

# Geomorphology and Sustainable Traditional Gathering Patterns



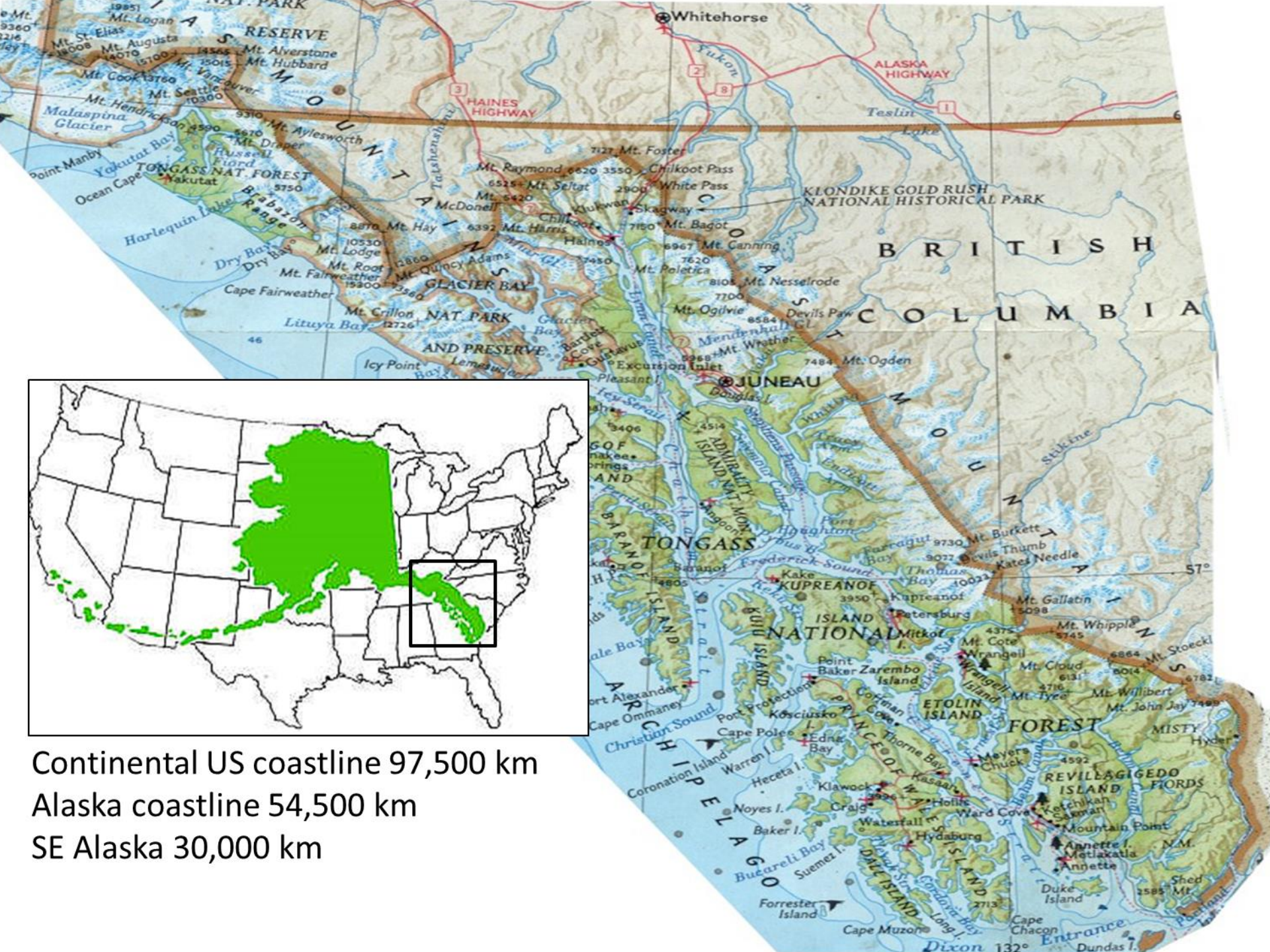
ShoreZone users meeting, October 13, 2015

Adelaide Johnson and Linda Kruger  
U.S. Forest Service, PNW Research Station, Juneau, Alaska

# Acknowledgements

- ▶ Brian Buma, Forest Ecologist, University of Alaska Southeast
- ▶ Jim Noel, Data analyst, NOAA, ShoreZone. Juneau
- ▶ Dave Gregovich, Alaska Department of Fish and Game, Juneau
- ▶ Barbara Schrader, Forest Ecologist, National Forest Service, Region 10
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- ▶ Central Council of Tlingit and Haida Indian Tribes of Alaska, Yakutat Tlingit Tribe, Hoonah Indian Association, Forest Service Tribal Liason (Angoon based), Organized Village of Kake, Klawock Tribe, and Organized Village of Kasaan.
- ▶ High School student interns and community members: Sierra Ezrre, Quinn Newlun, Randy Roberts, Natasha Kookesh, Simon Friday, Mitchell England, and Madison Scamahorn.





Continental US coastline 97,500 km  
 Alaska coastline 54,500 km  
 SE Alaska 30,000 km

# Rationale

I. Coasts are changing

a) Land shift

b) Sea level rise

c) Flooding/surge

II. Changing coastal resources

III. Changes in resilience and vulnerabilities

# Rationale

I. Coasts are changing

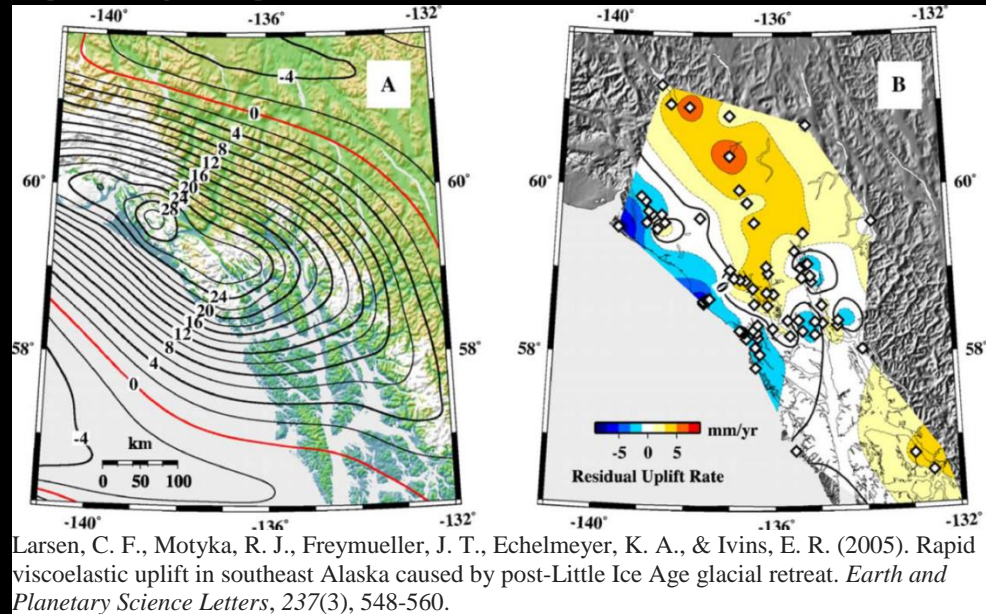
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# Rationale

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- b) **Sea level rise**
- c) Flooding/surge

## II. Changing coastal resources

## III. Changes in resilience and vulnerabilities

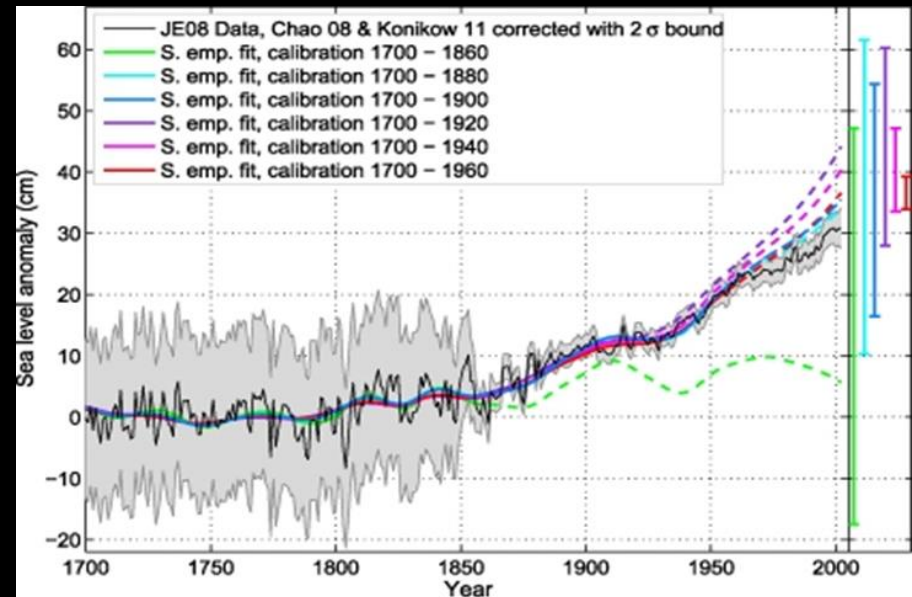


Figure 1 from Predictability of twentieth century sea-level rise from past data  
Klaus Bittermann et al 2013 Environ. Res. Lett. 8 014013 doi:10.1088/1748-9326/8/1/014

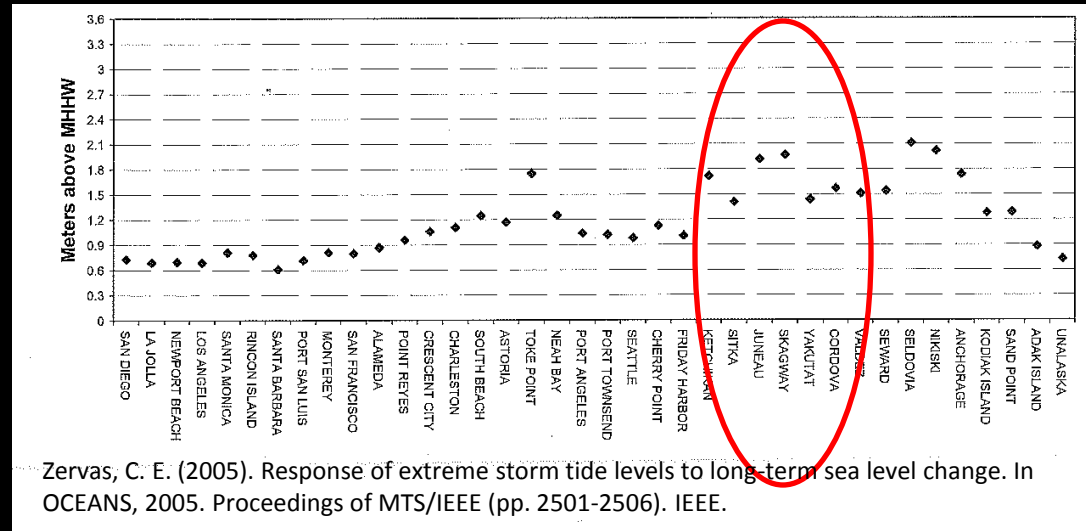
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Site - Exposure, Substrate, Slope

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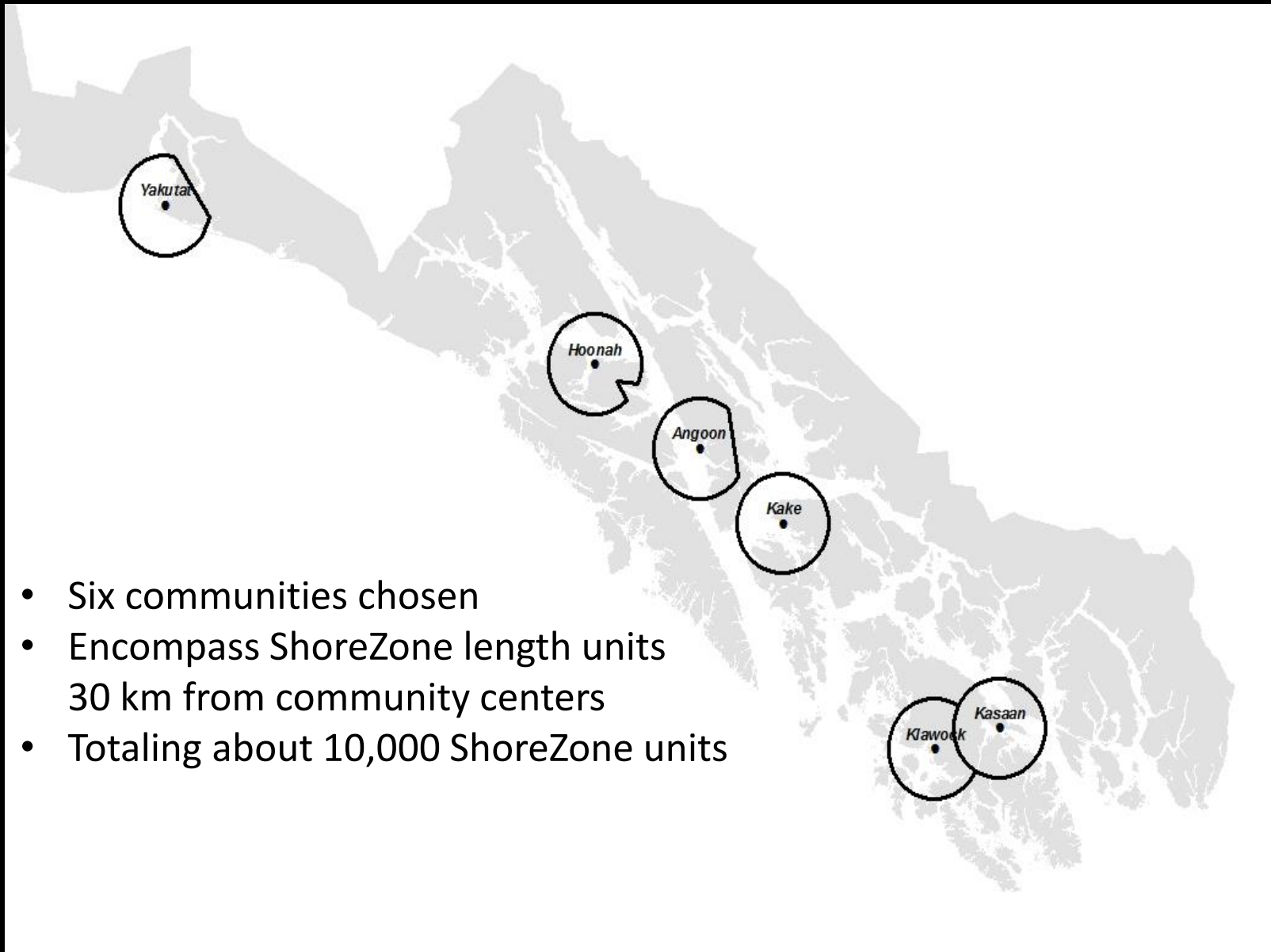
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*Objectives: Better understanding of  
community threats and vulnerabilities*

1. How is the land changing?
2. How does change affect shoreline species?
3. How are communities impacted?



- Six communities chosen
- Encompass ShoreZone length units 30 km from community centers
- Totaling about 10,000 ShoreZone units

# Methods

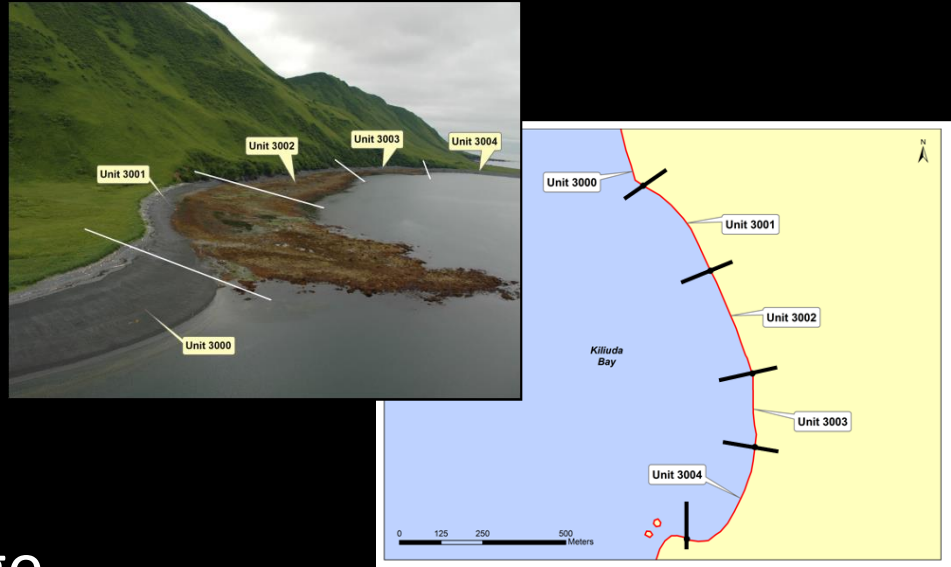
## 1. Merge to ShoreZone:

- Bathymetry
- GPS data
- Sea level rise
- River data for tidal surge

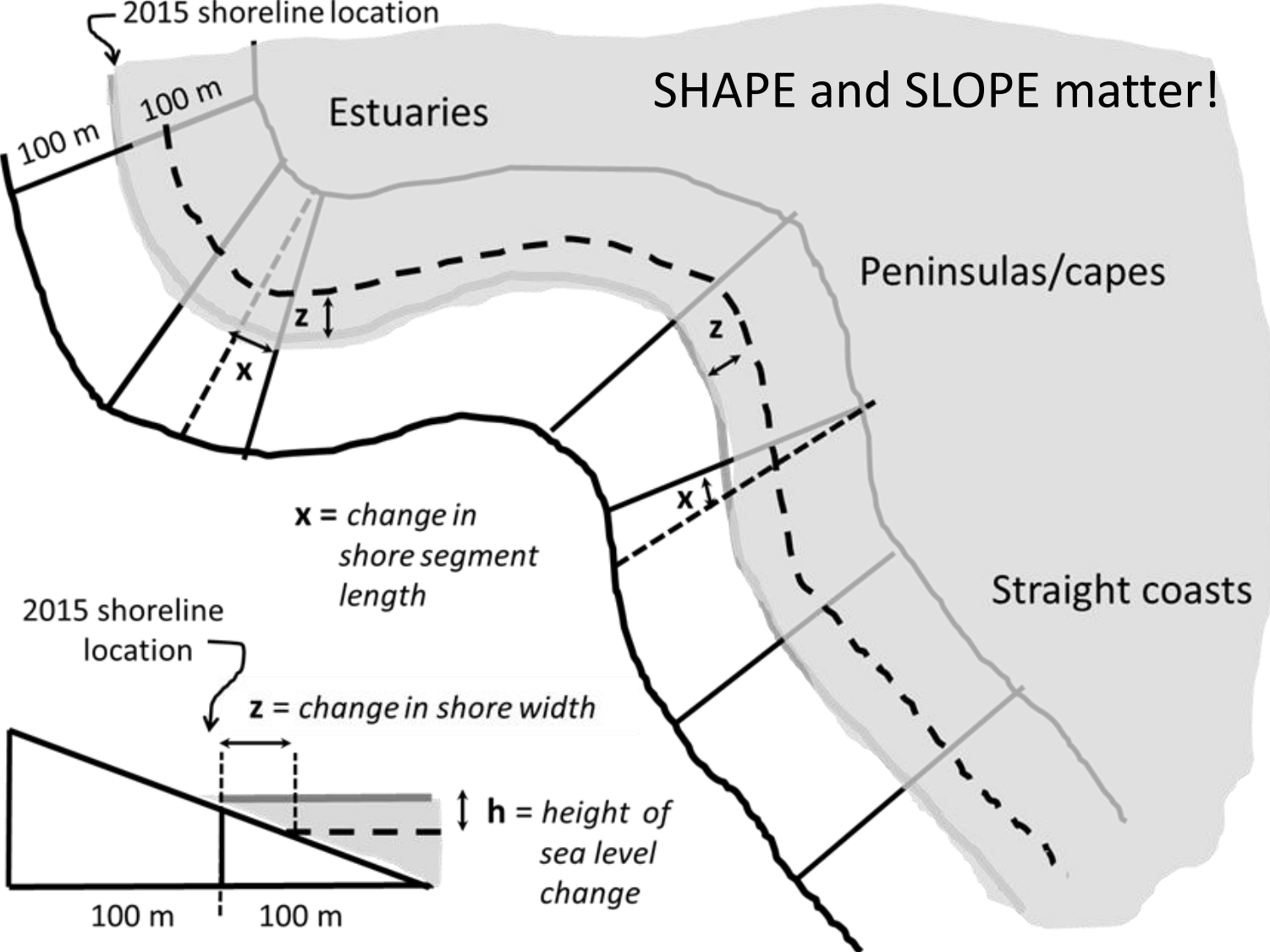
## 2. Assess by exposure, slope, and substrate

## 3. Evaluate change in unit and likely changes in species

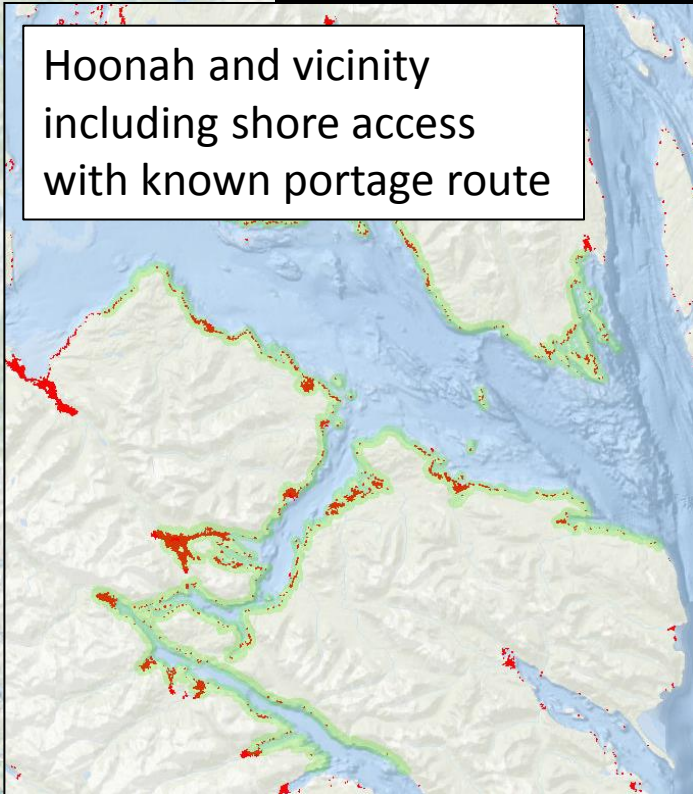
## 4. Relate these changes to species used communities to assess vulnerabilities



# SHAPE and SLOPE matter!



# PRELIMINARY RESULTS



Hoonah and vicinity  
including shore access  
with known portage route

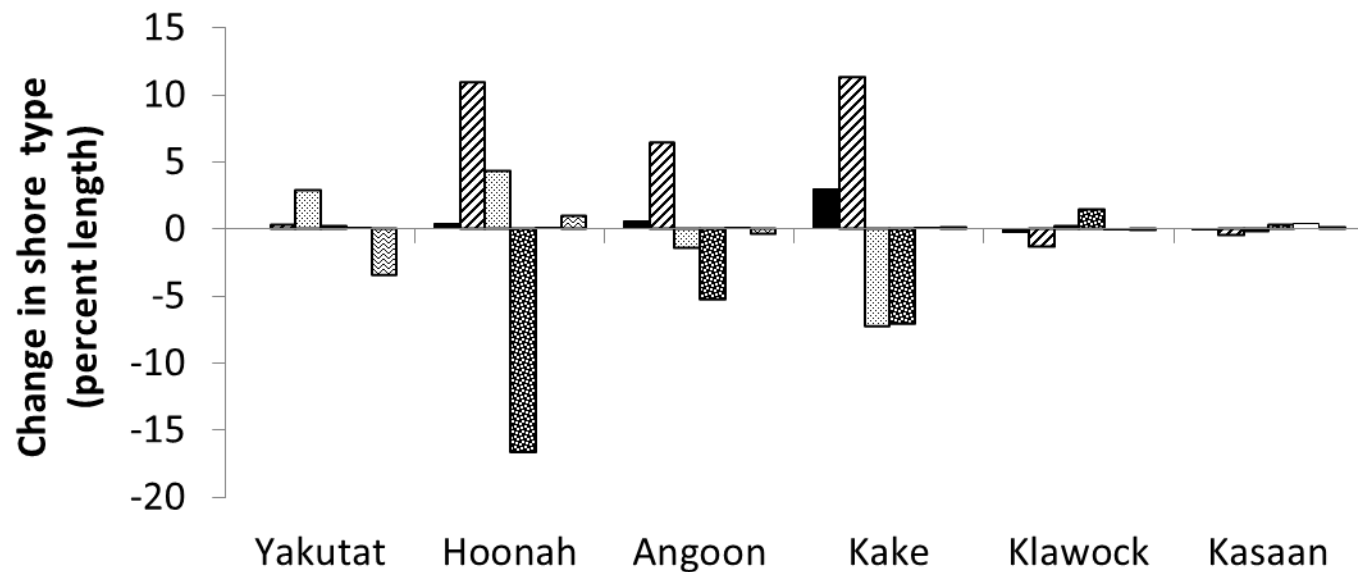
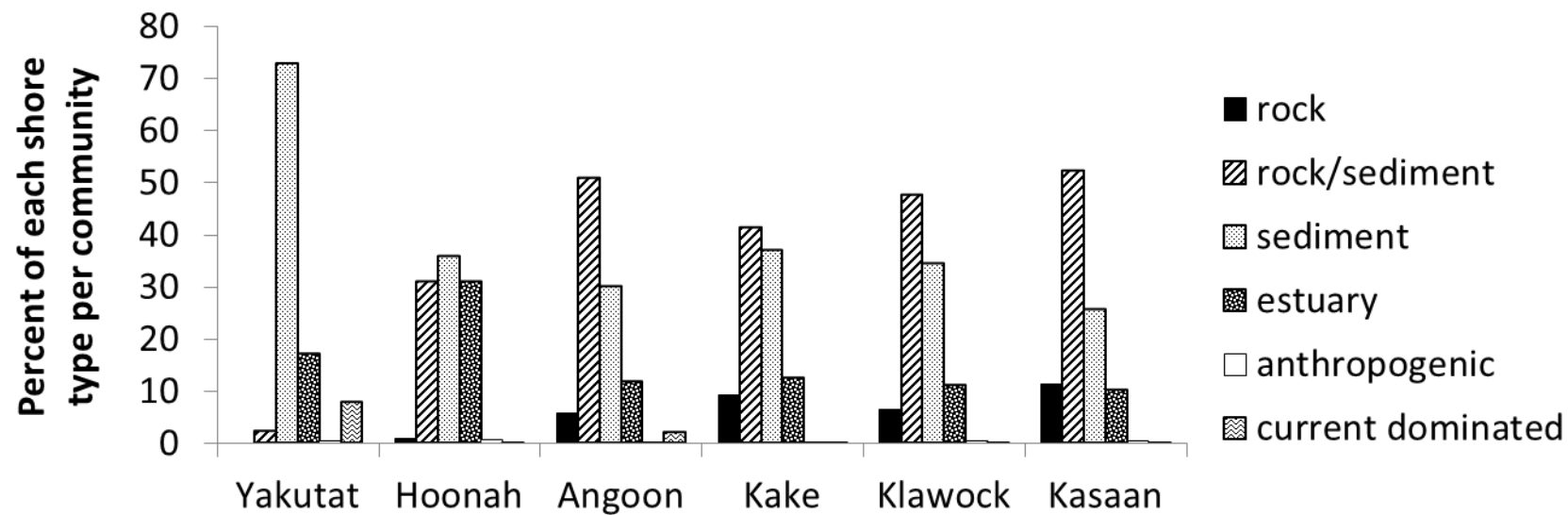
This map shows the Hoonah area in southeast Alaska. It features a topographic background with elevation contours. A network of red lines indicates shore access points, and a green line highlights a specific portage route connecting the coast to inland areas. The map also shows the coastline and several rivers flowing into the area.

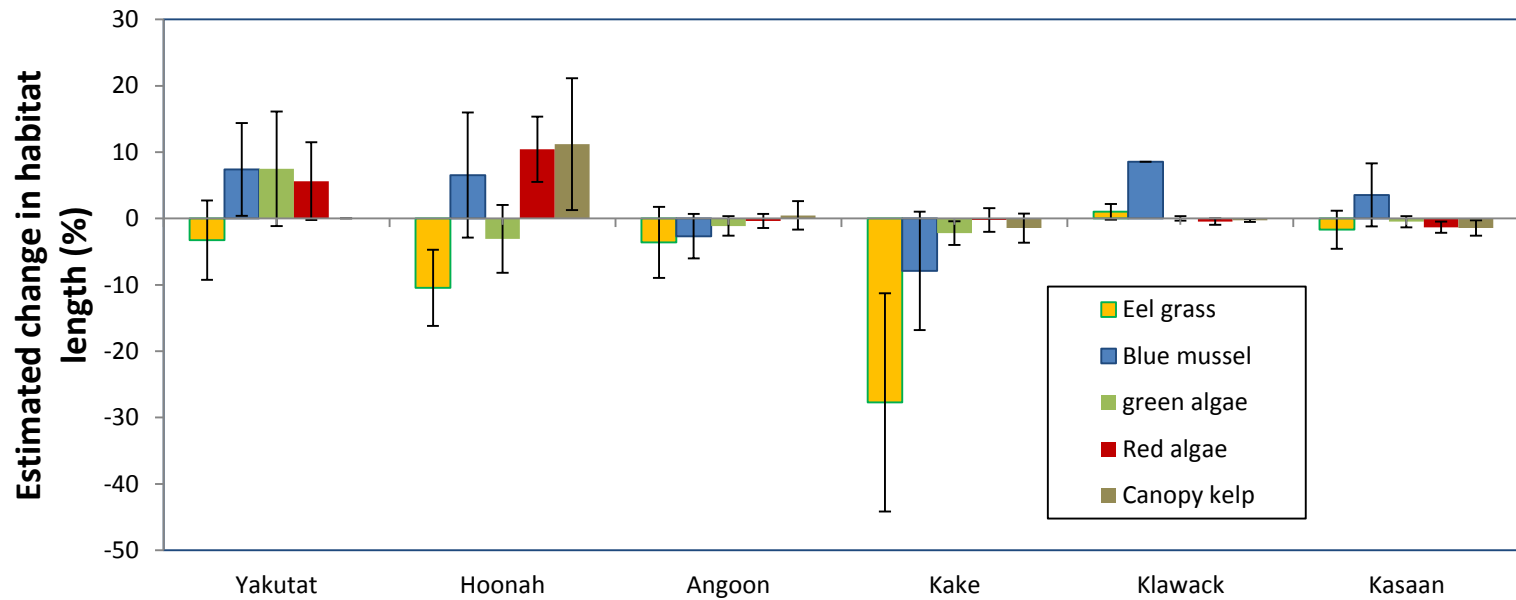


Kake and vicinity

This map shows the Kake area in southeast Alaska. It features a topographic background with elevation contours. A network of red lines indicates shore access points, and a green line highlights a specific portage route connecting the coast to inland areas. The map also shows the coastline and several rivers flowing into the area.

Overall, more change to north.  
Throughout southeast Alaska,  
estuaries and other low-slope areas  
have most significant alteration.





Gains and losses.

Limitations of ShoreZone data.

What other species of special interest are in the same biobands?



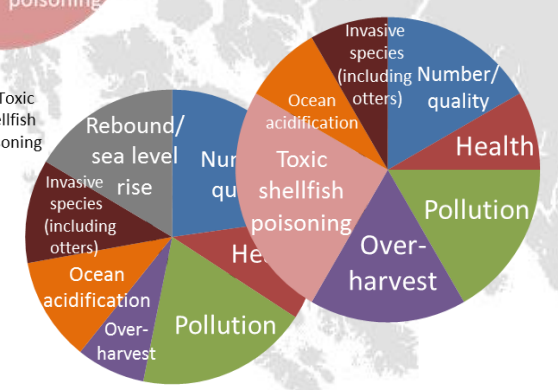
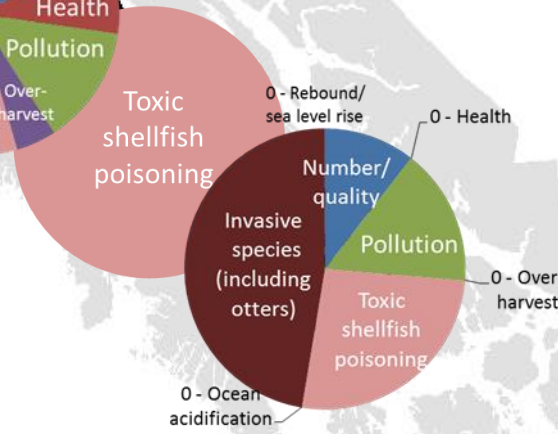
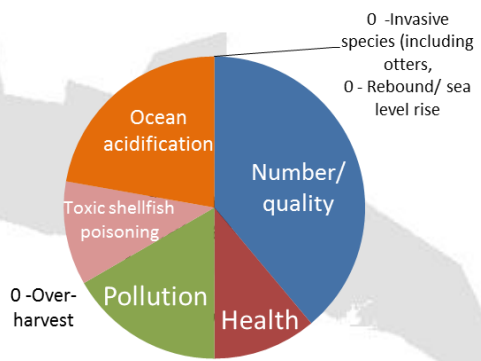
- Located student interns in six communities.
- Met with Tribes/Associations.
- Developed discussion points.
- Interns conducted 10 family conversations.
- Summaries of harvesting and collecting pattern with species, habitats, mode of transportation, and concerns.
- 53/70 discussions complete (85% Native).

Page 4/6

(C) Form: This site information needed in this section, except the single exposure type

Species (circle)	Circle type	Walk = W Drive = D Boat = B ATV = V	Concerns? Species quality = Q, quality = Q, or health = H pollution = P, over harvest = O, sea level rise = L, invasive species = I, harmful organisms/chemical runoff & land application = Z	Other = C
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# Butter clams and cockles



An aerial photograph showing a shoreline. On the left, there is a dense forest of green trees. On the right, there is a rocky beach with a mix of grey and brown rocks, and patches of brown and orange seaweed. The water is dark blue and calm. A semi-transparent dark grey box is overlaid on the right side of the image, containing the text.

# Summary

- ShoreZone is useful tool for assessing changes in geomorphology.
- Differences/similarities in habitat characteristics per community.
- Estuaries and low-gradient areas most prone to change over time.
- Loss of eel grass and clam habitats; gain of bull kelp and red algae.
- Community resilience development.