

# A Vulnerability Assessment: Combining Scientific and Traditional Ecological Knowledge

Climate Change  
Vulnerability Assessment

Version 1 • April 2018

Integrating Scientific  
and Traditional  
Ecological Knowledge



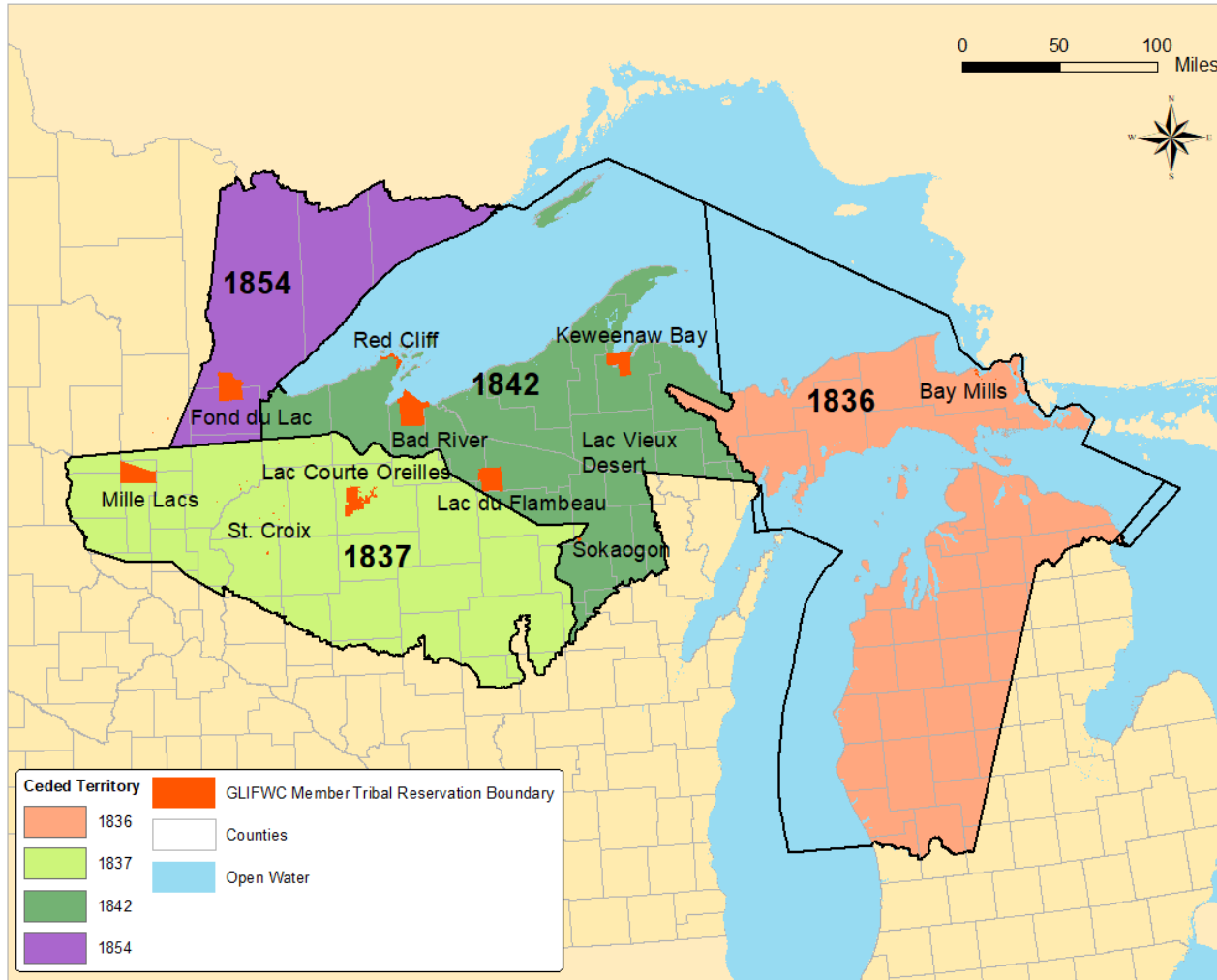
Hannah Panci

Great Lakes Indian Fish and  
Wildlife Commission

April 9, 2019



# What is GLIFWC?



# Climate Change Vulnerability Assessment

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



Melonee Montano



# Scientific Ecological Knowledge

Science / “Western” science

# Traditional Ecological Knowledge

the accumulation of cultural tradition, practical experience, and adaptation to environmental changes over time

*The Wilson Journal of Ornithology* 123(3):521–535, 2011

## LARGE-SCALE MOVEMENT AND MIGRATION OF NORTHERN SAW-WHET OWLS IN EASTERN NORTH AMERICA

SEAN R. BECKETT<sup>1</sup> AND GLENN A. PROUDFOOT<sup>1,2</sup>

**ABSTRACT.**—We used information compiled by the U.S. Geological Survey’s Bird Banding Laboratory and geographic information systems (GIS) analysis to identify trends in annual Northern Saw-whet Owl (*Aegolius acadicus*) movement across eastern North America. Analysis of 81,584 Northern Saw-whet Owl banding events revealed a southbound annual fall migration front with peak banding activity occurring progressively later in the season as latitude decreases. Northbound owls comprised <9% of owls banded and recaptured elsewhere in the same season, and <5% were recaptured northbound >100 km from banding location. There was no relationship between banding latitude and adult-to-juvenile ratio. However, the proportion of adults versus juveniles banded was not uniform among banding stations, suggesting age-differentiated migration patterns may exist. Information from multiyear foreign recaptures revealed that 72% of owls banded and subsequently recaptured at the same latitude in different years were recaptured <100 km from banding location. A similar trend was found in the Appalachian Mountains, the Great Lakes Basin, and the Atlantic seaboard. This indicates that Northern Saw-whet Owls may exhibit high migration route fidelity. These findings expand the Northern Saw-whet Owl information portfolio and illustrate the versatility of aggregate data sets as a tool for answering large-scale questions regarding migration. *Received 22 August 2010. Accepted 8 February 2011.*



Leonard & Mary Moose  
Mille Lacs Band (Hinckley)  
Photo by Melonee Montano



# CCVA Methods

## Scientific Ecological Knowledge

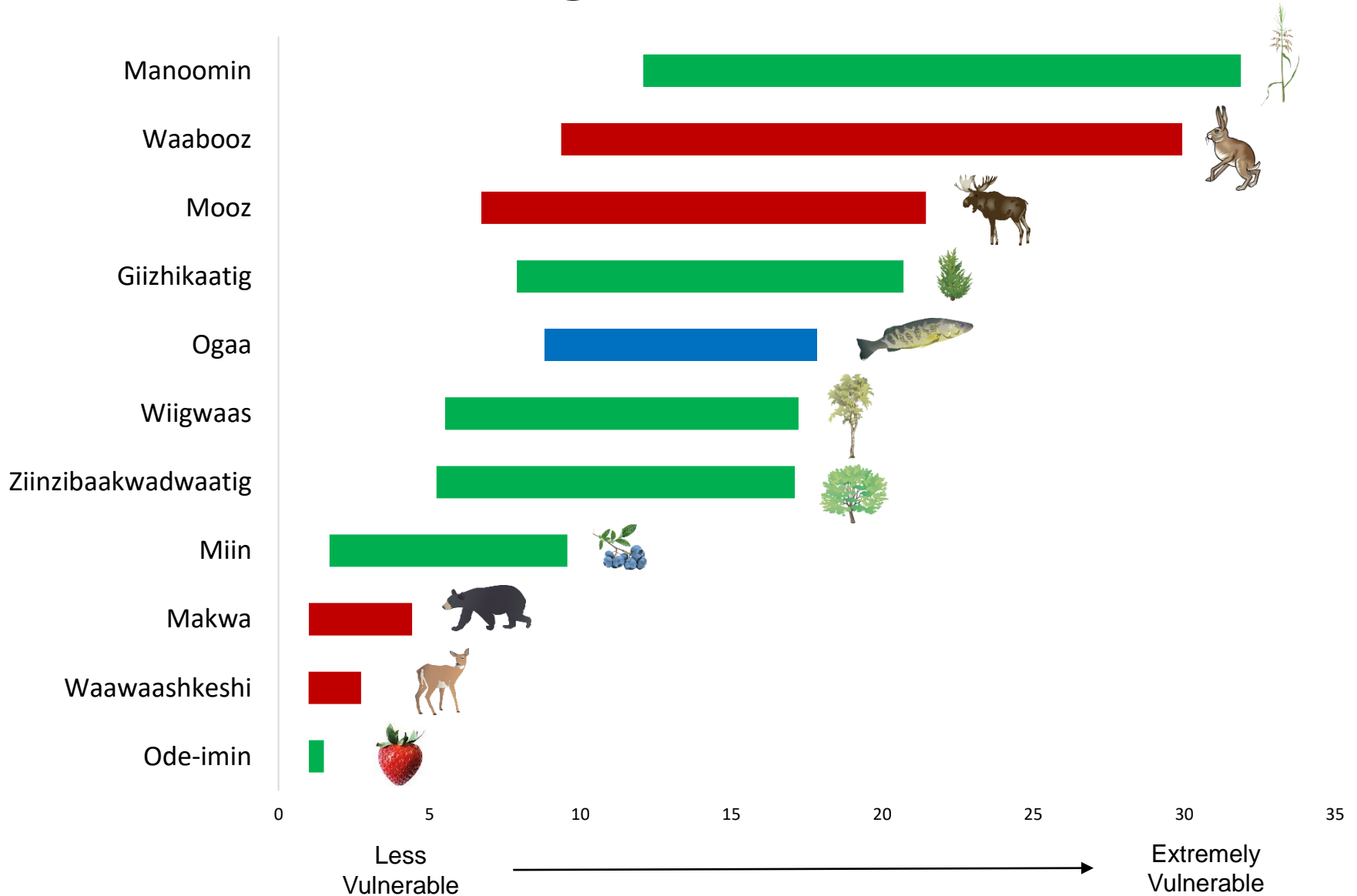
- NatureServe's Climate Change Vulnerability Index tool incorporates climate projections and literature on natural history
- Expert reviews of each being's assessment

## Traditional Ecological Knowledge

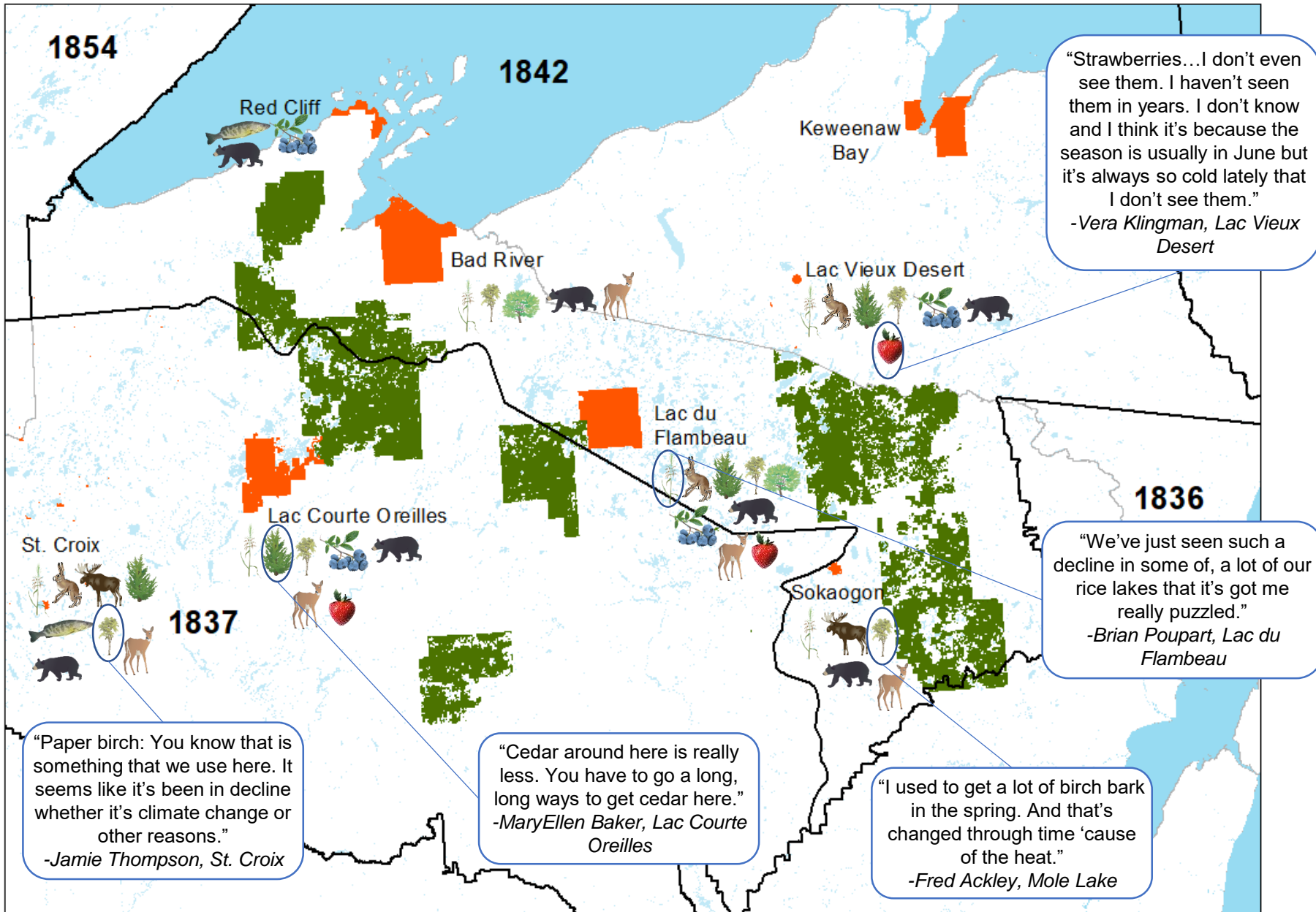
- At least 3 interviews in each community
- Elders, harvesters, other community members
- Interviewees provide stories, teachings, knowledge about changes

**Results**  
Incorporate both

# The most frequently mentioned beings are also among the most vulnerable



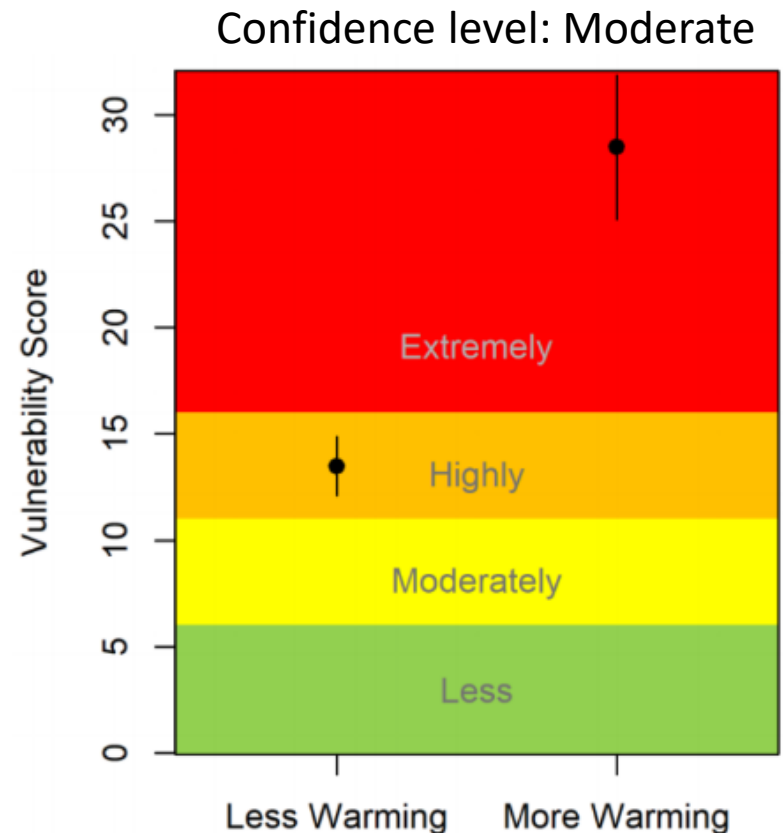
# TEK gives a place-based understanding of vulnerability



# Manoomin (Wild rice)

## Vulnerability

- Natural barriers
- Human land use changes
- Dispersal
- Thermal niche
- Hydrological niche
- Disturbance regime
- Dependence on ice/snow
- Competition from other species
- Pathogens or natural enemies
- Competition
- Genetic variation
- Documented response to climate change



# Manoomin (Wild rice) Vulnerability



“If I get out here this year, and I'd like to, for even a hour, ten minutes even, I can honestly say I was out there... somewhere in the ceded territory here ricing every year, I've riced every year of my life, 57 years. This would be the 57<sup>th</sup> year now.”

“You know what I was worried about this mornin’? That rain knocking my rice over.”

- *Fred Ackley, Mole Lake*

# Manoomin (Wild rice) Vulnerability



“And all this (year) they'll-, that little worm...before it turns into the brown moth... he'll eat that rice and then mold gets in the middle of that rice stalk... The whole stalk would be.. you know, I wouldn't say it was the best rice no more, 'cause it has that. And that's because it gets more hotter and more moist.”

– *Fred Ackley, Mole Lake*

# Manoomin (Wild rice) Vulnerability



“According to the little bit I know about wild rice, you have to have the water, its gotta be just right in order for, otherwise you're gonna drown it.”

– *Tom Maulson Sr., Lac du Flambeau*

# Final thoughts

- Many resources of tribal interest are vulnerable to climate change
- TEK and SEK complement each other and strengthen our overall knowledge of climate change vulnerability
- We need to use both knowledge systems to move forward in adapting to climate change



# Next Steps

Vulnerability  
assessment



Adaptation plan



Continuing research  
Implementation



# Miigwech!



Melonee Montano  
TEK Outreach Specialist  
[mmontano@glifwc.org](mailto:mmontano@glifwc.org)

Rob Croll  
Climate Change Program Coordinator  
[rcroll@glifwc.org](mailto:rcroll@glifwc.org)

Hannah Panci  
Climate Change Scientist  
[hpanci@glifwc.org](mailto:hpanci@glifwc.org)

Tanya Aldred  
Furbearer/Climate Change Biologist  
[tanya.aldred@glifwc.org](mailto:tanya.aldred@glifwc.org)

Aaron Shultz  
Inland Fisheries Biologist  
[aaronshultz@glifwc.org](mailto:aaronshultz@glifwc.org)

[glifwc.org/ClimateChange](http://glifwc.org/ClimateChange)