

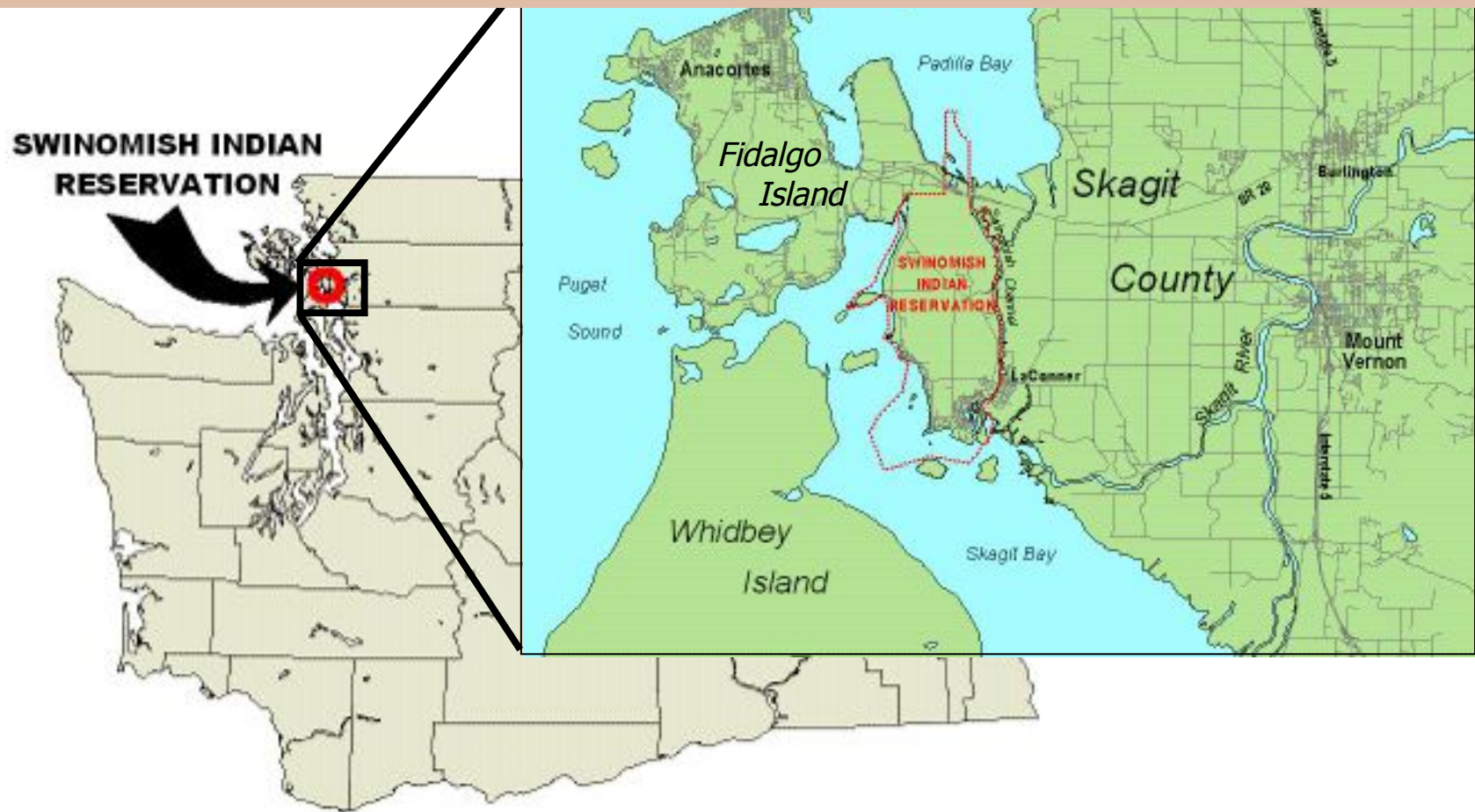
**National Adaptation Forum**  
**April 2, 2013**

# **Correlation and Climate Sensitivity of Human Health and Environmental Indicators in the Salish Sea**

**Jamie Donatuto,  
Swinomish Indian Tribal Community**  
**Eric Grossman,  
U.S. Geological Survey**



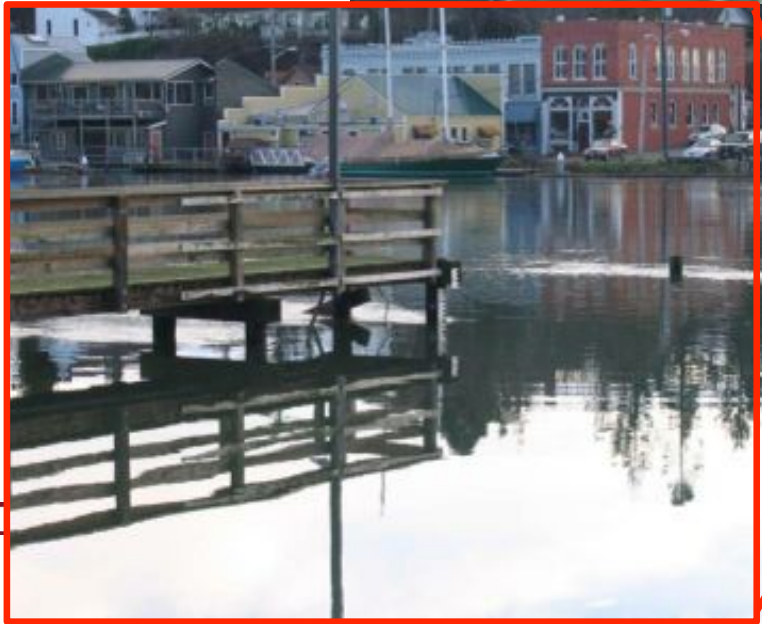
# Location of Swinomish Indian Reservation



# Swinomish Indian Reservation



# Tidal surge events – 2006, 2010, 2012



# Projected Sea Level Rise Puget Sound & WA Coast (UW Climate Impacts Group, 2006)

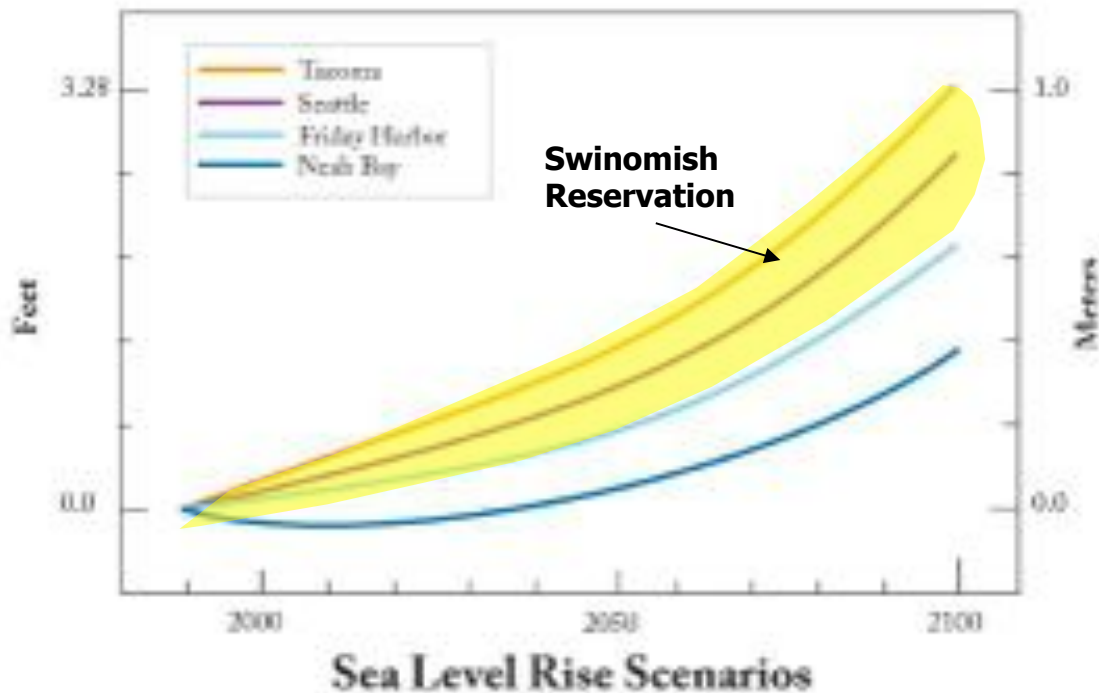
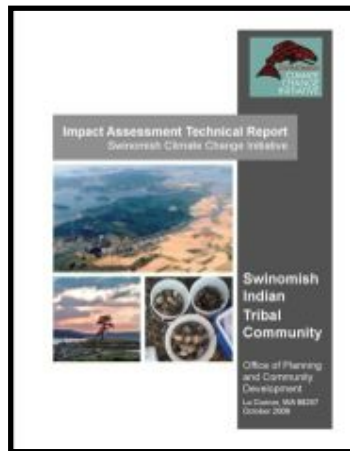


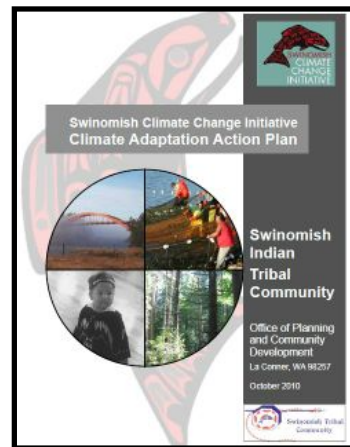
Figure 2-10. Sea Level Rise Anticipated In Several Washington Locations Between the Years 1990 and 2100



# 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**



# Impacts on Tribal Resources

## TOO MUCH WATER:



Beach seining



Fishing facilities



Shellfish

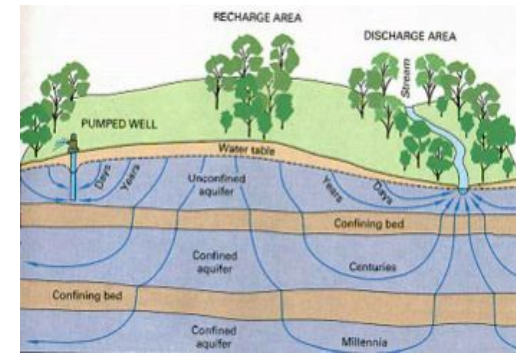
## TOO LITTLE WATER:



Stream flows



Wetlands



Groundwater recharge







# Impacts on Human Health

- Heat-related illness (exhaustion, stroke)
- Respiratory problems (asthma, air quality)
- Opportunistic viruses (West Nile, flu)
- Emerging health threats (fungal, viral)
- Food-borne/pollution related threats (toxins, water quality)



# Chpt 4: Cultural Tradition & Community Health

- ➔ “*Community wellness*” addresses issues of community resilience and cultural sovereignty that are vital to preparing for significant changes
- ➔ 5 health indicators -- community cohesion, food security, ceremonial use, knowledge transmission, and self determination.
  - e.g., healing gardens, language programs



# Chpt 4: Cultural Tradition & Community Health

- ➔ *“Honorable engagement”* --Climate Change Education and Awareness Group (CCEAG)
- ➔ Coast Salish Gathering Climate Change Summit: A Call to Action
  - Document baseline inventory of first foods
  - Assess vulnerabilities, observe changes
  - Preserve practices, generate approaches
  - Defending rights—Treaty implications



# Considering All Aspects of Health

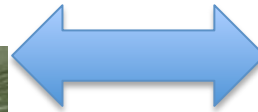
Seafood are “*cultural keystone*” species -- vital objects in maintaining physical, cultural, spiritual, and social health. (Garibaldi & Turner, 2004)

*“Like we say, it’s our spiritual food [seafood] so it feeds our soul.”*

*“..they lose the power and the success and the spirit of the ceremonies and of the gatherings without the traditional foods, because it’s all central. It’s like when people come... and you feed their spirit with the stuff... Their soul... the spirit is hungry for that...”*



# Impacts on Tribal Health?



Harvest &  
Use of  
Traditional  
Foods



# Community-based Indigenous health indicators

**Natural  
resources  
security**



**Cultural  
traditions**



**Education**



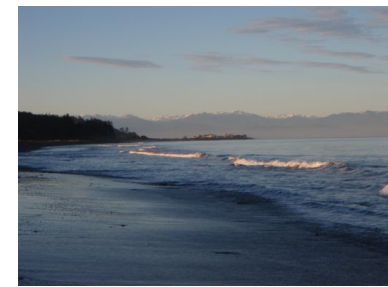
**Community  
connection**



**Self-  
Determination**



**Well-being**



## Indigenous Health Indicators (Source: Donatuto, Gregory & Campbell, ms. in progress)

**Community Connection:** Community members are actively participating in community functions and helping each other, particularly in connection with the harvest, preparation, and storage of natural resources.

**Natural Resources Security:** Local natural resources (land and aquatic plants and animals) are abundant and accessible such that they can support a healthy ecosystem(s) and healthy human community. The community equitably shares these natural resources.

**Cultural Traditions:** The community is able to carry forth their cultural traditions in a respectful and fulfilling way using the local natural resources.

**Education:** Knowledge, values and beliefs are actively passed on from elders to youth.

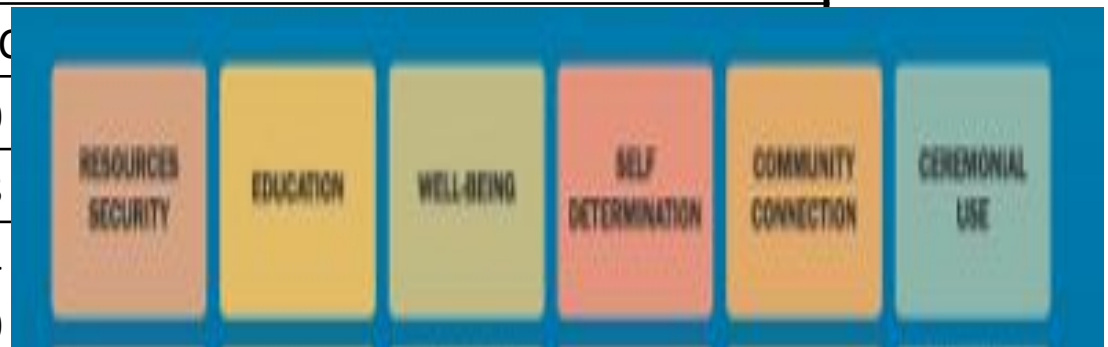
**Self-determination:** Communities develop and enact their own healing, development and restoration programs.

**Well-being:** Community members maintain their connection to their homeland, confident that their health and the health of the next several generations are not at risk due to contaminated natural resources.



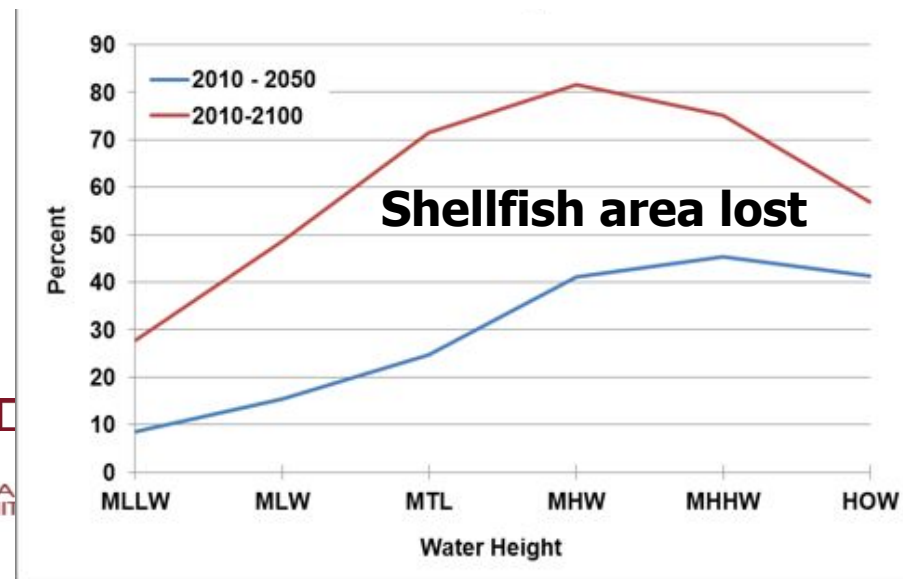
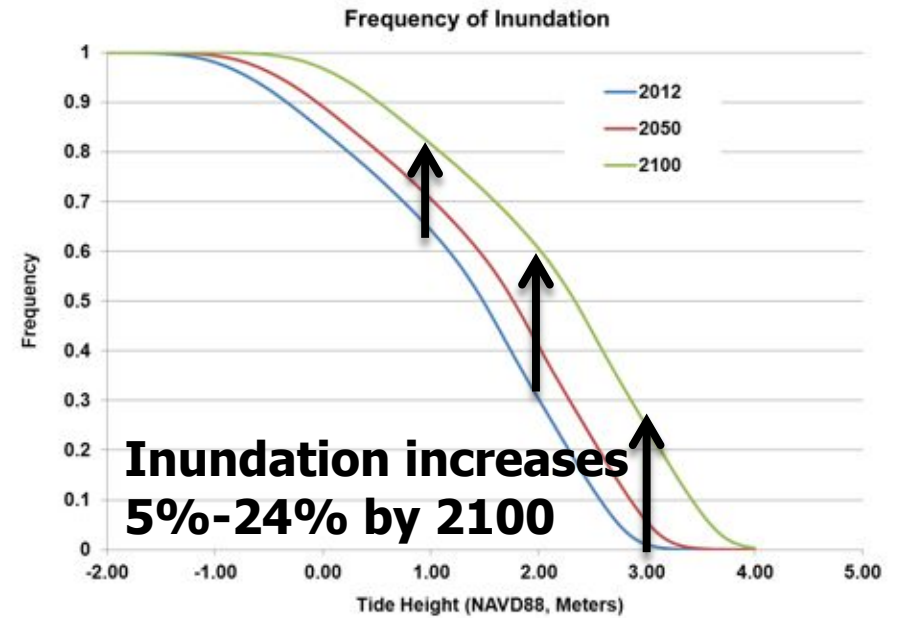
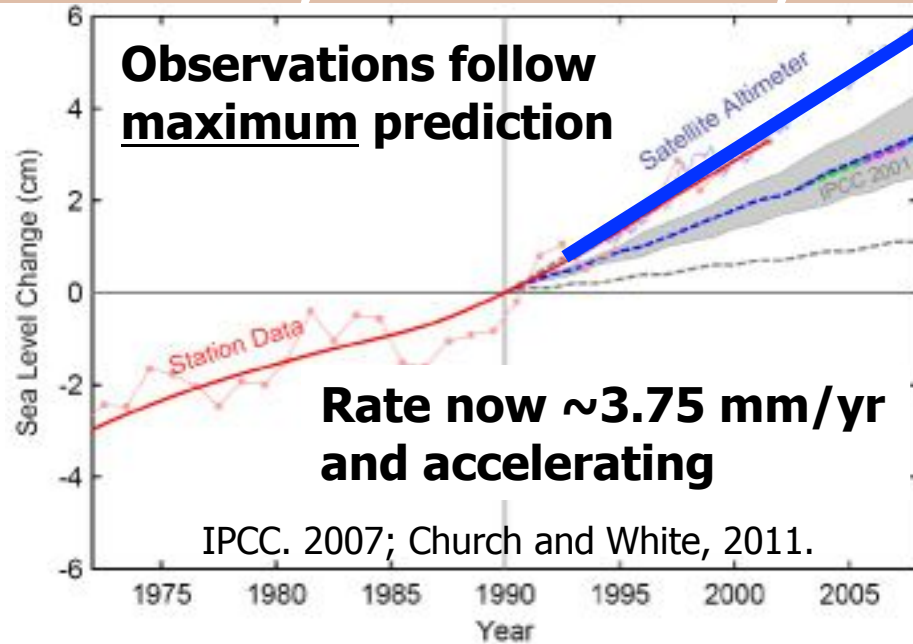
# Cross-walking Environmental & Indigenous health indicators in context of climate change

Indicator	Dataset Date Range
Fine Particulates	2001-2010 (Canada & US)
Water Quality Index	2001-2007 (Canada), 1995-2008 (US)
Stream Flow	1975-2009 (Canada & US)
Marine Dissolved Oxygen	2000-2009 (Canada & US)
Land Cover	2001-2010 (Canada & US)
Marine Species at Risk	1980-2010 (Canada & US)
Killer Whale Abundance	1969-1974 (Canada), 1974-2010 (US)
Toxics in the Food Web	2005 - 2010 (Canada & US)
Chinook Abundance	1951 - 2010 (Canada), 1952 - 2009 (US)
Commercial Catch	1983 - 2010 (Canada), 2003 - 2010 (US)
Shellfish Beaches	1999 - 2011 (Canada & US)
Swimming Beaches	2002 - 2011 (Canada), 2004 - 2011 (US)

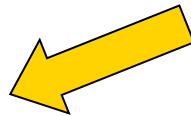
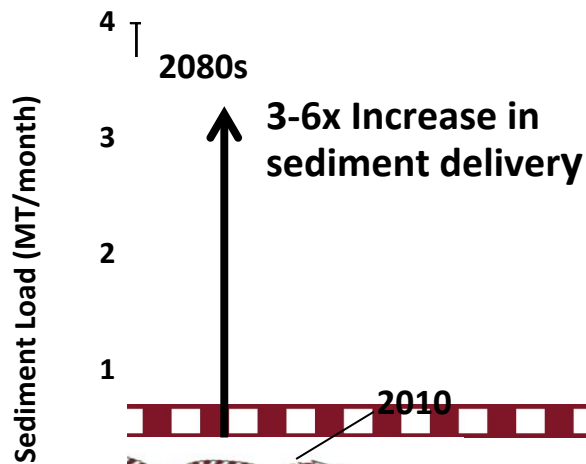
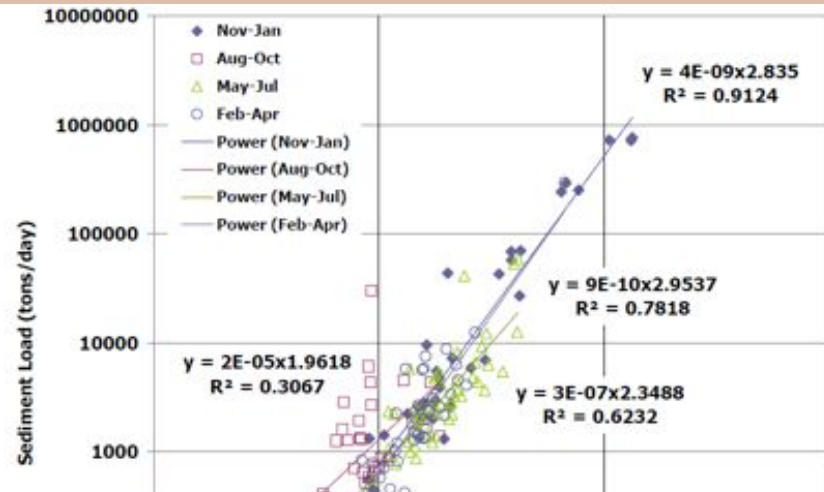
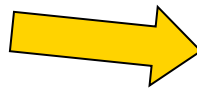
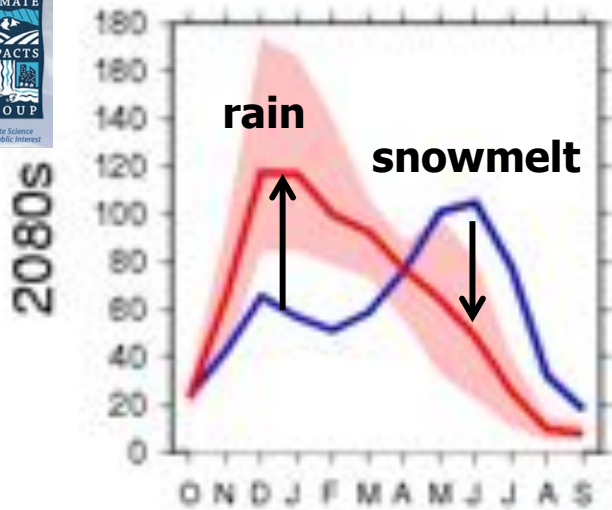




# Sea level rise impact pathway to shellfish: Coastal erosion, habitat loss, change in substrate/ access



# Sediment impact pathway to shellfish: Increases in sediment (burial), turbidity, contaminants, & change in substrate and/ access



# Tying it together with Indigenous health indicators

- ➔ In community group discussions:
  - ➔ Establish a baseline of current community health using the IHIs
  - ➔ Discuss changes in shellfish beds based on projections
  - ➔ Use scenarios of projections to determine how climate change may impact community health, determine priorities of what health aspects to focus on first, and how



# Indigenous health in the context of climate change

## Scenario: tidal inundation of shellfish beds

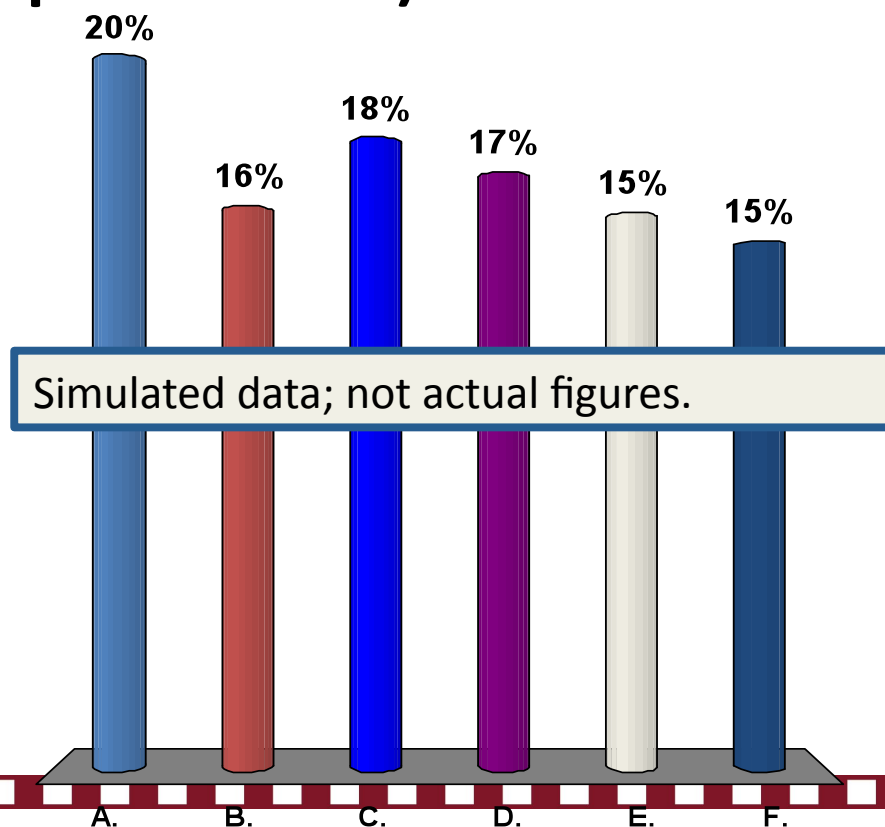
- Rising water covers most popular clam digging area
- Beds unable to move up beach
- Tribe identified alternative digging areas; all options less accessible, some have different kinds of clams



# Scenario: tidal inundation of shellfish beds

**What are the most important Health Indicators?  
(press the letter on your keypad in order of importance,  
the most important first)**

- A. Resources Security
- B. Community Connection
- C. Ceremonial Use
- D. Education
- E. Self Determination
- F. Well-being



# Next Steps

- Partnering with other Indigenous communities in the US & Canada to:
  - Establish baselines with IHIs in each community
  - Engage community in discussions about priorities, now & in future, and how to address them
  - Establish monitoring, criteria for evaluation based on community's priorities
- Flexibility, adaptive approaches
- Institutionalizing planning, efforts



# Thank you.

## Contacts & report information:

- Information and copies of Swinomish reports available on the Swinomish Climate Change web site:  
[www.swinomish-nsn.gov/climate\\_change/project/reports.html](http://www.swinomish-nsn.gov/climate_change/project/reports.html)
- Swinomish Climate Change Initiative supported by a grant from the U.S. Department of Health & Human Services, Administration for Native Americans.
- Development of the Indigenous Health Indicators supported in part by the U.S. Environmental Protection Agency, Science to Achieve Results Program.
- “Correlation and Climate Sensitivity of Human Health and Environmental Indicators in the Salish Sea” Project funded by the North Pacific Landscape Conservation Cooperative.
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