Local Response to Climate Change:
Swinomish Case Study

Swinomish Indian Tribal Community
Location of Swinomish Indian Reservation
Storm surge, February 2006

LaCONNER, WASHINGTON
WEDNESDAY, FEBRUARY 8, 2006

WILD AND WICKED WEATHER - High winds and high tides on Saturday morning caused waves to crash over the roadway at Snee-Oosh Beach, creating a traffic hazard for those who were brave, or crazy, enough to venture out in the storm. Winds in and around LaConner gusted up to 70 miles per hour Friday night causing power outages in some areas. Power was restored in plenty of time to watch the Super Bowl. - photo by Doug Cole

Chilberg Ave.
Swinomish Climate Change Initiative

- Focus is local impacts, adaptation
- Two-year, $400,000 project
- 80% federal funding, 20% Tribal
- Second year: Develop strategy options, publish Action Plan (Sept. 2010)
Impact Assessment Technical Report

- Review of climate data
- Broad impact analysis
- Many disciplines/sectors
- Risk zone mapping
- Inventory of at-risk assets
- Vulnerability assessment
- Risk analysis
- Basis for Action Plan
Climate Change Impacts

- Sea Level Rise risk of inundation and storm surge homes, infrastructure and shoreline resources.

- Wildfire Risk to homes especially in forest urban fringe.

- Health risks from heat events and increases in respiratory ailments.

- Risks to water supplies and waste water Treatment facilities.
Inundation Risk Zones – Sea Level Rise & Tidal Surge
Inundation Risk Zones – detail
Sea level rise scenarios, low-lying areas
Potential sea level rise impacts – built environment

- ~1,100 low-lying acres at risk
- 180 structures, over $100 million value
- Access/transportation links at risk
- Economic development land at risk
- Impaired marine/port facilities
- Erosion, flood damage from storm surges
Threats to Shoreline and Near Shore Habitat

- Loss of shoreline/shellfish habitat
- Stressed fish / shellfish populations
- Permanent species relocation/migration
- Threats from invasive species
- Loss of forage fish spawning beaches
- Loss of eel grass beds
- Hardened shorelines with resulting impacts.
Counter-Productive Response

- To protect at risk homes, roads and pipelines – first response may be to build bulkheads to hold back the sea.

- This will block any upward migration of shoreline habitats.

- Eventually squeezing out shorelines/beaches as permanent inundation meets vertical walls.
Coastal marshes have kept pace with the slow rate of sea level rise that has characterized the last several thousand years. Thus, the area of marsh has expanded over time as new lands have been inundated. If in the future, sea level rises faster than the ability of the marsh to keep pace, the marsh area will contract. Construction of bulkheads to protect economic development may prevent new marsh from forming and result in a total loss of marsh in some areas.

Allow for Habitat Migration

- To retain tideland and shoreline habitats relocate homes and infrastructure away from shoreline and not harden banks.

- Id critical areas to retreat and allow / encourage shoreline habitat migration and adaptation.

- Determine where and when dike setback or removal should be done.

- Plan long-term in actions taken now.
Current Project: Tribal Code Amendments to Address SLR

- Review Tribal codes for amendments to improve adaptation response.
- Shorelines and Sensitive Areas
- Building and Zoning Codes

Key issues:
- Reduce future building in SLR Risk Zones
- Provide for Shoreline Migration in key areas
- Prevent hardening of shorelines
- Address shifts in shorelines and ownership
Future Swinomish Projects on SLR

- Determine Where to Retreat
  - Relocate infrastructure
  - Acquire private lands and homes
  - Remove shoreline protection structures.

- Study of Dikes and Ag Lands to determine
  - Where to raise lands for economic development
  - To remove or setback dikes
  - How long will agriculture be feasible and when to convert to estuarine wetlands or other uses.
Sources

- **Swinomish Climate Change Initiative: Adaptation Plan.** September 2010. Swinomish Indian Tribal Community.
- **Rolling Easements: Options for Ensuring that Wetlands and Beaches Have Room to Migrate Inland as Sea Level Rises.** [Draft 2012]. James Titus, US EPA.