

# U.S. EPA's State and Local Energy and Environment Webinar Series

## Tribal Resilience Across the Country: From Guidebook to Action

May 22, 2019

We will start in a few minutes.

Two audio options:

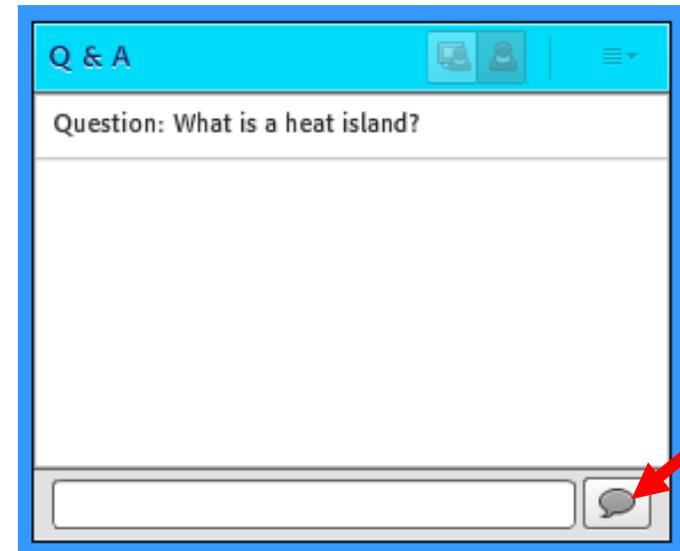
1. Listen via computer
2. Call in to 1-833-799-1917



# How to Participate

## Question and Answer

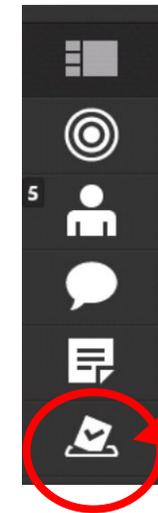
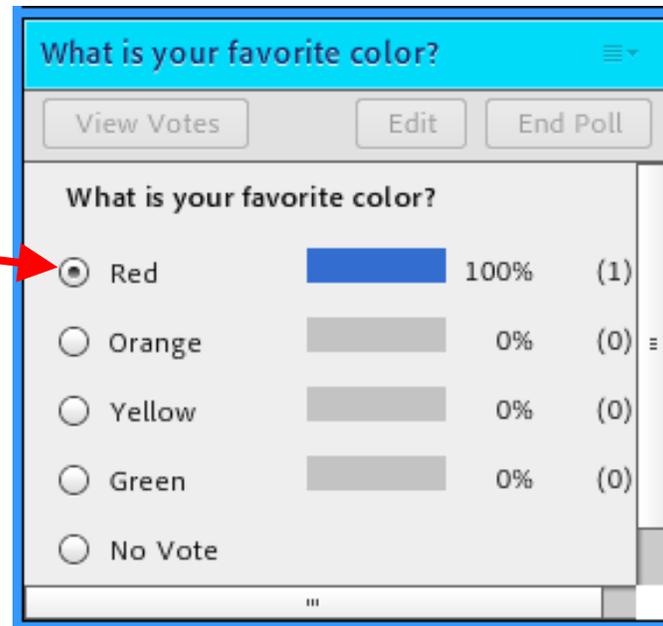
- Enter your question in the Q&A box
- Questions will be moderated at the end
- EPA will post responses to unanswered questions on the [State and Local Webinar Series page](#)



# How to Participate

## Polling

- We'll ask several poll questions during the webinar
- On mobile devices or tablets
  - ▶ Exit full screen mode
  - ▶ Tap the Poll icon



# Today's Agenda

- **Erica Bollerud**, Tribal Coordinator  
U.S. Environmental Protection Agency
- **Sascha Petersen**, Director  
Adaptation International
- **Mike Chang**, Climate Adaptation Specialist  
Makah Tribe
- **Stefanie Krantz**, Resilience Coordinator  
Nez Perce Tribe
- **Question and Answer Session**





Erica Bollerud  
Tribal Coordinator  
U.S. Environmental Protection  
Agency



# U.S. EPA's State and Local Energy and Environment Program

- Investing in energy strategies that lower emissions can be an effective way for state, local and tribal governments to achieve multiple goals:
  - ▶ Improve air quality and public health
  - ▶ Strengthen energy systems
  - ▶ Reduce greenhouse gas emissions
  - ▶ Save money
- We offer free tools, data and technical expertise about energy strategies, including energy efficiency, renewable energy and other emerging technologies, to help state, local, and tribal governments achieve their environmental, energy and economic objectives.
- Access all of these resources at the [Energy Resources for State, Local, and Tribal Governments site](#)



# Tribal Greenhouse Gas Emissions (GHG) Tool

- Free, interactive spreadsheet tool designed for tribal governments interested in compiling a relatively quick and simple GHG inventory.
- The tool has two modules: one for community-wide inventories, one for inventories of tribal government operations only. Use one or both.
- Pre-programmed with default emission factors or enter community-specific information.
- What can you do with the results?
  - Create an emissions baseline
  - Track emissions trends and measure progress towards meeting GHG reduction goals
  - Assess the relative contributions of emissions sources
  - Develop mitigation strategies and policies



Download at [epa.gov/statelocalenergy/tribal-greenhouse-gas-inventory-tool](https://epa.gov/statelocalenergy/tribal-greenhouse-gas-inventory-tool)

Erica Bollerud

[Bollerud.Erica@epa.gov](mailto:Bollerud.Erica@epa.gov)

U.S. Environmental Protection Agency



**State and Local  
Energy and Environment Program**



# Tribal Climate Adaptation Guidebook

Sascha Petersen

May 22, 2018



## PREPARING FOR CLIMATE CHANGE

A Guidebook for Local, Regional, and State Governments



Written by  
Center for Science in the Earth System (The Climate Impacts Group)  
Joint Institute for the Study of the Atmosphere and Ocean  
University of Washington  
King County, Washington

With an introduction by King County Executive Ron Sims



In association with  
**ICLEI**  
Local Governments  
... for Sustainability

## CALIFORNIA ADAPTATION PLANNING GUIDE



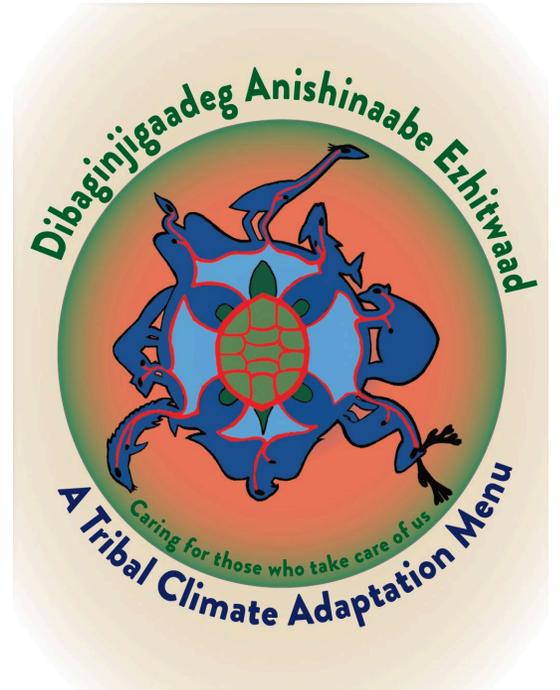
## IDENTIFYING ADAPTATION STRATEGIES



## CALIFORNIA ADAPTATION PLANNING GUIDE



## PLANNING FOR ADAPTIVE COMMUNITIES



**Tribal Climate Tool** Future climate projections for Pacific Northwest and Great Basin Tribes.

Tribe:

Area of Interest:

**Maps & Graphs**  
View maps and graphs that summarize projected changes in climate across your selected geography. You may tailor the view using the choices below.

**View**  
 Map  
 Graph

**Climate-related Variable**  
  
 Units:

**Time Period**

**Future Scenario**

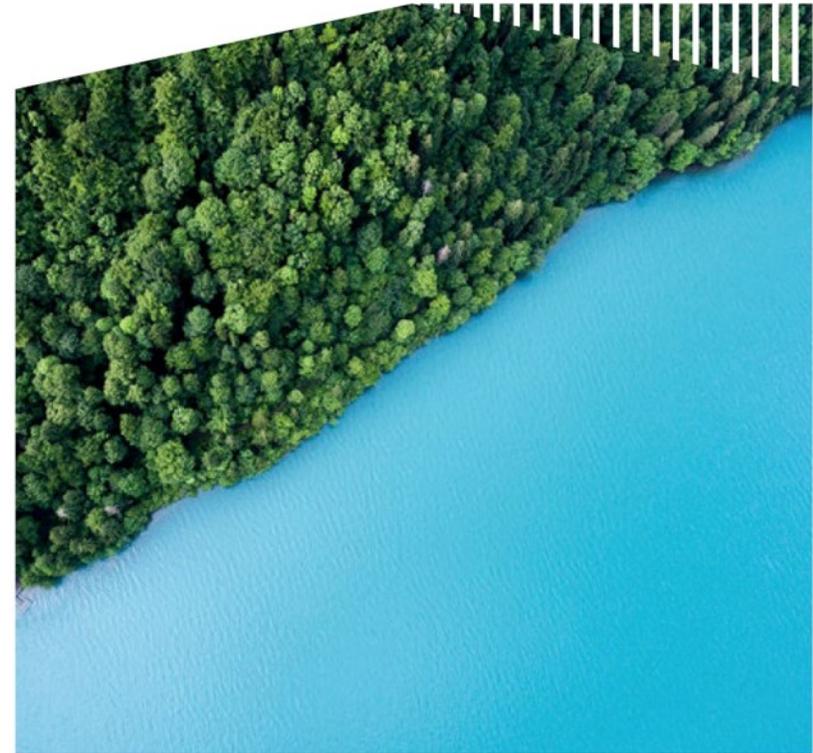
**Map**  
 Projected Change in Annual Average Daily Temperature  
 2070-2099 (Higher Emissions (RCP 8.5)) vs. 1971-2000 (Historical)  
 Umatilla Ceded basins

ESRI, NAVTEQ, DeLorme, null

Tribal Climate Tool, NW Climate Toolbox, Data: MACAv2-METDATA, RCP 8.5, 20-Model Mean

# CLIMATE RESILIENCE

## 2018 HANDBOOK



U.S. Climate Resilience Toolkit

Steps to Resilience Case Studies Tools Expertise Regions Topics

Search

## Meet the Challenges of a Changing Climate

Find information and tools to help you understand and address your climate risks.

LEARN HOW TO BUILD RESILIENCE >

SEE WHAT OTHERS ARE DOING >

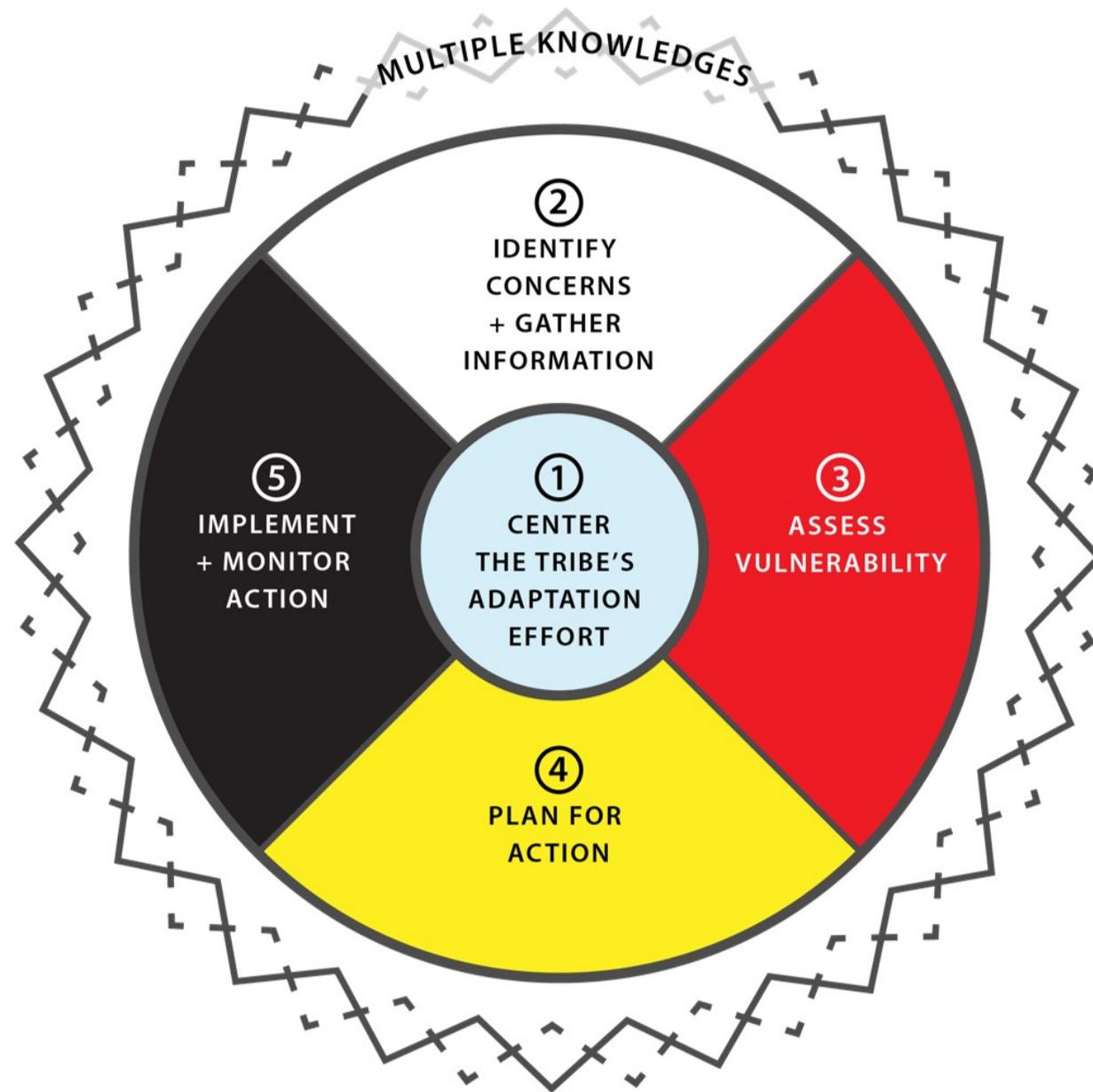
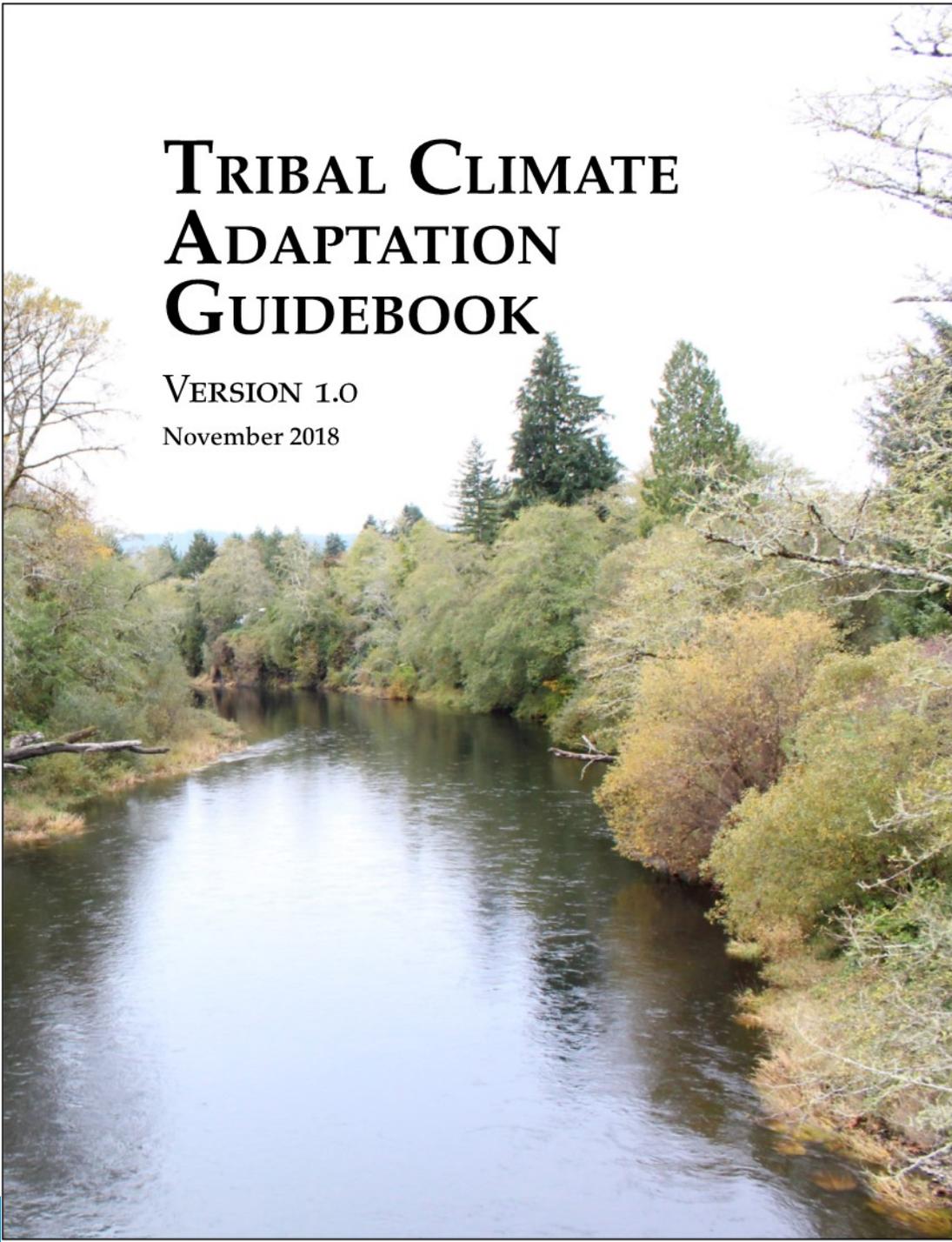
USE THE CLIMATE EXPLORER >

TOUR THE TOOLKIT >

# TRIBAL CLIMATE ADAPTATION GUIDEBOOK

VERSION 1.0

November 2018



# Writing Team



Meghan Dalton



OCCRI



Oregon State  
University



CIRC

Climate Impacts Research Consortium  
A NOAA BIRA TEAM



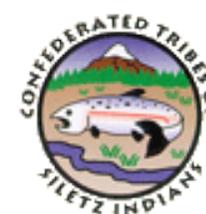
Sascha Petersen



adaptation  
international



Samantha Chisholm Hatfield



OCCRI



Oregon State  
University

# Acknowledgements

Advisors (9)

Reviewers/Contributors (21)

Editors (6)

Designers (3)

Funders (3)

Highlighted Tribal Case Studies (32)

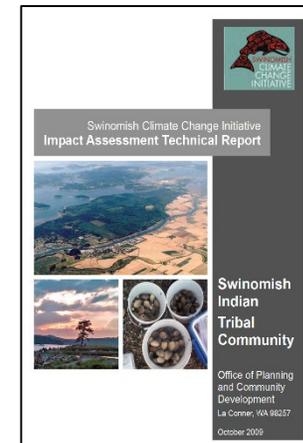
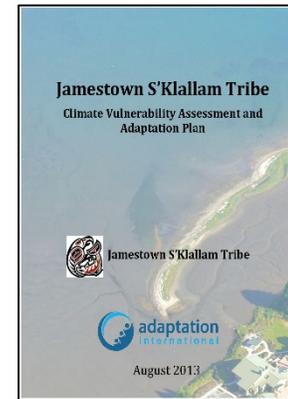
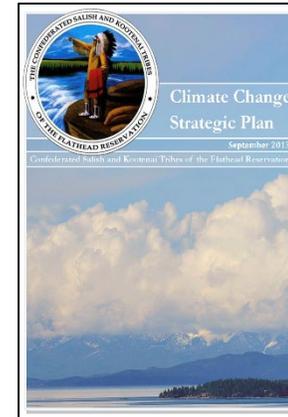


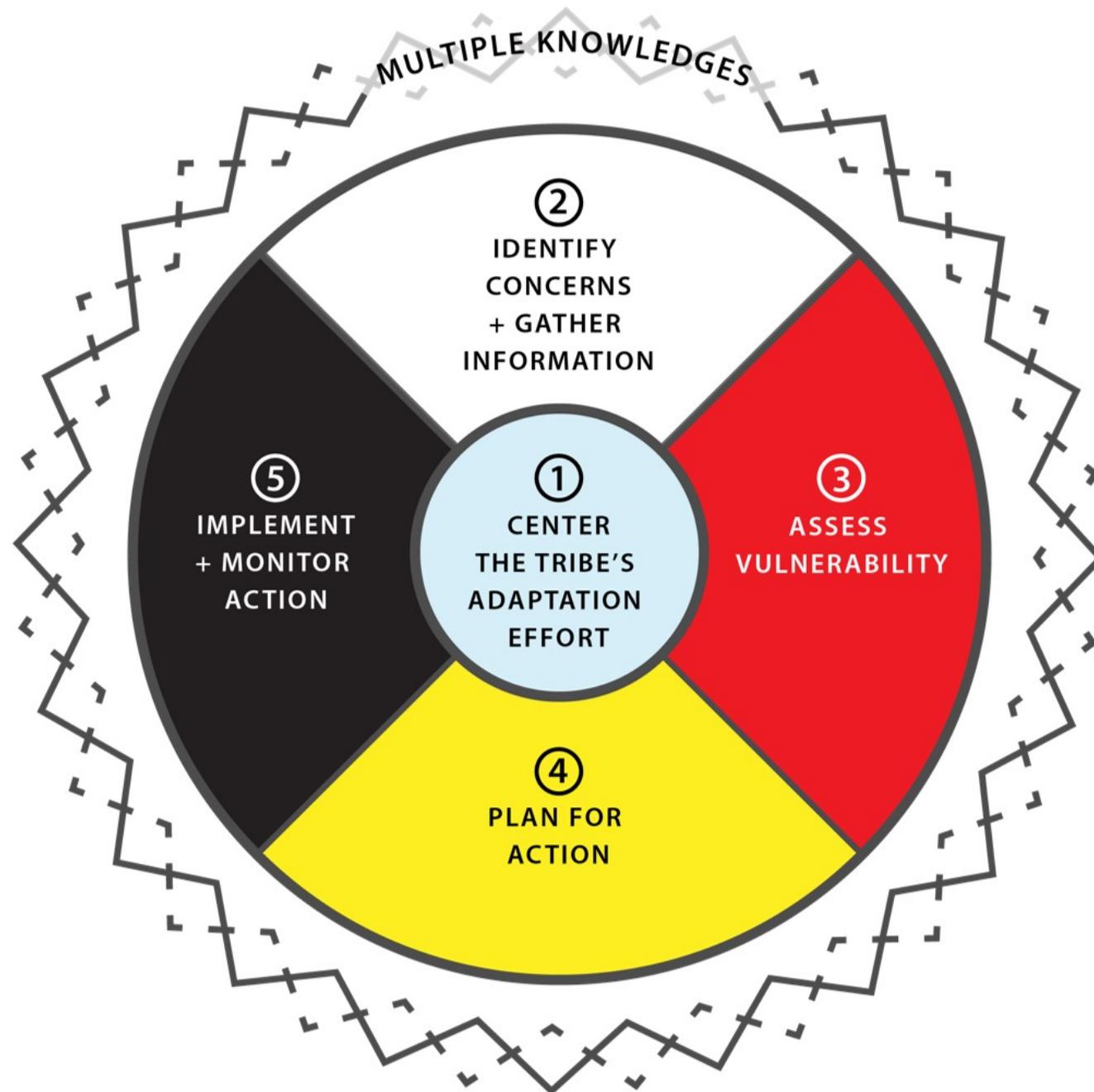
# Tribal Case Studies

	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
1854 Treaty Authority				X	
Alaska Native Tribal Health Consortium	X				
Blackfeet Nation				X	
Citizen Potawatomi Nation	X				
Coeur D'Alene Tribe	X				
Confederated Salish and Kootenai Tribes	X		X		
Fond du Lac Band of the Lake Superior Chippewa					X
Selawik				X	
Jamestown S'Klallam Tribe	X		X	X	X
Karuk Tribe	X				
Lac du Flambeau Tribe	X				
Makah Tribe	X			X	X
Marshall Island Indigenous Peoples					X
Menominee Indian Tribe	X				X
Native Village of Newtok	X				
Native Villages of St. Mary's & Pitka's Point		X			
Nez Perce Tribe	X			X	X
North Olympic Development Council				X	X
Puyallup Tribe		X		X	
Quinault Indian Nation	X				
Red Lake Band of the Lake Superior Chippewa Indians	X		X	X	
Saint Regis Mohawk Tribe		X	X	X	
Samish Indian Nation				X	
Shoshone-Bannock Tribes	X	X	X	X	
Stillaguamish Tribe	X				
Suquamish Tribe					X
Swinomish Indian Tribal Community	X		X	X	X
Tohono O'odham Nation	X		X	X	
Tulalip Tribes					X
Upper Snake River Tribes		X		X	
Yakama Nation		X		X	
Yurok Tribe	X	X		X	

# Tribal Case Studies

Approach	Qualitative Staff Input Tohono O'odham Nation	Vulnerability & Risk Confederated Salish and Kootenai Tribes	Guided Staff Input Jamestown S'Klallam Tribe	Vulnerability Index Shoshone Bannock Tribes	Multi-Criteria Swinomish Indian Tribal Community
Exposure	Summary of State Level Climate Projections	Existing Climate Projections + Observations	Climate projections, local sea level rise analysis + Observations	Downscaled climate projections + Observations with detailed spatial analysis	Downscaled climate projections with detailed spatial analysis + staff input & estimated probability
Sensitivity	Input from Staff, Community, and Partners	Input from Staff	Guided input from Staff	Detailed assessment of biology literature	Quantitative Impact + Staff Assessment
Adaptive Capacity		Input from Staff	Guided input from Staff	Literature and staff assessment	Staff Assessment
Vulnerability	Consequences of Impacts	Vulnerability Matrix	Vulnerability Matrix	Climate Change Vulnerability Index Results	Vulnerability Matrix
Selecting Planning Areas	Risk Assessment	Risk Assessment	Staff Input - Multi-Criteria Analysis using: Timing, Magnitude, Irreversibility	Staff Input - Multi-Criteria Analysis using: Vulnerability, Likelihood, Unique Value	Risk Assessment
	Pre-selected Sectors	Staff input using Risk & Vulnerability			Staff input using Risk & Vulnerability





# Features

-  **Checklists**—suggested activities within each section;
-  **Checkpoints**—opportunities to sustain three ongoing themes throughout the *Guidebook*:
  -  **Traditional Knowledges**—considerations for including TKs throughout the adaptation planning process relying on the *Guidelines for Considering Traditional Knowledges (TKs) in Climate Change Initiatives*. References to specific guidelines and actions are denoted by number (e.g., *CTKW Guideline 4*);
  -  **Community Engagement**—opportunities and strategies to engage the tribal community in the adaptation planning process;
  -  **Documentation**—opportunities to document the status of the adaptation planning process;
-  **Guiding Questions**—helpful questions to consider within each section;
-  **Case Studies**—tribal examples illustrating a particular activity ([Table 1](#)); and
-  **Resources**—external resources providing greater context or more specific guidance on a particular aspect of adaptation planning (a compilation of resources is found in [Appendix A](#)).

# Tribal Case Studies



Waswagoning Gaagige  
Bimaadiziwin Gaawin  
geqaabi naniizanasinoo

**Lac du Flambeau Resilience Initiative**

The Lac du Flambeau Tribe is working with the community to identify key natural and man-made hazards to develop an action plan to reduce the impacts of these hazards now and in the future.

**Climate Change on the Reservation**  
We know that the climate is changing and will impact our way



The Nimíipuu  
A Climate Change Story

Stefanie Krantz – Climate Change Coordinator  
stefaniek@nezperce.org

National Adaptation Forum, April 23, Symposium: Conducting a Tribal/Indigenous Climate Change Vulnerability Assessment and Developing a Tribal Adaptation Plan



Makah Traditional Knowledge & Cultural Resource Assessment

*A preliminary framework to utilize Traditional Knowledge into climate change planning*

Danielle Edelman  
Washington Sea Grant State Fellow  
Makah Tribe

Mike Chang  
Climate Adaptation Specialist  
Makah Tribe

National Adaptation Forum  
Madison, WI  
April 25, 2019





Download: <https://adaptationinternational.com/tribal-resilience>

Thank You!

Sascha Petersen

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[www.adaptationinternational.com](http://www.adaptationinternational.com)



# Poll 1

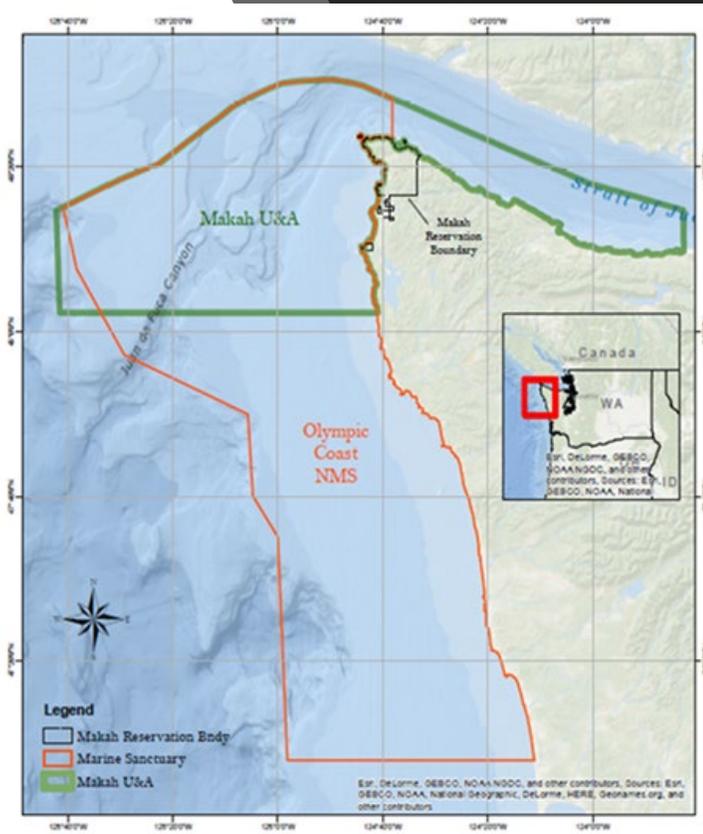
# Makah Traditional Knowledge (TK) & Cultural Resource Assessment

*A preliminary framework to utilize Traditional Knowledge into climate change planning*

Mike Chang  
Climate Adaptation Specialist  
Makah Tribe

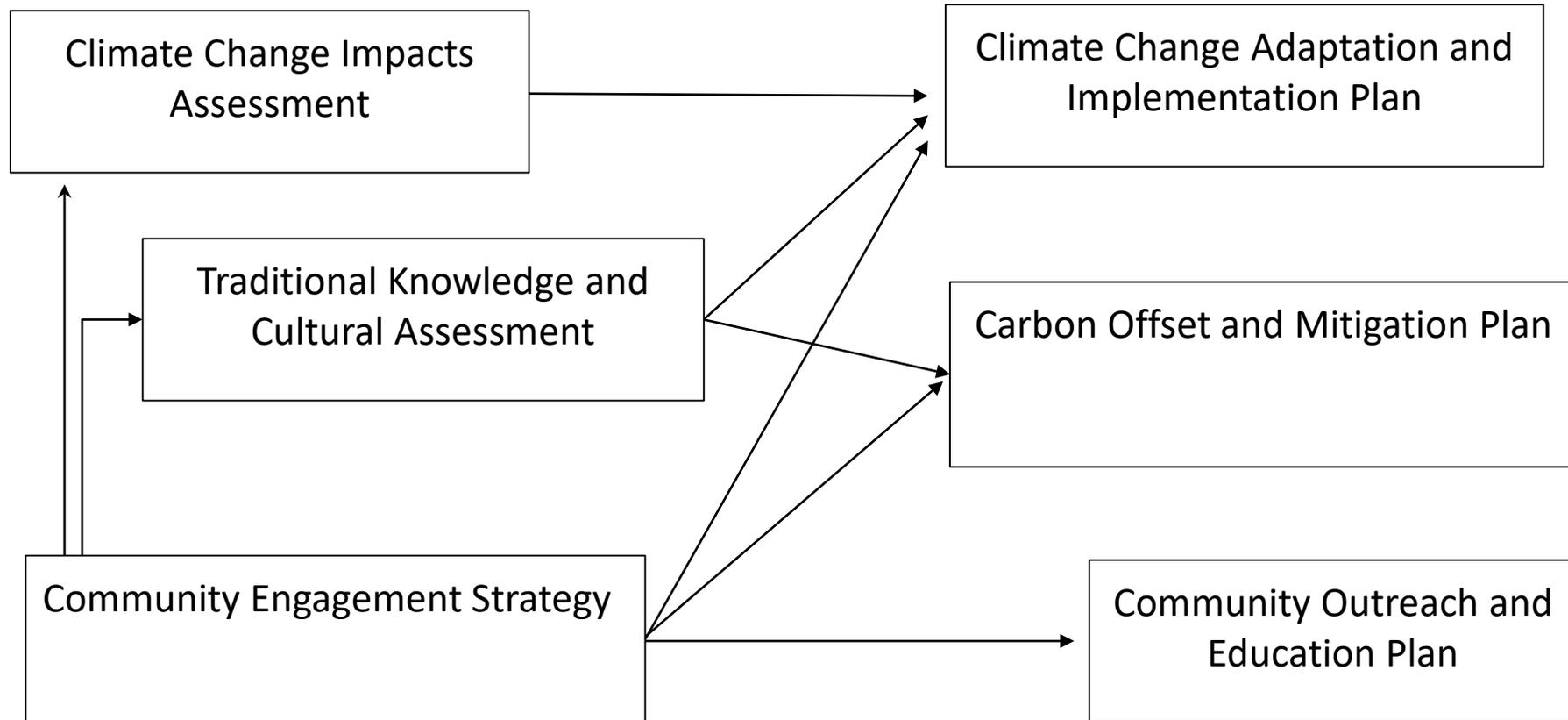


# Overview of the Makah Tribe



- Q<sup>w</sup>idicca?a'tx - “People of the Cape”
- 1855 Treaty of Neah Bay
- Ceded 300,000 acres of land to the U.S. and reserved the rights to hunt, fish, gather, whale, and seal within surrounding Usual and Accustomed Areas
- Makah identity, culture, and economy are dependent on natural resources, especially from the ocean
  - “The sea is my country.”
- Current Reservation ~47 sq miles

# Makah Climate Adaptation Logic Model



# Makah Climate Change Workgroup

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## Core Team

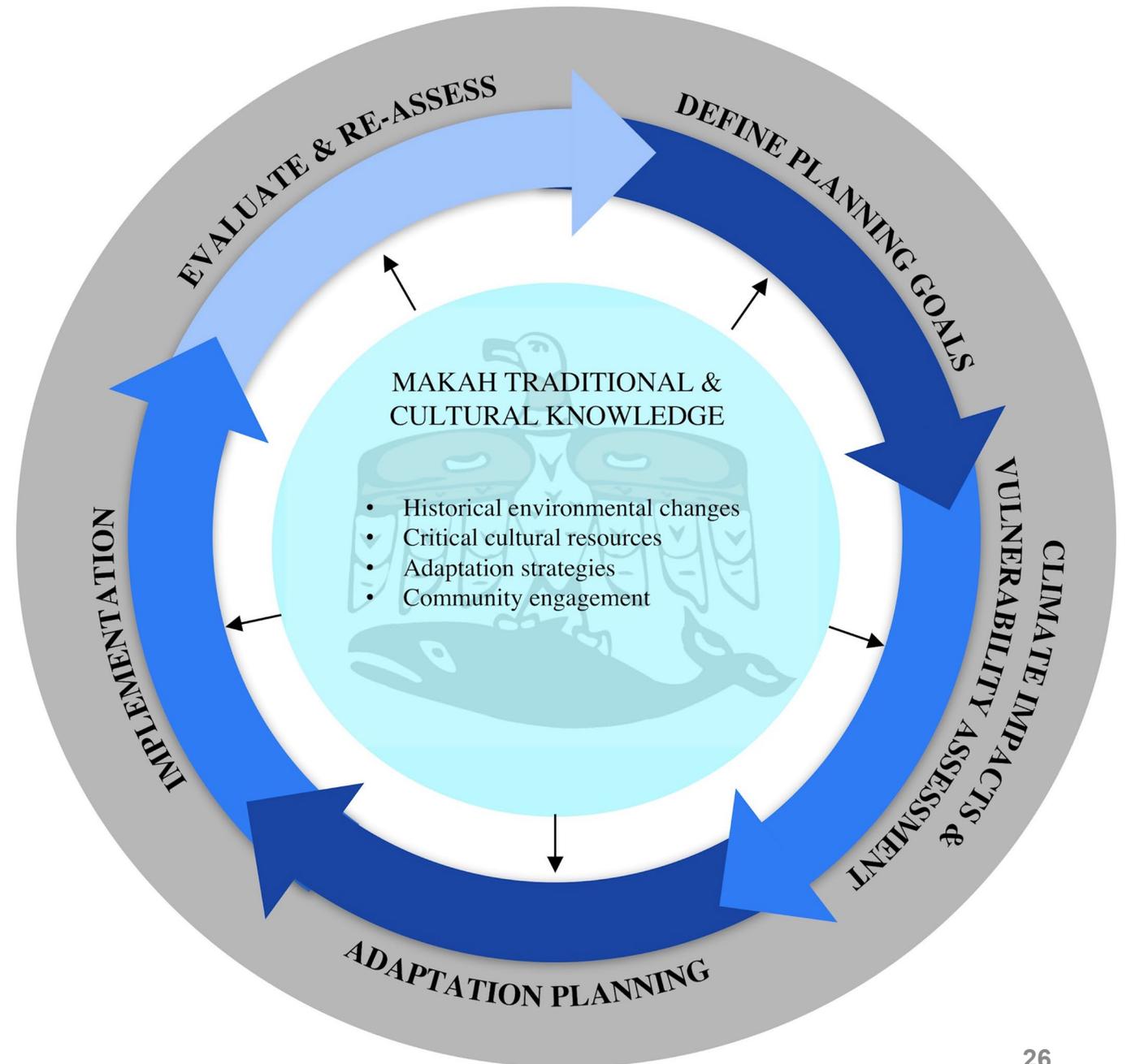
- Katie Wrubel: Natural Resources Policy Analyst
- Seraphina Gagnon: Project Coordinator I
- Michael Chang: Climate Change Consultant
- Zak Greene: Former Climate Change Consultant
- Dana Sarff: Former Environmental Division Manager
- Haley Kennard: Hershman Marine Policy Fellow
- Stephanie Martin: Habitat Division Manager
- Doug Sternback: Air Quality Specialist
- Aaron Parker: Former Water Quality Specialist
- Riley Smith, Water Quality Specialist
- Adrienne Akmajian: Marine Ecologist
- Chad Bovechop: Office of Marine Affairs Manager
- Laura Nelson: Marine Affairs Consultant
- Forrest Howk: Former Marine Affairs Consultant
- Rob McCoy: Forestry Manager
- Shannon Murphie: Wildlife Biologist
- Dave Herda: GIS Manager
- Rebekah Monette: Historic Preservation Officer
- Michelle Smith: Planner III
- Jerry Gardener: Former Emergency Management Coordinator
- Rickson Kanichy: Emergency Management Coordinator
- Patty Manuel: Operations Director
- Dave Lucas: Public Works Manager
- Patrick Anderson: Former Makah Clinic Director
- Roxanna Phillips: Makah Clinic
- Danielle Edelman: Marine Policy Fellow

## Advisors

- Russell Svec: Fisheries Director
- Ray Colby: Assistant Fisheries Director
- Hap Leon: Fisheries Biometrician

# Makah Traditional and Local Knowledge Framework

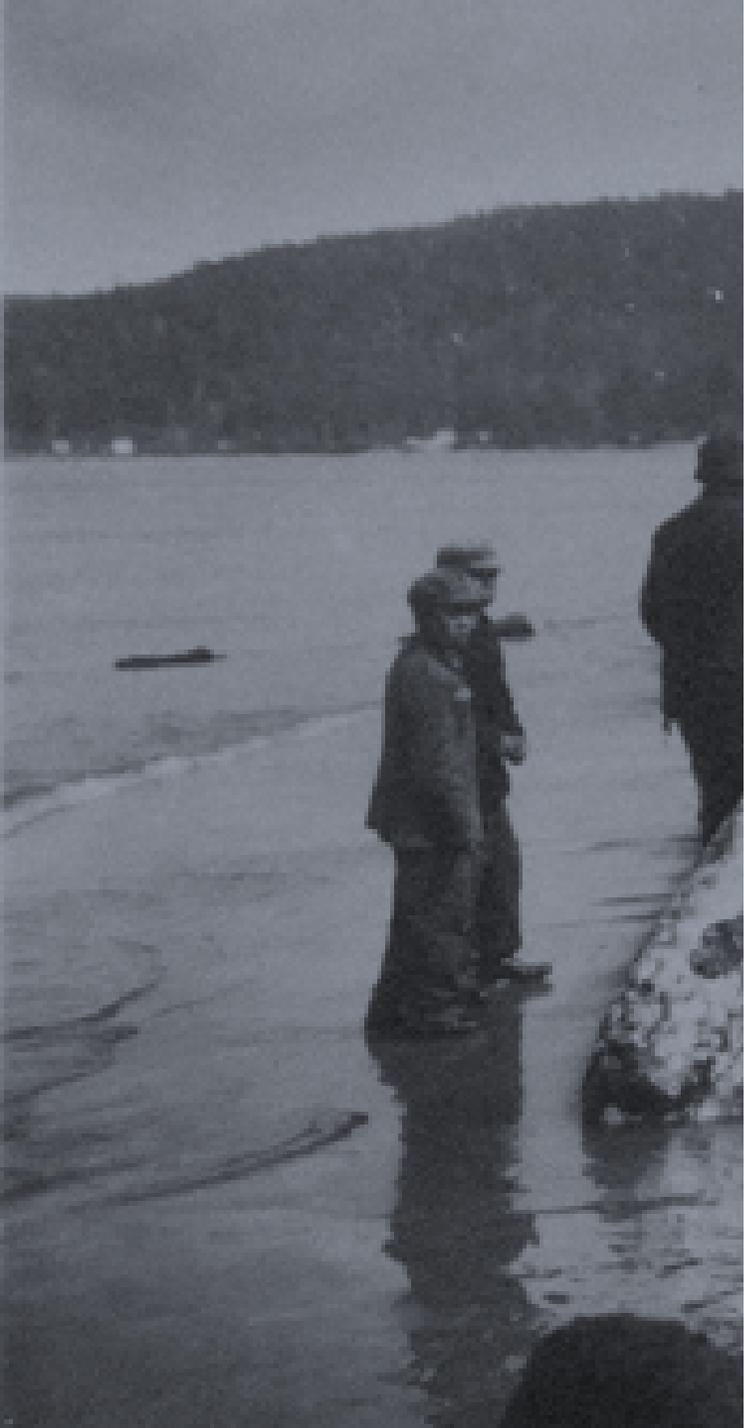
- Define historical baselines and observational environmental changes;
- Identify critical cultural resources and activities;
- Identify culturally-relevant adaptation strategies;
- And be able to engage the community into the climate planning process.



# Ethical Considerations

---

- Usage of the term “climate adaptation” within Indigenous communities context
- Methods of gathering TK -> “Free, Prior, and Informed Consent”
- Considerations around complementing Western science with TK



# Defining Traditional Knowledge

“TK or TEK is built on personal experience and interaction with peers, including people from other communities and passed on through stories, apprenticeship, and practice. It can be understood as knowledge and skills that are fluid, dynamic, flexible, adaptable, and continually updated and revised in light of new observations and experiences, and it can incorporate new technologies alongside the traditional.”

– Pearce et al. 2015, pg. 235



# *Historical baselines & observational changes*

---

- Why: This directly informs Makah Tribe's planning goals and helps fill in gaps in Western science monitoring efforts.
- How: Utilized TK interviews and archival data from Makah Cultural Research Center.
- Example: Using archaeological evidence from 1969-70; 1990s subsistence surveys to determine historical resource use, abundance, and habitat



# *Identify critical cultural resources*

---

Why: Help identify critical resources and relationships important for the Makah culture and community.

How: Utilized from 2018 TK interviews, 2017 & 2018 community surveys; archival research

Example: 1990s and 2018 subsistence surveys; 2018 TK interviews

“Being on the water – I have to be. There is nothing like it. The water draws me to it. The ocean draws me to it, and I just need to be out there.” – Makah commercial and subsistence fisherman, 49 y.o.

# *Identifying culturally-relevant adaptation strategies*

---

Why: Provides a suite of culturally-relevant adaptation strategies that aims to address community priorities.

How: 2017 & 2018 community surveys; 2018 TK interviews

Examples: Support the teaching and learning of traditional and cultural foods at Neah Bay school; sharing of harvest methods and food preparation across generations; emphasizing community events to increase social cohesion



# *Community Engagement*

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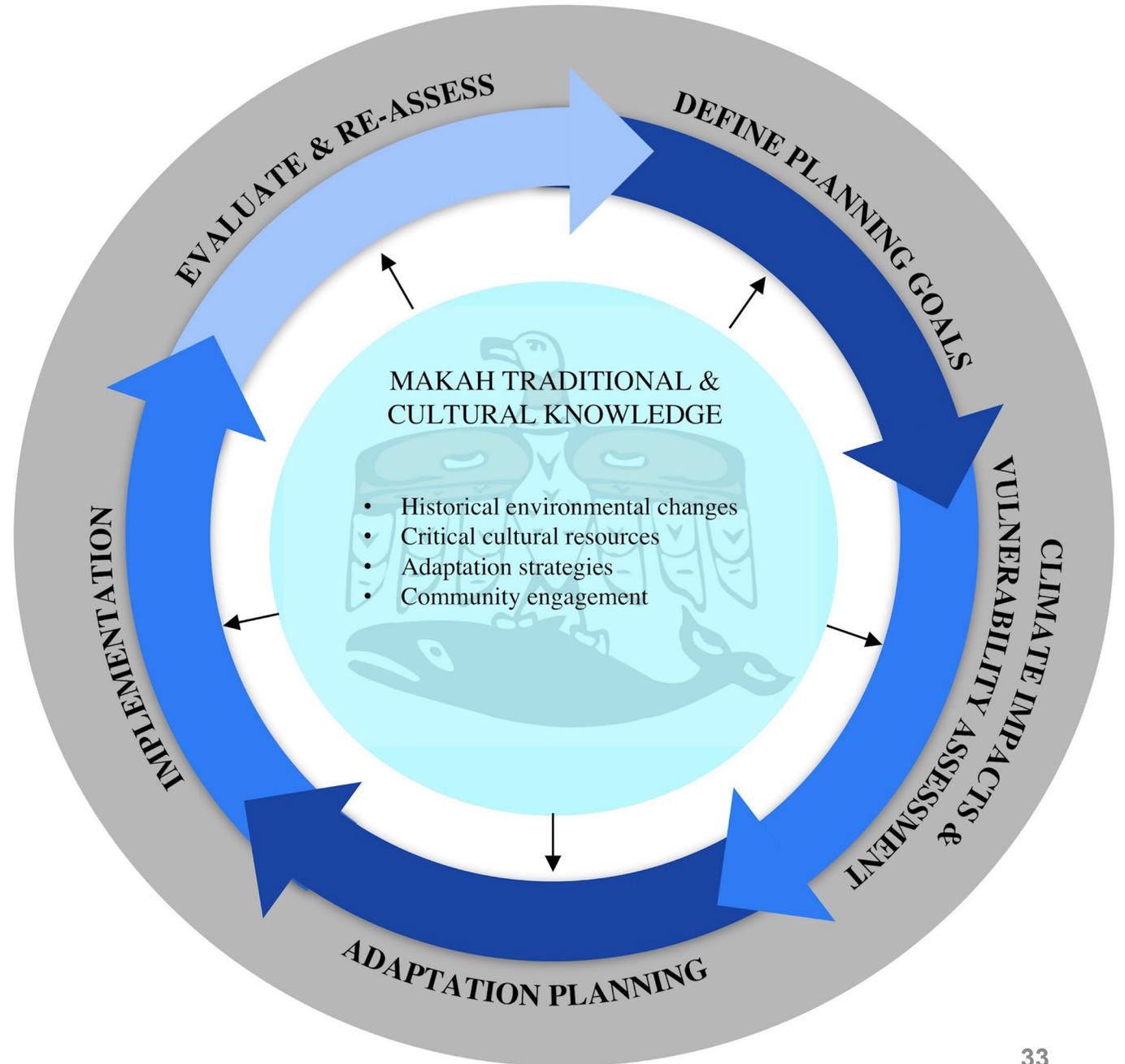
Why: Using TK, the Makah community is able to engage and connect their experiences directly to climate change; creates “buy-in” from the community into the planning outputs

How: 2017 & 2018 community surveys

Examples: Framing climate impacts into cultural activities and subsistence activities; 80% supports climate adaptation work for the Tribe; continued engagement with speaker series on climate impacts, historical and cultural activities, and current research.

## Makah Traditional and Local Knowledge Framework: Lessons Forward

- Not the end all be all – still learning and framing and changing
- Opportunistic data!
- Ethical considerations





Questions?

## Contact Information

Michael Chang, Climate  
Adaptation Specialist

[m.hsu.chang@gmail.com](mailto:m.hsu.chang@gmail.com)

Danielle Edelman

WSG State Fellow, Makah Tribe

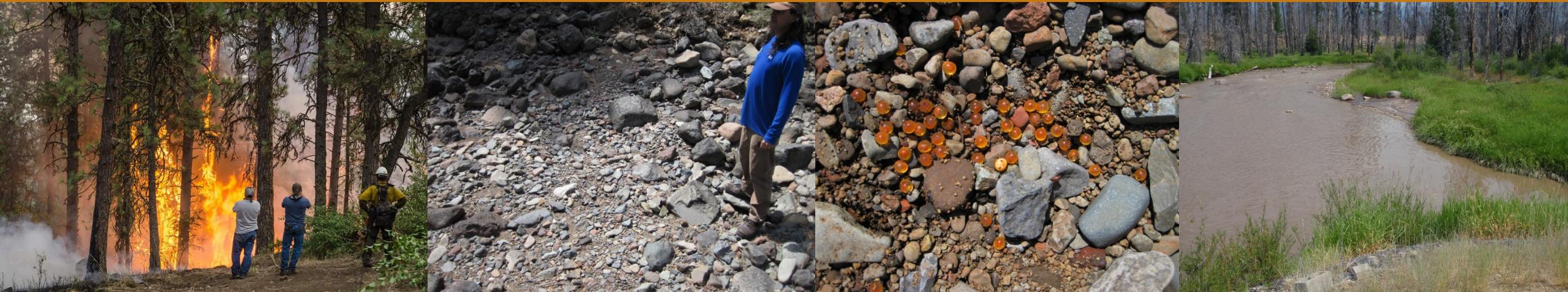
[de.edelman@gmail.com](mailto:de.edelman@gmail.com)

# Poll 2



# The Nimíipuu A Climate Change Story

Stefanie Krantz – Climate Change Coordinator  
[stefaniek@nezperce.org](mailto:stefaniek@nezperce.org)



# PROCESS

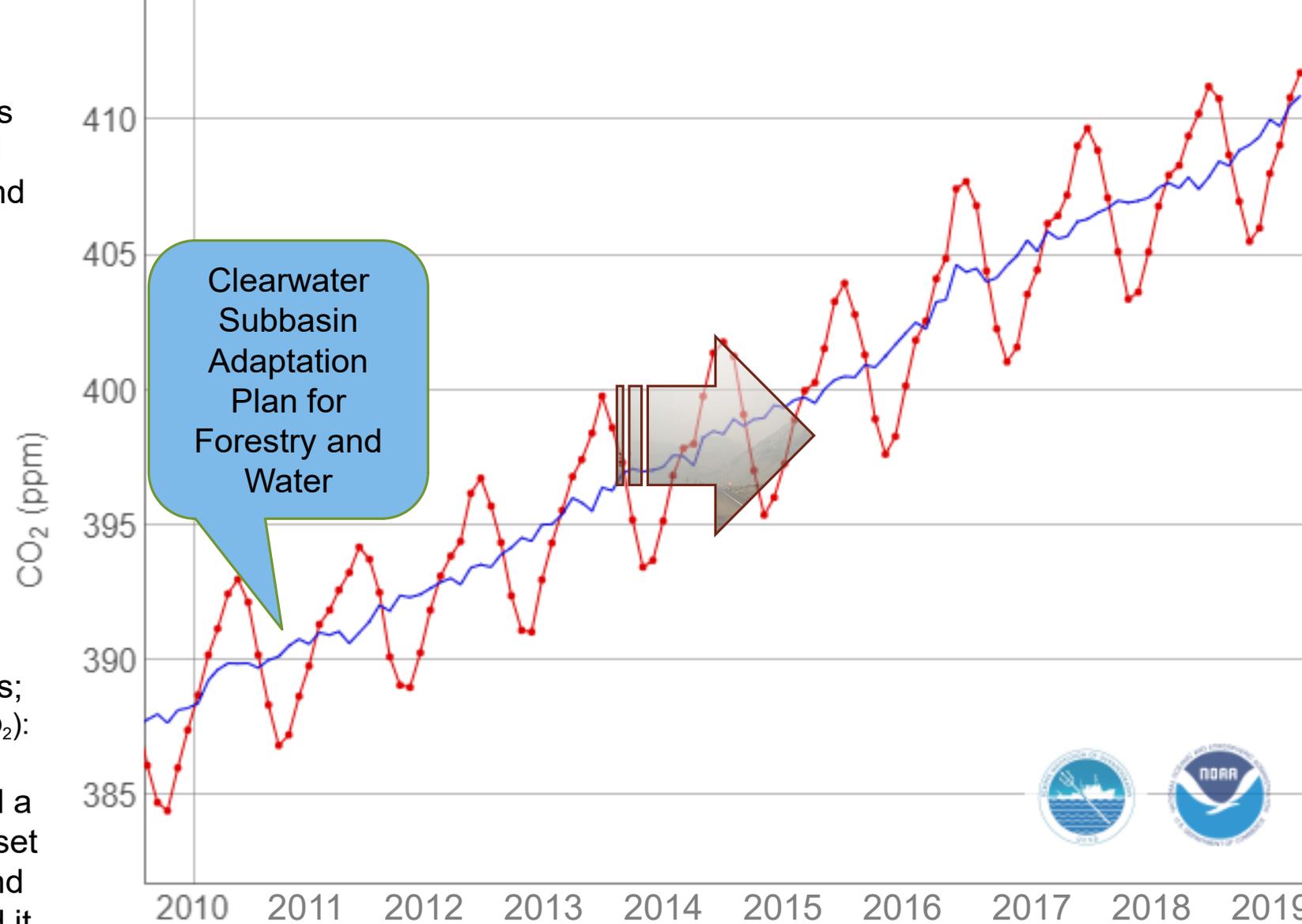


Camus along Clearwater River in Northern Idaho  
Source: Columbia River Intertribal Fish Commission

- Driven by Tribal Leadership, Staff, community
- Comprehensive
- Local staff
- Funding
- Vision: mitigation and sustainability
- Western science and traditional science

# Timeline of Nimípuu Climate Planning Process

Ancestors survived ice age and ice age floods



Clearwater Subbasin Adaptation Plan for Forestry and Water

Mid 1990s; (350 ppm CO<sub>2</sub>): Tribe developed a carbon offset project and completed it by 2010

2005 to present (380 ppm) NPT Fisheries working on project to end diversion of water from Reservation Creeks to cool water and protect critical habitat for salmonids.

Hover over the graph to display values for specific dates

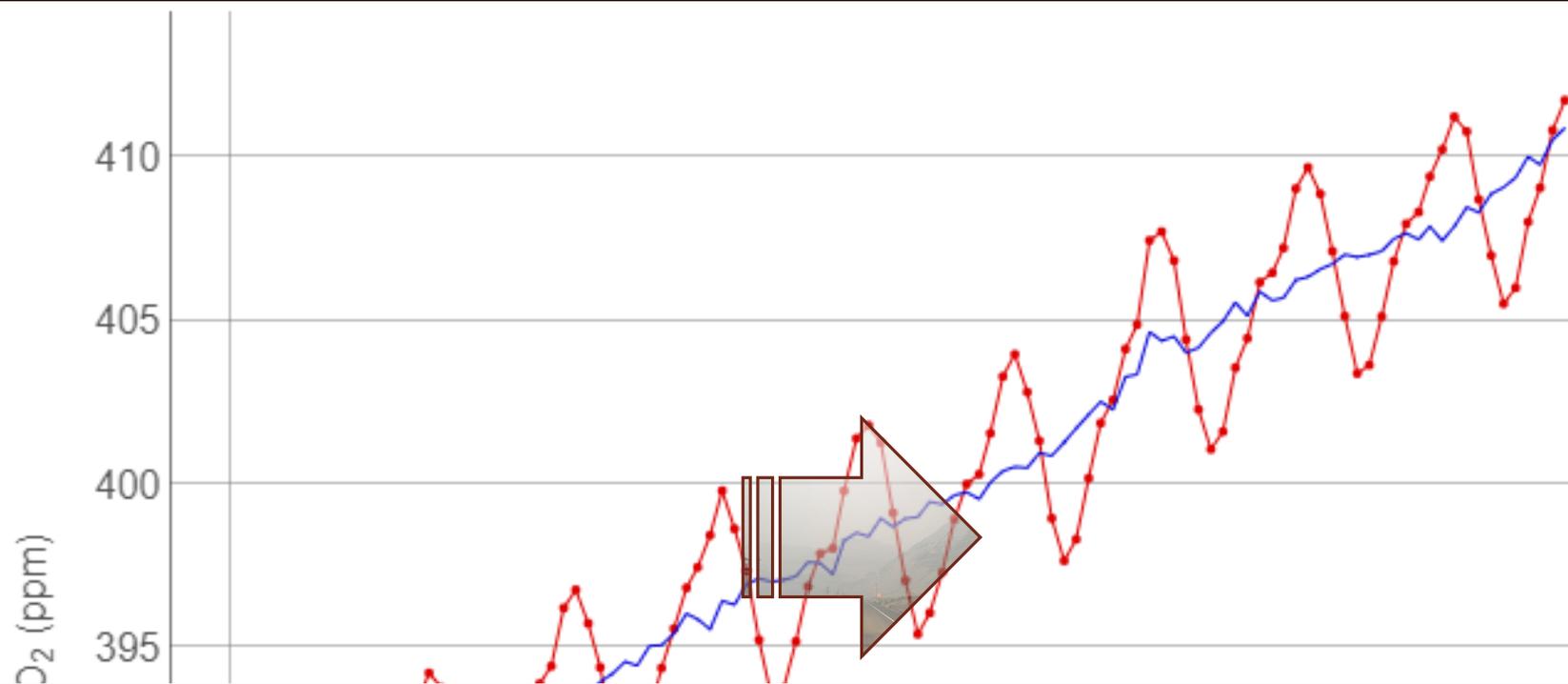
— co2  
— trend

Display:

co2  
 trend



- CAP: Climate Action Plan
- CO<sub>2</sub>: Carbon Dioxide
- CSA: Climate Smart Agriculture
- DFRM: Department of Fisheries Resources Management
- DNR: Department of Natural Resources
- ITEP: Institute for Tribal Environmental Professionals
- NPT: Nez Perce Tribe
- NPTEC: Nez Perce Tribal Executive Committee
- RPI: Rights Protection Implementation
- VA: Vulnerability Assessment



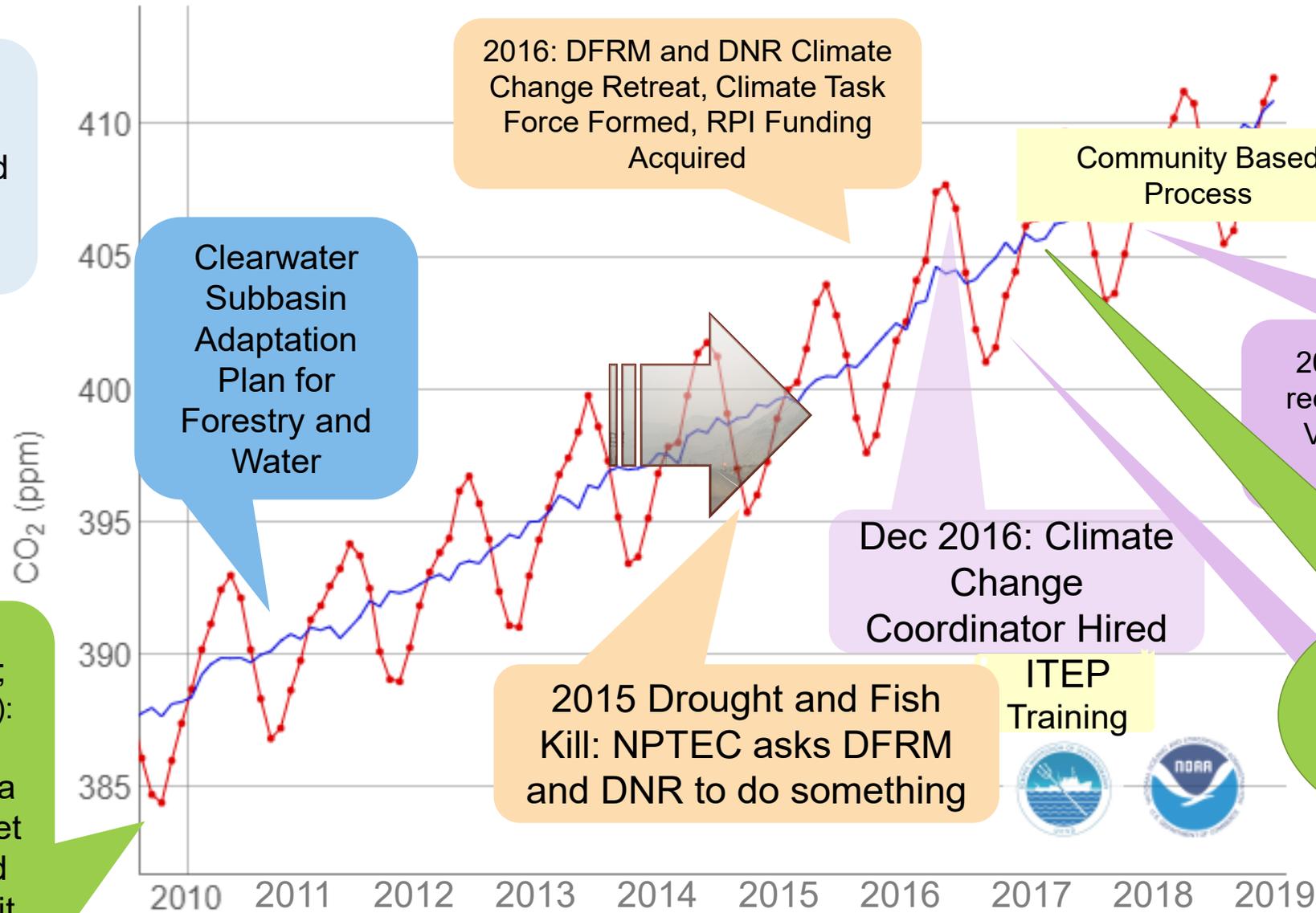
Hover over the graph to display values for specific dates

- **co2**
- **trend**

- Display:
- co2**
  - trend**



# Timeline of Nimípuu Climate Planning Process



Ancestors survived ice age and ice age floods

Clearwater Subbasin Adaptation Plan for Forestry and Water

Mid 1990s; (350 ppm CO<sub>2</sub>): Tribe developed a carbon offset project and completed it by 2010

2005 to present (380 ppm) NPT Fisheries working on project to end diversion of water from Reservation Creeks to cool water and protect critical habitat for salmonids.

2016: DFRM and DNR Climate Change Retreat, Climate Task Force Formed, RPI Funding Acquired

2015 Drought and Fish Kill: NPTEC asks DFRM and DNR to do something

Dec 2016: Climate Change Coordinator Hired



ITEP Training

2017 & 2018: Climate Program received additional funding to do VA and CAP, Surveys, Toolkit, Workshop, & CSA Projects

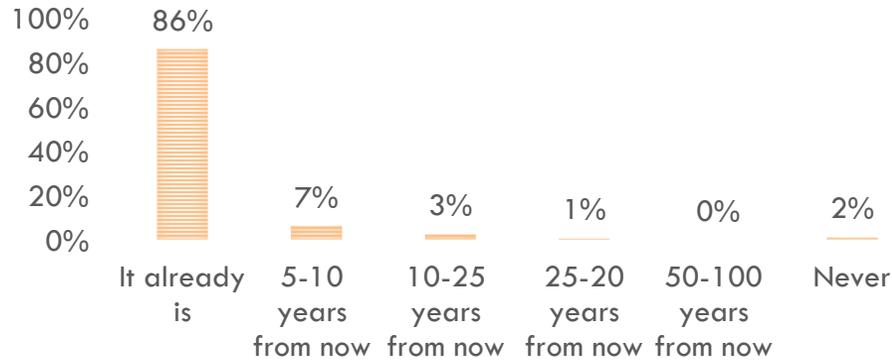
2017: Short-Term Climate Mitigation Measures Passed

June 2017: Climate Change Interns Hired

VA in review, Toolkit in testing, & Climate Smart Ag & CAP Project Ongoing, Climate Smart Workshops Planned

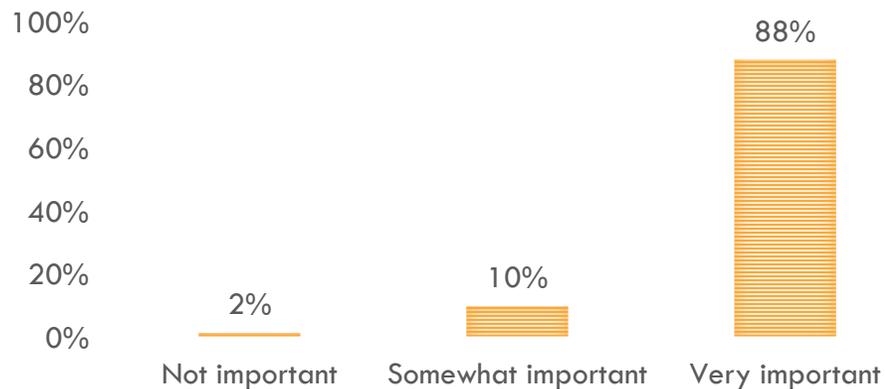
Community Based Process

**WHEN DO YOU THINK CLIMATE CHANGE WILL START HARMING TREATY-RESERVED RESOURCES ON AND OFF-RESERVATION?**



“These changes have impacted my family personally for years now. We have experienced lower numbers in herd animals that we hunt. We have experienced less and dry roots and berries because of extreme temperatures and lack of snow pack. The snow run off is going faster than ever so the river gets low fast which prevents us from certain fishing. Invasive species are starting to cover sections of land that used to be covered by native plants and species.”

**HOW IMPORTANT IS IT FOR THE NEZ PERCE TRIBE TO FOCUS ON ADAPTING TO THE IMPACTS OF CLIMATE CHANGE?**



“Climate change could literally change our entire way of being and doing. This is alarming.”

“All I know is that we are greatly impacted as a tribal people. We can pass our knowledge to the next generation - but if we do not in some way preserve this land for our future, what will we have to pass on?”



The Seasonal Round is an integral part of  
Nez Perce Culture

Hunting Impacts: emerging diseases, tick and other pest outbreaks, changing migration patterns, and droughts followed by winters with heavy snows.



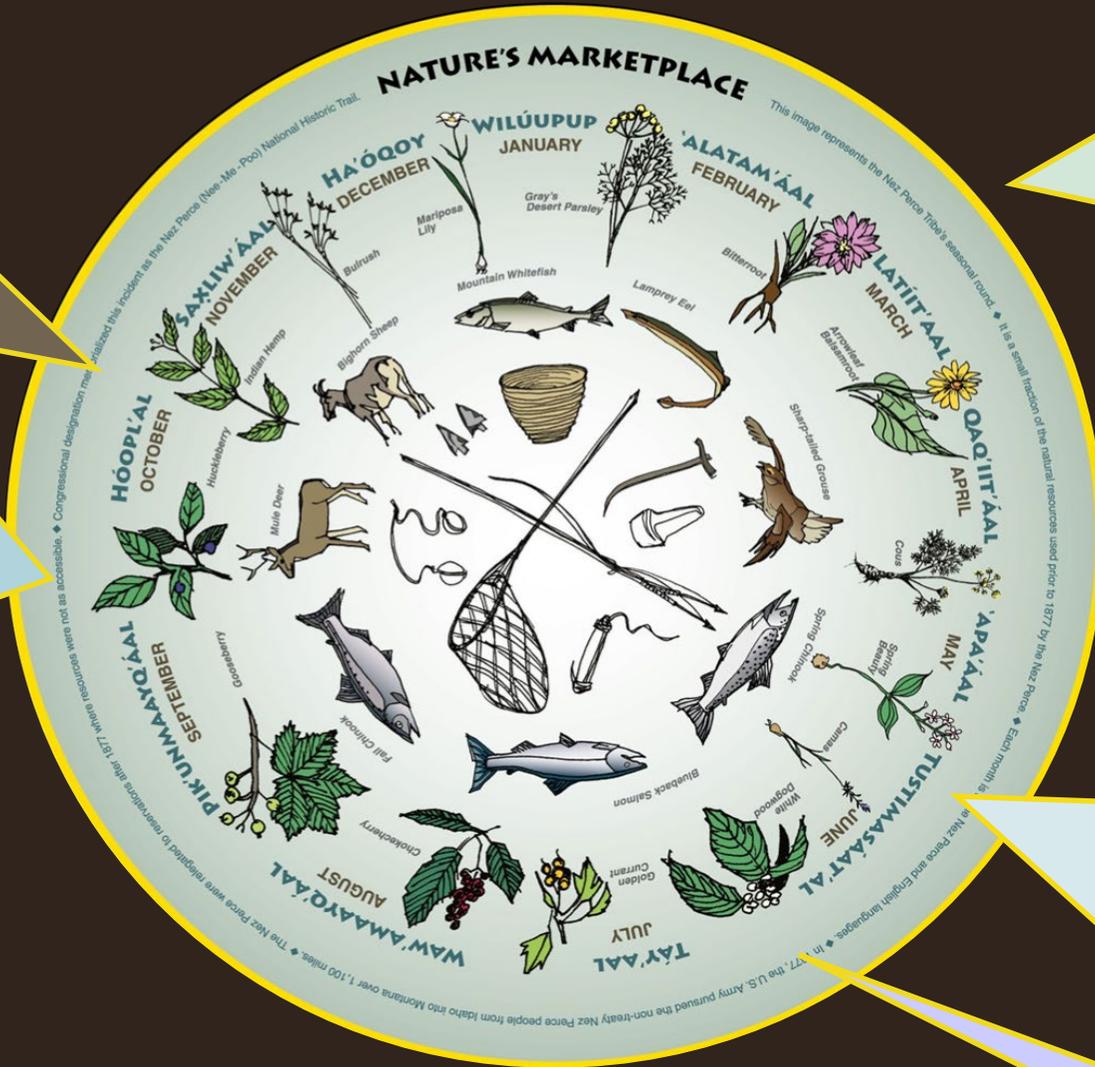
Roots like Camas: Size, quality, and abundance has changed. The hydrology of forests is changing, and wetland plants like camas are affected.



Wildfire Impacts: Hunting and gathering, Public health, Infrastructure, and economic



The Seasonal Round is an integral part of Nez Perce Culture



Gathering Impacts:

- Timing of early spring wild foods has changed
- Gathering period shortened
- Ancient gathering sites impacted



Salmonids and Fishing:

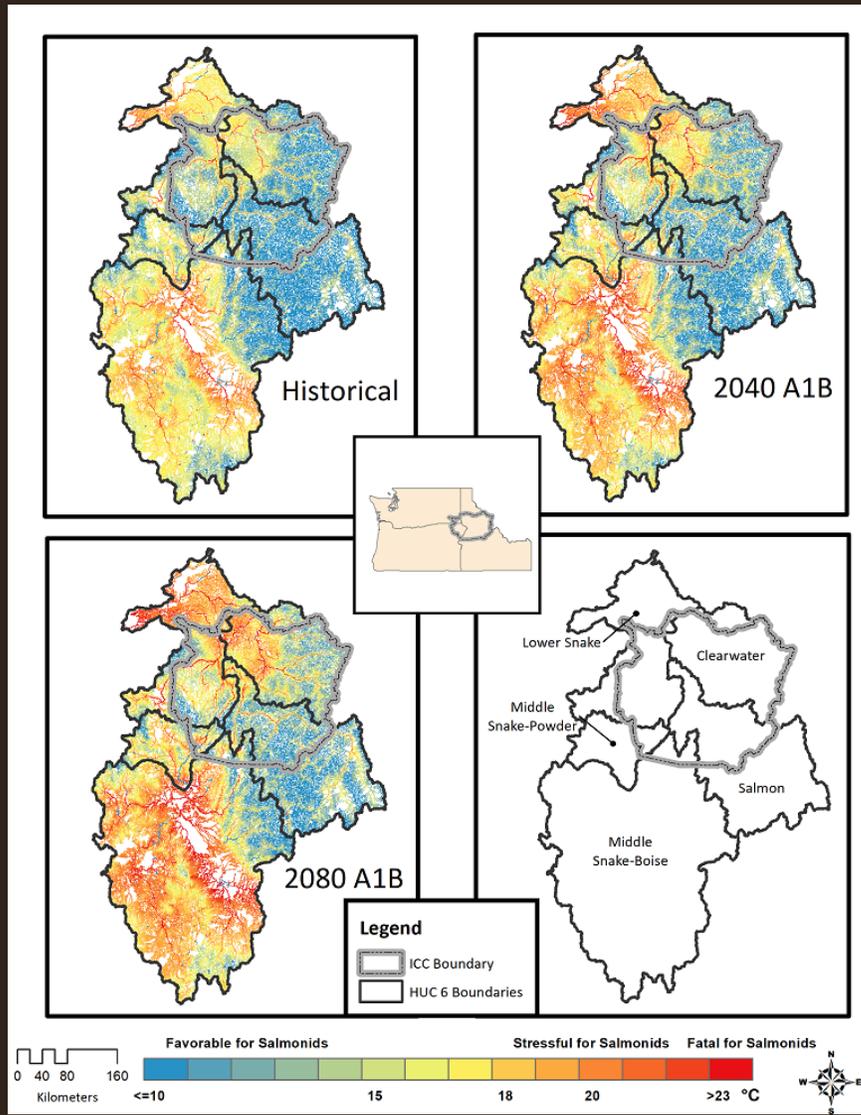
- Lethal water temperatures
- Redds in dry creek beds
- Every part of the life cycle of migratory fish impacted
- Returns have been so low that subsistence fishing has been severely impacted.



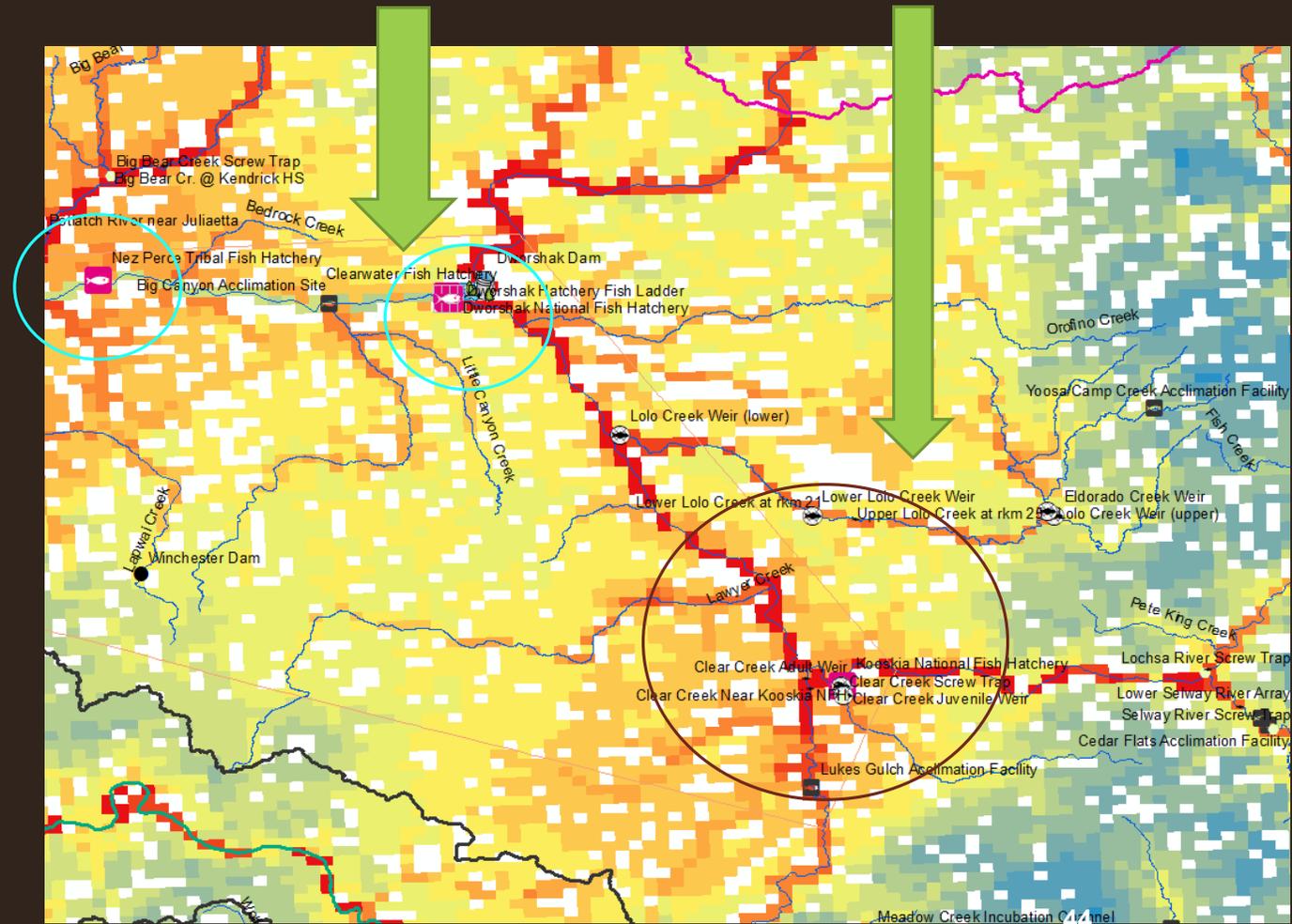
Berries: Distribution, timing, and quality is changing



# SAMPLE OF TECHNICAL WORK



Note the river temperature below and above Dworshak Dam and at the Kooskia Fish Hatchery and acclimation sites upriver.



# SUCCESSSES, BLESSINGS, AND CHALLENGES

- Good reports/models/maps to help
- Climate Impacts toolkit
- Meetings – capacity – overwhelmed staff
- Learning the ropes – of process and people
- Getting involved
- Education– informal and formal
- The Nimíipuu are a Resilient People
- Extreme events were a call to action
- Tribe already had completed some climate work
- The Tribe JUST STARTED A CLIMATE CHANGE AND ENERGY SUBCOMMITTEE – WHU WHOOOO!!!



# In 2017, The Nez Perce Tribe Adopted Short Term Mitigation Measures that focus on...

- ✓ Reducing Transportation Emissions
  - ✓ Reducing Energy Use & Transitioning to Renewables
- ✓ Reducing solid waste and transitioning to biodegradable alternatives
  - ✓ Planning for more aggressive cuts to our carbon footprint



# Vision of a resilient future....

Restored Community

Restored Biodiversity

Restored Hydrology

Restored Fish

Restored Health

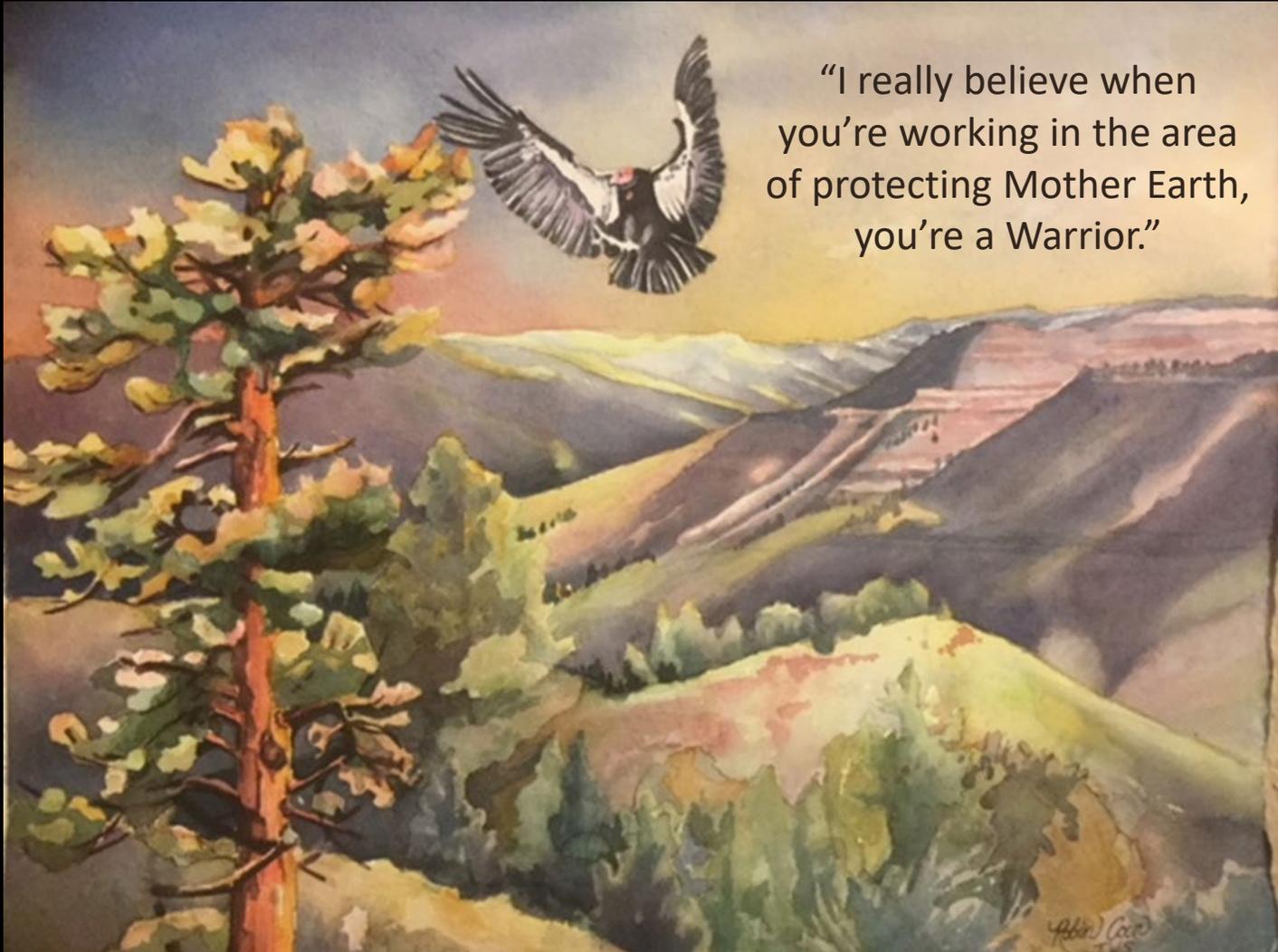
Restored Wealth

Sustainable Economy





# Qe 'ci 'yéw 'yew



“Climate is changing, *there’s no question about it,*” ...

It’s here.

We’ve just got to figure out how we’re going to cope with it.

And *WE’VE GOT TO SLOW IT DOWN.*

Now, reversing it is going to be *A BIG DARN JOB.*”

~Governor Brad Little

# Poll 3

# Question and Answer Session



# Connect with the State and Local Energy and Environment Program



Erica Bollerud

U.S. Environmental Protection Agency

[Bollerud.Erica@epa.gov](mailto:Bollerud.Erica@epa.gov)

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