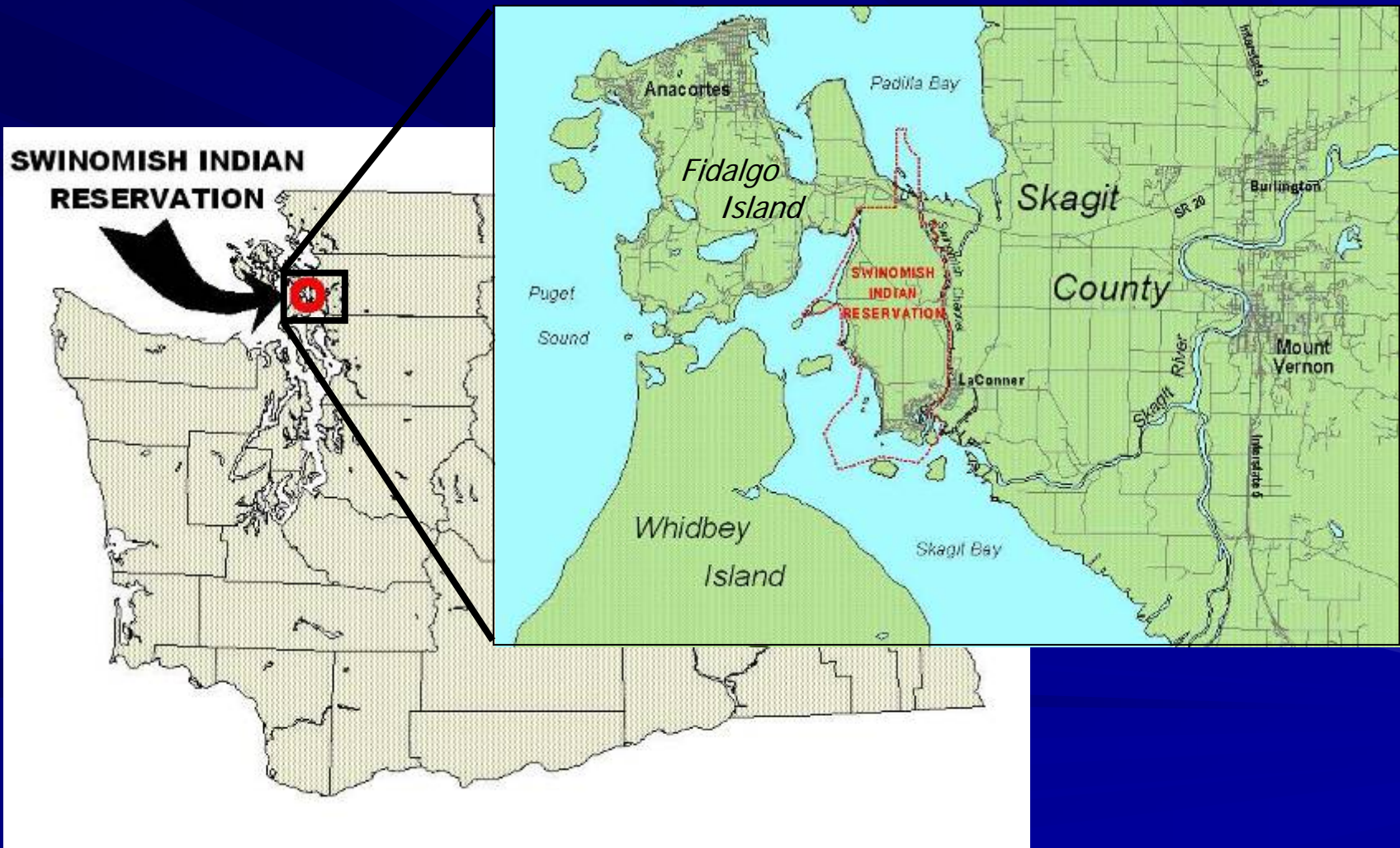


Responding to Climate Change: Swinomish Case Study



The challenge of climate change

- Climate change is global, but impacts are local/regional and vary greatly
- The best coordinated action will not stop climate change
- Response to climate change will span generations
- Uncertainty in climate models and projections
- Change may occur faster than projected

The challenge for Tribes/Swinomish

- Contribution to GHG's not on scale of anticipated impacts (smaller, rural community, little industry)
- Mitigation of causes requires effort well beyond Tribe's contribution
- Connection to Reservation homeland requires response, limits options
- Need for preparation and adaptation is comparatively great (significant issues, limited resources)

Some terms and references:

- IPCC: Intergovernmental Panel on Climate Change (United Nations)
- Mitigation: Actions to try to reduce the causes of climate change.
- Adaptation: Actions to respond to the unavoidable effects of climate change, either actual or projected.

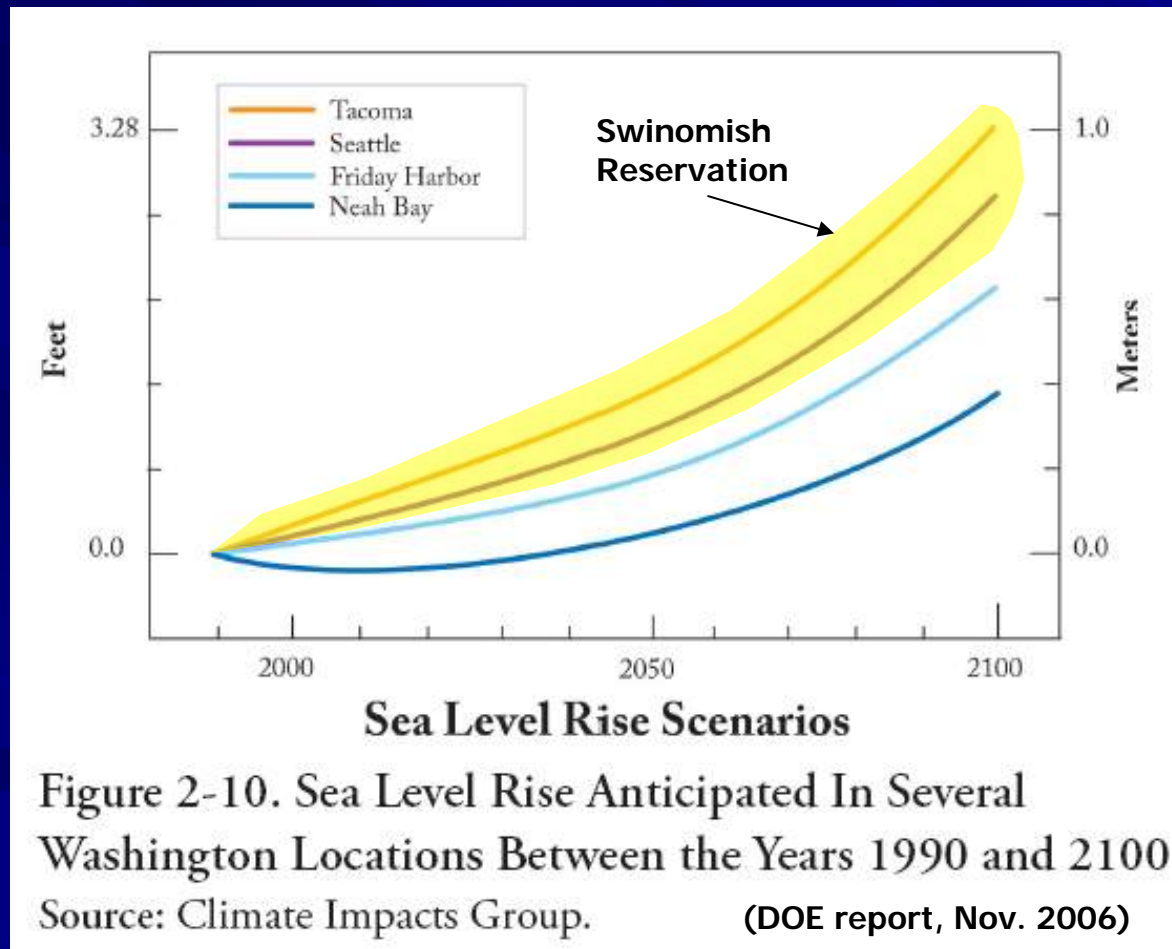
Specific motivation for Swinomish

- **Regional recognition of potential impacts and issues (WA DOE report, Nov. 2006)**
- **Local extreme weather events:**
 - **Storm/tidal surge, Feb. 2006**
 - **Severe windstorm, Nov. 2006**

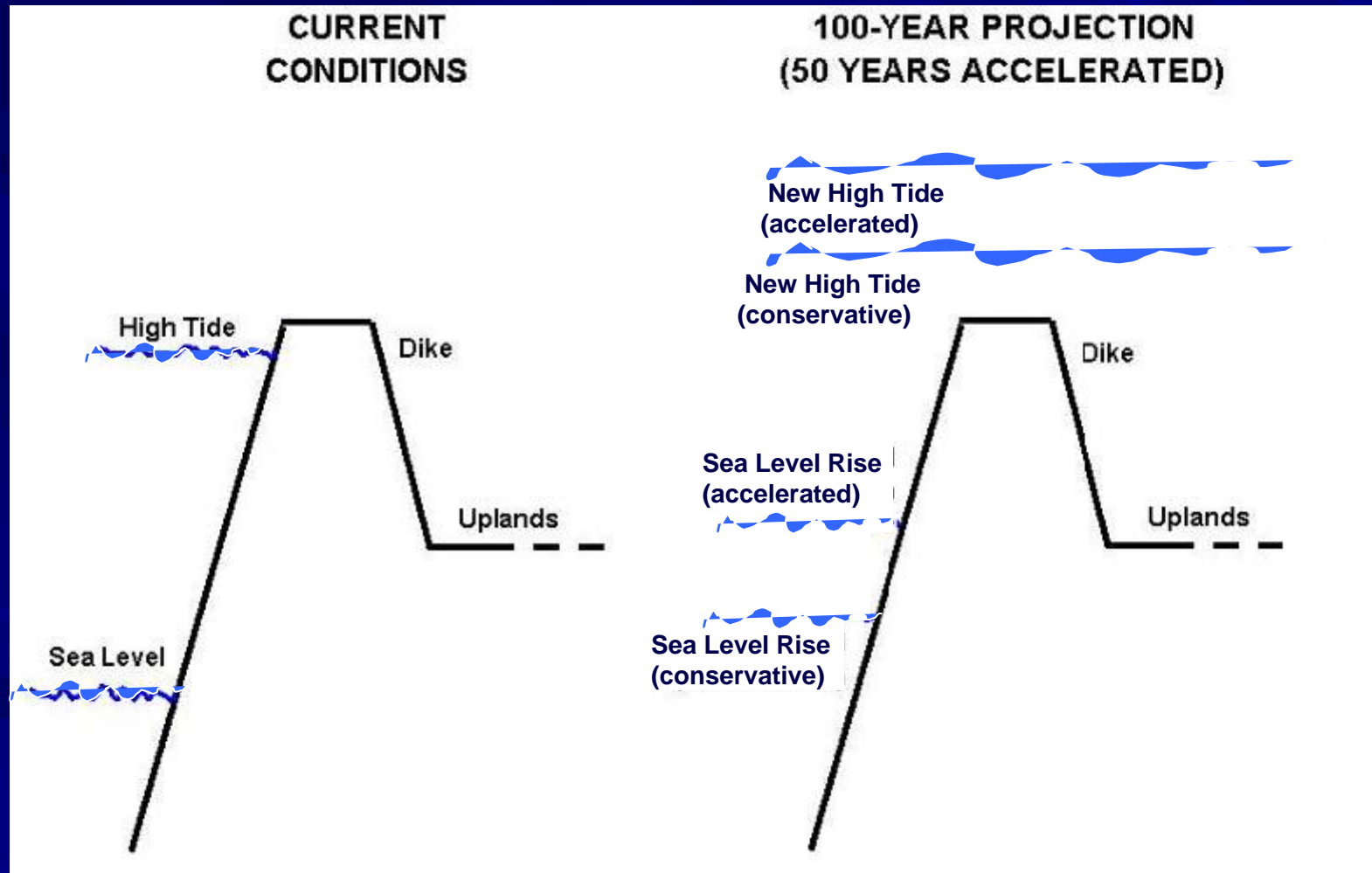
WA Dept. of Ecology report, Nov. 2006:

- **“Climate change impacts are visible in Washington State and economic impacts are becoming apparent.”**
- **“Low-lying areas such as ... the Skagit River delta will be among the first affected.”**
- **“The current consensus views underestimate the pace of climate change...sea levels appear to be rising faster than projected.”**

Potential sea level rise, Puget Sound



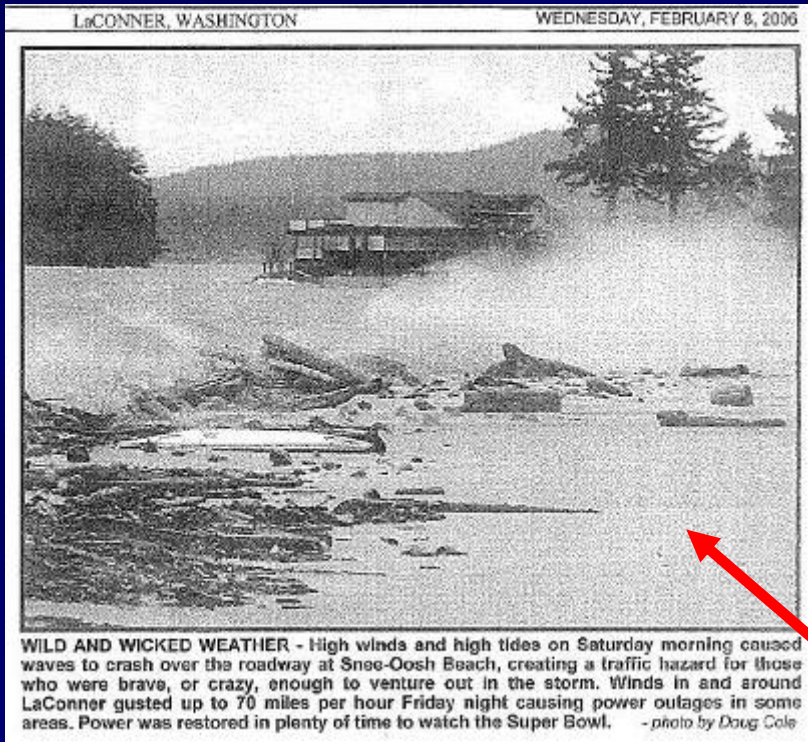
Sea level rise scenarios – low-lying areas



Storm/tidal surge, February 2006



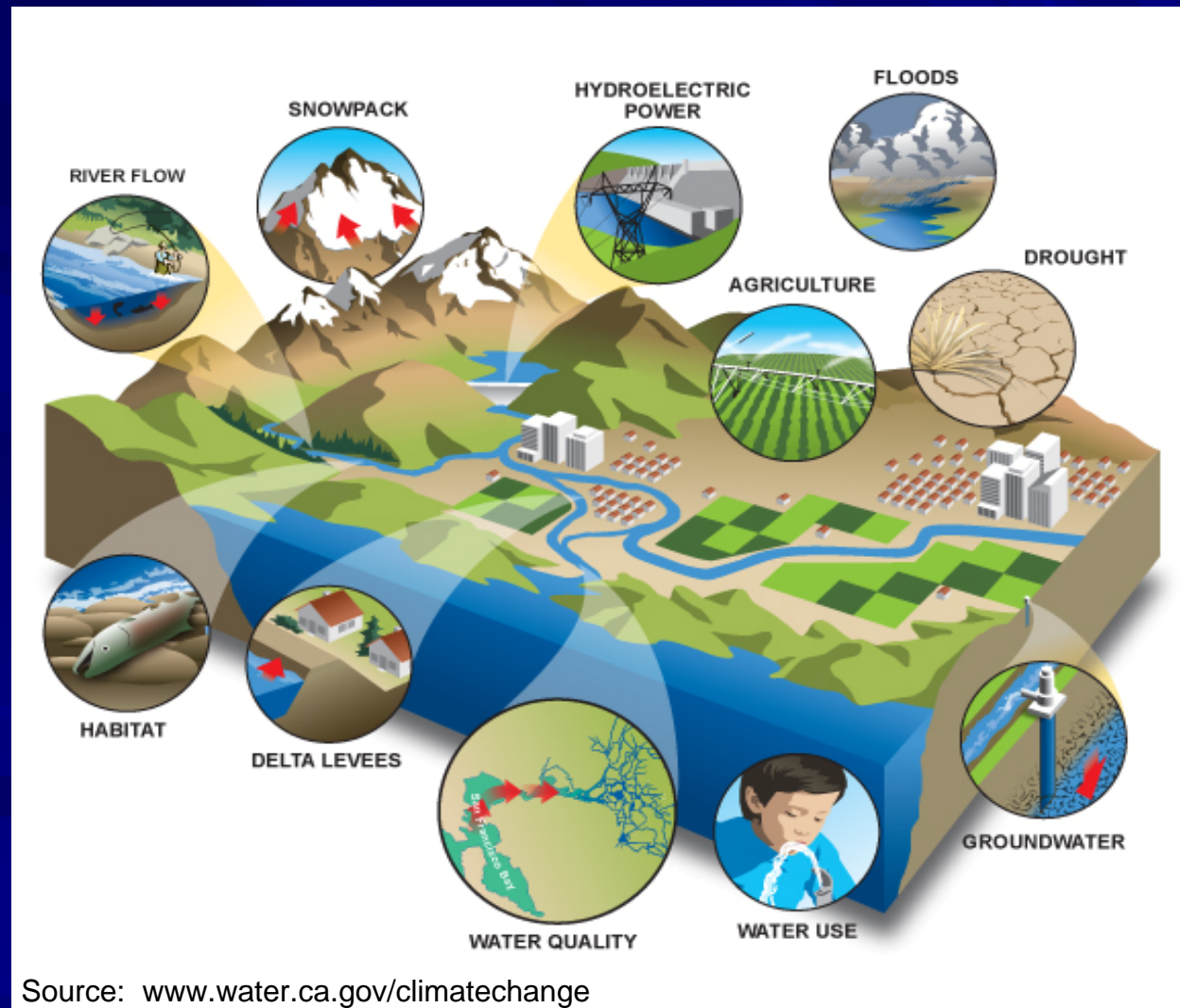
Storm/tidal surge, west shore, February 2006



Regional impacts of climate change (WA DOE, Nov. 2006; CIG 2009)

- **Increasing temperature**
- **Decline of glaciers**
- **Reduced annual snow pack**
- **Reduced river flows**
- **Changing runoff patterns, timing**

Regional impacts of climate change (WA DOE, 2006; CIG 2009)



Source: www.water.ca.gov/climatechange

Potential impacts from sea level rise – Swinomish Reservation

- 1,100 low-lying acres at risk
- Economic development, ag lands at risk
- 180 structures, over \$100 million value
- Access/transportation links at risk
- Impaired dock/port facilities
- Inundation of shellfish beds
- Inundation of beach seining sites
- Erosion/ destruction of buried scared sites
- Bluff erosion, local flooding

Swinomish Climate Change Initiative

- Two-year, \$400,000 project to assess impacts, develop action plan
- 80% ANA funding, 20% Tribal match (cash/in-kind)
- First year: Impact assessment, publish technical report (Oct. 2009)
- Second year: Develop strategy options, publish Action Plan (Sept. 2010)

Project participants

- **UW Climate Impacts Group**
- **Skagit River System Cooperative**
- **Town of LaConner**
- **Skagit County**
- **Shelter Bay Community**

Adaptation – Technical Assessment

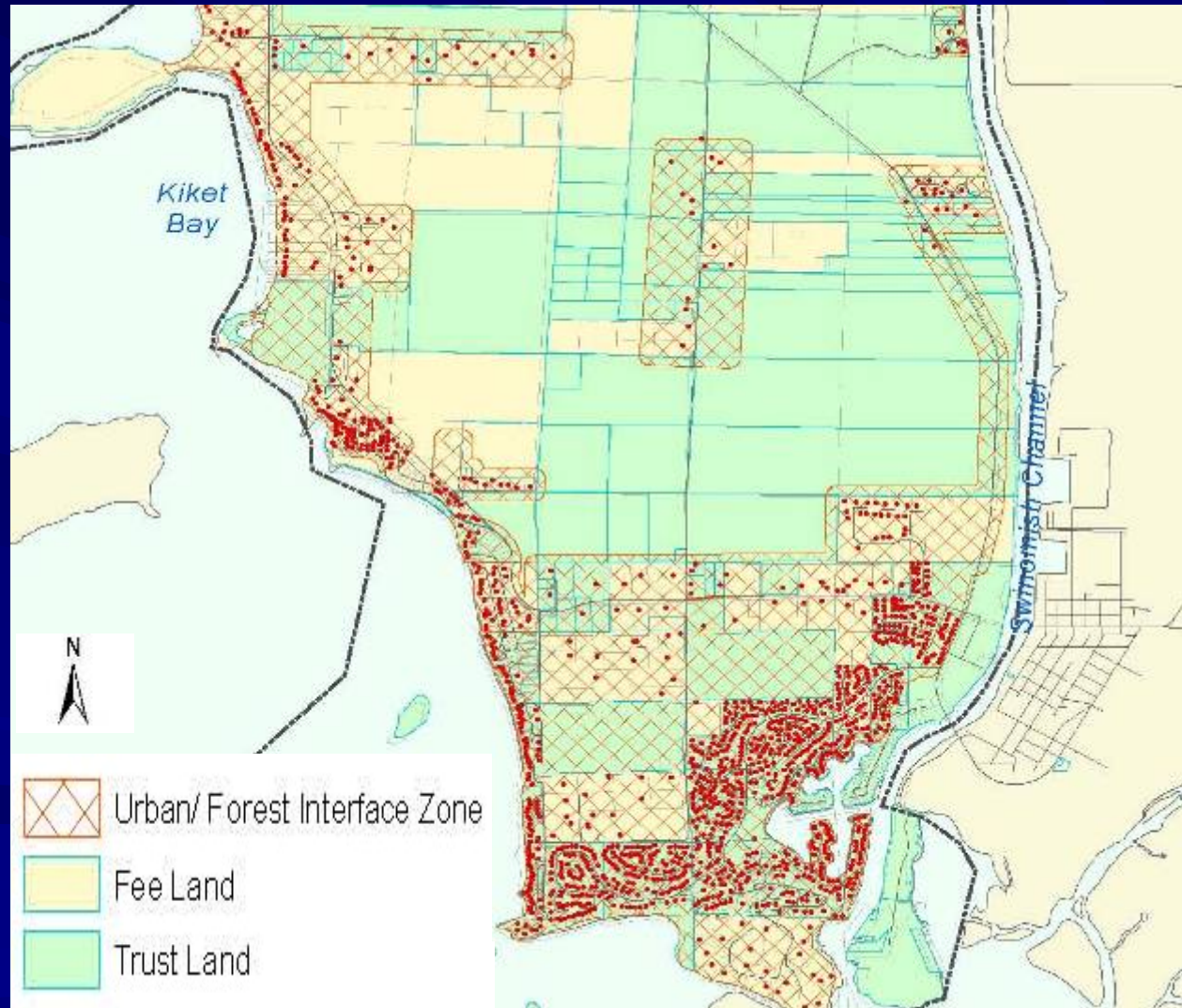
- Impact Analysis: survey climate data, identify at-risk areas (zones), range and probability of potential impacts
- Vulnerability Assessment: inventory assets & resources in risk zones, assess sensitivity and adaptive capacity
- Risk Analysis: value of at-risk assets; vulnerability X probability = risk

 **Technical Report (2009)**

Technical Report:

[http://www.swinomish.org/
departments/planning/clim
ate_change/climate_main.
html](http://www.swinomish.org/departments/planning/climate_change/climate_main.html)

Structures within wildfire risk zone



Property within primary wildfire zone (Urban/Forest Interface)

Property Type	Number	Acres	Approximate Value
Residential	1,368	1,995	\$ 493,688,000
Non-Residential	9	143	\$ 4,806,000
Buildable Lots	183	80	\$ 19,918,000
TOTAL	1,560	2,218	\$ 518,412,000

Public/ human health impacts

- **Increased respiratory diseases**
- **Heat-related illnesses**
- **Drowning**
- **Vector-borne diseases**
- **Enteric Diseases**
- **Food-related illnesses/ diseases**

Other projected impacts

- **Stressed fish populations**
- **Forest, habitat conversion/migration**
- **Species relocation/migration**
- **Increase in pests, disease vectors**
- **Reduced water availability**
- **Overarching cultural implications**

Impacts on tribal traditions



Beach seining



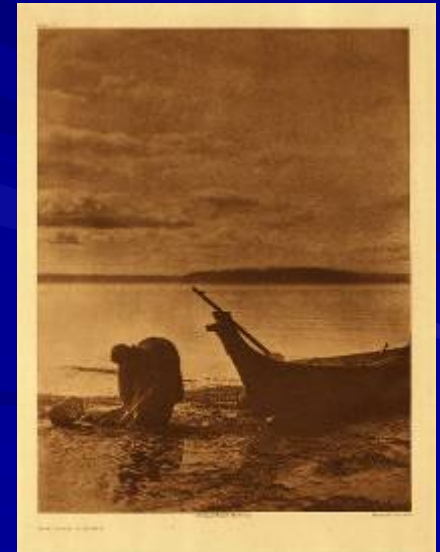
Fishing



Native plants



Shellfish harvesting



Cultural sites

Impacts on tribal traditions

Solastalgia: a combination of the Latin word solacium (comfort) and the Greek root –algia (pain)

“The pain experienced when there is recognition that the place where one resides and that one loves is under immediate assault . . . a form of homesickness one gets when one is still at ‘home.’ ” --Albrecht *et al*, 2007

Where we go from here – Adaptation strategy planning

- **Review potential strategies**
- **Evaluate/prioritize options**
- **Assess funding issues, timelines**
- **Interagency coordination**
- **Prepare Action Plan (Sept 2010)**

Helpful resources

- Peer-reviewed science
IPCC, CIG, NWF, NOAA, NAS, etc.
- Reports/Guides
“Preparing for Climate Change” - King Co./CIG
- Other organizations/jurisdictions
CIG, ICLEI, WA-King Co., WA-Olympia, CA-Pacific Institute
- Funding agencies
ANA, EPA, USDOE, states
- Tribal networks
Tribes & Climate Change (www4.nau.edu/tribalclimatechange/index.asp)
Coast Salish Gathering (www.coastsalishgathering.com)
NCAI (www.ncai.org)

Credits

- Swinomish Climate Change Initiative supported by a grant from the U.S. Department of Health & Human Services, Administration for Native Americans.
- **Impacts of Climate Change on Washington's Economy: A Preliminary Assessment of Risks and Opportunities**, Washington Department of Ecology Publication No. 07-01-010, November, 2006. Produced for WA DOE and Department of Community, Trade, and Economic Development by the Washington Economic Steering Committee and the Climate Leadership Initiative of the Institute for a Sustainable Environment, University of Oregon.
- IPCC Working Group I (2007). **Climate change 2007: The Physical Science Basis, Summary for Policy Makers**. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Solomon S, Qin D, Manning M, Chen Z, Marquis M, Averyt KB, Tignor M, Miller HL, (eds) Cambridge University Press, United Kingdom and New York.
- Photos: Channel Town Press (Doug Cole), Feb. 2006; John Doyle, Feb. 2006; Swinomish Indian Tribal Community.
- Presentation preparation/contact: Ed Knight, AICP, Senior Planner, Swinomish Indian Tribal Community, LaConner, WA, 360-466-7304, eknight@swinomish.nsn.us. More information and full Technical Impact Assessment Report available at the Swinomish Climate Change web site, www.swinomish.org/departments/planning/climate_change/climate_main.html