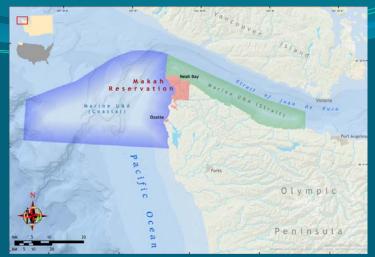


Makah Tribe

- 1855 Treaty of Neah Bay
- •Ceded 300,000 acres of land to the U.S. and reserved the rights to hunt, fish, gather, seal, and whale within surrounding Usual and Accustomed Areas
- Makah identity, culture, and economy are dependent on natural resources, especially from the ocean





Lessons Learned from Climate Assessments

- Dense, Highly Technical Review of Literature
 - Written by scientists for scientists
- Lack of Traditional and Cultural Knowledge Expressed
 - How to complement traditional knowledge with western science?
- Lack of Planning Relevancy
 - How does a vulnerability assessment translate into an adaptation plan? And how can an adaptation plan be implemented?
 - Issue of scale?

Makah Climate Change Workgroup

Core Team

- •Katie Wrubel: Natural Resources Policy Analyst
- Seraphina Gagnon: Project Coordinator I
- Michael Chang: Climate Change Consultant
- Dana Sarff: Former Environmental Division Manager
- Haley Kennard: Hershman Marine Policy Fellow
- Adrianne Akmajian: Marine Ecologist
- Stephanie Martin: Habitat Division Manager
- Doug Sternback: Air Quality Specialist
- Aaron Parker: Former Water Quality Specialist
- •Chad Bowechop: Office of Marine Affairs Manager
- Laura Nelson: Marine Affairs Consultant
- •Forrest Howk: Former Hershman Fellow

- Rob McCoy: Wildlife Manager
- •Shannon Murphie: Wildlife Biologist
- •Dave Herda: GIS Manager
- •Rebekah Monette: Historic Preservation Officer
- •Michelle Smith: Planner III
- Rickson Kanichy: Emergency Management Coordinator
- •Patty Manuel: Operations Manager
- Dave Lucas: Public Works Director
- Patrick Anderson: Makah Clinic Director

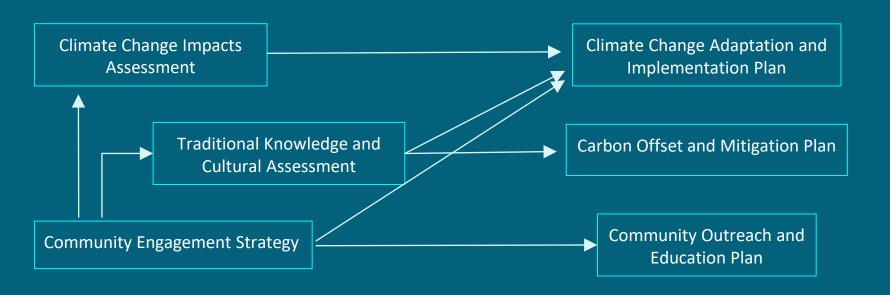
Advisors

Russell Svec: Fisheries Director

Ray Colby: Assistant Fisheries Director

Hap Leon: Fisheries Biometrician

Climate Adaptation Logic Model



Climate Change Planning

Makah Climate Impacts Assessment

- Reviews current Western science publications for consensus <u>climate impacts</u> relevant to Makah
- Five Sections (Terrestrial, Marine, Aquatic, Infrastructure, & Health)

Species Vulnerability Assessment

- Compilation of 2-page descriptions for each <u>species' vulnerability</u> to projected climate change impacts
- We have over 100 species

Makah Traditional Knowledge Assessment

- Interview Makah tribal members on how cultural activities have been impacted over time
 - Integrate TEK in our impacts assessment and adaptation planning efforts

Community Engagement

- •Surveys on climate impacts, baseline knowledge, and adaption ideas at community dinners
 - February 2017 and October 2018
- •15 Interviews on Climate Change and Ocean Acidification
 - May 2018
- Upcoming workshops on regional vulnerability to ocean acidification
 - With Washington Sea Grant
- Education and Outreach efforts
 - Speaker series on specific topics
 - OA with Drs Jan Newton, Dick Feely, and Nina Bednarsek

Community Impacts Survey

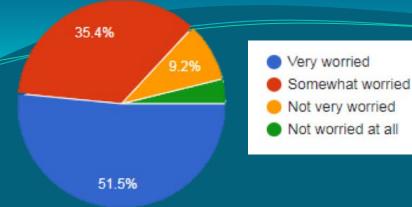
Developed a community survey with the following goals:

- 1. Help us to identify community concerns so that we can address those in the adaptation plan.
- 2. Learn some about the community's understanding of climate change.
- 3. Understand the level of support for climate planning efforts.
- 4. Explore the challenges natural resource managers face when trying to incorporate climate change planning into their work; are there things the CCWG can do to make this easier.

Community Dinner

- Held a dinner in Neah Bay in February 2017.
- Members of the climate change workgroup discussed ongoing and future work.
- Had a table set up for people to take the community survey.

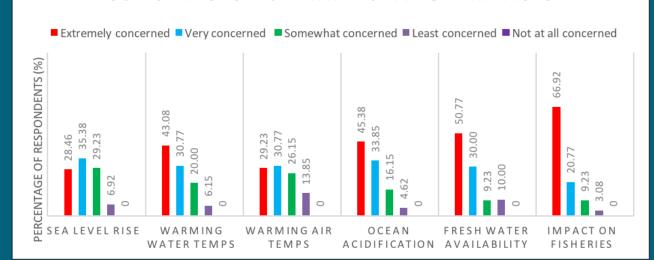




Community members'
level of worry about
climate change impacts to
the Makah Tribe.

Ranked concerns of climate change impacts from the Makah community. Impacts to fisheries ranked the highest concern.





Shift-click to make that word the treet.

ocean

temperature-

decreases in lower level food organisms for higher level fish stocks (less fish)

Sea level fish roads wildlife ice melting

change extinction of whales

weather rising sea levels

acidification early berry harvesting increase of storms impacts on traditional harvest seasons shellfish biota pest control food security water security

feed rise in sea levels heavy weather extreme heat

for our fishes seafoods

conditions changing species w/in U&A Air quality sea level rise

production resulting in a lack of prev for salmonids

acidity ocean refuse ocean and stream fossil fuel contamination education to the public refuse ocean and stream fossil fuel contamination education to the public

and stream fossil fuel contamination education to the public

level is rising more CO2 in the air less animal life animal species going extinct less food warming unexpected weather changes heat waves dry summer

pollution our shellfish whales our dump (old one) is full of PB and POLLUTION

rivers animals weather pollution

on the fishing in this area

life change in migration health etc WATER shortages atmospheric temperature rising.

ocean temperature change extinction of whales

That which to make that good the root.

temperature

water decrease in primary ocean production resulting in a lack of prey for salmonids

quality air quality

causing issues with ocean life change in migration health etc

radioactive fallout from Japan

availability skin safety and quantity quality and quantity of fish air quality

shellfish red tide and other toxins

quality being a coastal native

marine mammals.

shortages effect on fishing plants and trees atmospheric temperature rising

trees.

security

in summer months

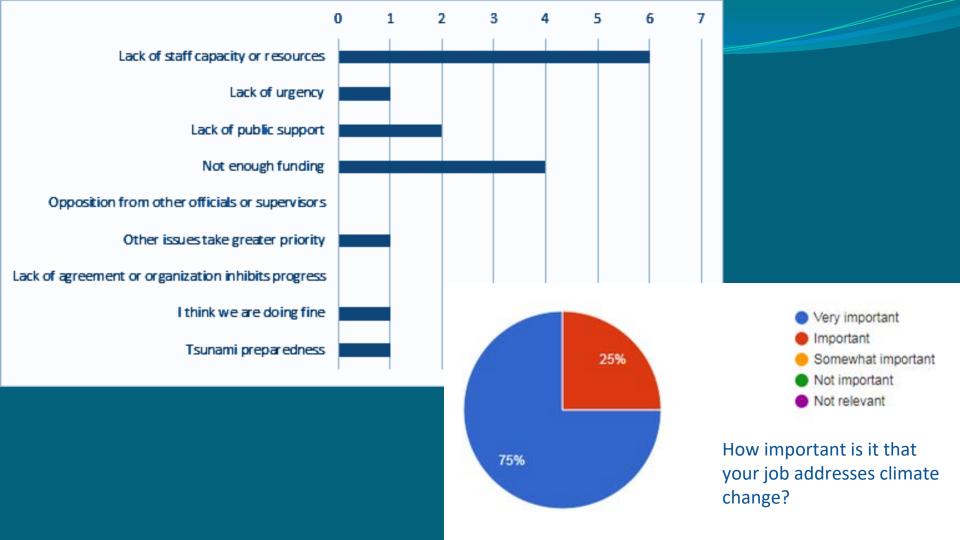
ocean pollution our shellfish whales our dump (old one) is full of PB and POLLUTION

availability.

dry conditions food chain fish life bees shortage dryer summers colder winters more rain in the winter months

levels

water



Climate Adaptation Strategies:

Current Strategies

Makah Fishing Fleet Repower Program

- securing funds to alter fishing fleet engines to become more sustainable and emit less greenhouse gases
- Clean Air-Healthy Woodstoves
- changing old woodstoves for newer, more efficient and sustainable woodstoves for community members
- Energy Audit/Carbon Footprint Analysis
- analysis of energy use from government buildings and implement steps to increase efficiency and decrease **GHG** emissions

Future Strategies

Scoping Water Supply

- Water conservation and mitigation strategies Carbon sequestration
- eelgrass, kelp, timber, etc.



Next Steps

June 2018: Finalized Climate Vulnerability and Impacts Assessment

Fall 2018: Makah Traditional and Cultural Knowledge Assessment

October 2018: Makah community dinner and Adaptation Surveys

Winter 2018: Makah Energy Audit and Carbon Mitigation Plan

2018-2019: Makah Climate Adaptation Plan

Staff workshops and community surveys

Acknowledgments

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Makah Office of Marine Affairs
Washington Sea Grant
Marc Hershman Marine Policy Fellowship









