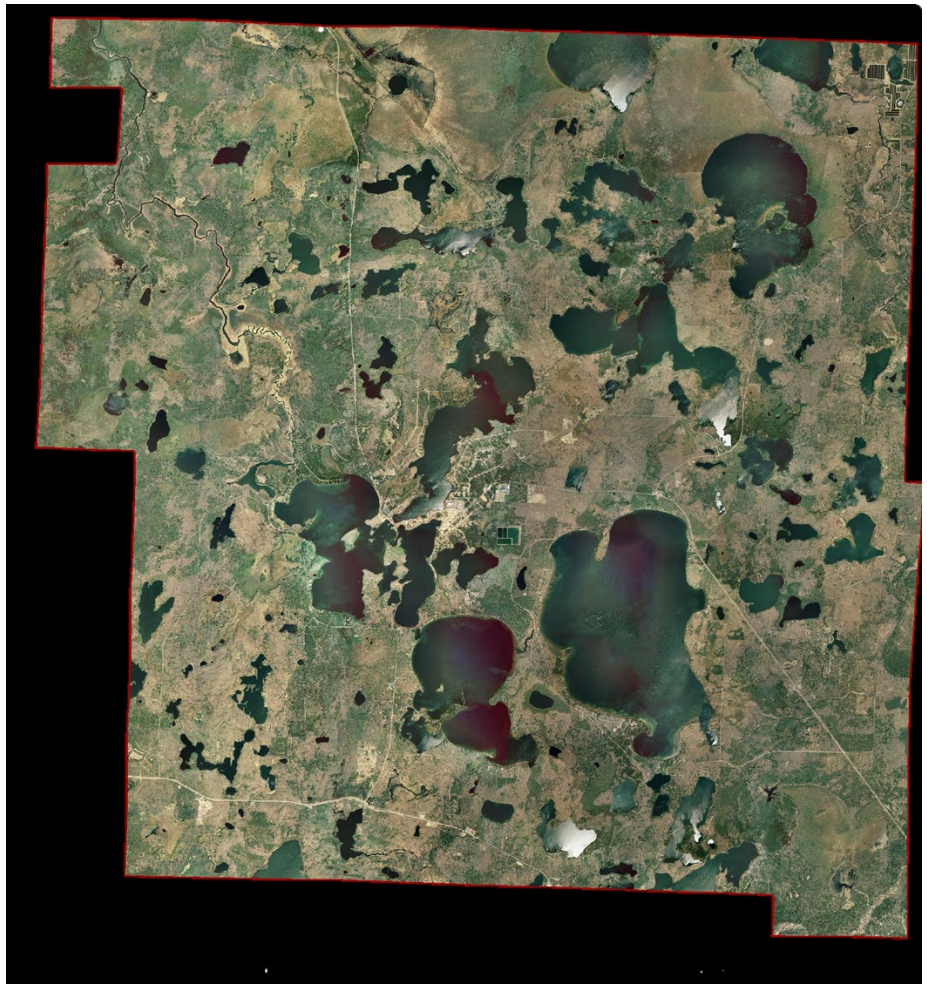
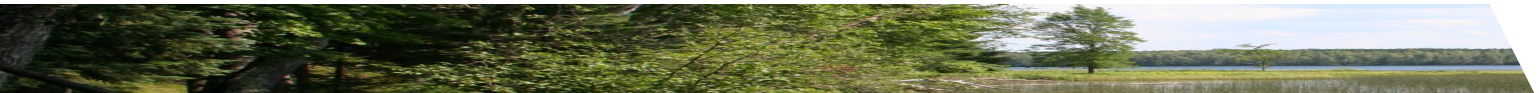




INITIAL REFLECTIONS AND PROJECT OVERVIEW

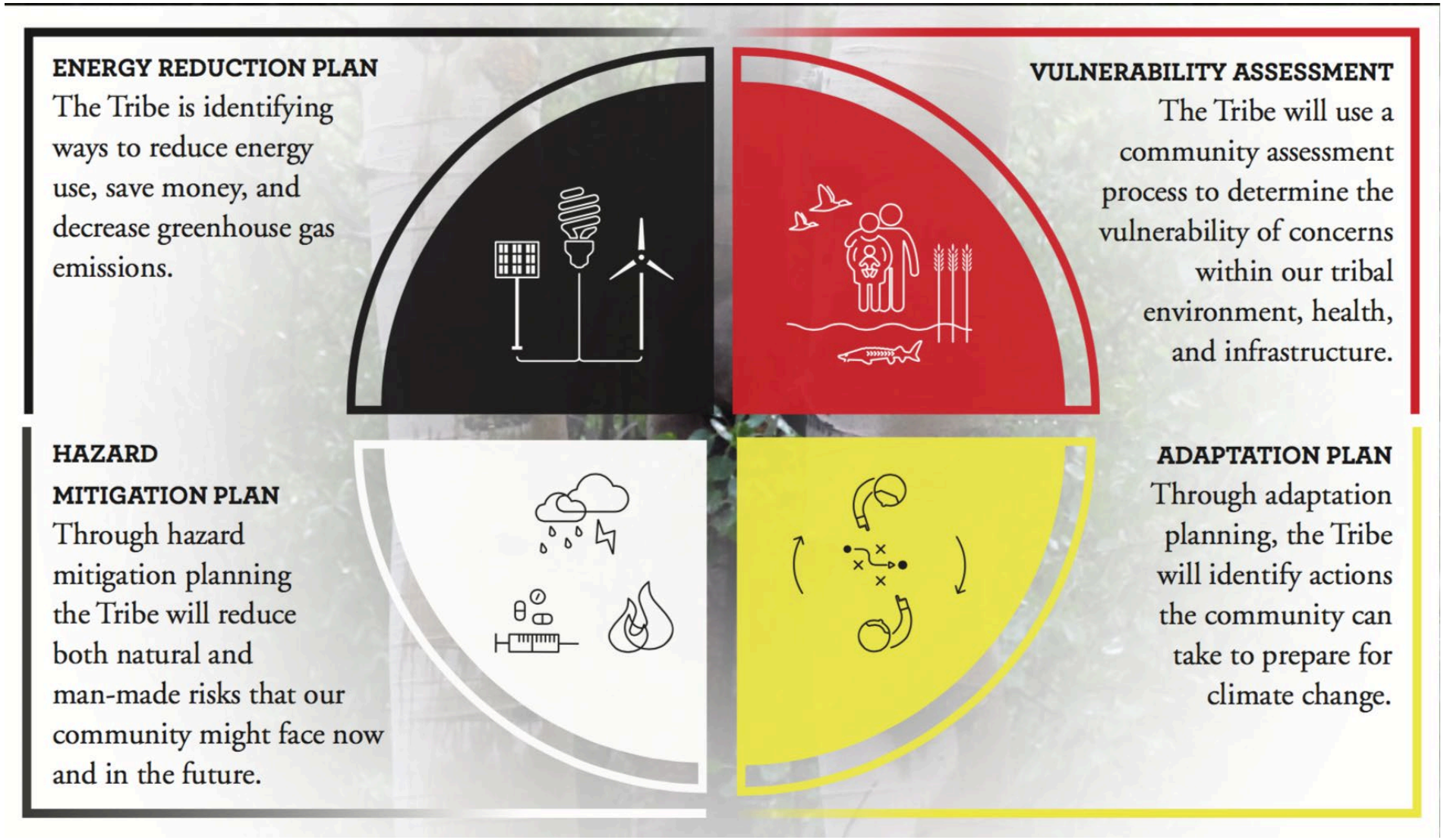
- In 2016 the Lac du Flambeau Tribal Council (Governing Board) recognized the need to protect our trust-natural resources and health for the next seven generations from climate alterations and extremes.

- Will integrate key aspects of our Tribal life ways, resources and knowledge that have been passed down from generations or Traditional Ecological Knowledge (TEK).

- Incorporate Western Science expertise to develop comprehensive Resilience Plans to create a sustainable community for Tribal members, descendants and the seventh generation.

"The primary goals of this project are to create a **comprehensive Climate Resilience Plan** and to increase the capacity of all Lac du Flambeau Tribal Program Managers to incorporate environmental impact thinking into the **everyday management** of their departments"

Lac Du Flambeau Climate Resilience Initiative



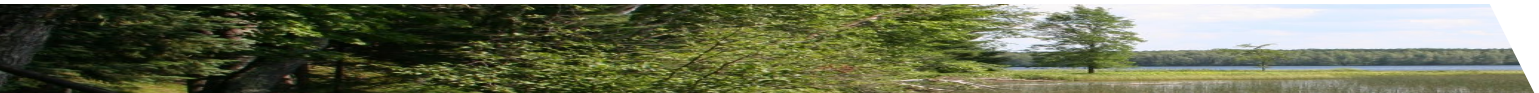
Community Engagement, Tribal Leader Input and Tribal Staff Engagement

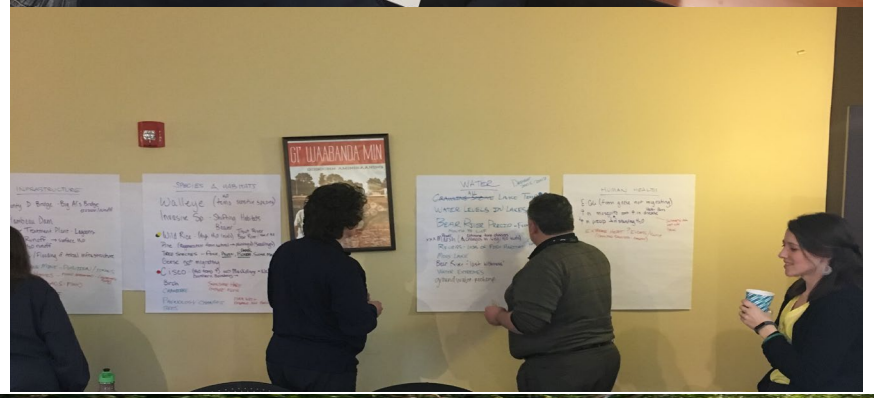
- Core Planning Team – Conducted Community Surveys
- Traditional Ecological Knowledge (TEK) Interviews
- Tribal Leader Discussions

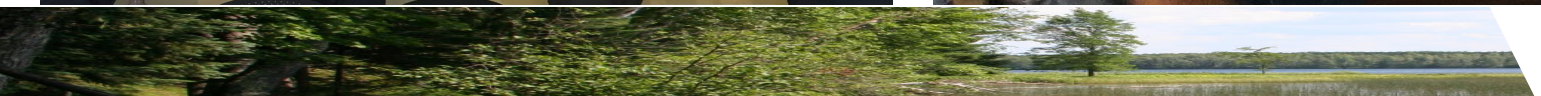
Established our Tribal Climate Resilience Planning (TCRP) Team to provide meaningful input into our Climate Resilience Initiative

Tribal Climate Resilience Planning Team (TCRP)

- Community Health
- Land Management
- Police Department
- Water and Sewer Utility
- Planning and Development
- Lake of the Torches Casino
- Facilities/Buildings
- Natural Resources Programs-Fisheries, Wildlife, Great Lakes Restoration Initiative, Water Resources, Environmental Protection, Environmental Response, Wildrice Cultural, and Conservation Enforcement
- Communications/PR
- Administration
- State of Emergency
- Forestry
- Dental Facility
- Housing Authority
- Public School*
- Fire Department*







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OUR SUPPORT PARTNERS THAT PROVIDE WESTERN SCIENCE

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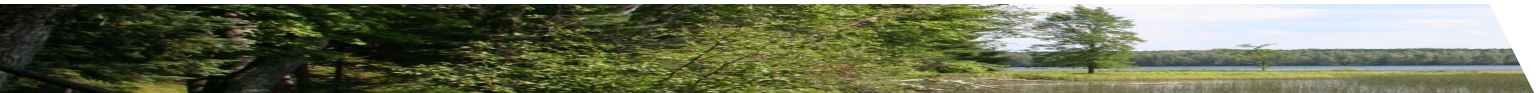
GLISA-Projected Seasonal Climate for the Lac du Flambeau Project Area

Variable	Mid-Century (2040-2059)	End of Century (2080-2099)
Annual Temperature	4.2°F	8.4°F
Winter Temperature	3.8°F	7.9°F
Spring Temperature	3.6°F	7.4°F
Summer Temperature	5.5°F	10.6°F
Fall Temperature	4.4°F	8.5°F
Annual Precipitation	2.0 in.	4.7 in.
Winter Precipitation	1.0 in.	1.5 in.
Spring Precipitation	1.1 in.	1.6 in.
Summer Precipitation	-0.1 in.	-0.1 in.
Fall Precipitation	0.6 in.	1.6 in.



Identified and Organized the Key Concerns

3 Areas of Concern: Environmental/Natural Resources, Community Health and Infrastructure

20 Natural Resources Species, 4 Community Health and 4 Infrastructure

Natural Resources

- Great Blue Heron (Crane)
- Common Loon (Loon)
- Walleye (Fish)
- Sturgeon (Fish)
- Cisco (Fish)
- Black Bear (Bear)
- Martin (Martin)
- White-tailed Deer (Deer)
- Bald Eagle (Bird)
- Muskrat
- Snowshoe Hair
- Honey Bees
- Little Brown Bat
- Spring Peeper (Frog)

- Wild Rice
- Sugar Maple
- White Birch
- White Cedar
- Wild Strawberries
- Highbush Cranberries

Community Health

- Increases in Vector-Borne Disease
- Mental Health Impacts from loss of Nat. Resource
- Extreme Heat Affecting Elders / Youth
- Increases in Allergy Problems Elders / Youth

Infrastructure

- Severe Thunderstorms affecting run-off
- Flooding Affecting Homes and Buildings
- Flooding Affecting the Water Treatment Plant
- Wildfire Affecting Homes and Buildings

Species Selected for Assessment

Animal Species	Plant Species
Great Blue Heron *(Crane)* – *Ajiijaak*	Wild Rice – Manoomin
Common Loon *(Loon)* – *Maang*	Sugar Maple – Ininaatig
Walleye *(Fish)* – *Ogaa*	White Birch – Wiigwaagimitig
Sturgeon *(Fish)* - *Name~*	White Cedar – Giizhik
Cisco *(Fish)* – *Adikamig*	Wild Strawberries – Odemin
Black Bear *(Bear)* – *Makwa*	Highbush Cranberries - Mashkiigimin
Martin *(Martin)* – *Waabizheshii*	
White-tailed Deer *(Deer)* – *Waawaasheshii*	
Bald Eagle *(Bird)* – *Migisi*	
Muskrat – Waashashk	
Snowshoe Hare – Wabooz	
Honey Bees – Aamoo	
Little Brown Bat – Paakwaanashii	
Spring Peepers-Frog - Omakaki	

NatureServe –Climate Change Vulnerability Index

- The Index uses a scoring system that integrates a species' predicted exposure to climate change within an assessment area and 3 sets of factors associated with climate change sensitivity

1. Indirect exposure to climate change
2. Species-specific sensitivity and adaptive capacity factors (including dispersal ability, temperature and precipitation sensitivity, physical habitat specificity, interspecific interactions, and genetic factors)
3. Documented response to climate change

Vulnerability Assessment of 20 Species of Concern

Quantitatively (CCVI) Assessed Species

English Name	Scientific Name	Group	Sea level	Natural barriers	Anthropogenic barriers	Climate change mitigation	Dispersal/Movement	Historical thermal niche	Physiol. thermal niche	Historical hydrol. niche	Physiol. hydrol. niche	Dependence on disturbance	Dependence on ice/snow	Physical habitat features	Other species for habitat	Dietary specificity	Pollinator specificity	Other species for dispersal	Pathogens/enemies	Competition	Other species interaction	Genetic variation	Genetic bottleneck	Reproductive system	Phenological response	Documented response	2050, RCP 8.5	2090, RCP 8.5
Bald Eagle	*Haliaeetus leucocephalus*	Bird	N	N	N	N	N	N	N	Inc	N	SI	N	N	N	N	N/A	N	U	N	N	N	N/A	N/A	U	U	LV	LV
Common Loon	*Gavia immer*	Bird	N	N	N	N	N	N	N	Inc	N	SI	N	N	N	N	N/A	N	SI	U	N	U	U	U	U	U	LV	LV
Great Blue Heron	*Ardea herodias*	Bird	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N/A	N	U	U	N	U	U	U	U	U	LV	LV
Snowshoe Hare	*Lepus americanus*	Mammal	N	SI	Inc	N	N	N	SI	SI	SI	SI	Inc	N	N	N	N/A	N	SI	SI	SI	N	N/A	N/A	Inc	U	HV	EV
Waabizheshi (American Marten)	*Martes americana*	Mammal	N	SI	Inc	N	N	N	SI	SI	N	Inc	GI	N	N	N	N/A	N	U	SI	N	U	U	U	U	U	MV	EV
Little Brown Bat	*Myotis lucifugus*	Mammal	N	N	SI	N	N	N	N	Inc	SI	SI	N	N	N	SI	N/A	N	Inc	N	N	N	N/A	N/A	U	U	LV	HV
Common Muskrat	*Ondara zibethicus*	Mammal	N	N	SI	N	SI	N	N	SI	SI	N	N	N	N	N	N/A	N	U	U	N	U	U	U	U	U	LV	LV
Black Bear	*Ursus americanus*	Mammal	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N/A	N	N	N	N	N	N/A	N/A	U	U	LV	LV
White Tailed Deer	*Odocoileus virginianus*	Mammal	N	N	N	N	N	N	N	SI	N	N	N	N	N	N	N/A	N	U	N	N	N	N/A	N/A	N	U	LV	LV
Spring Peepers Frog	*Pseudacris crucifer*	Amphibian	N	SI	Inc	N	SI	N	N	N	SI	U	N	N	N	N	N/A	N	SI	SI	N	N	N/A	N/A	U	U	LV	HV
Cisco	*Coregonus artedi*	Fish	N	N	Inc	N	U	N	Inc	SI	Inc	U	SI	N	N	SI	N/A	N	U	U	N	U	U	U	U	U	MV	EV
Lake Sturgeon	*Acipenser fulvescens*	Fish	N	SI	Inc	SI	N	N	GI	SI	SI	U	N	N	N	N	N/A	N	SI	U	N	U	U	U	U	U	MV	EV
Ogaa (Walleye)	*Sander vitreus*	Fish	N	N	Inc	N	N	N	Inc	SI	SI	SI	N	N	N	N	N/A	N	U	U	N	U	U	U	U	U	LV	HV
Honey Bee	*Bombus affinis*	Invert-Insect	N	N	N	N	N	N	N	SI	N	SI	N	N	SI	N	N/A	N	Inc	N	N	N	N/A	N/A	N	U	LV	MV
Northern White Cedar	*Thuja occidentalis*	Plant	N	N	N	N	SI	N	Inc	SI	Inc	Inc	SI	N	N	N/A	N	N	SI	Inc	N	Inc	N/A	N/A	SI	U	HV	EV
White Birch	*Betula papyrifera*	Plant	N	N	N	N	N	N	Inc	SI	N	Inc	N	N	N	N/A	N	N	U	Inc	N	N	N/A	N/A	U	U	MV	EV
Manoomin (Wild Rice)	*Zizania aquatica*	Plant	N	Inc	Inc	N	Inc	N	N	SI	Inc	SI	N	N	N	N/A	N	N	SI	Inc	N	N	N/A	N/A	U	U	MV	EV
Sugar Maple	*Acer Saccharum*	Plant	N	N	N	N	N	N	Inc	SI	Inc	Inc	N	N	N	N/A	N	N	N	N	N	N	N/A	N/A	SI	U	MV	HV
Highbush Cranberry	*Viburnum trilobum*	Plant	N	N	N	N	N	N	Inc	SI	U	N	N	N	N	N/A	N	N	SI	N	N	N	N/A	N/A	SI	U	LV	HV
Wild Strawberry	*Fragaria virginiana*	Plant	N	N	N	N	N	N	N	SI-N	SI	N	N	N	N	N/A	SI	N	N	U	N	N	N/A	N/A	N	U	LV	LV

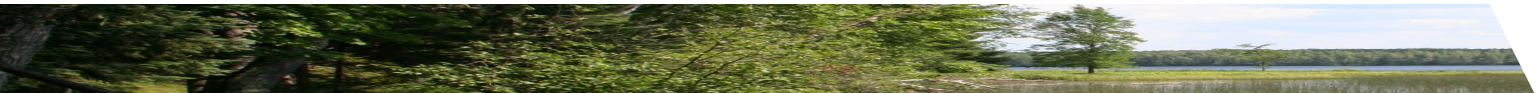
CCVI sensitivity and vulnerability rankings

Sensitivity categories

(1) Greatly Increase Vulnerability (GI)
(2) Increase Vulnerability (Inc)
(3) Somewhat Increase Vulnerability (SI)
(4) Neutral (N)
(5) Unknown (U)

Vulnerability categories

(1) Extremely Vulnerable (EV)
(2) Highly Vulnerable (HV)
(3) Moderately Vulnerable (MV)
(4) Less Vulnerable (LV)
(5) Insufficient Evidence (IE)

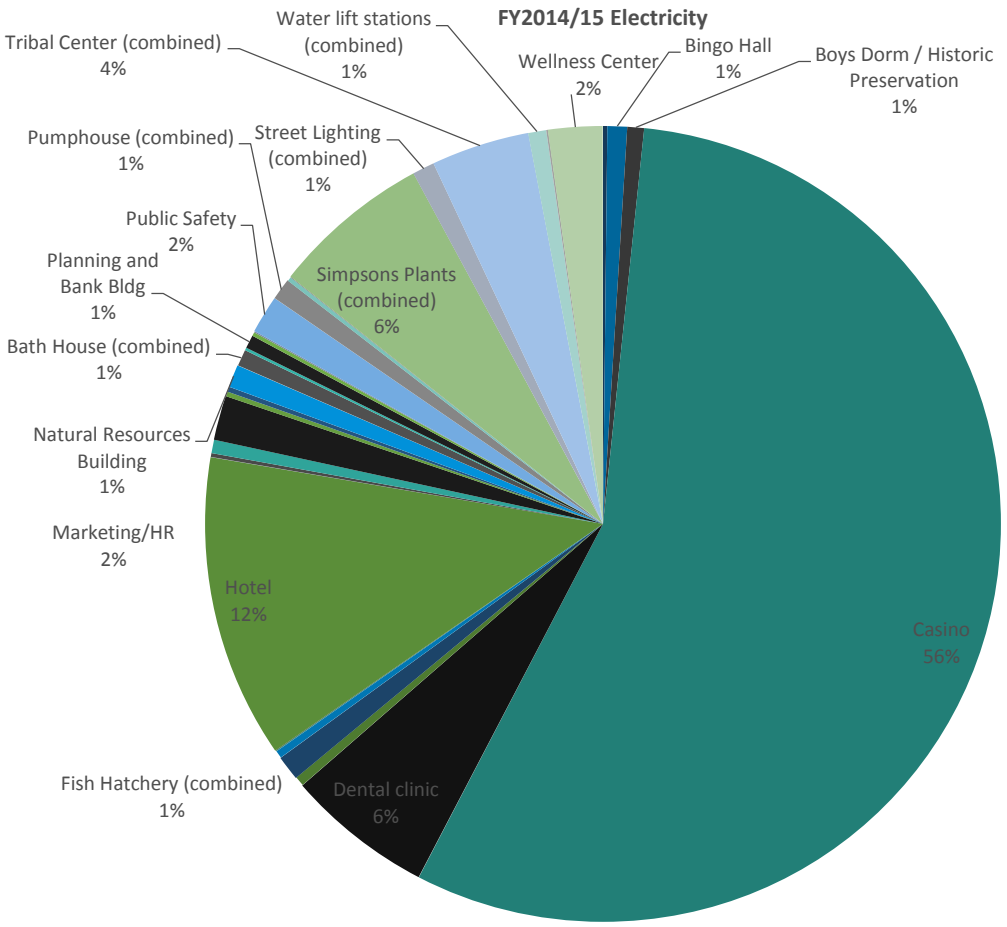


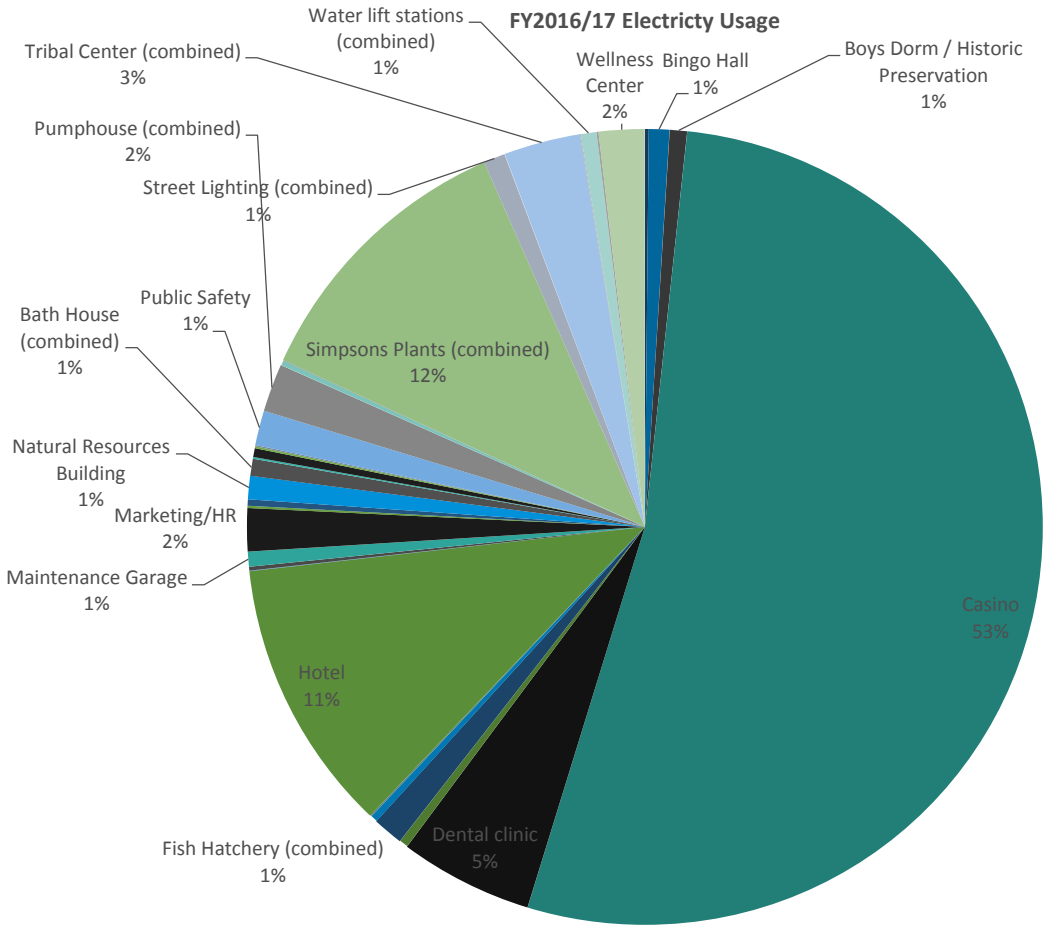
Energy Reduction Plan – Electricity and Propane

Electricity Data Summary

Total Electricity FY 2015: 9,445,472 kWh Total Electricity FY 2017: 9,873,483 kWh

Increase of 428,011 kWh

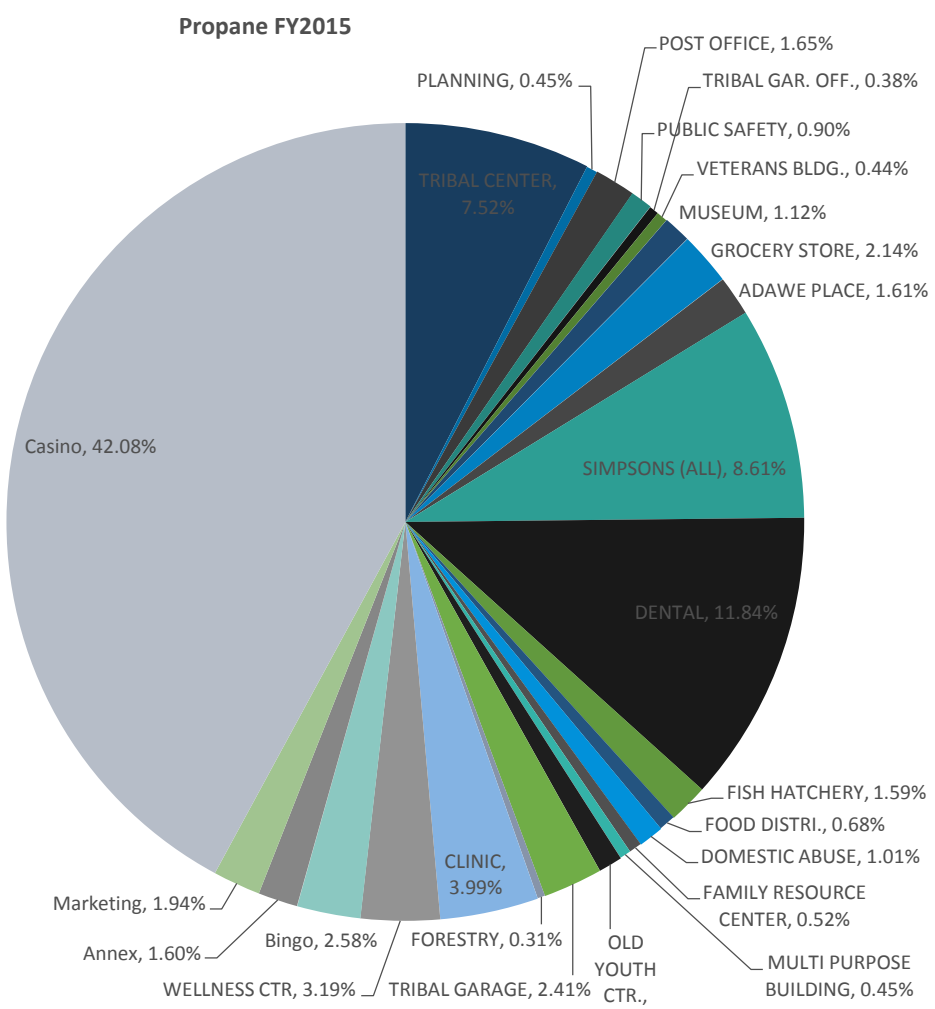


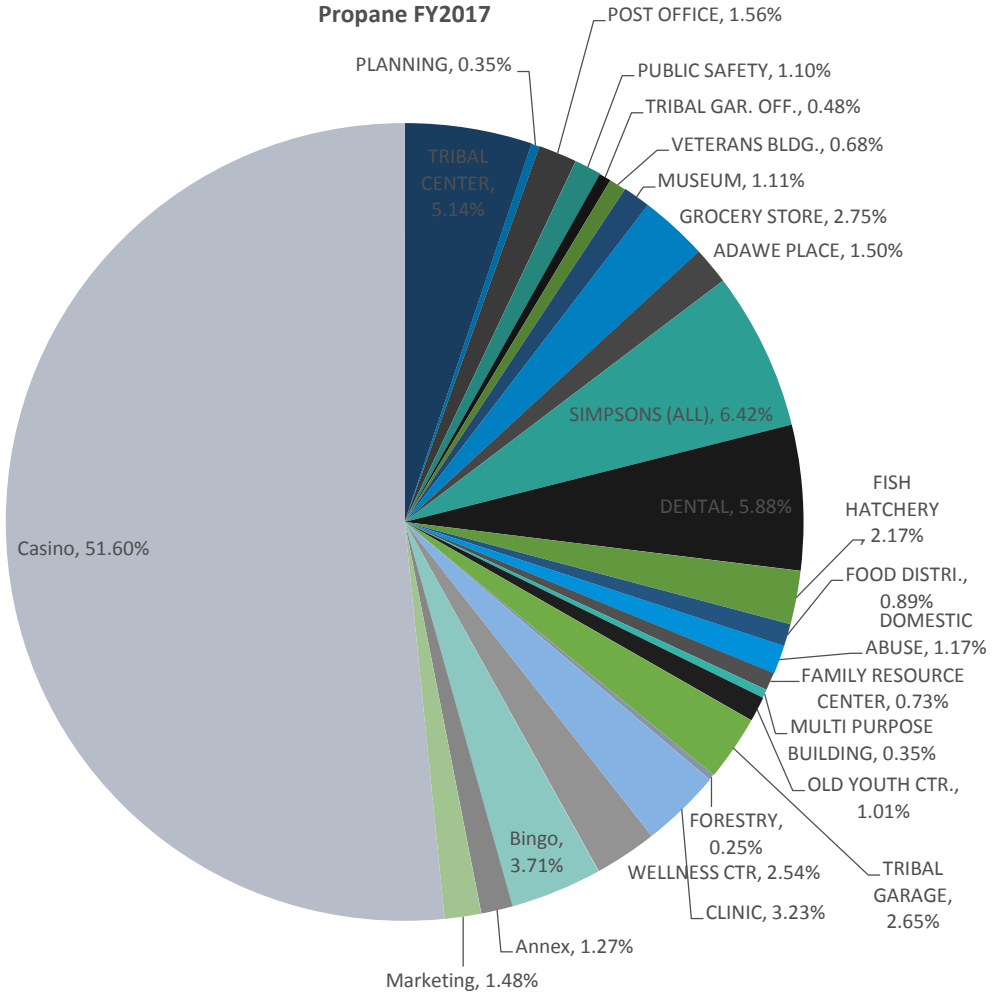


Propane Data Summary

FY 2015 Propane Usage: 325,600 gallons FY 2017 Usage: 289,216 gallons

Decrease of 36,384 gallons





Energy Reduction Plan

Considers Energy consumption for FY 2015 and FY 2017 expenses

Makes recommendations for reduced energy use

Lac du Flambeau Tribal Council
Climate Resilience Initiative
Energy Reduction Plan Analysis

OVERVIEW

The purpose of this analysis was to determine if there were any improvements in the energy usage and emissions from the tribal facilities from FY14/15 to FY16/17. Several of the tribal facilities had equipment upgrades over the last few years and this analysis could quantify some of the savings from those equipment and facility upgrades.

ENERGY ANALYSIS

Methodology

Energy usage data was collected from Wisconsin Public Service and the propane distributer for FY14/15 and FY16/17 and aggregated by the facility. The electricity emission factor was obtained from the 2016 regional EPA eGRID for MRO East, and multiplied to the usage data to calculate the electricity CO2 emissions.

Since propane usage is primarily used for heating and is correlated with how cold the weather gets, the propane data needed to be adjusted for weather variation such that the true usage trends could be seen. Propane usage was divided by heating degree days (HDD) and this adjusted propane usage was used to calculate the CO2 emissions using a standard emission factor from EPA. No weather adjustment was made for electricity because it was unclear whether a strong correlation between electricity usage and weather (via use of air conditioning and other similar heating/cooling equipment) was present.

Electricity Results

Overall for the tribe, there was a 4% increase in electricity usage and emissions. Despite the overall gain, there were facilities that did reduce their electricity usage, such as the multi-purpose building (-49.39%), the clinic lane street lighting (-41.52%), and the tribal center (-19.20%). These reductions may be related to upgrades in LED lighting, which were upgraded at both the multi-purpose building and the tribal center.

RECOMMENDATIONS IDENTIFIED

Implement Data Tracking

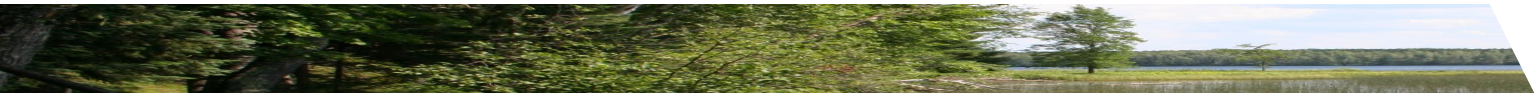
- WEGOWISE Midwest Tribal Energy Resources Association (MTERA)
- Fleet Fuel Tracking
- Waste Tracking

Set Strong Policies

- Adopt High Efficiency Building Codes-LEED Certification
- Ensure all new Facility construction is “Renewable Ready” at a minimum
- Purchase only EnergyStar Rated appliances

Continue actions from Strategic Energy and 25 X 25 Plan

- Large project are still on the table
- 25 X25 Plan calls for Renewable based-Energy Independence
- Cost effectiveness of many projects has become viable



Hazard Mitigation Planning

Adopted by our Tribal Council

August 28, 2019

FEMA Approved Mitigation Plan

October 16, 2019

LDF Hazard Risk Assessment Tool

	PROBABILITY	TREND	Health and Public Safety	Home and Property Damage	Livelihood Impacts	Cultural Wellbeing	Environmental Harm	Damage to Infrastructure	Recovery Costs	Government Services	Damage to Facilities / Agriculture	Risk Acceptability	Mitigation Potential	Overall Hazard Ranking
Plant and Animal Epidemic / Invasive Species / Species Loss	5	3	1	2	2	3	3	0	3	0	3	3	1	**0.98**
Illegal Drug Crisis	5	2	2	1	2	3	0	0	2	1	0	3	2	**0.89**
Severe Thunderstorms / Lightning / Hail	5	3	1	3	0	2	2	3	3	1	2	3	1	**0.88**
Epidemic / Pandemic / Vector-Borne Disease	2	3	3	0	3	3	0	0	2	2	2	3	2	**0.84**
Flood (flash flood, lake, river, stormwater)	4	3	0	2	1	3	3	1	3	1	2	2	2	**0.83**
Severe Winter Storms / Ice Storms	5	3	1	1	0	1	1	3	3	2	3	2	2	**0.76**
Forest / Wildland Fire	5	2	1	3	2	2	1	2	3	1	2	1	2	**0.72**
Hazardous Materials Release / Contamination / Run-off	4	3	1	0	0	3	3	0	3	0	0	3	2	**0.66**
Tornado / High Wind	2	2	2	2	2	2	2	2	3	1	3	2	2	**0.44**
Extreme Heat	5	3	1	0	0	1	2	1	0	2	0	2	2	**0.44**
Extreme Cold	4	1	2	2	1	0	0	3	1	2	1	1	2	**0.35**
School Violence / Armed Attack / Workplace Violence	2	2	3	0	0	1	0	0	1	2	0	2	2	**0.31**
Dam Failure	1	2	2	3	0	3	3	3	3	1	3	1	1	**0.15**

Progress through November 2017

- Contractor RFP
- Hired contractor – Adaptation International
- Management Team kickoff meeting
- TCRP/Contractor kickoff meeting

Progress through December 2018

- Community Surveys, Tribal Leader Engagement and TEK Interviews – Identified/Prioritized 20 Species,4 Infrastructure and 4 Health areas of concern
- Identified Climate Projections that will impact our Community through end of century
- Projected by January 1, 2019 – Vulnerability Assessment of 20 Species, 4 Infrastructure and 4 Health concerns
- Gathered Energy consumption data for all Tribal Facilities/Buildings and analyzing use and emissions

Progress through November 2019

- Community Surveys, Tribal Leader Engagement and TEK Interviews – Identified/Prioritized 20 Species,4 Infrastructure and 4 Health areas of concern
- Identified Climate Projections that will impact our Community through end of century
- Conducting Vulnerability Assessment of 20 Species, 4 Infrastructure and 4 Health concerns
- Gathered Energy consumption data, analyzed use and emissions for all Tribal Facilities/Buildings and completed Energy Reduction phase
- Analyzed and assessed natural and man-made threats to our Community, as well as identified mitigation strategies in our approved Hazard Mitigation Plan
- Completing our Adaptation Actions to prepare our community for climate Change

LDF Climate Resilience Initiative Project Website

www.ldfclimateresilience.org

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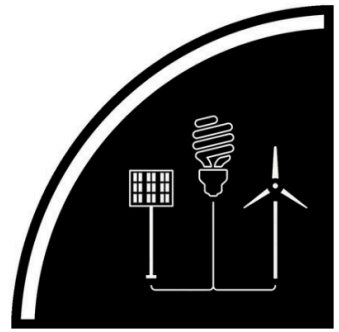
ENERGY REDUCTION PLAN

Through energy reduction planning, the Tribe identified ways to reduce energy use, save money, and decrease greenhouse gas emissions.

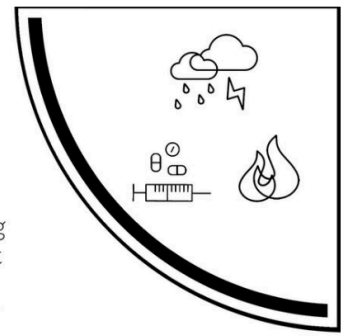


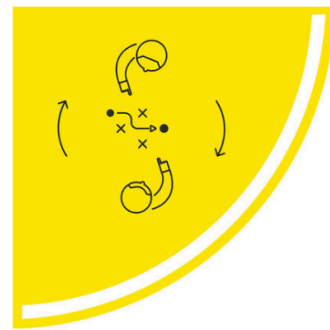
VULNERABILITY ASSESSMENT

The Tribe used a community assessment process to determine the vulnerability of key concerns within our tribal environment, health, and infrastructure.

HAZARD MITIGATION PLAN

Through hazard mitigation planning the Tribe has identified actions that reduce both natural and man-made risks that our community faces now and into the future.





ADAPTATION PLAN

Through adaptation planning, the Tribe has identified actions our community can take to prepare for climate change.

"We shall strive to improve the quality of life for the Lac du Flambeau Band of Lake Superior Ojibwe Nation."

GLISA
A NOAA RISA TEAM

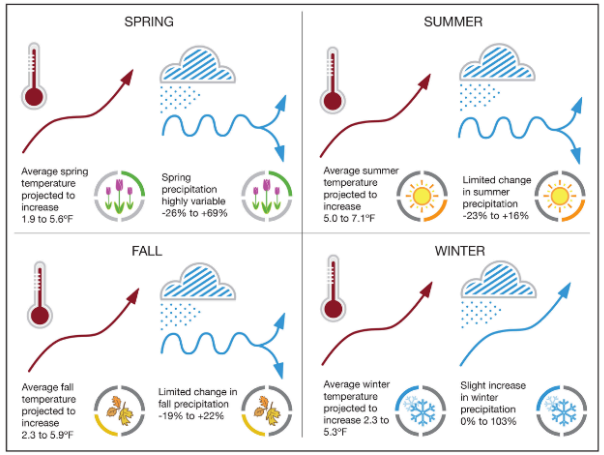
Regional Climate Change Projections

The Great Lakes Integrated Science + Assessment (GLISA), working collaboratively with the tribe, developed a summary of the climate projections for the project area for the middle and end of century (2050s and 2090s).

Global climate models (GCMs) simulate important physical processes and interactions involving the land, atmosphere, ocean, and ice over the entire Earth and are used to generate future climate projections useful for planning. Using data from the Nelson Institute, GLISA provided a summary of the historical and future climate information containing an average of all six GCMs.

A high level summary of the climate projections can be found **here.**

CLIMATE PROJECTION TECHNICAL REPORT

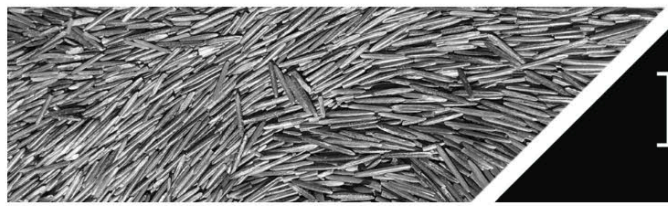


Vulnerability Assessment

Through a 9-month community engagement process, the tribe identified 20 ***Natural Resources*** species, four ***Community and Public Health***, and four ***Infrastructure*** issues of concern. Using a community assessment process, the tribe determined the relative vulnerability of these concerns.

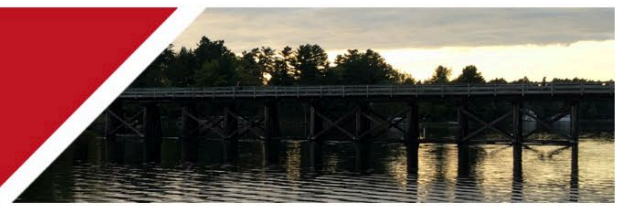
For more detailed information, select one of the focus areas below.

Public Health



Natural Resources

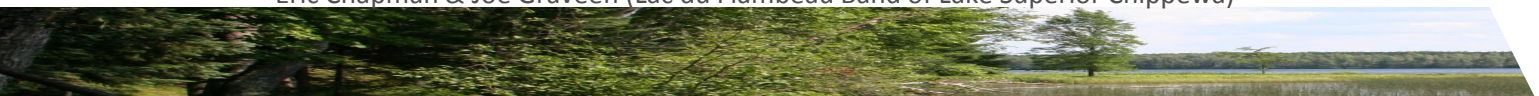
Infrastructure



Spring Peeper Wildrice Stand Bald Eagle

“Manoomin (Wildrice) has no state or county boundaries on where it will grow and provide sustenance for our families and a healthy environment for the winged ones, the ones that swim, the ones that crawl and the four-legged ones. We recognize manoomin as an indicator of healthy nibi (water) and hope this project educates our future generations on the importance of this gift from the creator.”

-Eric Chapman & Joe Graveen (Lac du Flambeau Band of Lake Superior Chippewa)



Miigwetch (Thank You!)
On behalf or our Tribal Climate Resilience Planning (TCRP) Team

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