



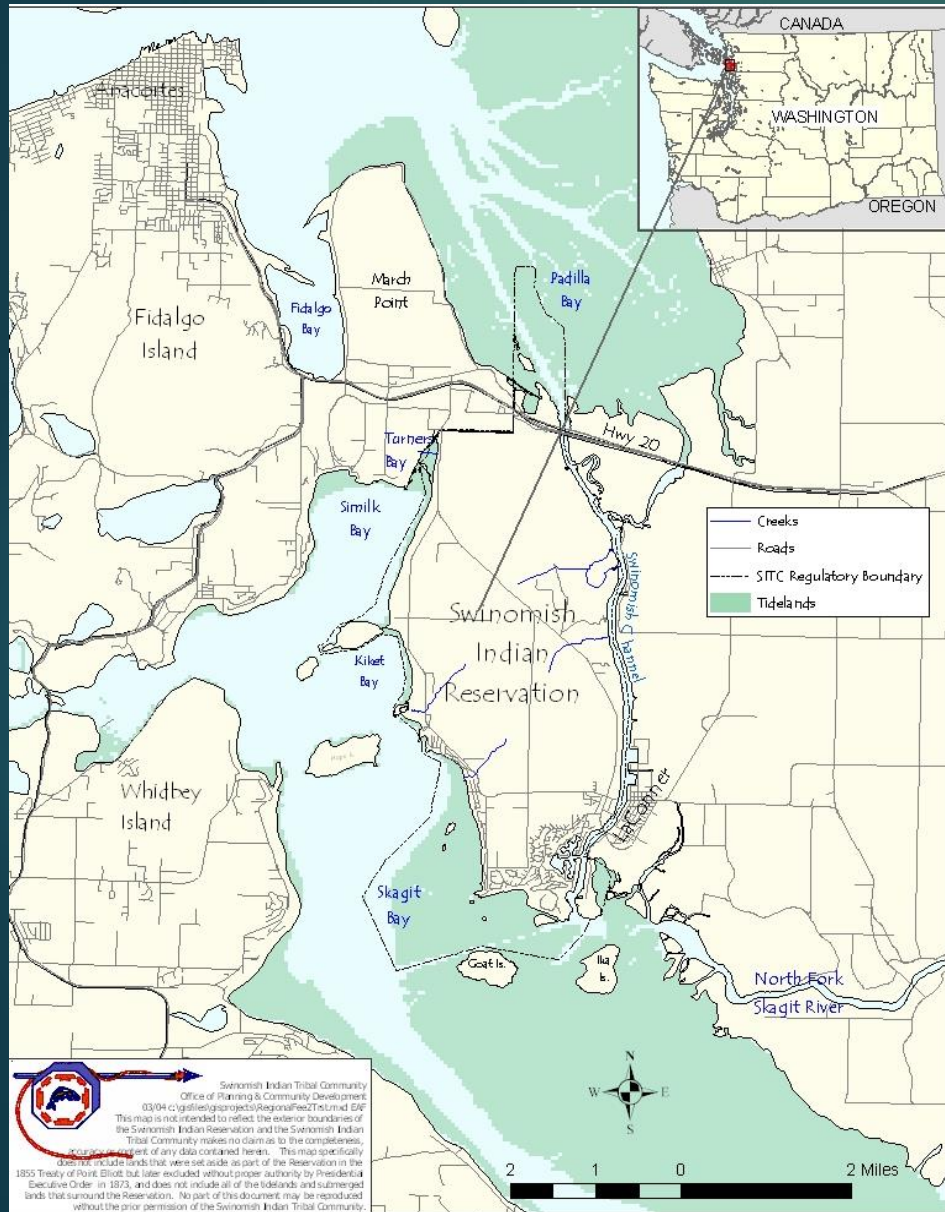
# Swinomish Tribe's Climate-Ready Projects

June 7, 2017

Larry Campbell & Jamie Donatuto  
Community Environmental Health Program  
Swinomish Indian Tribal Community



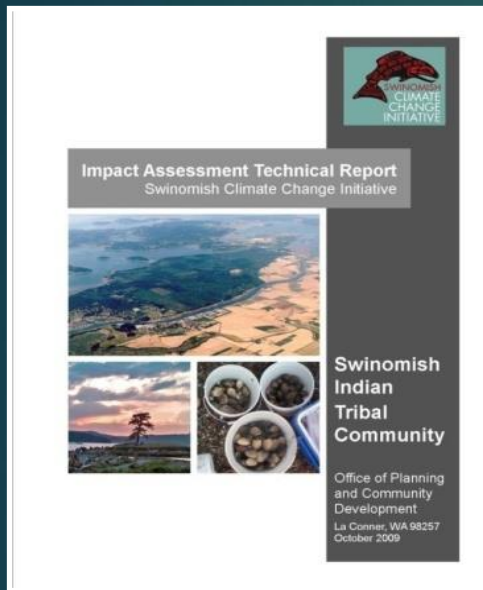
# Swinomish Indian Tribal Community



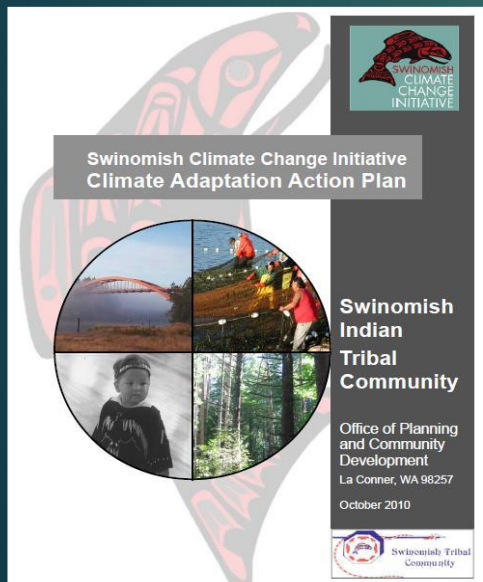
- ▶ Coast Salish people
- ▶ 1855 Treaty of Point Elliott: Sovereign nation
- ▶ Reservation: ~3,000 acres tidelands + ~7,000 acres uplands
  - ▶ Reservation 90% surrounded by water
- ▶ ~950 enrolled members

***“When the tide is out, the table is set.”***

# Swinomish Climate Change Initiative



- Year 1 – Technical Report (2009):
  - Impact assessment
  - Vulnerability assessment
  - Risk analysis



- Year 2 – Action Plan (2010):
  - Review strategies, criteria
  - Assess requirements
  - Develop/prioritize recommendations

[www.swinomish-nsn.gov/climate\\_change/project/reports.html](http://www.swinomish-nsn.gov/climate_change/project/reports.html)

# Impact Assessment: Tribal Resources

## TOO MUCH WATER:



Beach seining



Fishing facilities



Shellfish

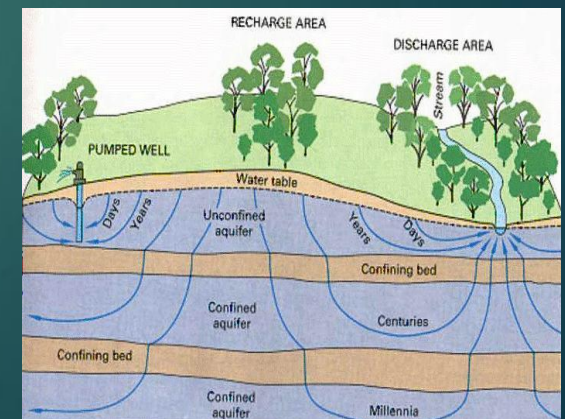
## TOO LITTLE WATER:



Streamflows



Wetlands



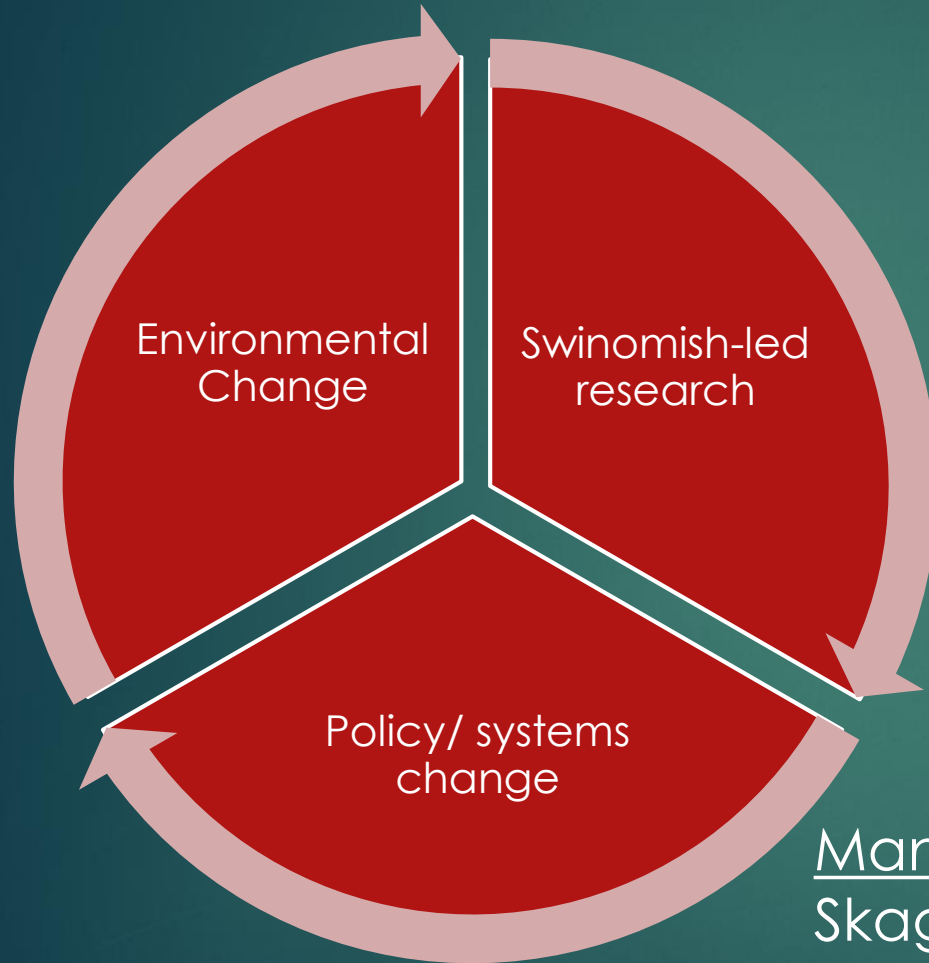
Groundwater recharge

# Impact Scoping Matrix

## Swinomish Climate Change Initiative

POTENTIAL CLIMATE CHANGE IMPACTS BY POLICY SECTORS							20 - 50 YR PROBABILITY: HIGH <---- ----- --> POSSIBLE		
SWINOMISH INDIAN RESERVATION VICINITY							50-100 YR PROBABILITY: HIGH <---- ----- --> POSSIBLE		
IMPACT TYPE:	Inundation	Tidal Surge	Severe Storm	Erosion	Salinization	Temp Δ	Heat Stress	Precip Δ	Nutrient Δ
<b>SECTOR/ELEMENT:</b>									
<b>NATURAL SYSTEMS</b>									
Shoreline/Beaches	High	High	High	High					
Tidelands/Marine Habitat	High			Possible		Possible	Possible		Possible
Fish & Wildlife:									
Shellfish	High	Possible	Possible			Possible	Possible		Possible
Salmon		Possible	Possible			Possible	Possible		Possible
Forage fish		Possible	Possible			Possible	Possible		Possible
Waterfowl/shorebirds		Possible	Possible			Possible	Possible		Possible
Upland wildlife & habitat			High			High	High	Possible	Possible
Water resources:									
Freshwater						Possible	Possible	Possible	Possible

# Swinomish Climate-Ready Projects



- Coastal zone management plan
- Forest carbon sequestration
- Create/ restore First Foods' habitat
- Update Impact Assessment & Action Plan

## Many Partners:

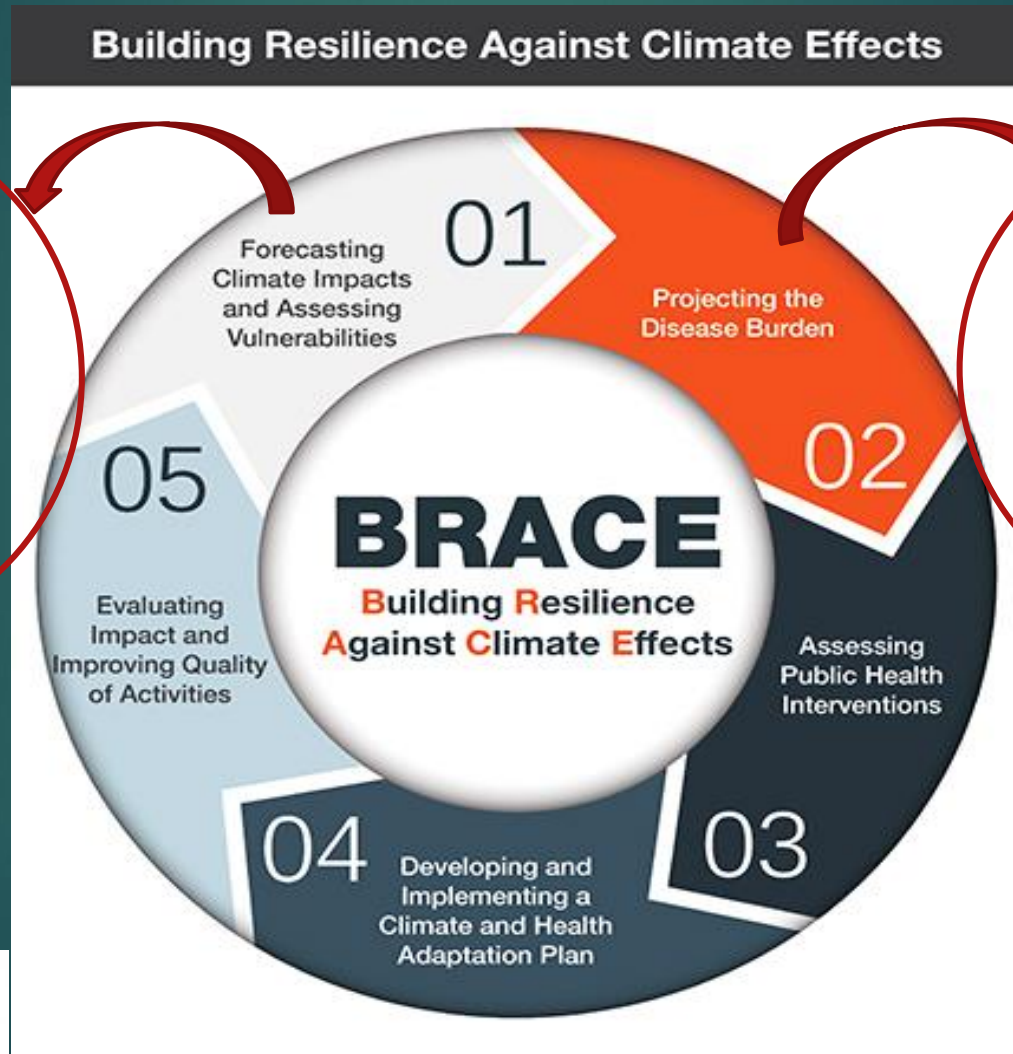
Skagit Climate Science Consortium (SC<sup>2</sup>), UW Climate Impacts Group, Coast Salish Gathering, NIHB and more

# Updating Swinomish Climate Initiatives to include Community Health



*Currently, health assessment focus is on individual, physiological, human health (e.g., heat-related illnesses, respiratory problems, opportunistic viruses such as West Nile)*

# Indigenizing the BRACE framework



Modify w/  
Swinomish  
health  
definitions,  
values, &  
priorities.

Modify w/  
methods  
developed for  
the Indigenous  
Health  
Indicators.



# Indigenizing the BRACE framework: Work to date

- Created a resource list of existing data and materials related to: 1) Swinomish health & climate change; Indigenous health & climate change; and, other pertinent info
- Performed a gap analysis of BRACE steps 1 & 2
- Swinomish-led research on parallel projects, e.g., IHI and First Foods
- Reviewed work with a technical advisory board

~ ʔəshig<sup>w</sup>əd tə adʔiışəd ~

## **COMMUNITY CONNECTION**

Work • Sharing • Relations

~ q<sup>w</sup>iqcut ~

## **RESILIENCE**

Self-Esteem • Identity • Sustainability

~ ǰəçusadad ~

## **EDUCATION**

The Teachings • Elders • Youth

~ talǰcut ~

## **SELF-DETERMINATION**

Healing & Restoration •  
Development • Trust

~ yayusbid ~

## **CULTURAL USE**

Respect & Stewardship • Sense of  
Place • Practice

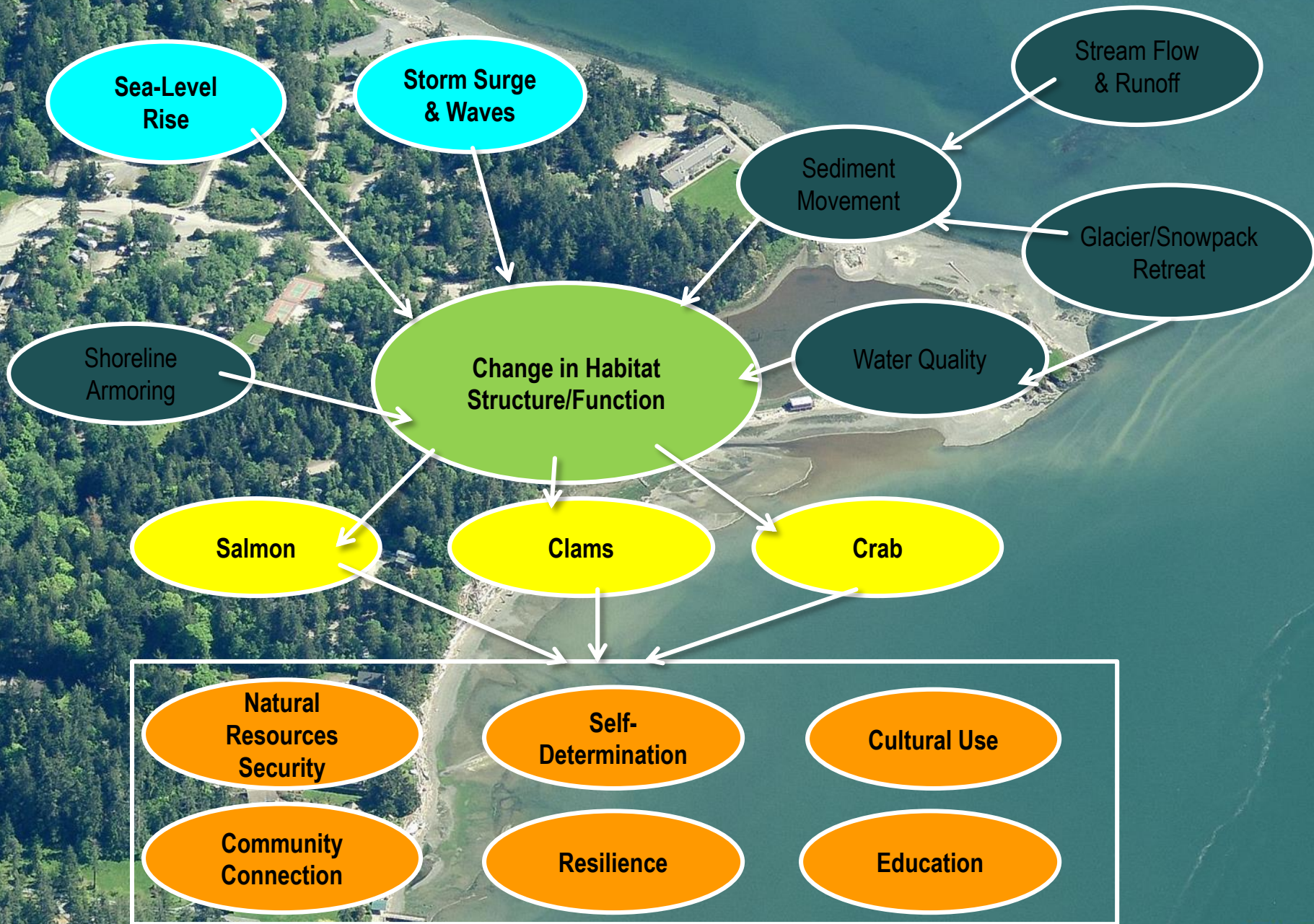
~ sʔutiǰdx<sup>w</sup> ti swatix<sup>w</sup>təd ~

## **NATURAL RESOURCE SECURITY**

Quality • Access • Safety

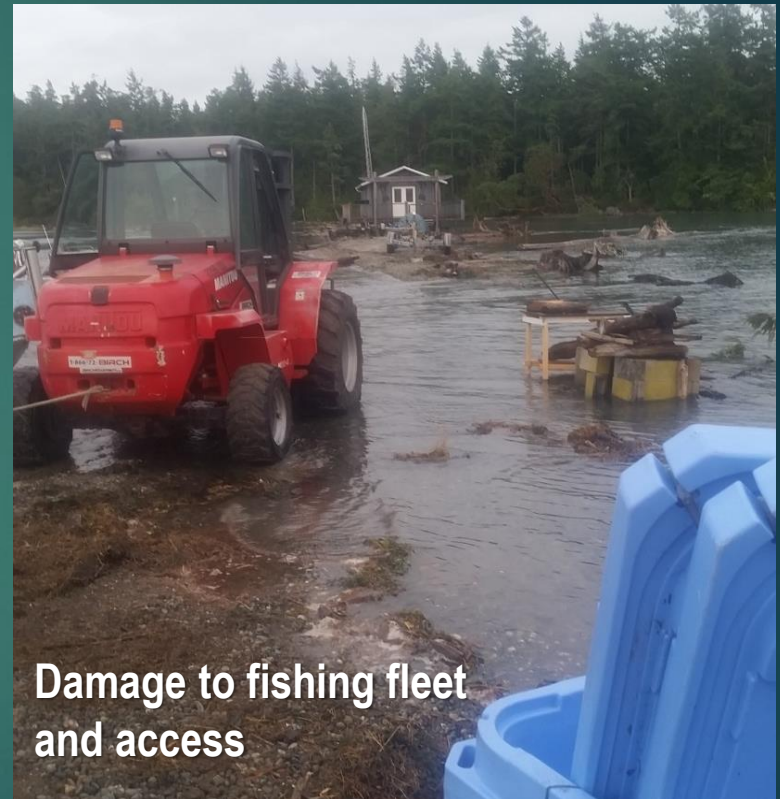
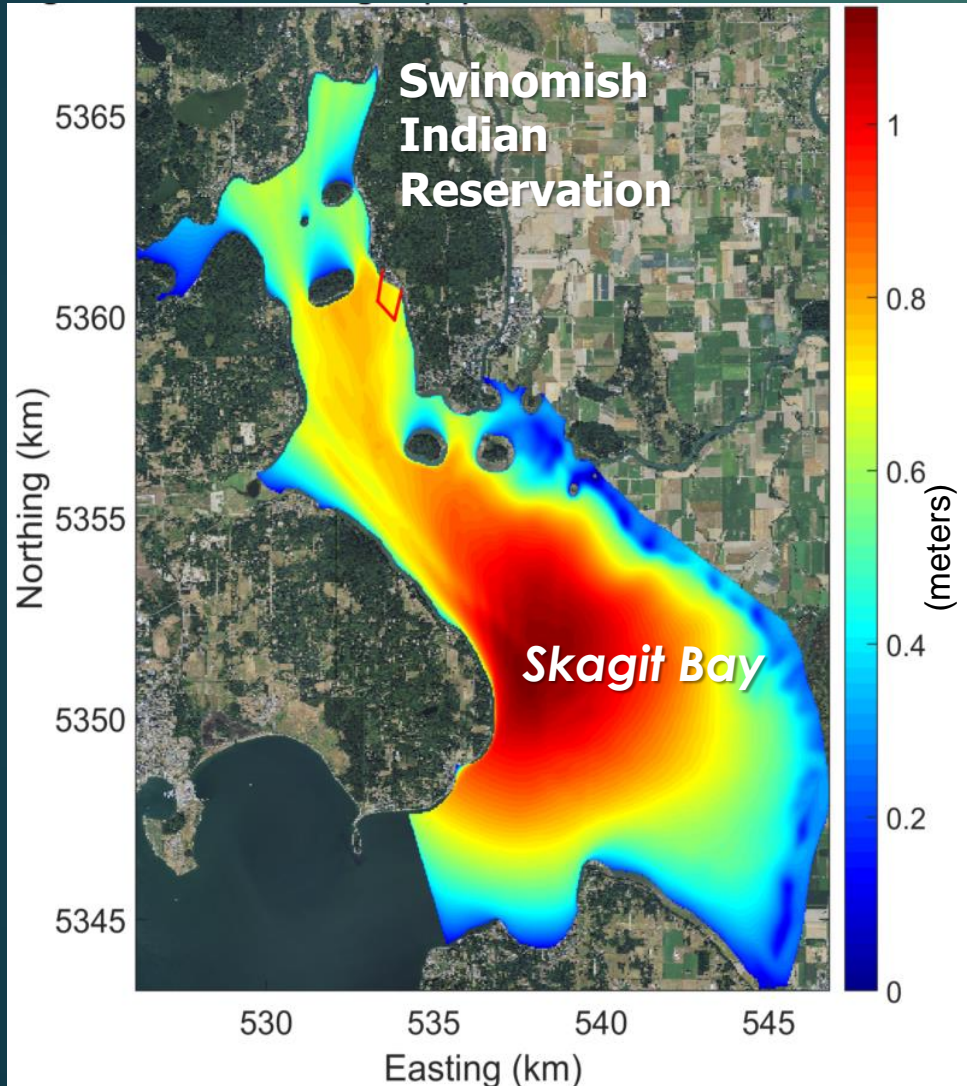


# Coastal Climate Change Impacts to Swinomish First Foods and Indigenous Health Indicators



# 2015 Summer Storm at Lone Tree

Forecasted wave heights (Aug. 29, 2015)



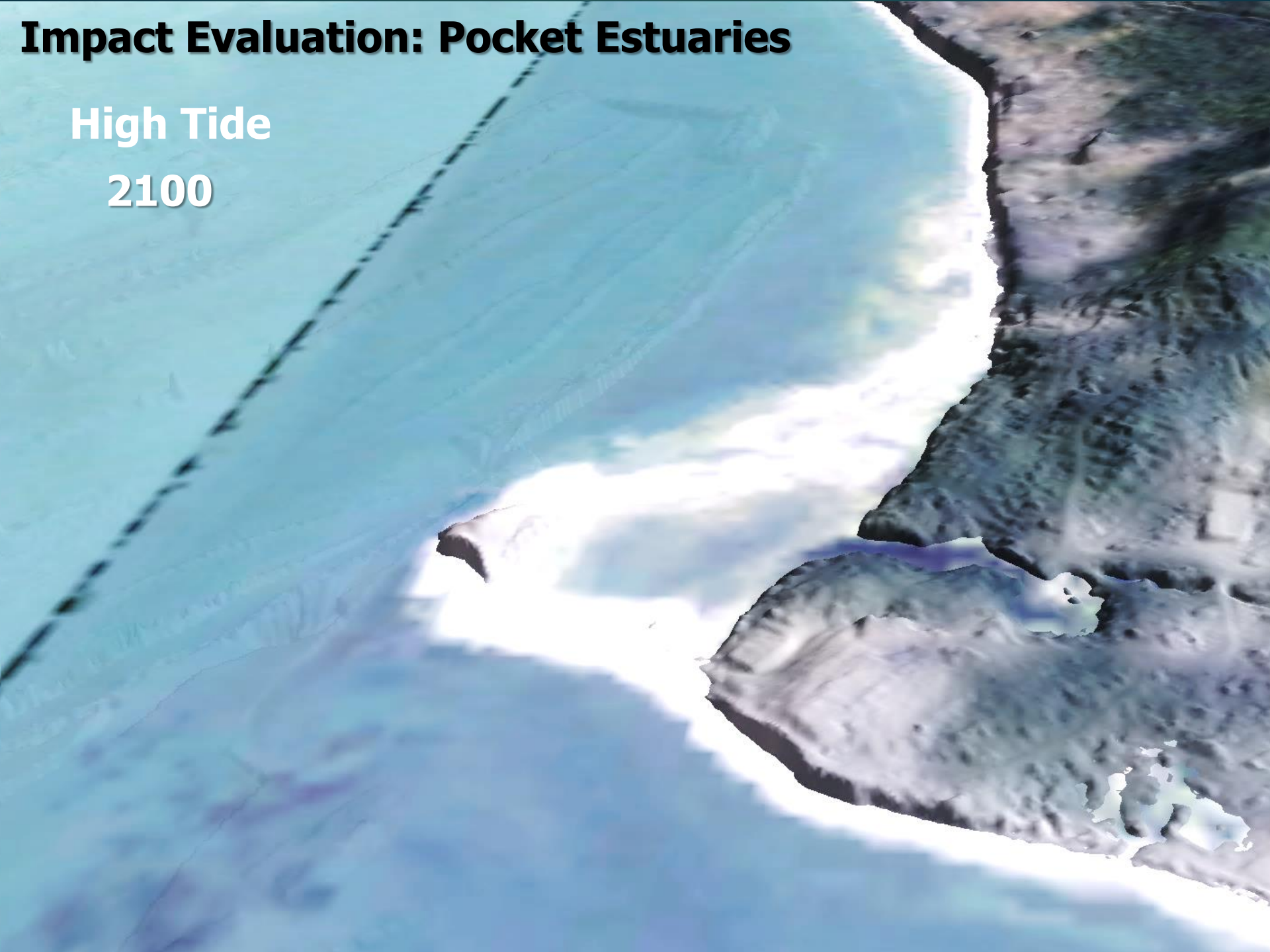
Damage to fishing fleet and access

Impact to salmon habitat (Lone Tree Pocket Estuary)

# Impact Evaluation: Pocket Estuaries

High Tide

2100



# Lone Tree

Clams

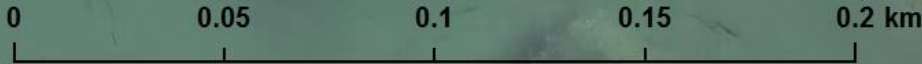
Salmon

Crab

Salmon

Crab

Clams



FIRST FOOD	Lone Tree Lagoon	Risk Key
Salmon	H	HIGH
Crabs	MH	MEDIUM HIGH
Clams	MH	MEDIUM
		MEDIUM LOW
		LOW

# Summary of Risk to First Foods

FIRST FOOD	Similk Beach	Turners Bay	Kukutali Preserve	Lone Tree Lagoon	Snee-Oosh Beach	Martha's Beach
Salmon	M	M	MH	H	M	M
Crabs	MH	M	MH	MH	MH	ML
Clams	MH	M	M	MH	M	NA
Overall (15)	11	9	11	13	10	6

# Projecting Health Impacts from Changes to First Foods Habitats (could be BRACE Step 2)

## SPECIFIC SITES

**1**

Each of the six coastal sites will experience a range of impacts from climate change. **Which do you think are the most important to protect, in order of priority, from these negative effects?**

**INSTRUCTIONS:** Our six coastal sites are spread across two posters. Take six (6) dots and place them next to the sites you believe are priority (one dot on each if they are the same, or more dots on sites that are a higher priority). Write down on a post-it note your own reasons why the site is important.

*Green - highest priority  
Orange - middle  
Pink - low*

SITE	DESCRIPTION	Priority Dots	Comments
<b>SIMILK BEACH</b>	Limited ability for the beach to migrate and moderate exposure to storms make this site vulnerable. Eelgrass beds are currently the only salmon habitat.	6 dots (3 green, 3 orange)	
<b>TURNERS BAY</b>	Turners Bay has the lowest wave impacts and a range of high quality complex habitats with room to adapt.	6 dots (3 green, 3 orange)	<i>idea are there so few pink dots? Get all be green.</i>
<b>KUKUTALI PRESERVE</b>	Rocky bluffs will limit migration of shoreline with sea-level rise.	6 dots (3 green, 3 orange)	<i>I don't know much about Kilet Turners or Similk please teach us and plan field trips</i>

## COMMUNITY HEALTH INDICATORS

**1**

Each of our health indicators will experience a range of impacts from climate change on our coast. **Which do you think are the most important to protect, in order of priority, from these negative effects?**

**INSTRUCTIONS:** Our six health indicators are spread across two posters. Take six (6) dots and place them next to the indicators you believe are priority (one dot on each if they are the same, or more dots on indicators that are a higher priority). Write down on a post-it note your own reasons why the indicator is important.

*Green - highest priority  
Orange - middle  
Pink - low*

INDICATOR	DESCRIPTION	Priority Dots	Comments
<b>COMMUNITY CONNECTIONS</b>	Working - Sharing - Relations Being involved in the community, supporting family, working hard and helping each other out. Hunters, fishers—harvestors help take care of the community and especially elders.	6 dots (3 green, 3 orange)	
<b>NATURAL RESOURCES SECURITY</b>	Quality - Access - Safety Our foods take care of us and we take care of them. Making sure that our foods—salmon, crabs, shellfish, deer, elk, plants—are healthy and available. Access and quality and safety	6 dots (3 green, 3 orange)	<i>Good food for us. Thank you</i>
<b>CULTURAL USE AND PRACTICES</b>	Respect & Stewardship - Sense of Place - Practice We respect and honor our traditions by harvesting local foods with a good mind and a good spirit. Being connected to the land that has supported our families for countless generations.	6 dots (3 green, 3 orange)	



# Next Steps

- ▶ Modify BRACE steps 1 & 2
- ▶ Input Swinomish results into Impact Assessment and Action Plan
- ▶ Internal review & TAB review
- ▶ Project evaluation
- ▶ Share! within Swinomish Community and beyond



First Salmon Ceremony offering

# ṭig<sup>w</sup>icid Thank you



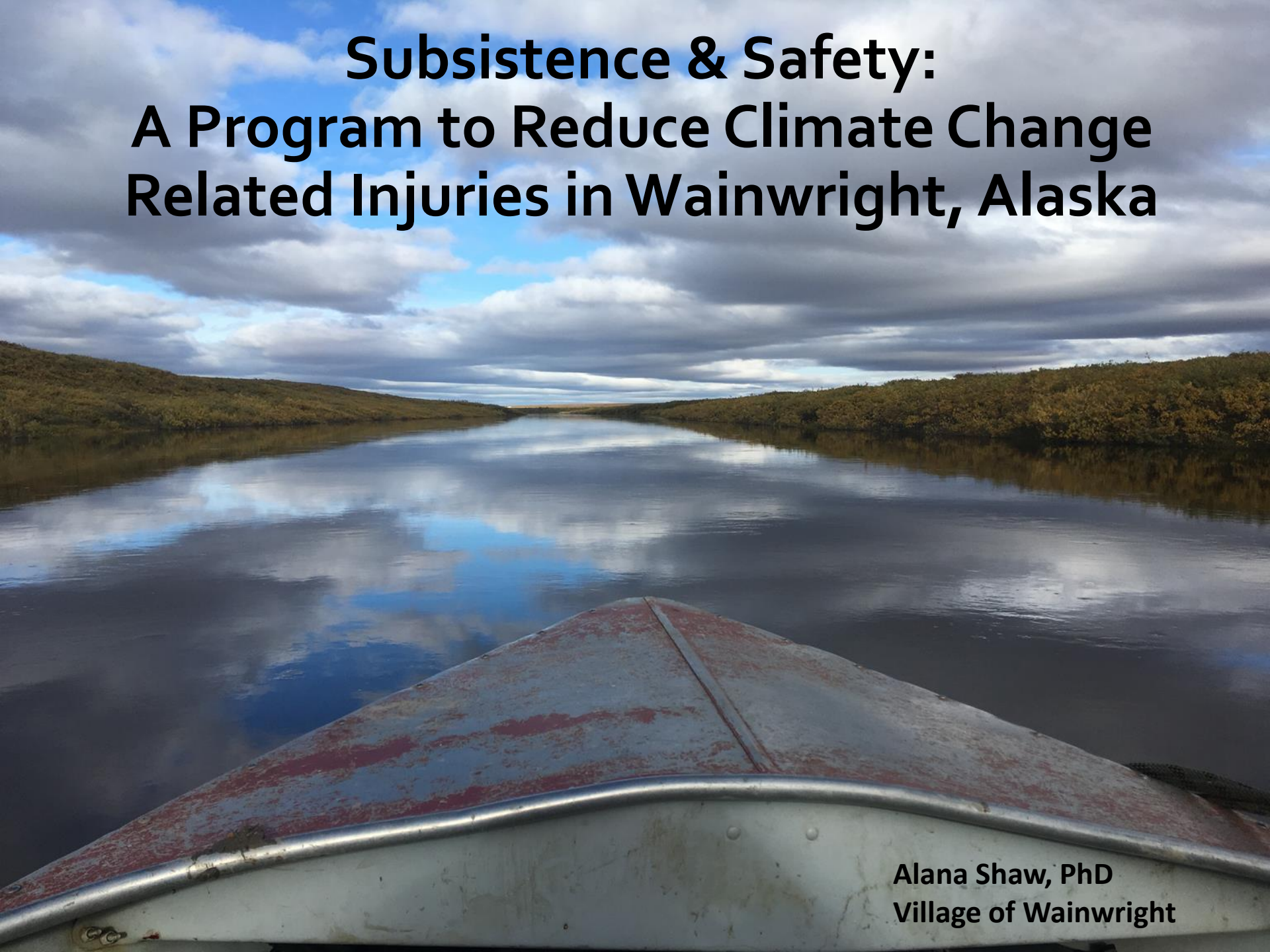
**NIHB MOA to Swinomish  
EPA STAR #83559501 to  
Swinomish**



**Beach seining at Lone Tree.—Photo by: Tyler Long**

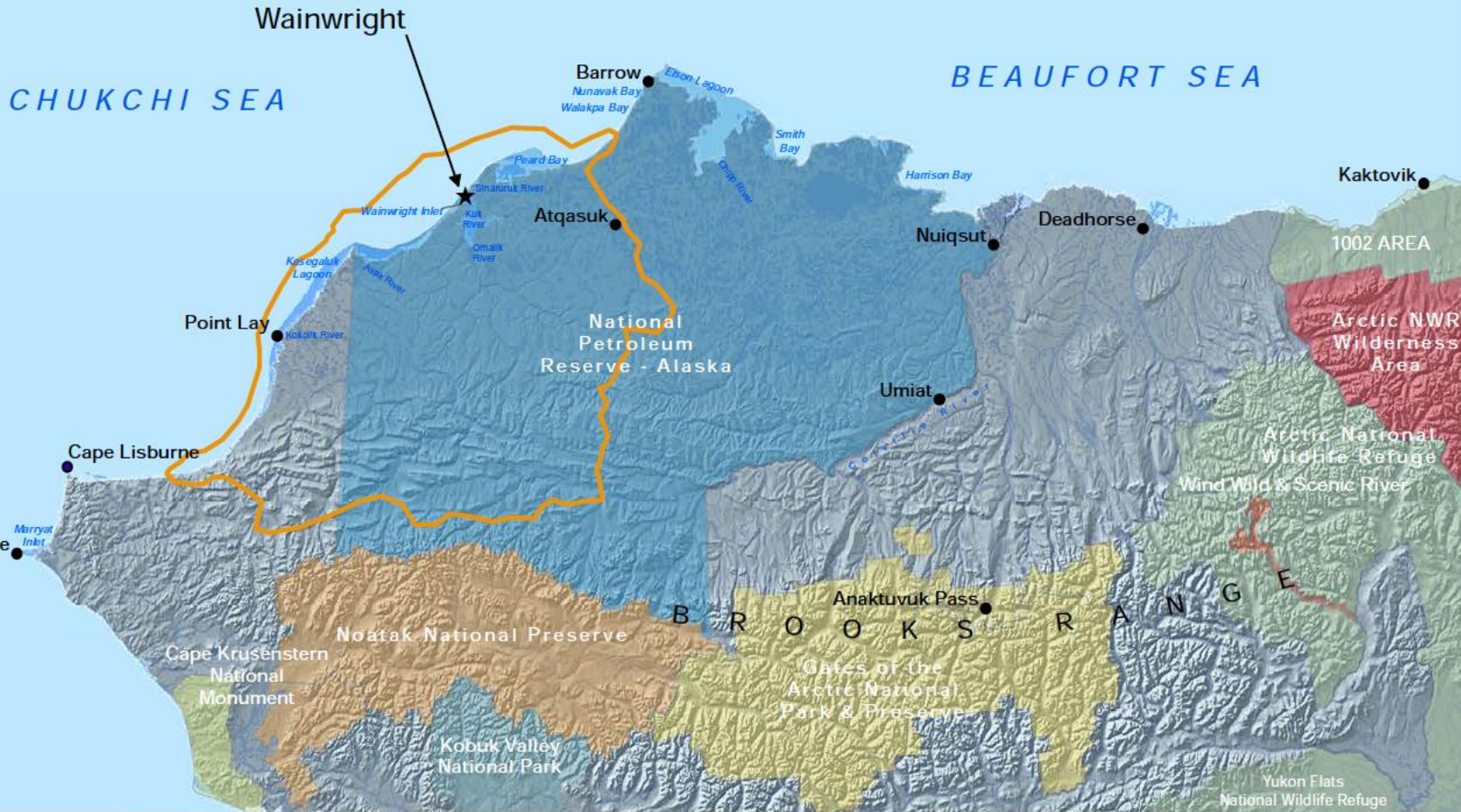
**Larry Campbell:** [lcampbell@Swinomish.nsn.us](mailto:lcampbell@Swinomish.nsn.us), 360-840-4127

**Jamie Donatuto:** [jdonatuto@Swinomish.nsn.us](mailto:jdonatuto@Swinomish.nsn.us), 360-466-1532



# **Subsistence & Safety: A Program to Reduce Climate Change Related Injuries in Wainwright, Alaska**

**Alana Shaw, PhD  
Village of Wainwright**



WAINWRIGHT AREA OF INFLUENCE	NATIONAL PARK & PRESERVE
NATIONAL PETROLEUM RESERVE	NATIONAL PRESERVE
NATIONAL PARK	NATIONAL WILD & SCENIC RIVER
NATIONAL WILDLIFE REFUGE	NATIONAL WILDERNESS AREA
NATIONAL MONUMENT	

\*\*Wainwright Area of Influence was digitized from the Traditional Use Area Conservation Plan Map Book as produced by the Wainwright Traditional Council and The Nature Conservancy, Aug. 18, 2008.



**DISCLAIMER**

For informational purposes only. Umiat makes no expressed or implied warranties of merchantability or fitness with regards to character and function of this printed map. All attempts have been made to identify discrepancies among data sources and are provided as is. The user is cautioned against using this map for detailed analysis or interpretations.

Title: **WAINWRIGHT, ALASKA AREA OF INFLUENCE**



Figure: **16**

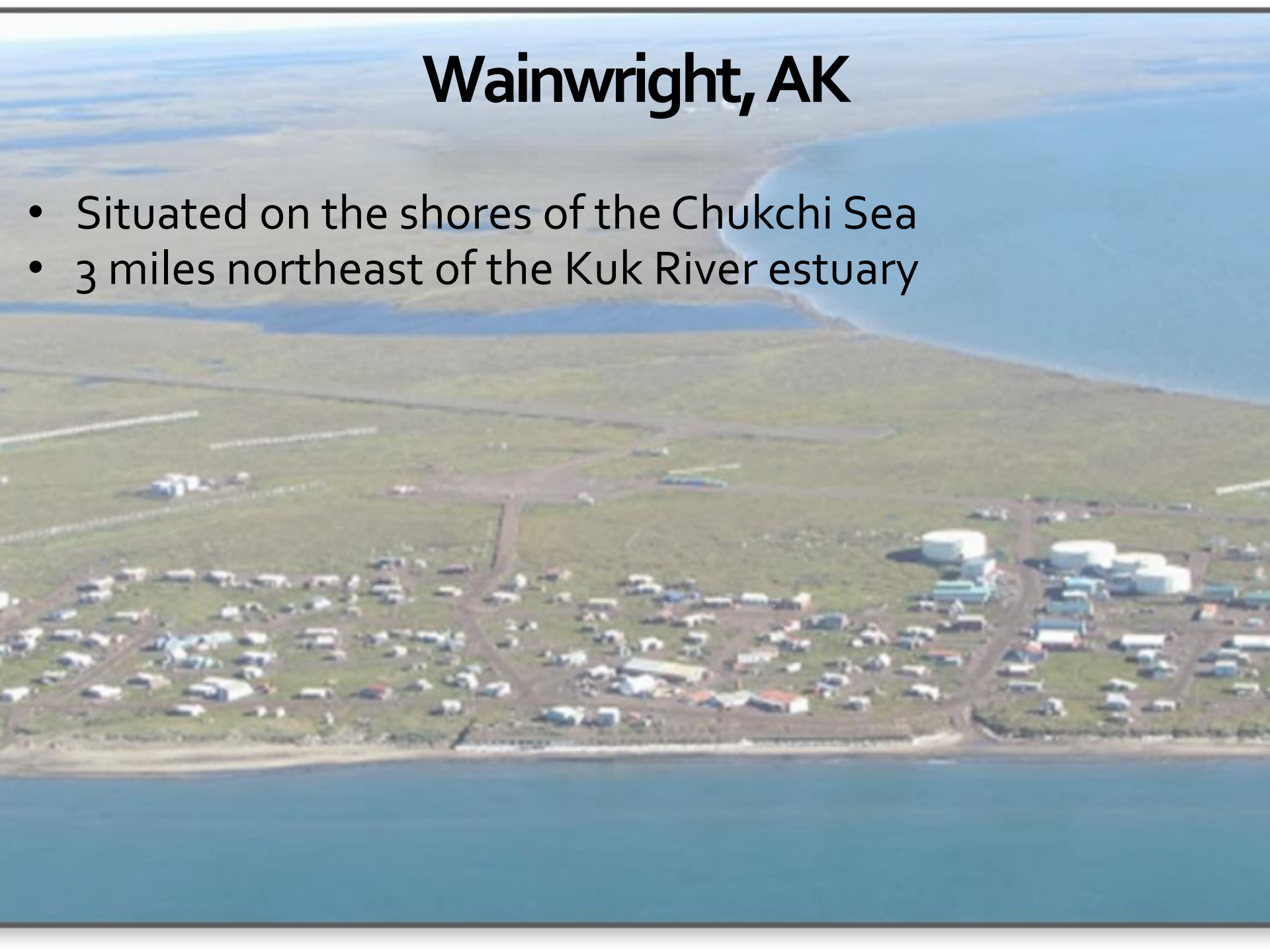
**UMIAQ**

# Wainwright, AK



# Wainwright, AK

- Situated on the shores of the Chukchi Sea
- 3 miles northeast of the Kuk River estuary



# Wainwright, AK



## According to 2010 census:

- Population size: 546, 94.6% Iñupiat
- 93% of households reported participating in the local subsistence economy
- More than 2/3 of households acquire 50% + of their diet from hunting, fishing, and gathering

# Environmental Justice and 'Eskimo Soul Food'





# Environmental Justice and 'Eskimo Soul Food'

- Whale meat and other Native foods actually have more nutritional value than store-bought products



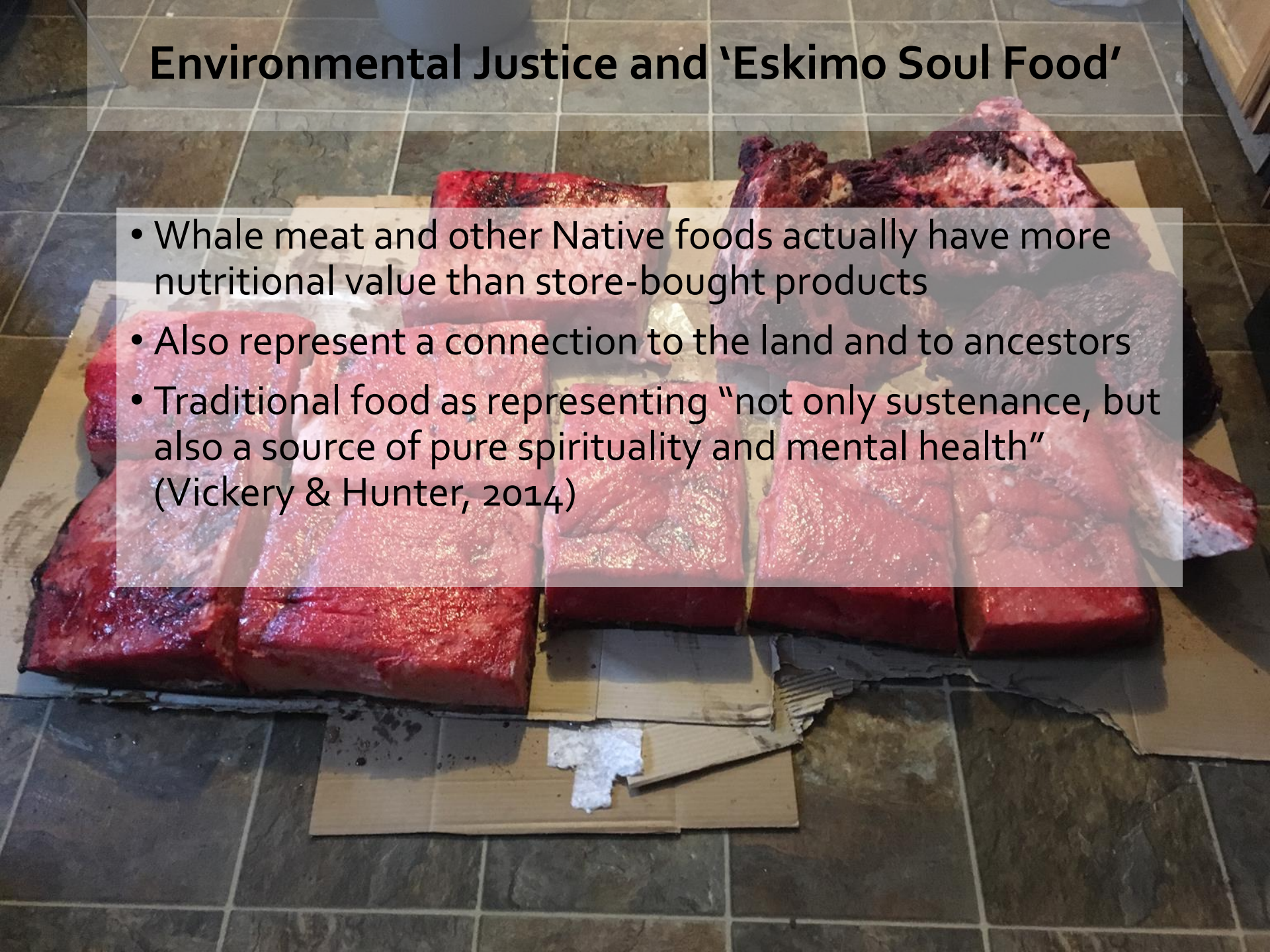
# Environmental Justice and 'Eskimo Soul Food'

- Whale meat and other Native foods actually have more nutritional value than store-bought products
- Also represent a connection to the land and to ancestors



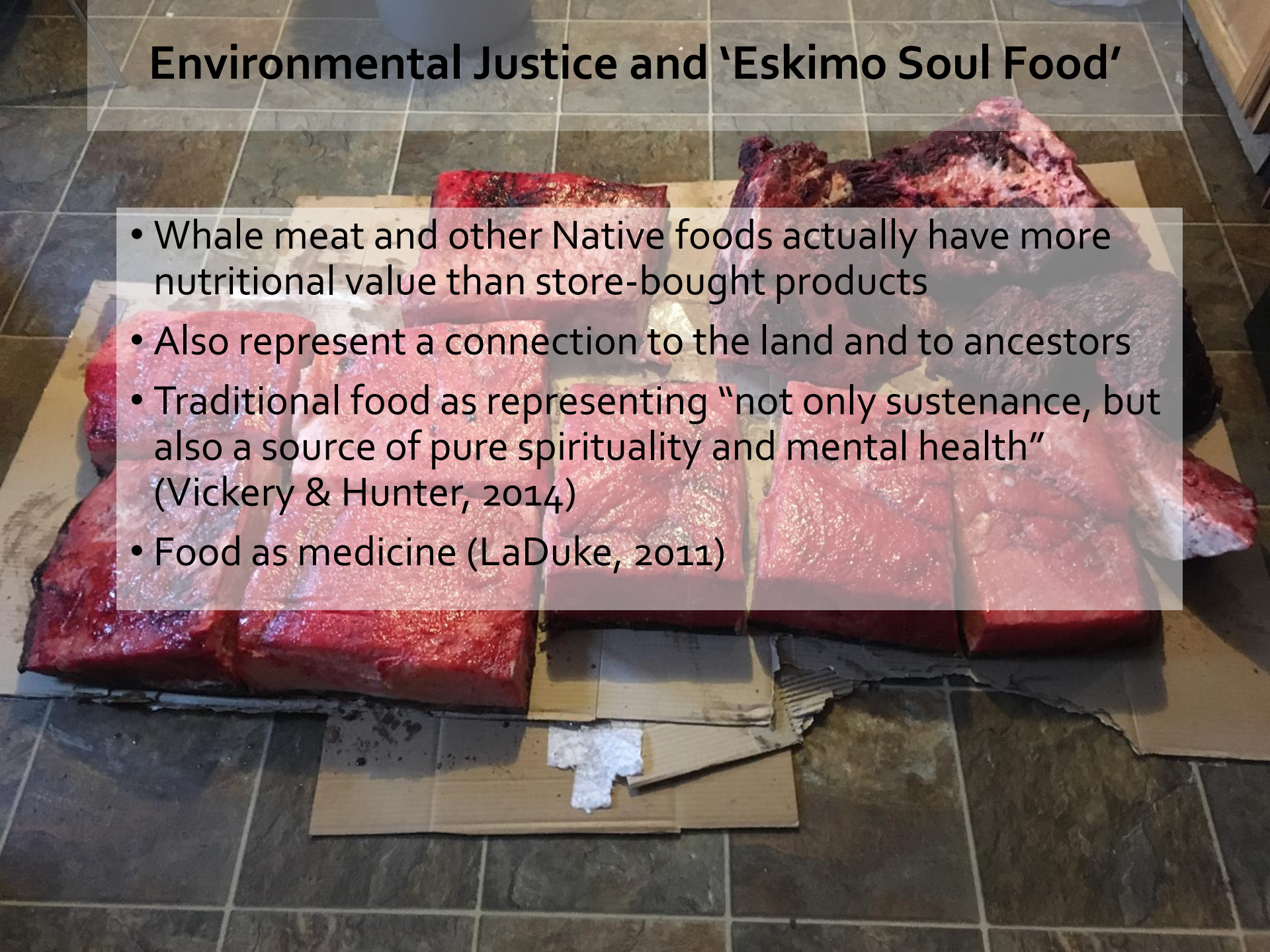
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- Food as medicine (LaDuke, 2011)



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- First Foods and the maintenance of Tribal identities = a sovereign 'right to food' (Adamson, 2011)

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- Food as medicine (LaDuke, 2011)
- First Foods and the maintenance of Tribal identities = a sovereign 'right to food' (Adamson, 2011)
- Aboriginal subsistence rights extinguished under ANCSA



(Marinucci et al, 2014)



(Marinucci et al, 2014)

implement a focused adaption plan  
and evaluate its impact on the  
health of the community



- 1) Assessing the health effects of climate change in Alaska with community-based surveillance  
(Driscoll, Mitchell, Barker, Johnston, & Renes, 2016)**
- 2) Maintaining the subsistence way of life in Wainwright: A decision-analytic approach to strengthening subsistence systems in a changing Arctic  
(Christie, Hollmen, Huntington, Lovvorn, Draft Final Copy, 2017)**



**Health effects of climate change:  
Significant association between unseasonable  
environmental conditions and self-reported injury and  
mortality**



# Health effects of climate change: Significant association between unseasonable environmental conditions and self-reported injury and mortality

- Limited epidemiological investigations into the adverse health outcomes due to climate change in the circumpolar north



# **Health effects of climate change: Significant association between unseasonable environmental conditions and self-reported injury and mortality**

- **Limited epidemiological investigations into the adverse health outcomes due to climate change in the circumpolar north**
- **Even though these areas are experiencing greater environmental effects when compared to lower latitudes**



# **Health effects of climate change: Significant association between unseasonable environmental conditions and self-reported injury and mortality**

- **Limited epidemiological investigations into the adverse health outcomes due to climate change in the circumpolar north**
- **Even though these areas are experiencing greater environmental effects when compared to lower latitudes**
- **Used participatory surveillance in sentinel communities in 3 ecologically distinct regions of Alaska**

# Health effects of climate change: Significant association between unseasonable environmental conditions and self-reported injury and mortality

- Unintentional injury significantly more likely on months when respondents reported unseasonable environmental conditions



# Health effects of climate change: Significant association between unseasonable environmental conditions and self-reported injury and mortality

- Unintentional injury significantly more likely on months when respondents reported unseasonable environmental conditions
- Particularly true when travel plans changed as a consequence of conditions



# Health effects of climate change: Significant association between unseasonable environmental conditions and self-reported injury and mortality

OUTCOME	EXPOSURE 1: UNSEASONABLE CONDITIONS	EXPOSURE 2: CHANGED TRAVEL PLANS DUE TO THOSE CONDITIONS
Water Insecurity	<b>1.61**</b>	<b>1.69**</b>
Asthma (outdoors)	<b>1.45*</b>	1.16
Mortality from Unusual Weather	1.79	<b>3.72**</b>
Hypothermia	1.75	<b>3.46**</b>
Frostbite <sup>b</sup>	1.74	<b>3.48**</b>
Injury	<b>2.83**</b>	<b>4.50**</b>
Odds Ratios adjusted for sex and race		* $p < 0.05$ ; ** $p < 0.01$



# **Health effects of climate change: Significant association between unseasonable environmental conditions and self-reported injury and mortality**

- **Highlights the need to develop and implement  
adaption strategies to reduce the adverse health  
outcomes associated with unusual environmental  
conditions**



# Subsistence Way of Life

(Christie, Hollmen, Huntington, & Lovvorn, 2017)



# Subsistence Way of Life

(Christie, Hollmen, Huntington, & Lovvorn, 2017)

Identified 5 Challenges to the subsistence way of life in Wainwright:

Challenge	Current adaptive strategy	Future adaptive strategy
Unpredictable ice conditions influencing hunter safety	NOAA ice imagery Traditional knowledge VHF radio Snow machines for search & rescue	Subsidized tracking devices Safety workshops Hunter meeting place Program for sharing safety equipment
Stronger winds, storms, and wave action	Traditional knowledge Marine weather forecast VHF radio Boats for search and rescue Larger whaling boats	Subsidized tracking devices Safety workshops Hunter meeting place Small equipment sharing program New dock construction Larger search and rescue boats

# Hunter Safety

(Christie & Huntington, 2017)

Fundamental goal: Maintaining a Subsistence Lifestyle

Key Component: Issue of Hunter Safety

## 7 Strategies to Address Hunter Safety:

- 1) A safety equipment sharing program (including Global Positioning Systems(GPS), Personal Locator Beacons (PLB), and immersion suits)
- 2) **A program providing inReach and SPOT tracking devices to hunters**
- 3) A financial aid program for the purchase of equipment such as larger, more seaworthy boats or motors
- 4) **Safety workshops**
- 5) A hunter meeting place for equipment repair and information transfer
- 6) A new docking facility at the mouth of the local river that would facilitate safe access to hunting grounds
- 7) A more seaworthy search and rescue boat

# Remote Travel Safety Workshop

When: May 25, 2017, 5:30PM- 9:30PM

Where: Community Center

All Wainwright Hunters and Travelers are  
Welcome to Attend

In addition to PLBs, Wainwright Search & Rescue is  
launching a new inReach check-out program

Come receive hands-on training with these devices  
Please feel free to bring your own inReach, if you have one

Other topics covered will include:

Trip Planning

Proper Equipment

Navigation

Community members are encouraged to attend in order to share their  
own knowledge and best practices

Cost of Attendance is Free!

Dinner will be Provided

Door Prizes: \$200 Gas Vouchers

Hosted by Village of Wainwright &  
the Institute for Circumpolar Health Studies

in Partnership with  
Wainwright Search & Rescue



Village of Wainwright

In Partnership with Wainwright Search & Rescue

With funds from the National Indian Health Board

**inReach SE units are now available for check-out at Wainwright SAR base!!**



Upon equipment return, individuals will receive an entry into a random prize drawing for their own inReach device. Drawings will be held at the close of the project.

**To check-out an inReach unit:**

Please contact Wainwright SAR at:  
763-0272 or 925-2004

# Data Collection & Project Goals



# Data Collection & Project Goals

- North Slope Borough patient encounter forms and NOAA weather data will be used to correlate unintentional injuries with unseasonable weather



# Data Collection & Project Goals

- North Slope Borough patient encounter forms and NOAA weather data will be used to correlate unintentional injuries with unseasonable weather
- Wainwright Search & Rescue Rescue Mission Records, Safety Workshop audio recordings, and inReach check-out forms used to measure changes in the frequency of community member use of location technology, dialog on the use of location technology, dialog of safe subsistence travel practices, and unintentional injuries associated with unseasonable weather.





# Data Collection & Project Goals

- Favorable health outcomes would be fewer injuries related to outdoor subsistence activities and fewer injuries related to travel.



# Data Collection & Project Goals

- Favorable health outcomes would be fewer injuries related to outdoor subsistence activities and fewer injuries related to travel.
- Success in this project will be viewed as the increased knowledge and use of location technology within the community and an increase in informed risk behavior.



Quyanaqpak!





# The Blackfeet Nation and Climate-Related Health Impacts: Strengthening Understanding and Adaptive Capacity

Gerald Wagner, Director, Blackfeet Environmental  
Office, Blackfeet Nation

In partnership with Melly Reuling and Libby Khumalo  
of the Center for Large Landscape Conservation

THE CENTER FOR  
LARGE LANDSCAPE  
CONSERVATION

# Blackfeet Climate Adaptation Planning

Planning is underway in nine sectors, with chapter drafts completed for most:

- Culture & People
- Forestry
- Water
- Fish
- Wildlife
- Agriculture
- Land & Range
- Infrastructure
- Health

# Why health and climate change?



Source: Erin Conwell, taken July 21, 2015 of the Reynolds Creek wildfire above St. Mary Lake in GNP. Weather.com

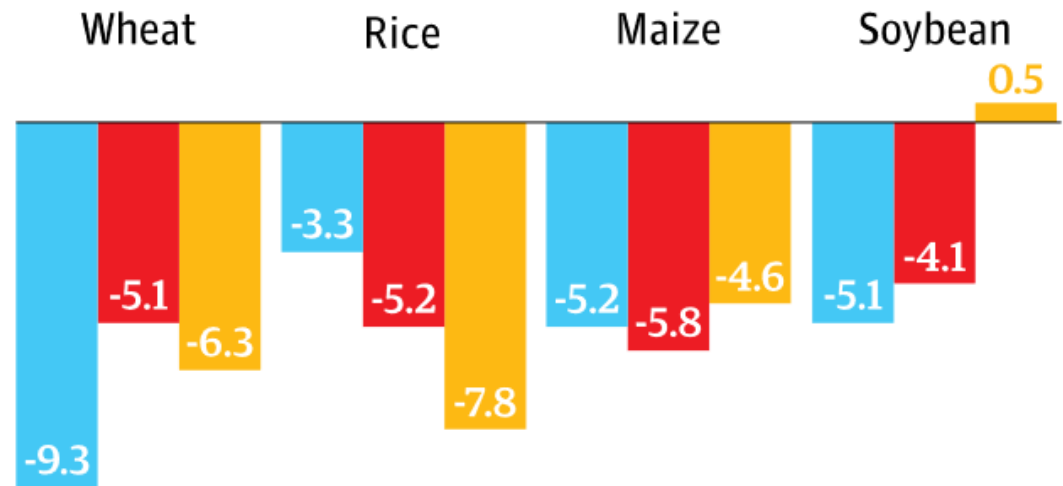
# Why health and climate change?



## High CO2 cuts crop nutrients

Percentage under CO2 levels expected in 2050,

■ Zinc ■ Iron ■ Protein



SOURCE: NATURE



Building resilience by welcoming buffalo home  
Source: linnii Initiative





The National Adaptation Forum: We are influencing national-level discussions and policy

# Strengthening climate change & health communications in the Blackfeet Nation

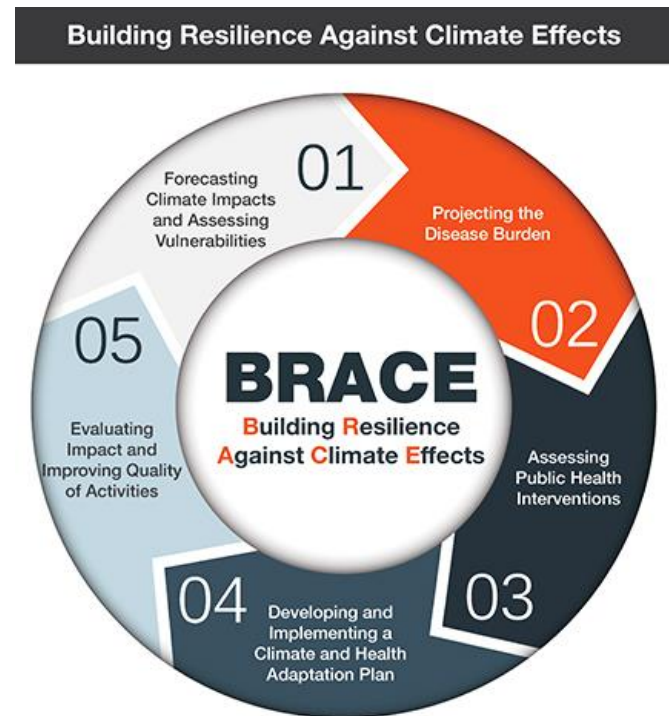
## Project goals:

- Support healthy and sustainable Blackfeet communities
- Specifically address climate-related health impacts
- Help managers prepare for a changing environment
- Foster collaboration to sustain long-term climate adaptation
- Share information with neighboring Tribal Nations
- Build awareness and education tools: eg. presentations, website, printed materials

# Strengthening climate change & health communications in the Blackfeet Nation

Currently focusing on Step #1:

Existing knowledge gap means we are currently building awareness about climate-related health impacts in the health and natural resources sectors



# Strengthening climate change & health communications in the Blackfeet Nation

## First focus group meeting: April 27<sup>th</sup>

- Nine participants representing Tribal Council, Agricultural Resource Management Planning, the Blackfeet Tribal Health Department, the Indian Health Service, and the Blackfeet Environmental Office
- Participants listened to and discussed an overview of health-related impacts from climate change
- A couple of participants working with tribal health expressed doubt at the meeting's beginning that climate change relates to their work, but by the end of the day, they wanted to spread their message to colleagues:

*"Climate change is in Blackfeet Country.*

*Impacts are here now!"*

- Participants decided to create a communications plan for communicating health-related impacts of climate change and promoting adaptation
- Participants provided initial ideas for the plan's content

# Strengthening climate change & health communications in the Blackfeet Nation

## Hired a Climate Health Coordinator

- Kim Paul is coordinating planning in health and the broader climate change adaptation plan
- She is mentoring 10 interns to share knowledge about climate change with younger generation, build capacity, and create communications materials for multiple ages (e.g. website)
- Kim brings expertise in health, as she is near the end of her interdisciplinary doctoral program focusing on health, chemistry, and the Blackfeet Nation

# Strengthening climate change & health communications in the Blackfeet Nation

Second focus group meeting: May 30<sup>th</sup>

- 12 participants from the Tribal Health Department, Agricultural Resource Planning, the Native Science Field Center, the Blackfeet Buffalo Program, The Nature Conservancy, the Blackfeet Tribal Health Department, International Traditional Games, the Blackfeet Environmental Office, the Natural Resources Conservation Service, and Glacier National Park
- During an overview of health-related impacts from climate change, participants shared observations, concerns, and ideas for addressing climate change impacts to health
- After the overview and discussion, participants provided content for the first three sections of the plan

## Comments from focus group participants

- “Today I learned more about climate change than I’ve ever learned in my life. One thing I never knew was that climate change can affect health! More extreme weather and fires, causing respiratory issues for people with asthma, the young, elders.”
- “It surprised me that emotion and mental health tie into climate change.”
- “I learned how climate change has already affected hunting and gathering.”
- “I was surprised by the amount that climate change can affect mental health and also the stories and changes people are already seeing.”
- “I was surprised how we can work together and how brilliant is our team.”

# Next steps...

By June 15: Outline communications plan draft-in-progress and send to team for review and comments

By July 15: Meet to discuss and finalize communications plan

By August 31: Implement communications plan. Begin drafting communications materials (e.g. website, printed documents, brochure, flyers to accompany paychecks), as outlined in the communications plan.

Sept – Nov: Complete communications materials and share with selected audiences

November 30: Assess effectiveness of communications materials and make changes as needed

December 31: Complete update of the communications plan