



Coastal Resilience in the Great Lakes Region

February 13, 2020

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Building Resilience on America's Freshwater Coast

Beth Gibbons

American Society of Adaptation Professionals

The Power of the Great Lakes Region



4,530 miles of US coastline



30 Million people



5 out of 10 leading agricultural states



160 Million Tons of Cargo transported Annually



80% of the surface freshwater in the US



Growth & Opportunity Under a Changing Climate



Agricultural Growth



Population Growth



Ag-tech/water tech/ industry growth

45 Million ppl

In neighborhoods flooding annually @ 3' SLR

History of Policy Impacts



RACIST ZONING
POLICY



URBAN RENEWAL AND FHWA
“BLIGHT” REMOVAL



STATE SANCTION
VIOLENCE



SUBPRIME
MORTGAGE
TARGETING



Overcoming History in a Changing Context

Detroit

- Detroit Climate Action Collaborative
- Detroit Climate Ordinance
- We the People of Detroit

Milwaukee

- MMSD Capital [\$35 Million]
- MMSD CSO Reduction [55/year to 2.3/Year]
- New GI RFP for a PPP to capture 50 million gallons of stormwater

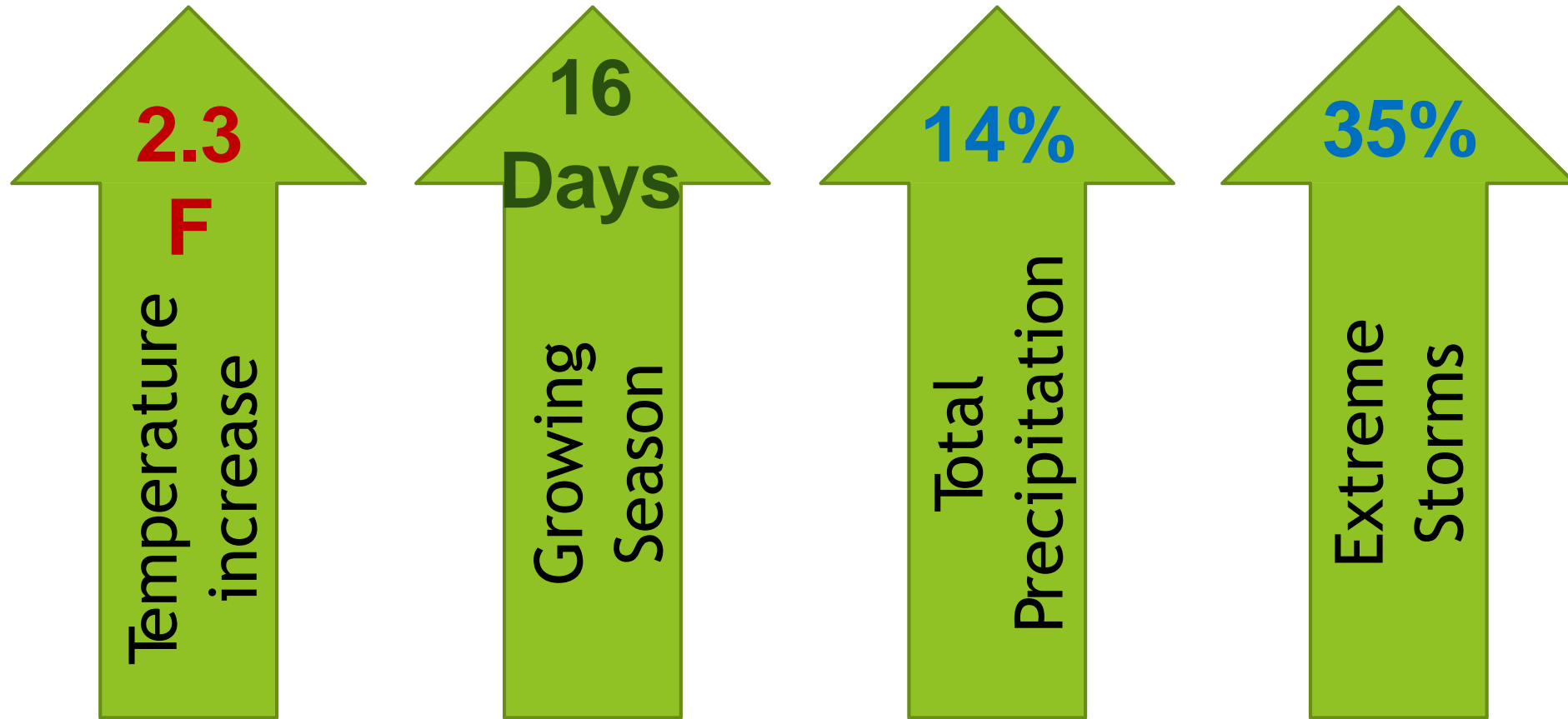
For the small
cities too...

Duluth, MN (pop. 86,000)

- Resilient Walkway investment \$25 Million

Marquette, MI (pop. 21,000)

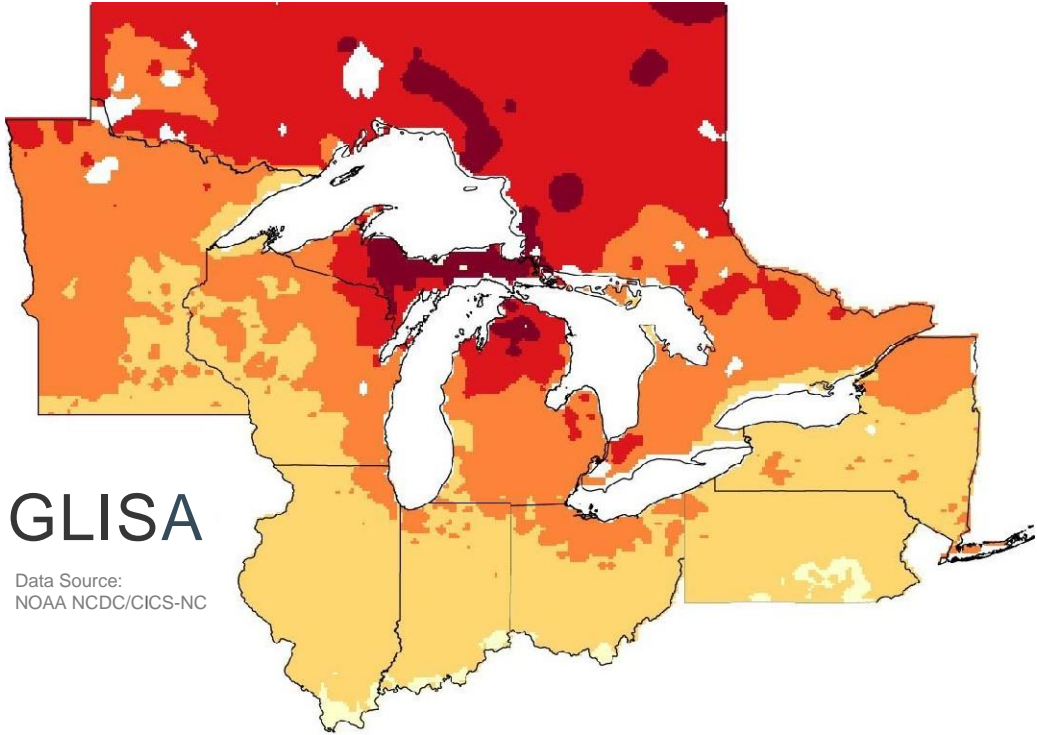
- \$5 Million in road shift
- Civilian Conservation Corps



Changes from 1951 - 2017
We are in the change, right now.

Projected Change in Average Temperature

Period: 2041-2070 | Higher Emissions: A2



GLISA

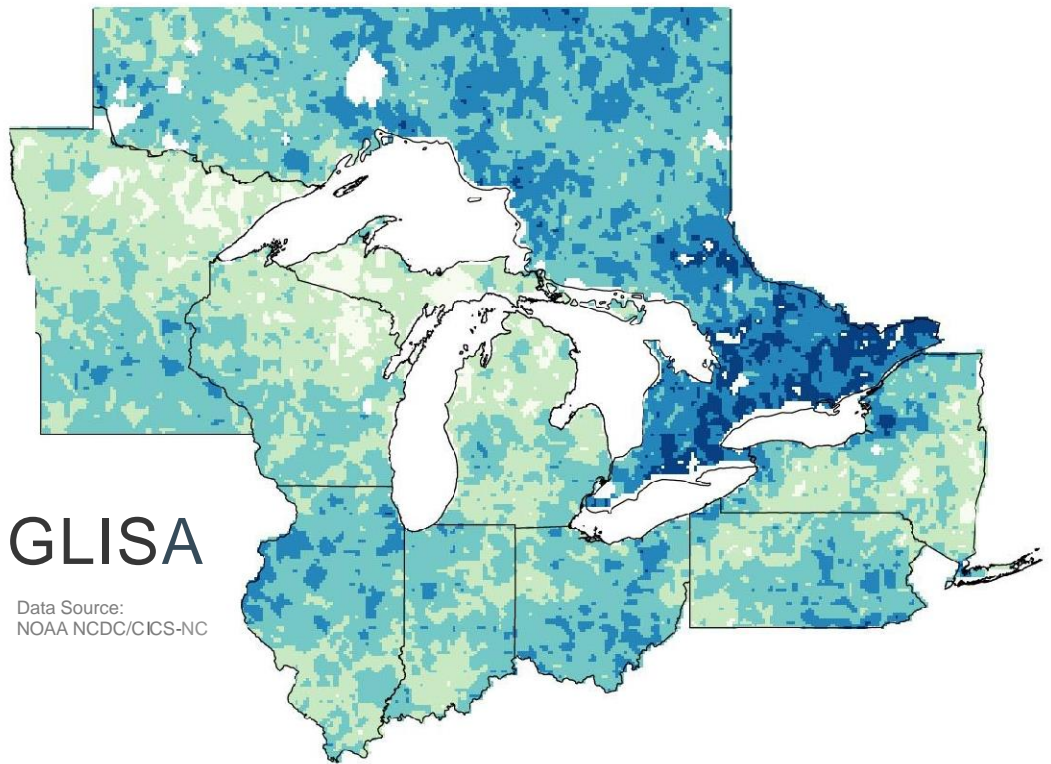
Data Source:
NOAA NCDC/CICS-NC

Change in Average Temperature (°F)



Projected Change in Average Precipitation

Period: 2041-2070 | Higher Emissions: A2



GLISA

Data Source:
NOAA NCDC/CICS-NC

Precipitation Difference (Inches) Per Year



Policy Recommendation Themes



**Mainstream
climate.**



Be proactive.



**Develop lasting
authority.**



**Elevate social
equity.**



**Support nature-
based solutions.**



**Facilitate local
and regional
action.**

Specific Policy Recommendations: Policy Updates

- ▶ Modernize the Stafford Act
- ▶ Renew the National Flood Insurance Policy
- ▶ Update FEMA Disaster Funding
- ▶ Accelerate CDBG relief
- ▶ Increase and Expand Great Lakes Restoration Initiative Funding to Great Lakes Restoration & Resilience Initiative
- ▶ Maintain soil health priorities in Farm Bills

Every \$1 on
resilience
bears an \$11
return on
investment.

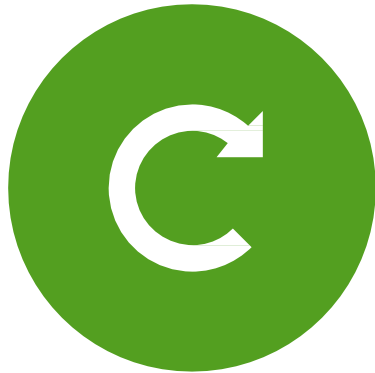
- National Institute of
Building Science

- ▶ Federally Mandated Resilient Building Codes and Standards
- ▶ Establishment of Resilience Revolving Loan Fund
 - ▶ (e.g. H.R. 3779: Resilience Revolving Loan Fund Act of 2019)
- ▶ Establish funding for separating legacy combined sewer systems

Support Critical Climate Programs

- ▶ NOAA's Regional Integrated Sciences and Assessments (RISA) program
- ▶ NOAA's Regional Climate Centers (RCCs)
- ▶ NOAA's National Estuarine Research Reserves (NERRS) program
- ▶ USGS Climate Adaptation Science Centers (CASC)
- ▶ USDA Climate Hubs.
- ▶ Bureau of Indian Affairs
- ▶ National Climate Assessment

Policy Recommendations in Summary



UPDATE



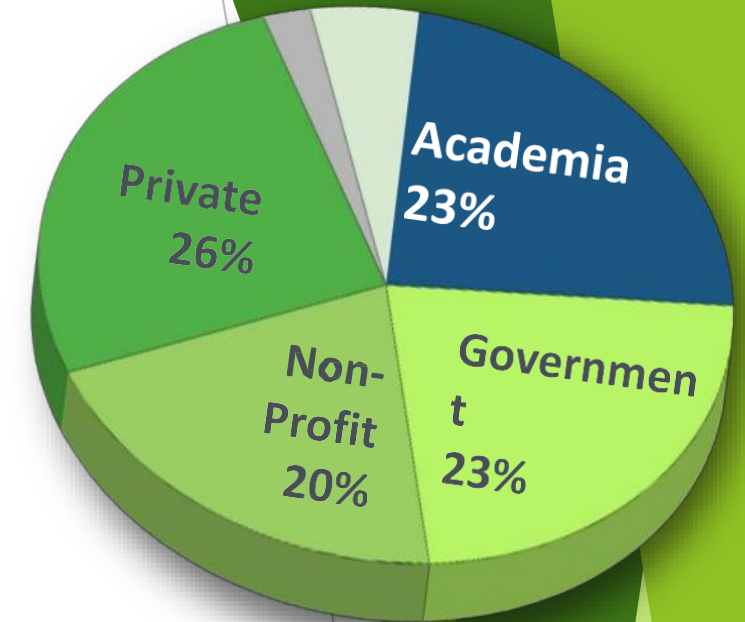
INNOVATE



SUPPORT

American Society of Adaptation Professionals

- ▶ Connecting & Supporting Adaptation Professionals to advance innovation & Excellence in the field of adaptation





www.adaptationprofessionals.org



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Beth Gibbons
The American Society of Adaptation
Professionals

Great Lakes Coastal Assembly

Vision...coastal landscapes that support unique structure and processes essential for sustaining healthy species populations, resilient natural communities, and provide benefits to society.

Priorities...

- *Catalyze Collaboration*
- *Serve as a Resource*
- *Facilitate Communication*
- *Promote Science and Tool Development*



Lake Erie
Commission



DEPARTMENT OF
NATURAL RESOURCES



Audubon | GREAT LAKES



Canada



USGS



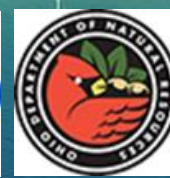
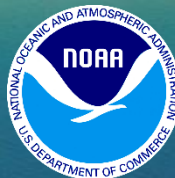
Great Lakes
Commission
des Grands Lacs

The Nature
Conservancy
Protecting nature. Preserving life.

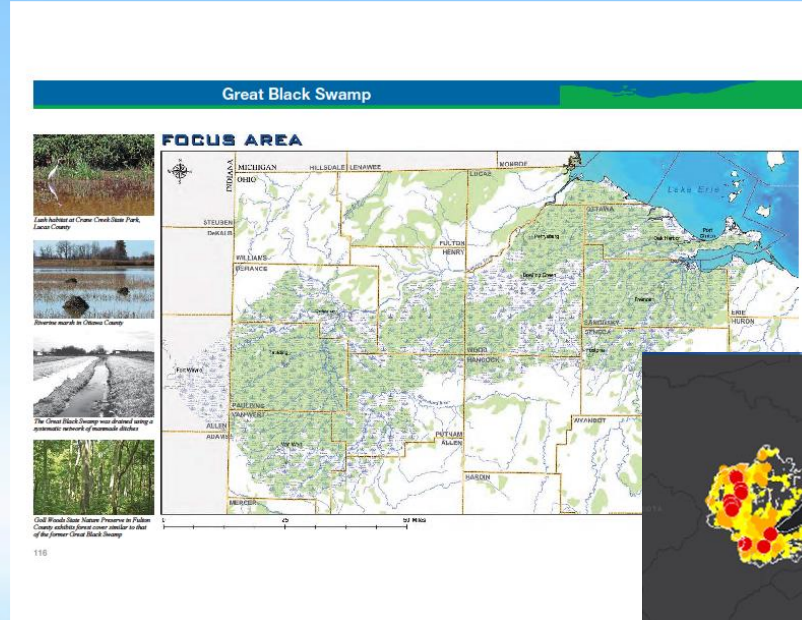


NORTHLAND
COLLEGE

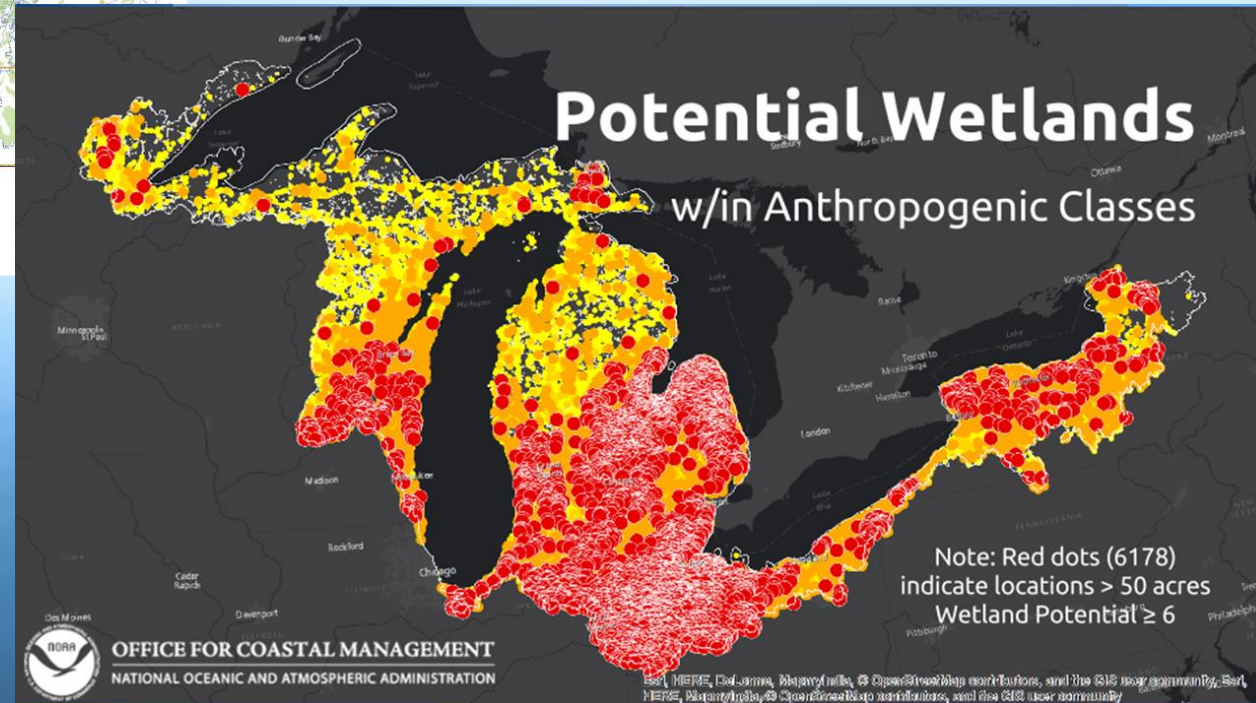
CMU
CENTRAL MICHIGAN
UNIVERSITY



Great Lakes Wetland Loss



Wetland Restoration and Conservation Opportunities



- ~50% of Great Lakes wetlands lost due to change in land use
- ~90% wetland loss in Ohio – draining of the Great Black Swamp

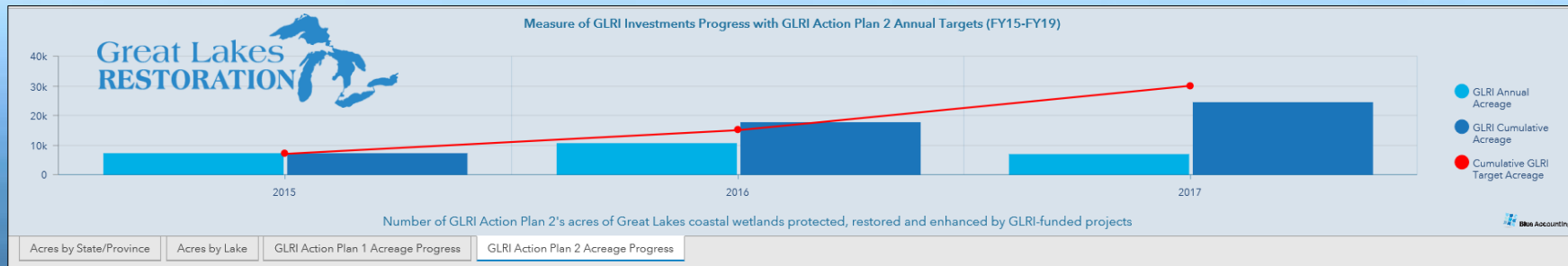
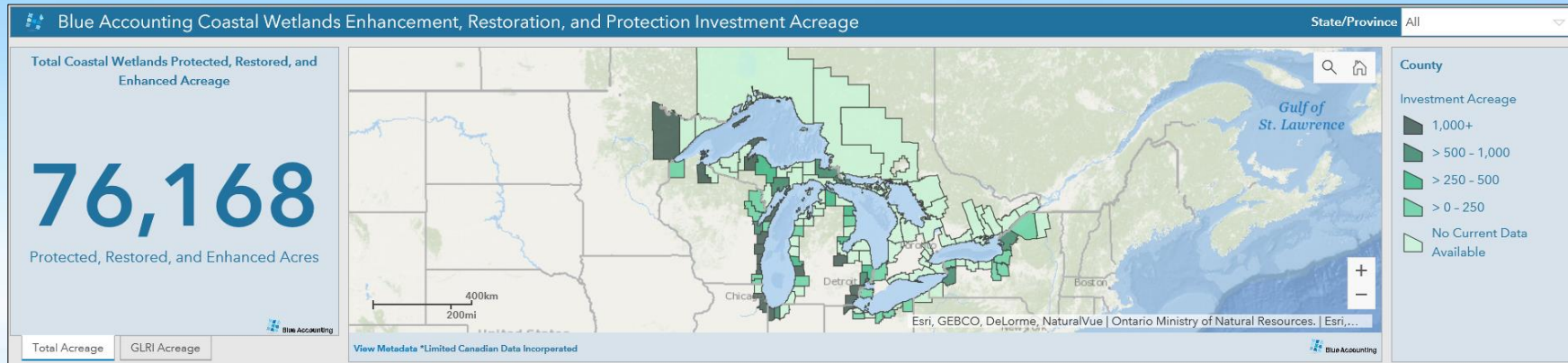
Coastal Assembly: Promoting Critical Connections



- Sponsored first ever Great Lakes Coastal Wetland Symposium
- Catalyzed development of two coastal wetland Decision Support Tools
- Coordinated the development of coastal wetland projects for State and Federal implementation funding
- Developed a Shared Vision and Goals for coastal wetlands based on Landscape Conservation Design principles
- Tracking our collective progress and success through Blue Accounting (joint venture between GLC and TNC)

Accelerate "On the Ground" results + improved resiliency

Tracking Coastal Wetland Progress



Blue Accounting



blueaccounting.org

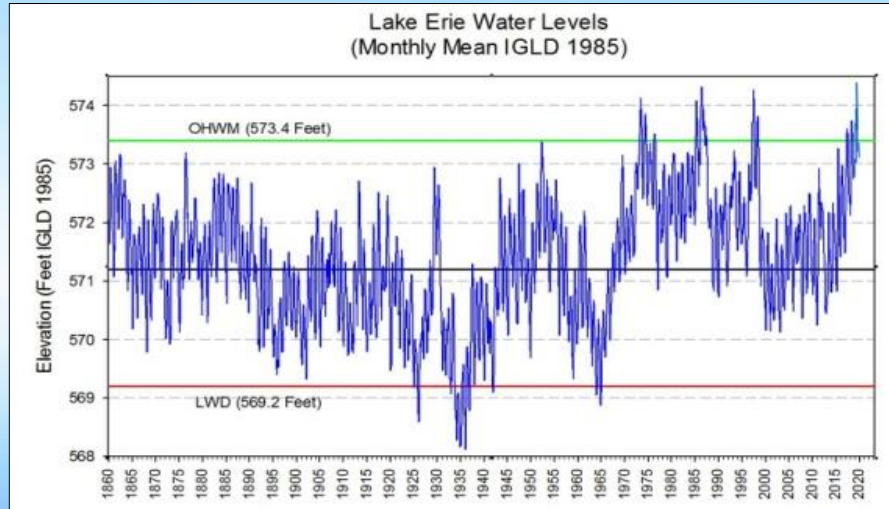
Coastal Resiliency



- Wetland Diversity – type and function
- Habitat (fish and wildlife)
- Water Quality (filtration, nutrient and sediment reduction)
- Water Retention (storage, flood mitigation)
- Wave/Energy Attenuation (shore protection and stabilization)

Maintain Ecosystem Services

“Strategic Investments based on Sound Science in a Changing World”



- Great Lake Water Levels
- Increased Storm Frequency and Magnitude
- Invasive Species
- Anthropogenic Impacts



Achieve Landscape
Scale Benefits

Coastal Assembly Co-Chairs

Christie Deloria – USFWS Coastal Program
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Coastal Resilience in the Great Lakes Region: Traditional Knowledge, Vulnerability and Adaptation in the Ceded Territories



Rob Croll
Policy Analyst/Climate Change Program Coordinator
February 13, 2020

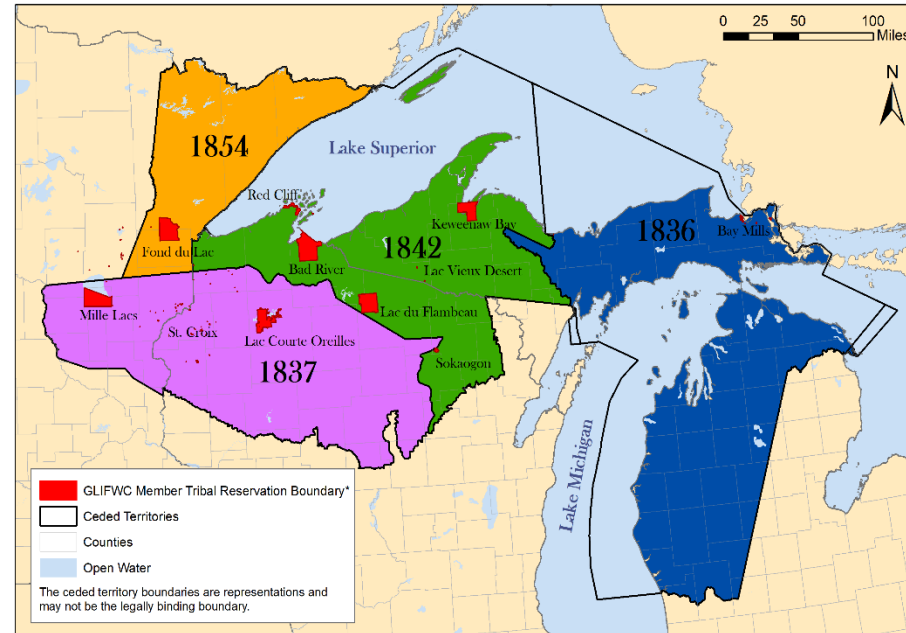


What is GLIFWC?



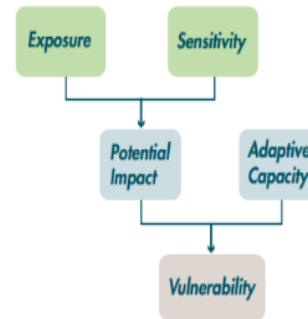
A “tribal organization” (PL 93-638) exercising authority delegated by its 11 member tribes to implement federal court orders and interjurisdictional agreements related to their treaty rights.

- GLIFWC assists its member tribes in:
 - Securing and implementing treaty guaranteed rights to hunt, fish and gather in the 1836, 1837, 1842 and 1854 Chippewa treaty ceded territories.
 - Cooperatively managing, restoring and protecting ceded territory natural resources and their habitats.



GLIFWC Climate Change Projects

- Lake Superior adikameg diet study
- Lake Superior namegos projects
- Phenology study
- Seed Bank
- Ogaa study/Mille Lacs Telemetry Study
- Waabizheshi Project
- Vulnerability assessment
- Tribal Climate Adaptation Menu



T
E
K



Climate Change Vulnerability Assessment

- Use a holistic approach to assess vulnerability of over 60 culturally important beings to climate change.
- Promote recognition that Anishinaabe knowledge and worldview provide important and needed contributions to the understanding of resource vulnerability.



Climate Change Vulnerability Assessment

Scientific Ecological Knowledge

- NatureServe's Climate Change Vulnerability Index tool incorporates climate projections and literature on natural history
- Expert reviews of each being's assessment used to validate and adjust scores.

Traditional Ecological Knowledge

- At least 3 interviews in each community.
- Interviewees provide stories, teachings, knowledge about changes.
- Given equal weight to expert reviews and used to validate and adjust scores.

Results
Incorporate both

Extremely
Vulnerable



Lake whitefish, tullibee



American marten, moose, snowshoe hare



Wild rice, labrador tea, northern white cedar, tamarack

Highly
Vulnerable



Northern pike, yellow perch, lake trout, walleye



Fisher



Wild leek, black ash, wild ginger, paper birch, sugar maple, balsam fir, American ginseng



Wood duck, trumpeter swan, common loon, cave bats, sharp-tailed grouse



Wood turtle

Moderately
Vulnerable



Sturgeon, smallmouth bass, muskellunge



Blueberry, sweetgrass, American basswood, broadleaf arrowhead, sweet flag, bloodroot, princess pine, white ash



Sandhill crane, fireflies



Snapping turtle, painted turtle, spring peeper

Less
Vulnerable



Largemouth bass



Long-tailed weasel, short-tailed/least weasel, American mink, white-tailed deer, river otter

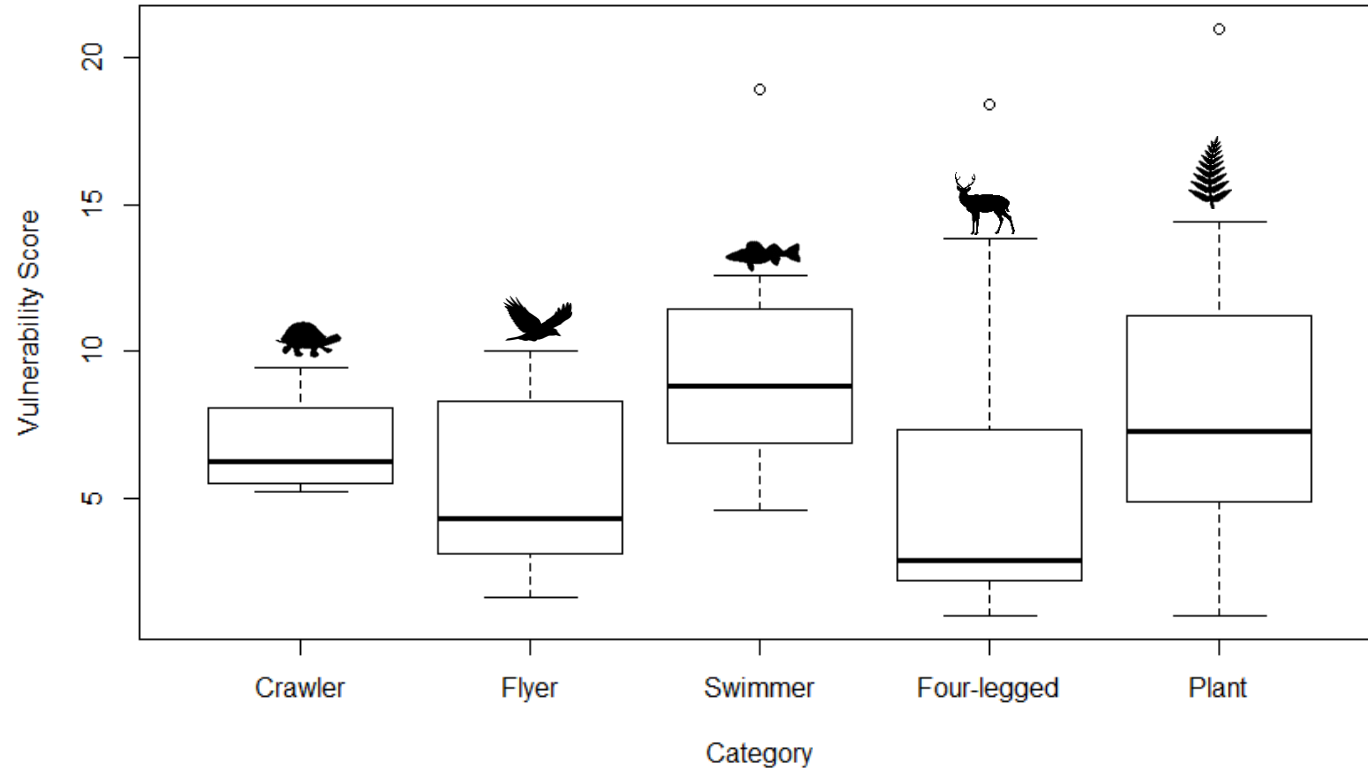


Raspberry, red-osier dogwood, strawberry, ostrich fern, wild sage



Wild turkey, common raven, Canada goose, mallard, American crow, blue-winged teal, tree bats, bald eagle

Vulnerability Across Categories



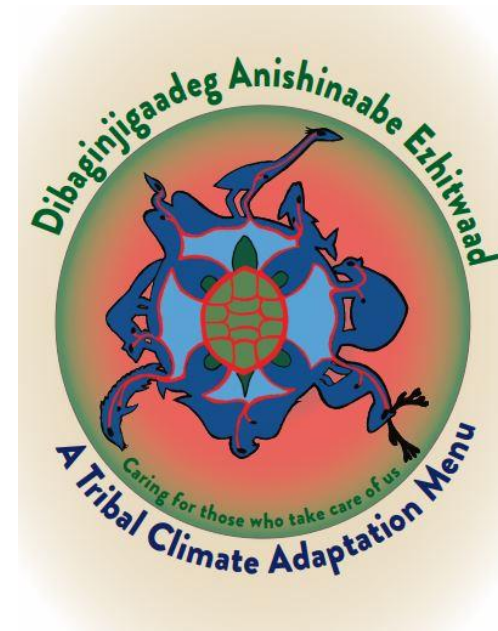
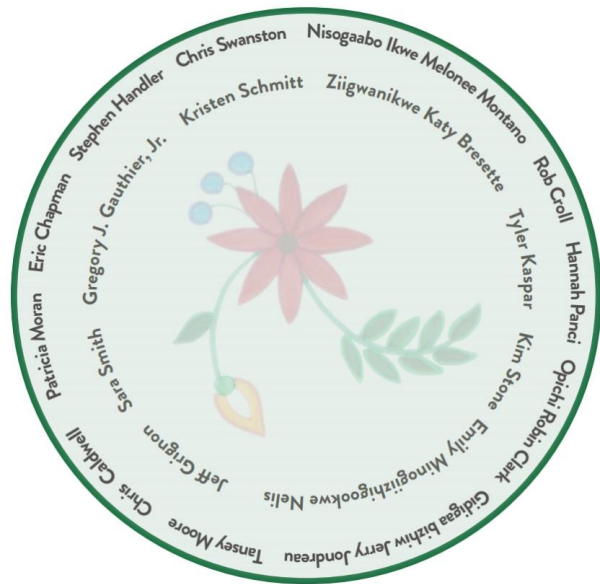


- Culturally important beings moving (shifting ranges) or disappearing due to climate change
- Seasonal indicators no longer correspond with their associated natural phenomena
- Loss of access to culturally important beings and those reciprocal relationships that have been maintained since time immemorial is an existential threat to indigenous culture and physical & emotional health
- Tribal homelands, reservations and treaty ceded territories are fixed in place
- Adaptation actions must be culturally appropriate and community supported.

Dibaginjigaadeg Anishinaabe Ezhitwaad: A Tribal Climate Adaptation Menu

How do we create an adaptation planning tool that integrates indigenous knowledge, culture, science and perspective with western science and perspectives?

How can we facilitate culturally appropriate climate adaptation between tribes and non-tribal partners?



Michigan Tech



Guiding Principles

Provides a framework to integrate indigenous and traditional knowledge, culture, language and history into the climate adaptation planning process

Facilitates community engagement and decolonization of scientific research and application in indigenous communities and co-management areas (ceded territories)

Provides general guidance for non-tribal partners working in indigenous communities

Written from an Ojibwe/Menominee perspective but intentionally designed to allow other tribal communities to integrate their customs and culture.



nindinawemaaganidag “all my relatives”

- Decisions for use of our relatives were originally communal decisions made with recognition, acknowledgement and reciprocity throughout
- Today management and decision-making for land and the natural environment is no longer communal, but made by individuals, agencies and institutions



Cultural Practices and Community Engagement

Strategy 1: Consider cultural practices and seek spiritual guidance.

- 1.1. Consult cultural leaders, key community members, and elders.
- 1.2. Consider mindful practices of reciprocity.
- 1.3. Understand the human and landscape history of the community.
- 1.4. Hold respect for all of our relations, both tangible and intangible.
- 1.5. Maintain dynamic relationships in a changing landscape.

Strategy 2: Learn through careful and respectful observation (gikinawaabi).

- 2.1. Learn from beings and natural communities as they respond to changing conditions over time.

Strategy 3: Support tribal engagement in the environment.

- 3.1. Maintain and revitalize traditional relationships and uses.
- 3.2. Establish and support language revitalization programs.
- 3.3. Establish, maintain, and identify existing inventory and monitoring programs.
- 3.4. Establish and maintain cultural, environmental education, and youth programs.
- 3.5. Communicate opportunities for use of tribal and public lands.
- 3.6. Participate in local- and landscape-level management decisions with partner agencies.



“TAM” Workshops

- Paper birch habitat & restoration – GLIFWC
- Forest management/cultural fire/moose habitat – Grand Portage Band of Ojibwe
- Tribal wetland restoration – Iowa Tribe of Oklahoma
- Great Lakes coastal marsh/manoomin restoration – Sault Tribe of Chippewa
- Cedar restoration – Bay Mills Indian Community
- Road/stream crossings – Hiawatha National Forest
- Sea level rise preparation – Miccosukee Tribe of Florida
- Creating an indigenous focused master naturalist class – Ho Chunk Nation
- Culturally appropriate invasive species control – Mohawk Council of Akwesasne

Reviving Manoomin

Objectives:

1. Restore manoomin
2. Increase community involvement and access
3. Improve habitat for fish, waterfowl and secretive marsh birds

Challenges	Opportunities
<ol style="list-style-type: none"> 1. Warmer water temps 2. high stream flow in spring 3. heavy precipitation events 	<ol style="list-style-type: none"> 1. longer growing season 2. Renewed interest within community in manoomin

Adaptation Tactics:

- 1.1 Work with tribal leaders & members to identify knowledgeable individuals and consult in a respectful way.
- 7.6 Partner with outside agencies and tribes within 1836 Treaty territory
- 8.1 Identify native sources of manoomin & plant in historic and suitable areas
- 3.5 Establish SOPs for seeding manoomin and harvest regulations
- 7.1 Identifying historical and cultural sites for manoomin restoration
- 2.3 Use manoomin to restore historically disturbed sites
- 3.4 Establish and maintain cultural, environmental education & youth programs

1.1.01.3 Consult w/ leaders & cultural history

- Storytelling on sign. manoomin
- understanding enviro for growth & harvest techniques (can it be used to stabilize areas?)
- partnerships (Forest Service) - boys & girls club, drug court, Canada First Nations, Pucks Unlimited
- Examine historical maps/records

10.1 Beings across a greater geographical range

- Artificial impoundments

Miigwech!



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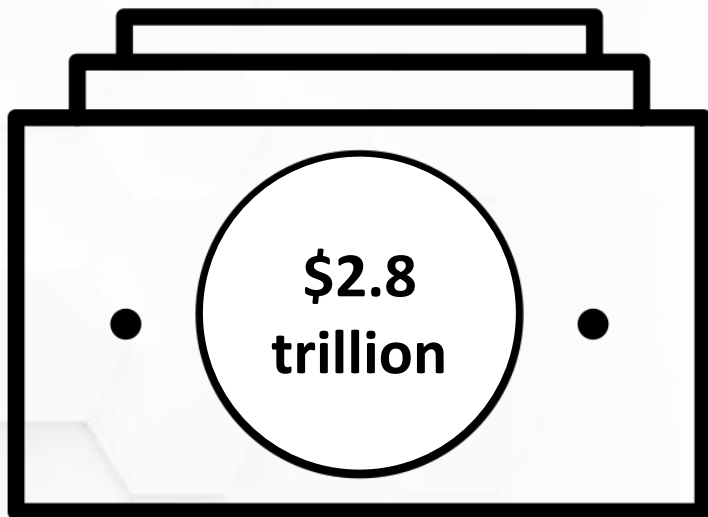
glifwc.org/ClimateChange



**EVERY FARMER, EVERY ACRE AND EVERY VOICE MATTERS
TO CREATE SUSTAINABLE FOOD SYSTEMS**

**BRODY STAPEL, WISCONSIN DAIRY FARMER
FEBRUARY 13, 2020**

Agriculture's Impact



Created by Andrei Yushchenko
from Noun Project

America's Dairyland



**No. 1
DAIRY
STATE!**

**23% OF
THE TOTAL
DAIRY FARMS**
in the U.S. are in
WISCONSIN

**IN 2018 WISCONSIN PRODUCED
OVER 30 BILLION
POUNDS OF MILK**
That's 14% of the total U.S. milk production




**THE WISCONSIN
DAIRY INDUSTRY
GENERATES
\$45.6 BILLION**
each year for the state's economy

This is more than the combined value of
Florida citrus and Idaho potatoes



**WISCONSIN DAIRY
FARMS HELP FUEL
THE STATE'S
ECONOMY**
creating
154,000 JOBS
and generating
\$1.26 BILLION
in state and local taxes



**WISCONSIN
AVERAGES
150 COWS
PER HERD**
well below the
U.S. average of 251

**95% OF WISCONSIN
DAIRY FARMS ARE
FAMILY OWNED**

Agriculture's Challenges

WE LOSE 175 ACRES OF FARMLAND EVERY HOUR, MOSTLY TO URBAN ENCROACHMENT.



According to American Farmland Trust, the United States loses about 175 acres of farmland every hour, mostly due to the expansion of urban and suburban areas. This equates to nearly 3 acres of farmland lost per minute – farmland that cannot be replaced once gone.

★ U.S. Farmers & Ranchers Alliance ★

Source: American Farmland Trust

DISASTER EVENTS HAVE CAUSED OVER \$560 BILLION IN DAMAGES IN THE UNITED STATES FROM 2010-2019 - AND THEY ARE INCREASING.



Eight of the last 10 years in the U.S. have experienced greater than the average number of billion-dollar disaster events, many of them from intense storms (thunderstorms, tornadoes, hurricanes, and blizzards) that greatly impact agriculture.

★ U.S. Farmers & Ranchers Alliance ★

Source: National Oceanic and Atmospheric Administration – National Centers for Environmental Information, (2020). Billion-Dollar Weather and Climate Disasters. Overview.

A Solution to Climate Change

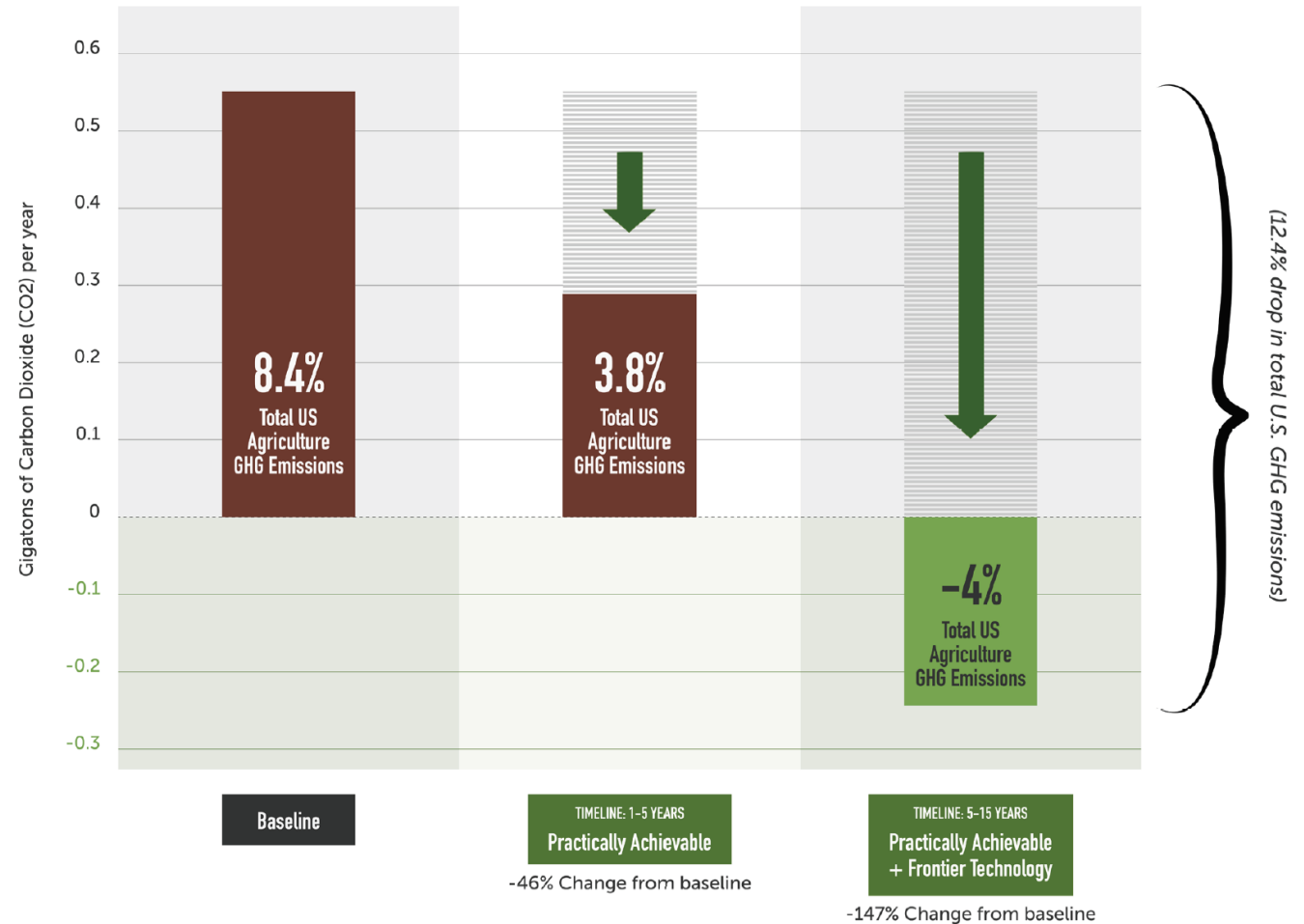
CURRENTLY, U.S. SOILS STORE 100 TIMES MORE CARBON THAN TOTAL U.S. EMISSIONS IN A YEAR.



★ U.S. Farmers & Ranchers Alliance ★

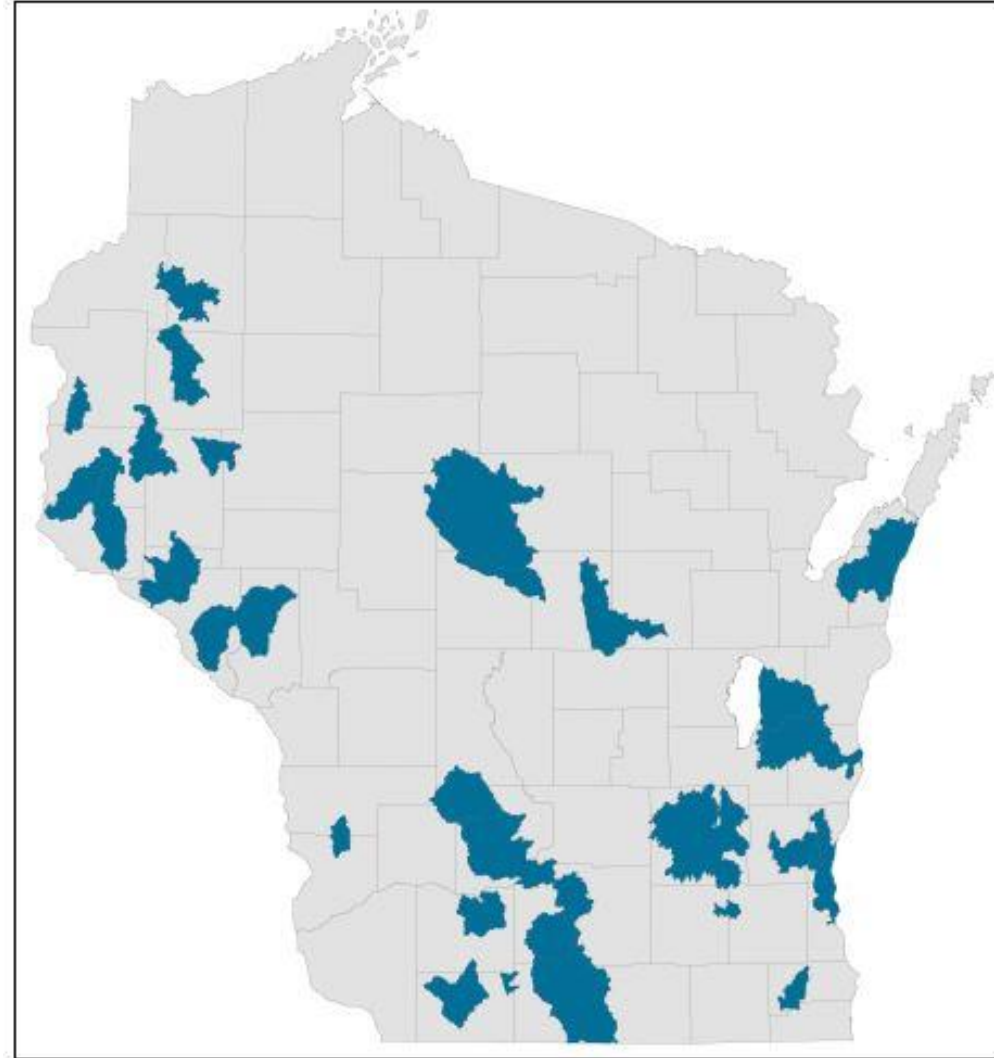
Source: Second State of the Carbon Cycle Report (SOCCR2): A Sustained Assessment Report, U.S. Environmental Protection Agency (2019).

Agriculture carbon removal estimates



Farmer-Led Watershed Conservation

- 31 organizations
- Sensitive watersheds
- Continuous improvement
- Stakeholder partnerships
- Innovative solutions



Dairy Strong Sustainability Alliance



Continuous improvement:

- Land use
- Soil health
- Nutrient management
- Water quality/quantity
- Greenhouse gas emissions
- Energy use

Technology on the Farm



- 250 cows, 1,100 acres
- Fitbits for cows
- Precision technology
- Adaptability



Changing to Cover Crops

- Reduce soil erosion
- Manage nitrogen, nutrients
- Boost water-holding capacity
- Protect water quality
- Sequester carbon
- Control weeds
- Increase yields



Looking to the Future





Coastal Resilience in the Great Lakes Region

What did you think of the briefing?
Please take 2 minutes to let us know at:
www.eesi.org/survey

Materials will be available at: www.eesi.org/021320greatlakes

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