

**National Working Waterfronts & Waterways Symposium
Tacoma, WA
March 27, 2013**

**Facing the Future:
Waterfront Development Challenges
in a Changing Climate**

Part 1: Ed Knight, Swinomish Indian Tribal Community

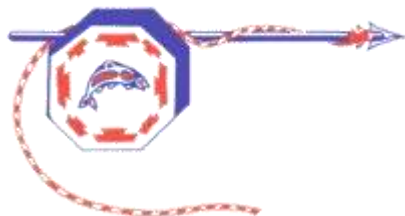
Part 2: Sean Keithly, Collins Woerman, Seattle, WA

Part 3: Steve Moddemeyer, Collins Woerman, Seattle, WA

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Facing the Future: Waterfront Development Challenges in a Changing Climate

Part 1: The Issues and the Challenges



**Ed Knight, AICP, Senior Planner
Swinomish Indian Tribal Community**

Questions for Part 1:

- ❑ **What's all the fuss about?**
- ❑ **Why should we (or do we) care?**
- ❑ **What are we (i.e., Swinomish) doing about it?**

Some terms and references:

- ❑ **IPCC: Intergovernmental Panel on Climate Change (United Nations)**
- ❑ **CIG: Climate Impacts Group, University of Washington**
- ❑ **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**

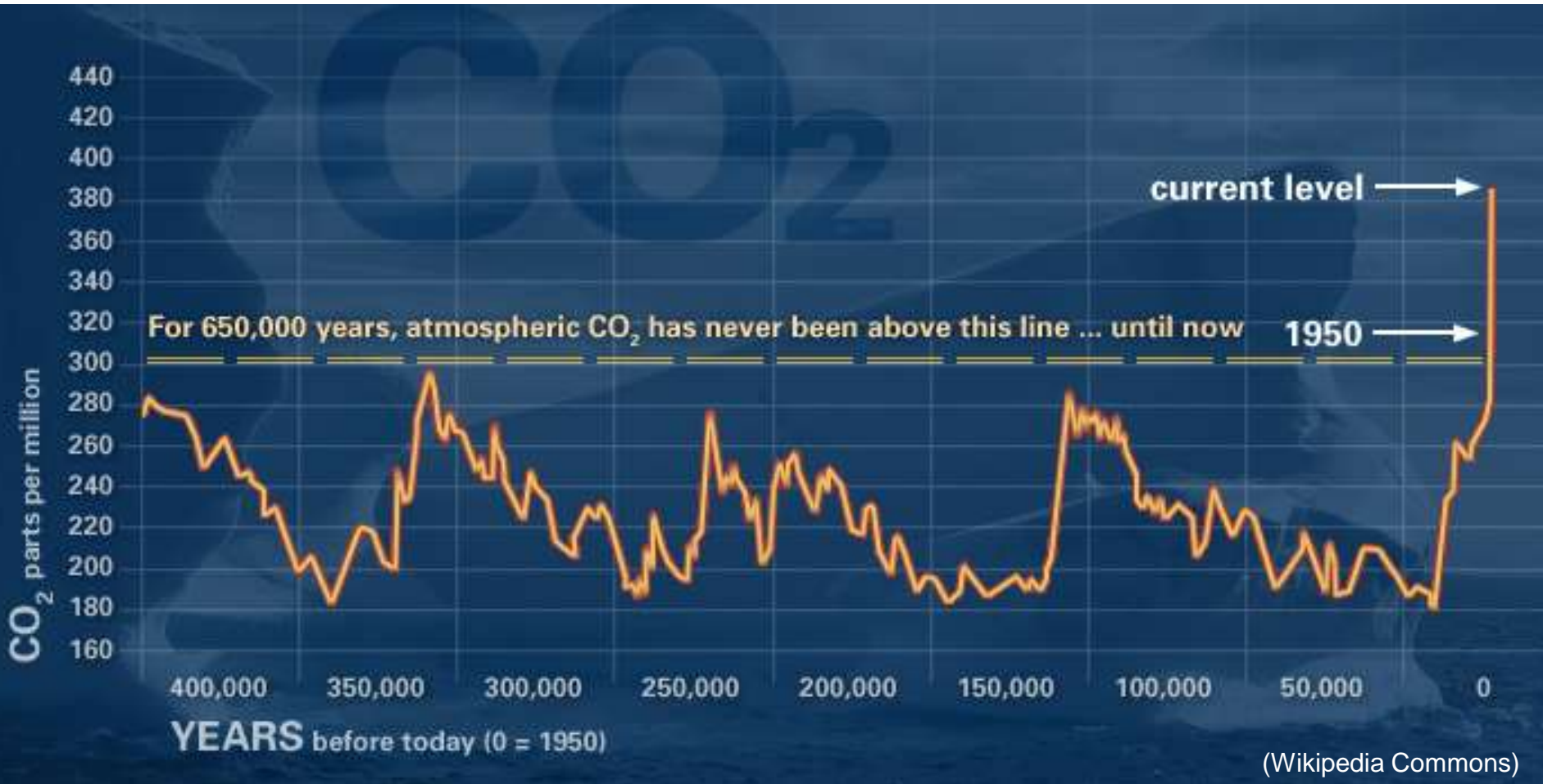
Understanding the Challenges

- Changes will happen regardless of action
(act now to plan...)**
- Changes will vary locally and regionally
(understand local conditions, response)**
- Changes will continue across generations
(long-term continuity of effort)**
- Changes may occur faster than projected
(flexibility of responses)**

What's all the fuss about, and why should we care?

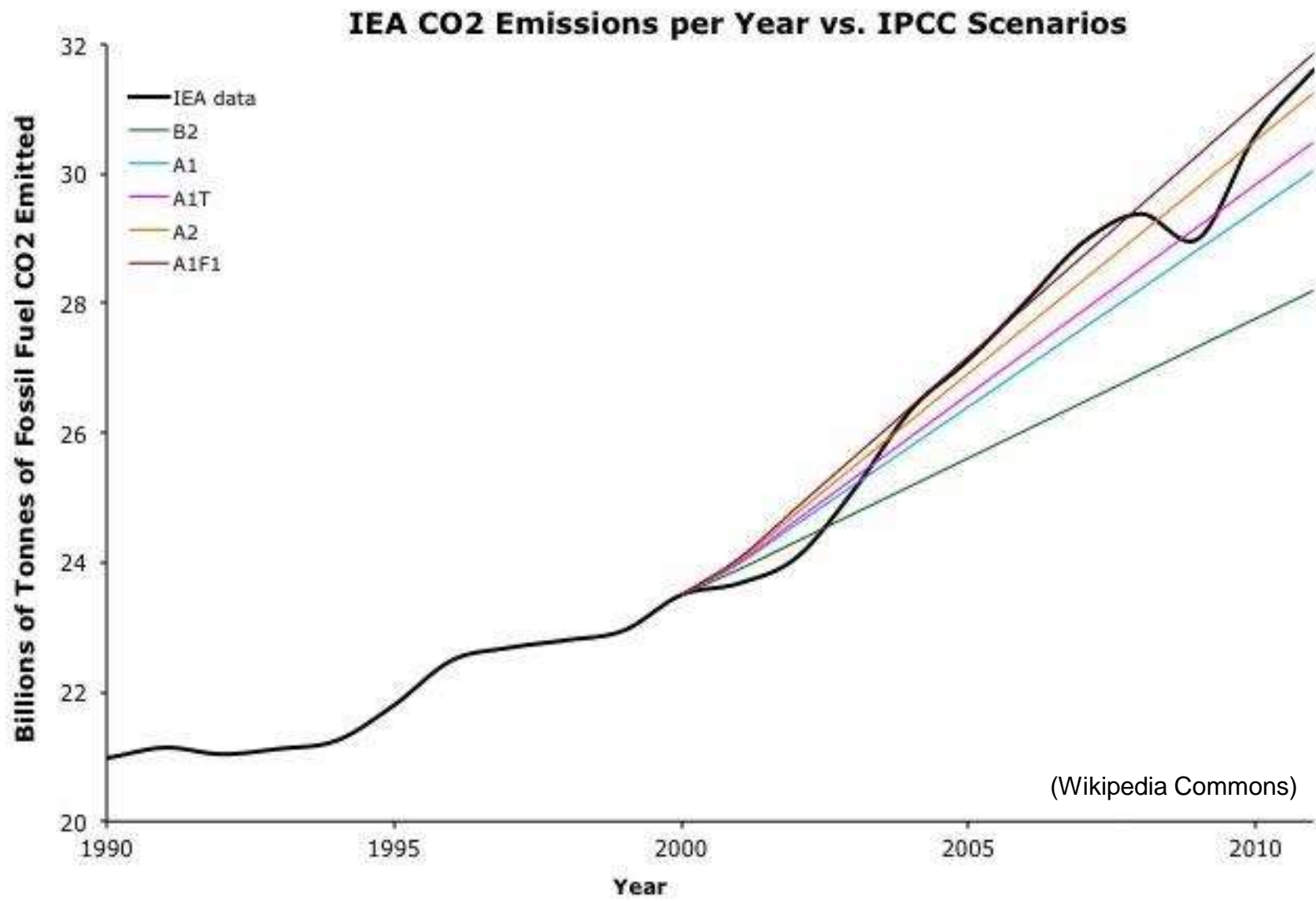
- ❑ CO₂ emissions, observations exceeding worst-case scenarios (IPCC)**
- ❑ Local extreme weather events
(hurricanes, floods, severe drought)**
- ❑ Consensus, recognition of issues
(state, national, international)**
- ❑ Connection to localities (homeland,
Reservation) requires response**

650,000 years of CO₂ data . . .



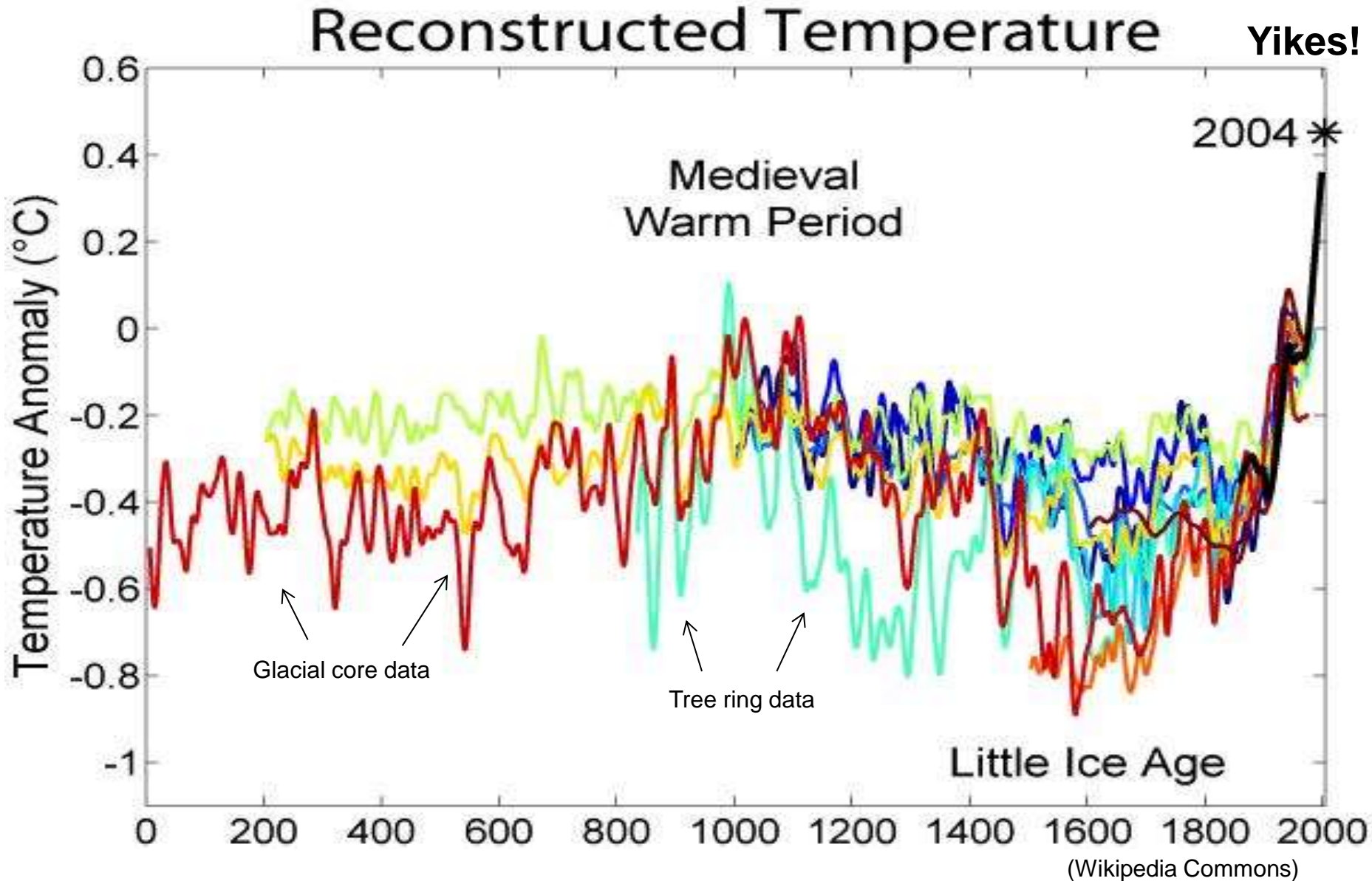
(Wikipedia Commons)

. . . exceeding worst case scenarios . . .



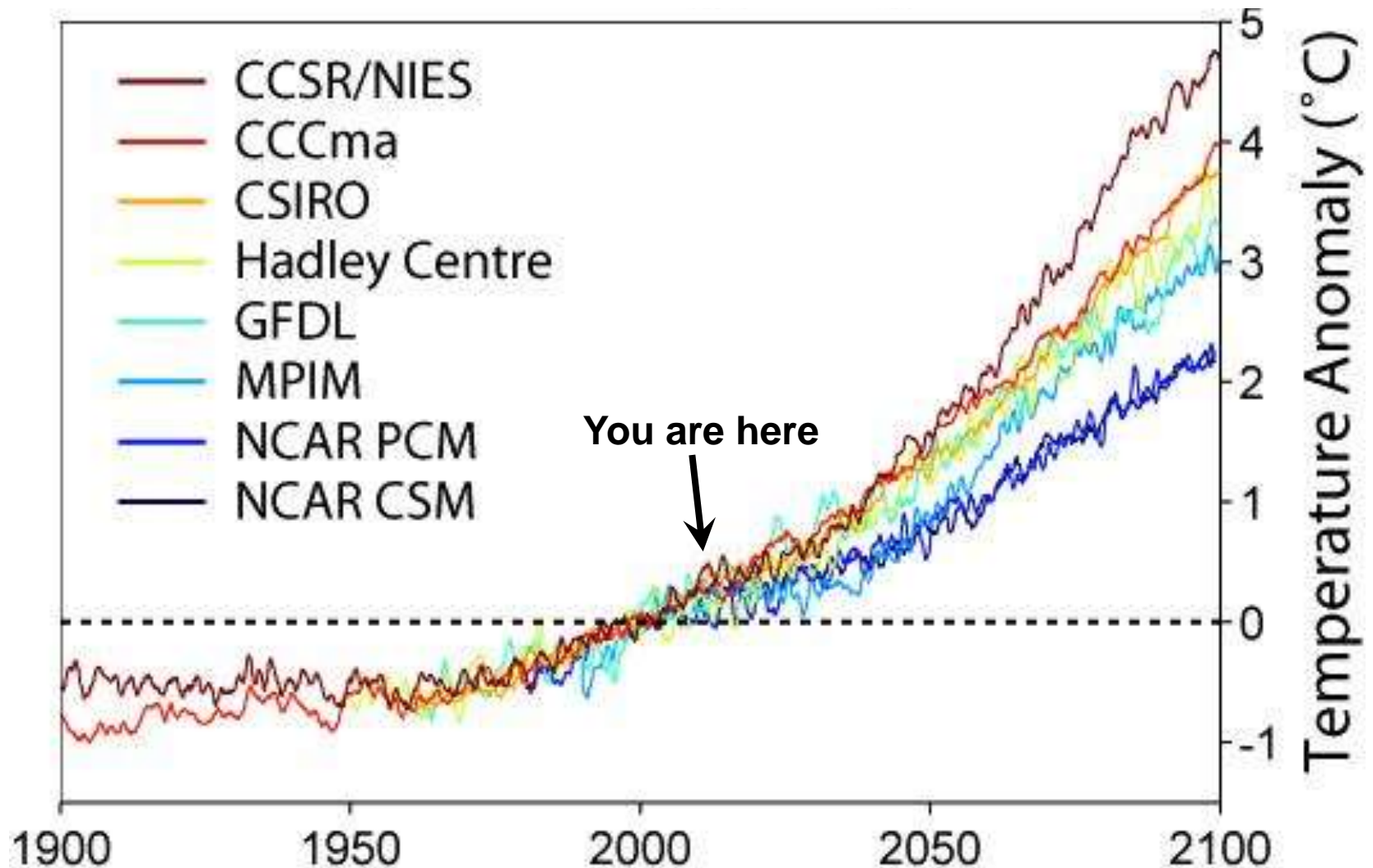
(Wikipedia Commons)

... driving temperatures higher . .

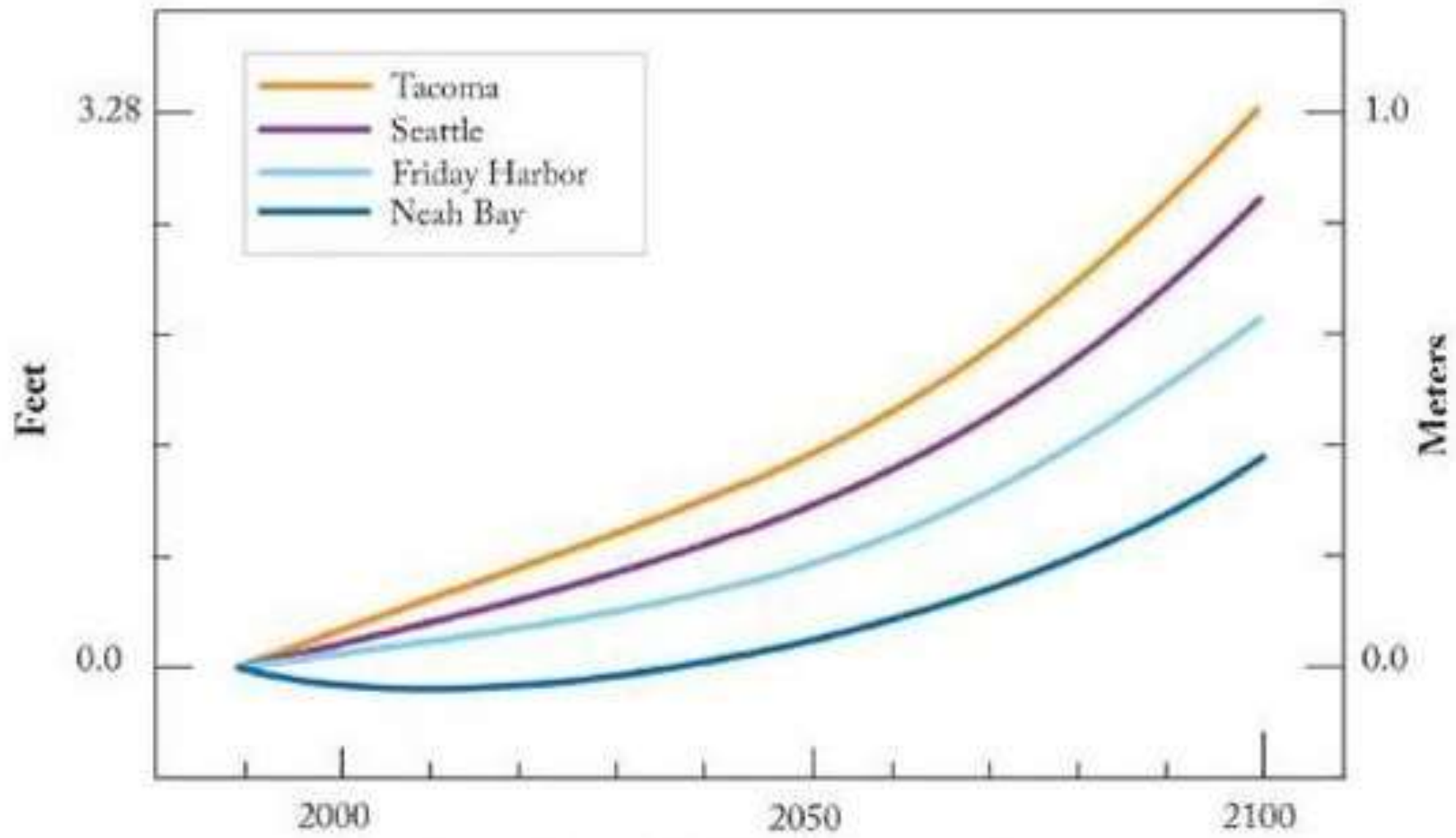


. . . and higher . . .

Temperature Model Projections Through 2100

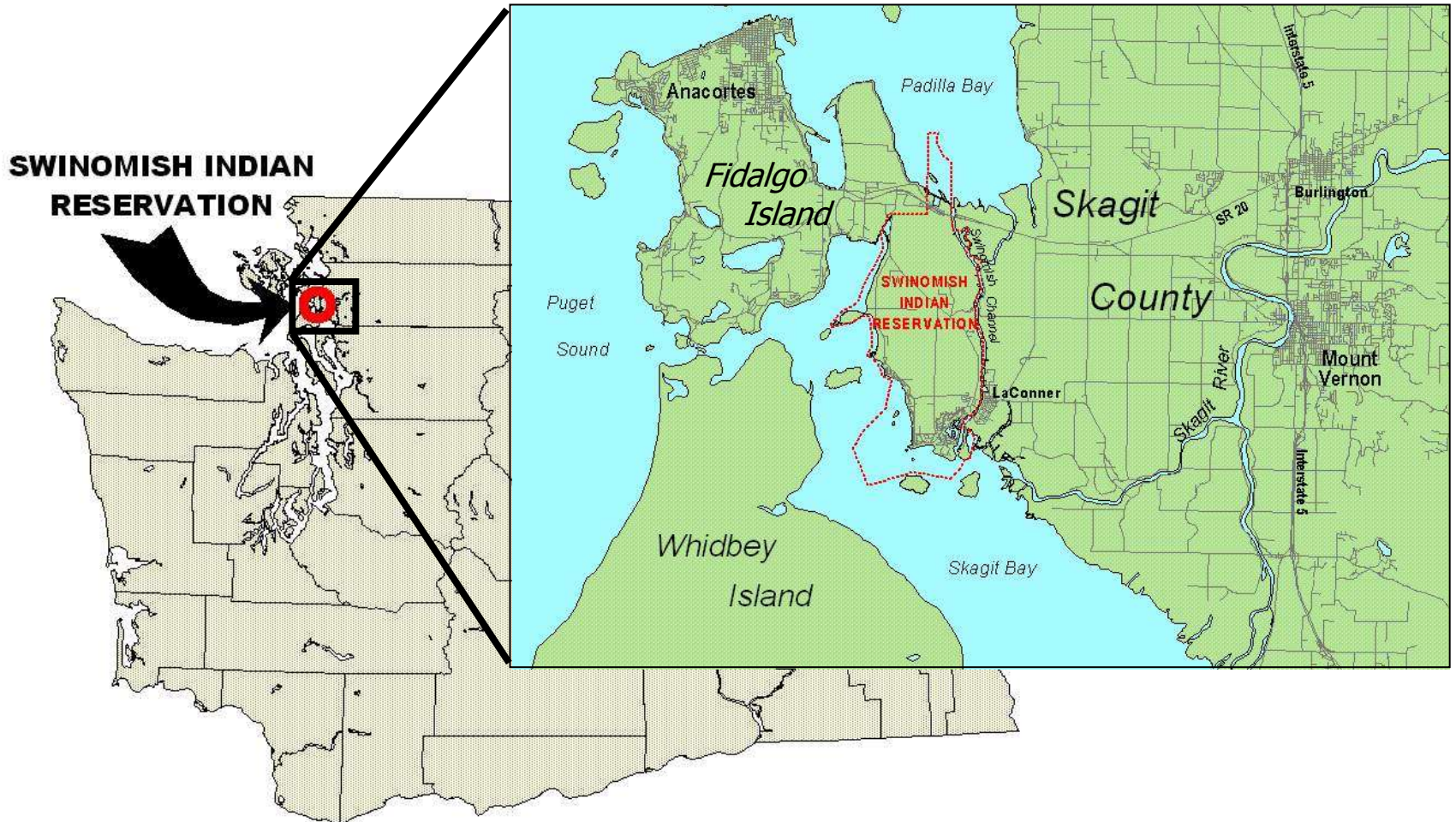


... and increasing Sea Level Rise

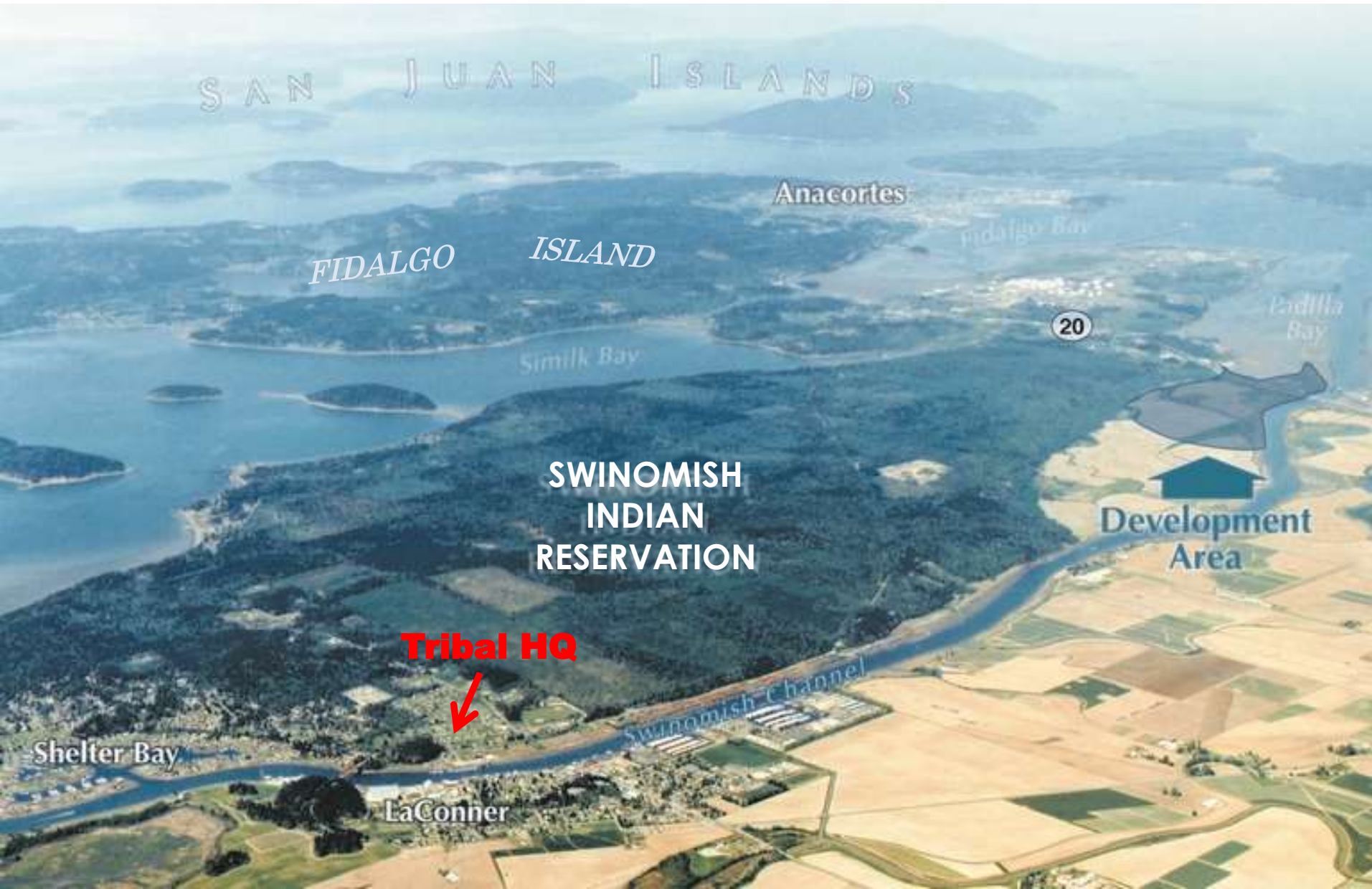


Sea Level Rise Scenarios (CIG, 2006)
Puget Sound and WA Coast

Location of Swinomish Indian Reservation



Swinomish Indian Reservation



Swinomish Channel view north from LaConner bridge

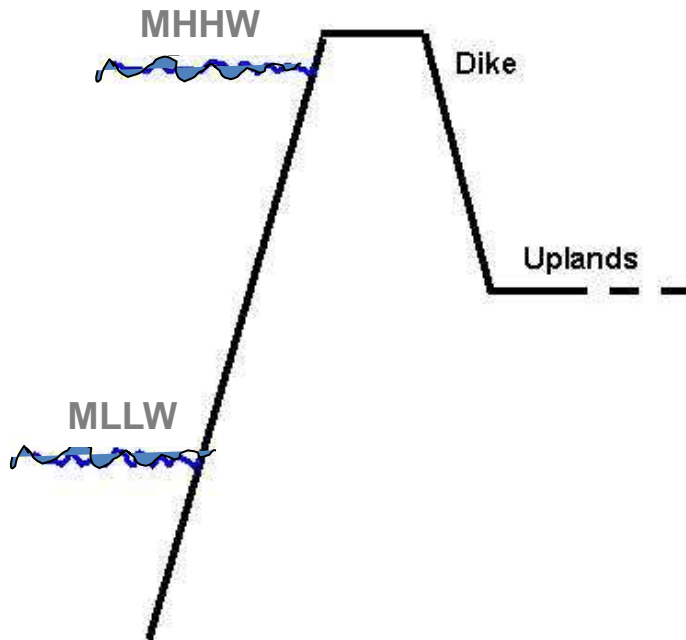


Vulnerable Economic Development Lands

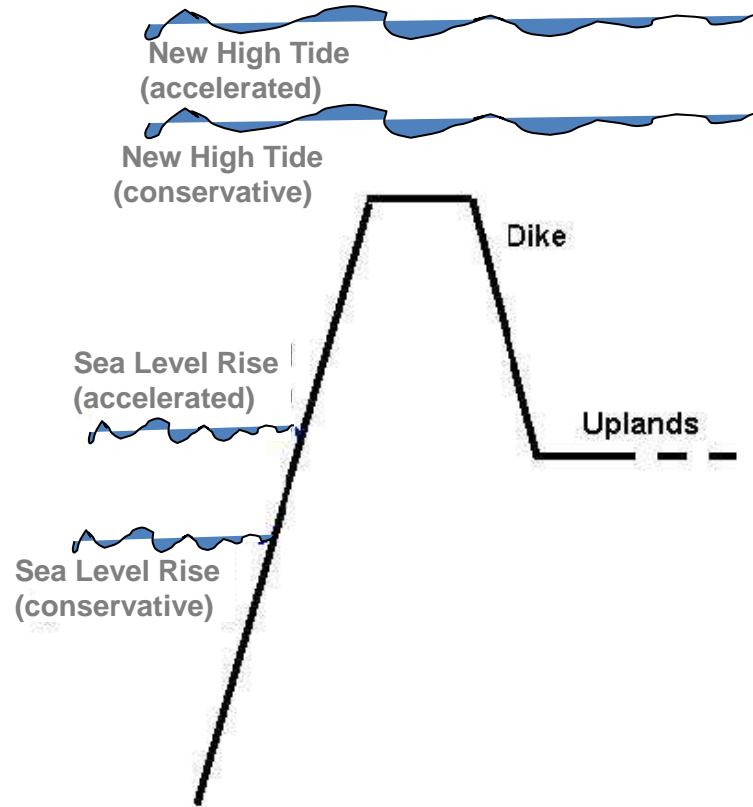


Sea level rise scenarios, low-lying areas, (Swinomish Reservation vicinity)

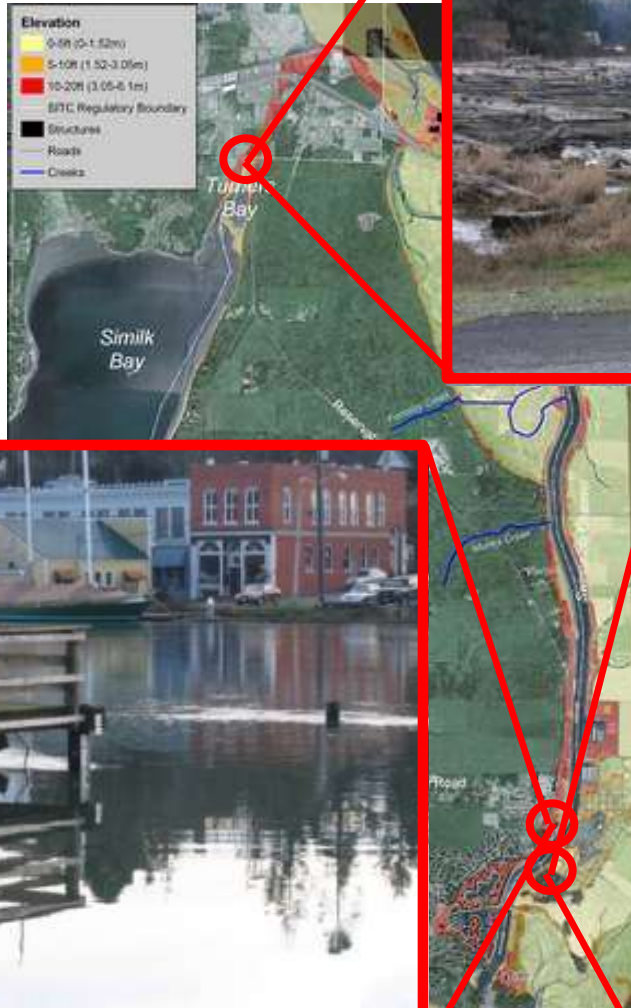
**CURRENT
CONDITIONS**



**100-YEAR PROJECTION
(50 YEARS ACCELERATED)**



Tidal surge, Swinomish Reservation vicinity – 2006, 2010, 2012



Swinomish Climate Change Initiative

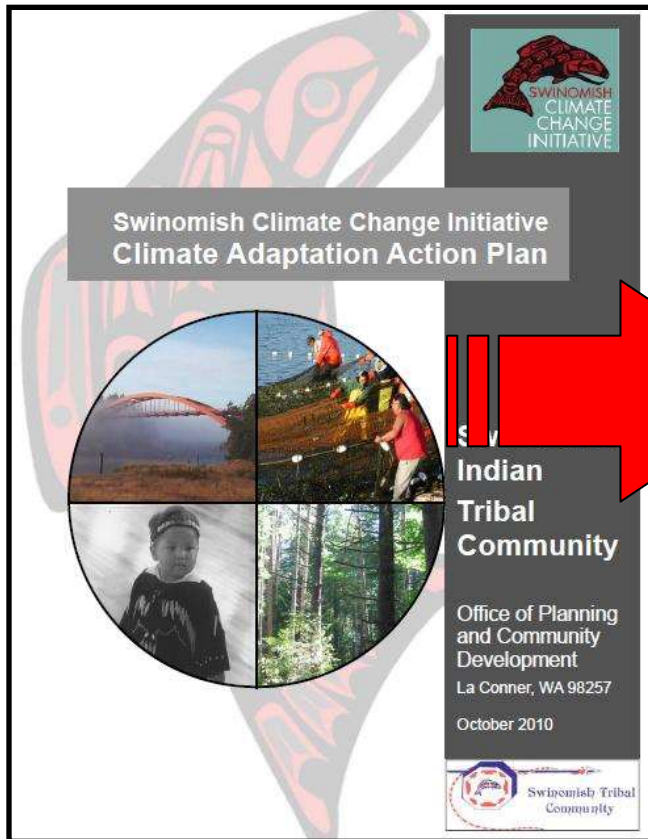
- ❑ Two-year, \$400,000 project**
- ❑ 80% federal funding (ANA), 20% tribal match**
- ❑ Year 1: Impact assessment, outreach, strategy scoping**
- ❑ Year 2: Develop recommendations, action plan**

Swinomish Climate Change Initiative Impact Assessment 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

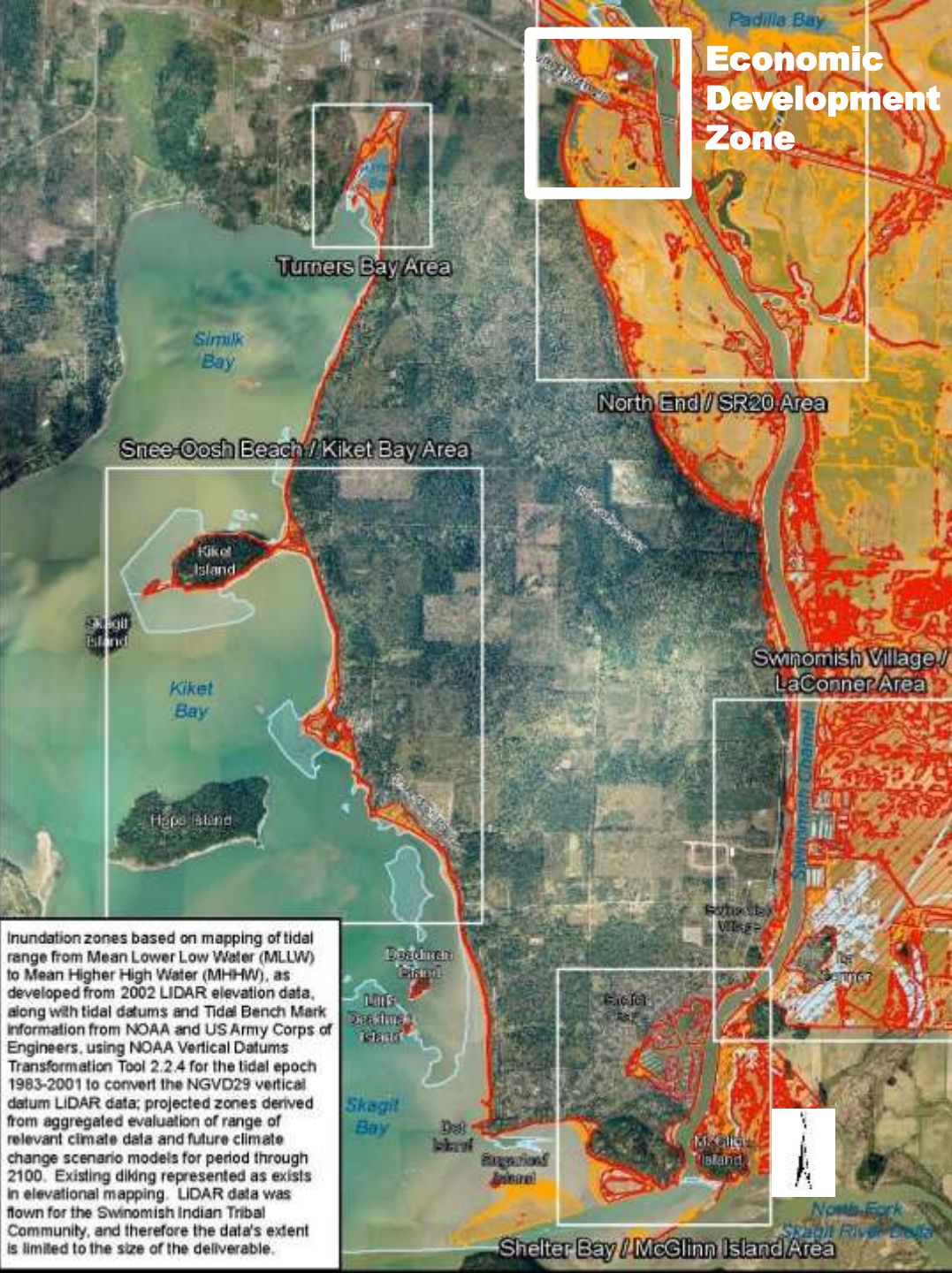
Action Plan Objectives for Low-Lying Areas



- **Coastal zone measures (immediate needs)**
- **Sustainable development (look to the future)**
- **Regional access preservation (low-lying routes)**
- **Interim upland protection (levee maintenance)**
- **Long-term adaptation (sea level rise, tidal surge)**

Inundation Risk Zones

Swinomish Indian Reservation



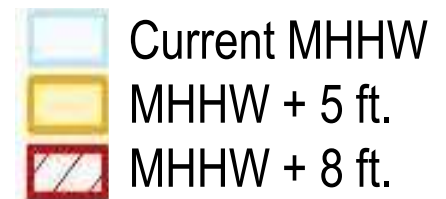
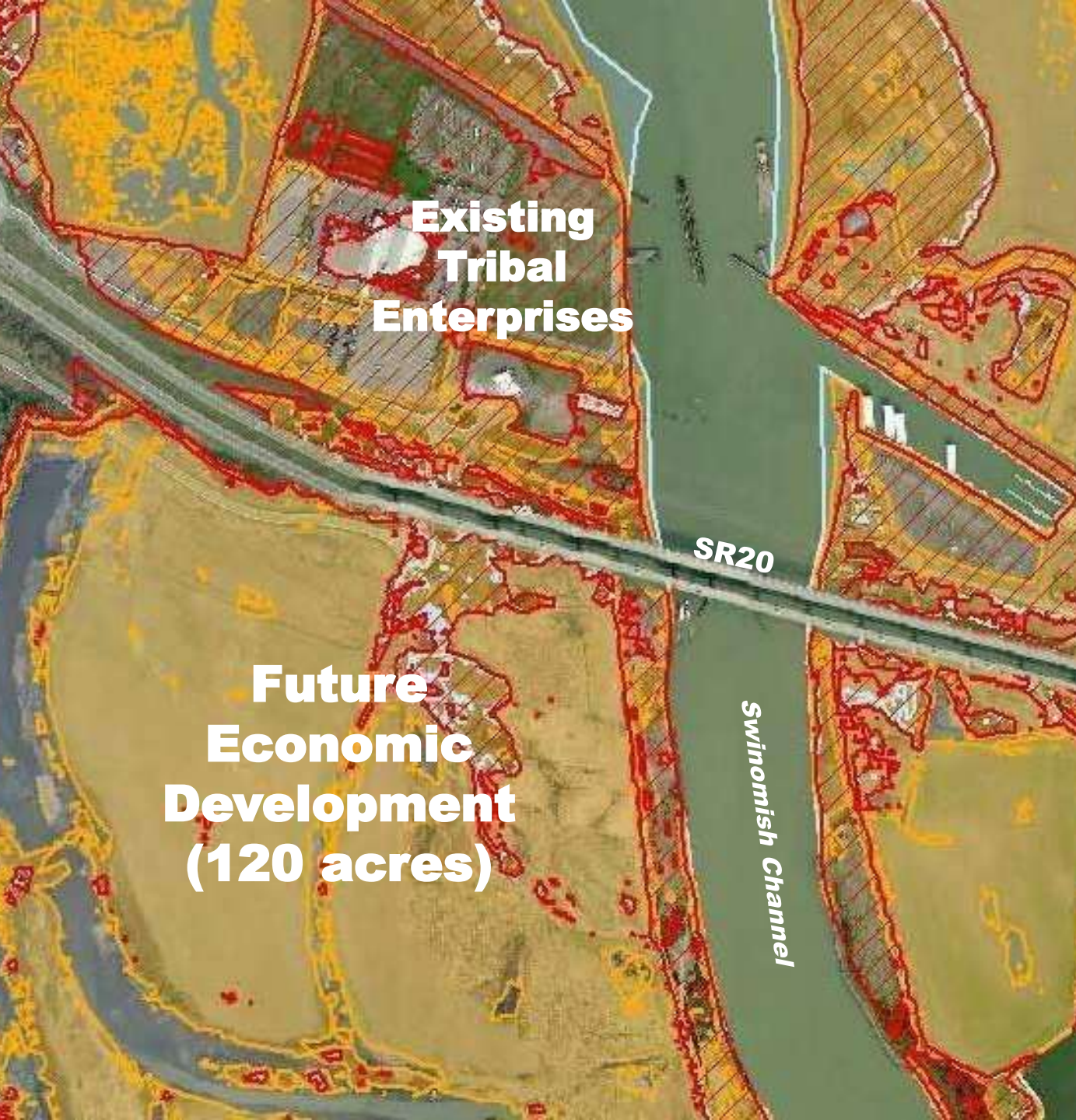
Inundation zones based on mapping of tidal range from Mean Lower Low Water (MLLW) to Mean Higher High Water (MHHW), as developed from 2002 LIDAR elevation data, along with tidal datums and Tidal Bench Mark information from NOAA and US Army Corps of Engineers, using NOAA Vertical Datums Transformation Tool 2.2.4 for the tidal epoch 1983-2001 to convert the NGVD29 vertical datum LIDAR data; projected zones derived from aggregated evaluation of range of relevant climate data and future climate change scenario models for period through 2100. Existing diking represented as exists in elevational mapping. LIDAR data was flown for the Swinomish Indian Tribal Community, and therefore the data's extent is limited to the size of the deliverable.

- Current MLLW – MHHW zone
- Projected SLR Zone (+ 5 ft.)
- Projected Tidal Surge (+ 8 ft.)

* Based on LIDAR flight on April 1, 2002
+/- 17cm Vertical, +/- 24cm Horizontal

Inundation Risk Zones

North Reservation Economic Development Zone



* Based on LIDAR flight on April 1, 2002
+/- 17cm Vertical, +/- 24cm Horizontal

The Challenge: Sustainable Development



The Challenge: Capture Amenities (waterfront uses, views, natural)

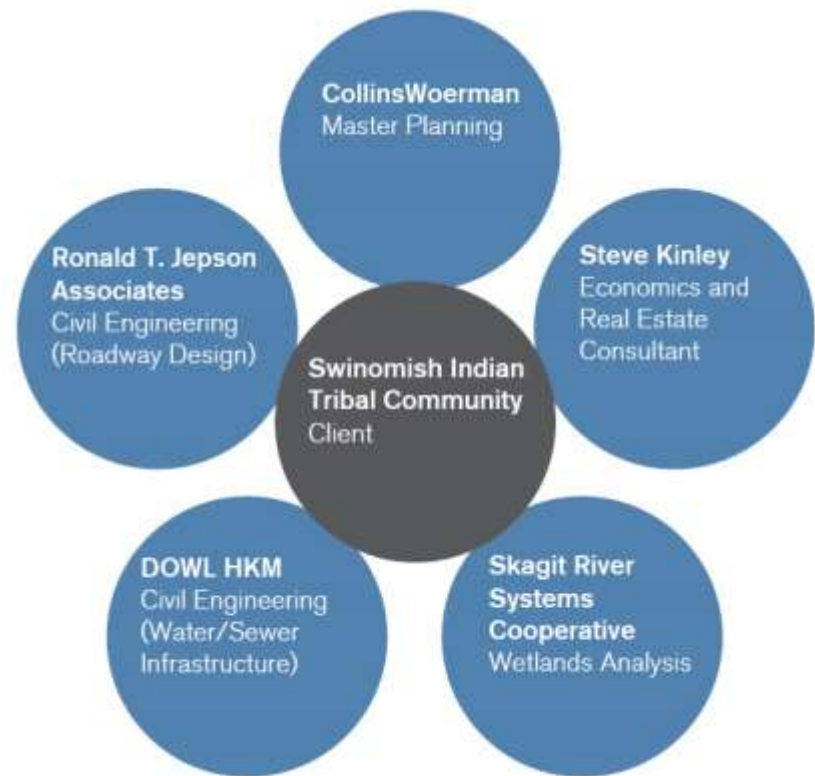


Major challenges in responding

- ❑ **Many disciplines, many moving parts**
- ❑ **Data uncertainties and gaps**
- ❑ **Complex issues, changing circumstances**
- ❑ **Public perceptions and communication**
- ❑ **Funding options, sources, availability**
- ❑ **Long, indefinite timeframes for impacts; shorter, finite project timelines**

Crafting a solution

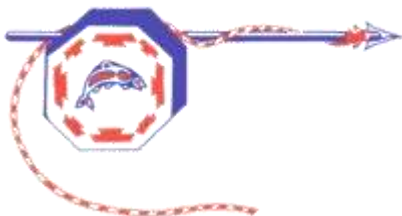
- ❑ Build a team to create a comprehensive economic development master plan
- ❑ Focus on a values-based planning approach
- ❑ Address a broad range of complementary issues: **technical, economic, social, environmental**



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Part 2: Creating a Values-Based Vision for Resilient Development



Sean Keithly, AICP, Associate Planner

CollinsWoerman



The Swinomish Economic Development Zone Master Plan Project

Overall Objective:

Assess site development opportunities and constraints, and prepare a master plan to guide economic development projects in the SITC Economic Development Zone



Existing Site Context



Process Crafting + Refining the Vision

- **Values** Workshops, existing planning documents
- **Site Analysis** Site visits, existing data/documents
- **Market Analysis**
 - Economic data and reports (local/regional)
- **Case studies** Local and national examples
- **Synthesis** of information, SWOT analysis
- **Conceptual site diagrams**
- **Test concepts** Input, revision, refinement
- **Create the vision** Final site plan + document



Client workshops + meetings

Key economic development goals

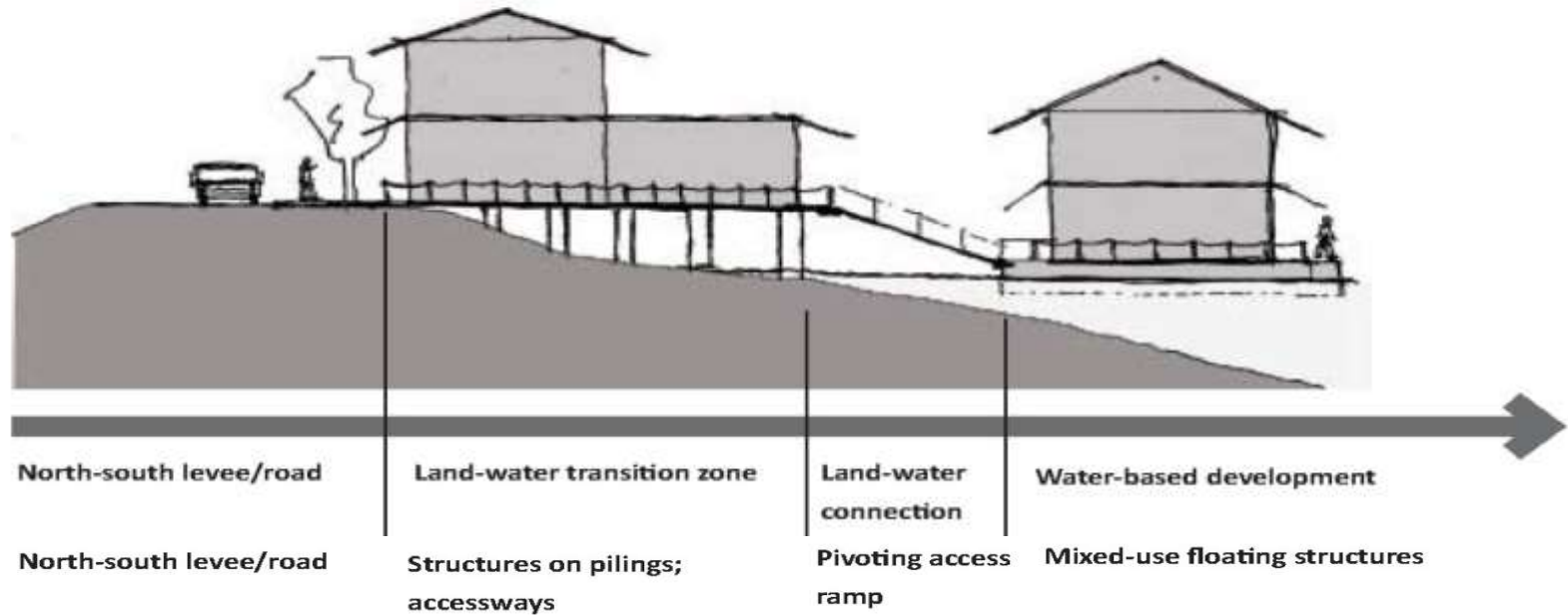
- ❖ Create a mix of complementary uses and focus on place-making
- ❖ Balance a “working waterfront” with a mixed-use destination
- ❖ Create a vehicle for sustainable, resilient economic growth

Balancing a working waterfront with recreation, culture, education, and tourism

- Eco-Industrial
- Working waterfront
- Mixed-Use retail
- Eco-Tourism
- Resilient building
- Education
- Culture



Thinking about new approaches to waterfront development + sea level rise...



One idea: “Proactive adaptation”

- One of three alternatives based on Tribal input
- Adapt by inundating a portion of the site
- Floating “Eco-Lodge” and associated uses (non-residential)



Vision meets reality: Addressing practical challenges

- **The good news:** As of 2011, Corps of Engineers policy includes consideration of sea level rise
- **The not-so-good news:** Floating structures as a proactive response requires a Sec. 404 permit (use must be “water dependent”)
- **The bottom line:** Regulatory norms ultimately made floating structures impractical

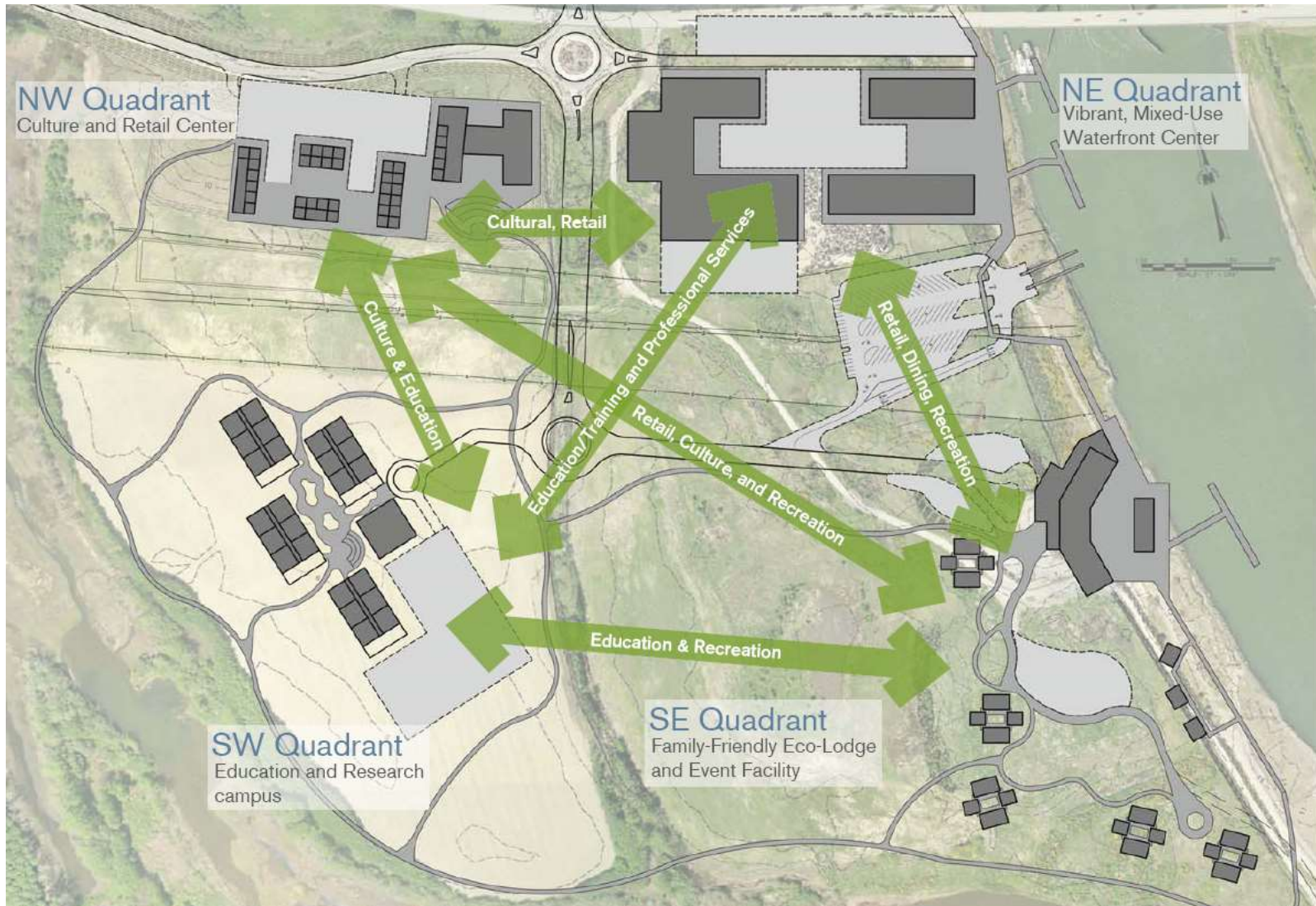
Adapting the approach: Crafting a refined Master Plan vision

- Resilient and adaptable to changing conditions
- Economically viable
- Meet Tribal development goals & values
(economic / social / environmental)

Overall development vision



Complementary uses across the site

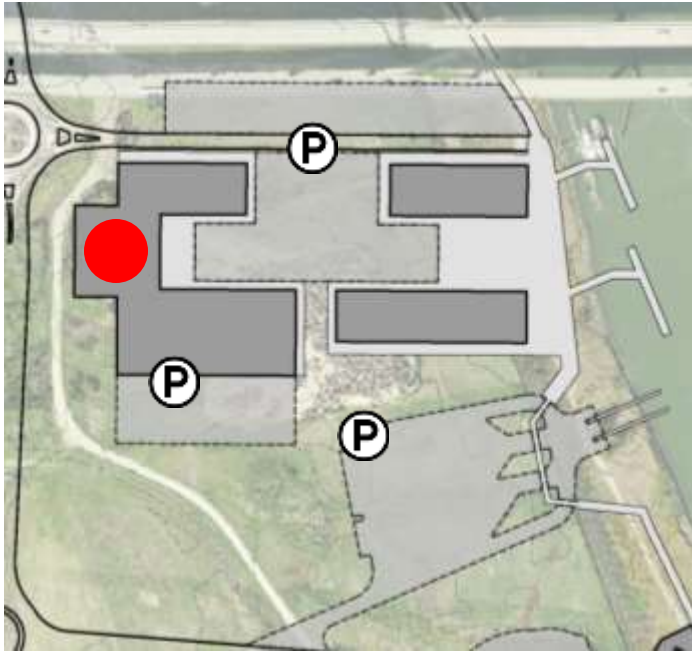


Northeast quadrant: Mixed-use working waterfront concept



Northeast Zone

High-Bay Flex Light Industrial / Office



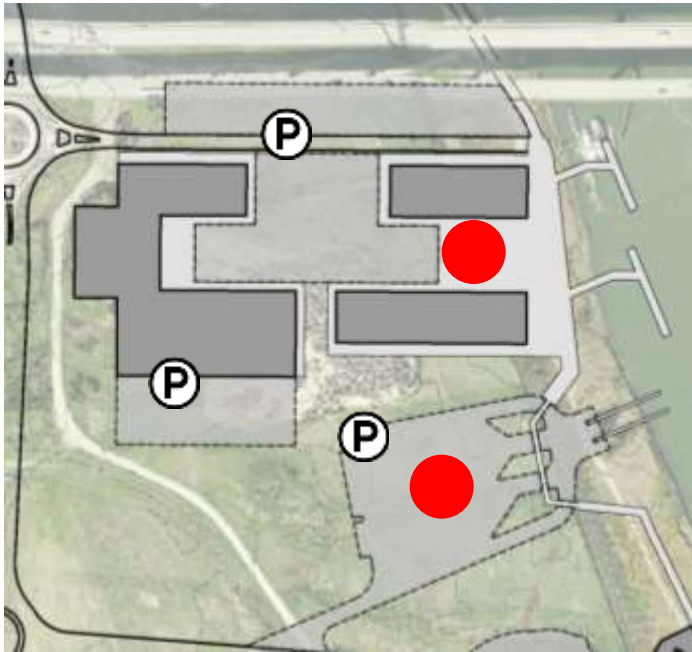
Loft-style light industrial / office / showroom space

- Large flex space could have multiple uses – good opportunity for creating local skilled jobs



Northeast Zone

Mixed-use Retail, Restaurant, Plaza & Boat Launch



Mixed-use Retail, Restaurant, Plaza and Boat Launch

- Prime opportunity for a waterfront destination
- Waterfront public space
- Transit moorage and boat launch





Southeast Zone

Eco-Lodge and Cabins



Working with water

Climate-resilient development



Adaptable Uses for a Changing Climate



“Floatable” structures



Elevated structures

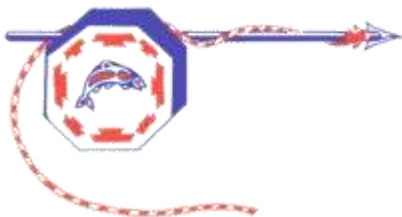
Current and Next Steps

- ❑ Market analysis and testing
- ❑ Infrastructure support (access, utilities)
- ❑ Investment/design to move concept forward

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Part 3: Planning for Resilience in the 21st Century



Steve Moddemeyer, Principal

CollinsWoerman

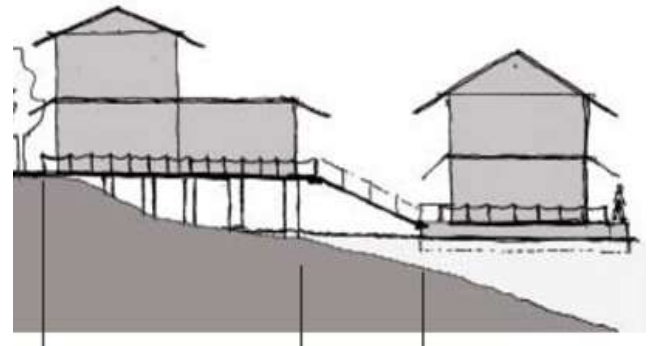


Recap:

Part 1: Adaptation issues and challenges

Part 2: Values-based vision for resilient development

Part 3: Planning for resilience in the 21st Century



Resilience

A framework for planning in the 21st Century



It's more than just climate change!

Climate change

Earthquake

Storm

outage

Power

Wind

incidents

Transport

Terrorism

Volcano

Heat
Excessive
Landslides

disorder

Civil

Seiches

Fires

Pandemic

shortages

Floods

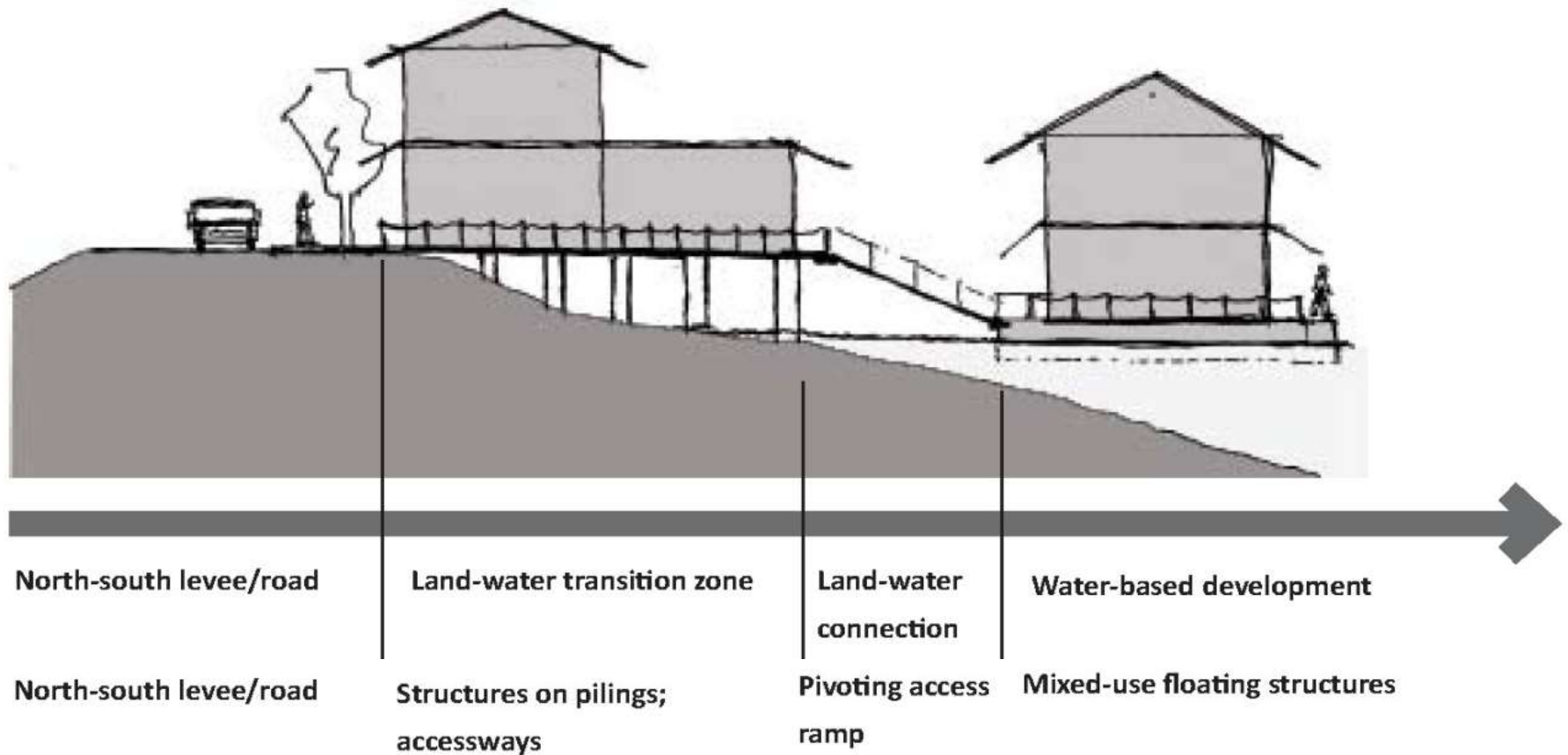
Tsunami

Water

Lahar

Resilience applies to all land use

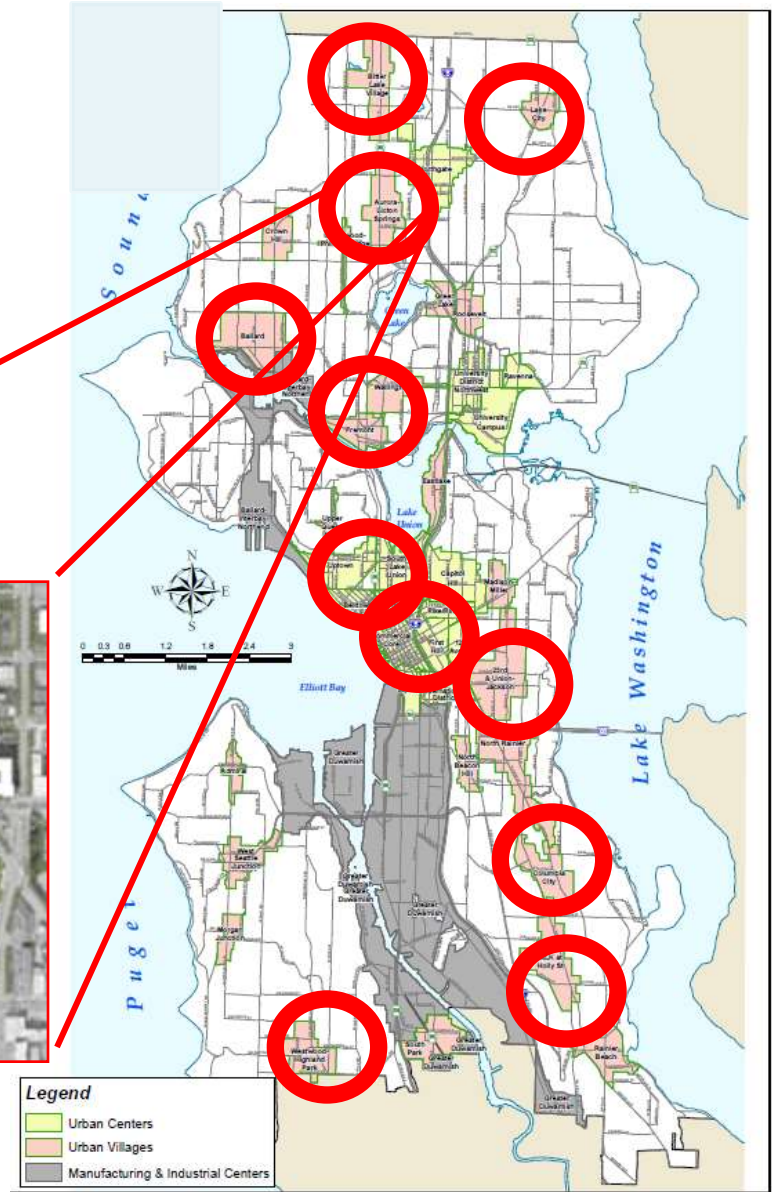
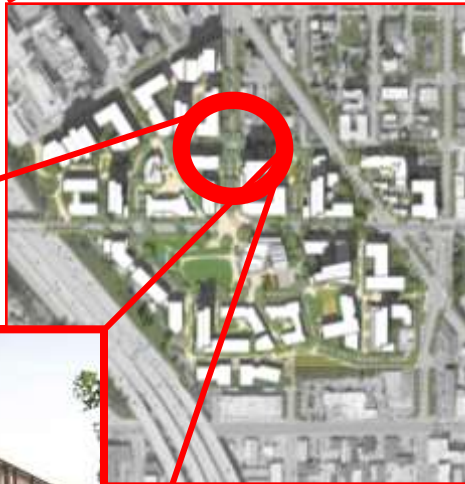
Plan for variability – not constancy!



Resilience applies to all land use

- ❑ Resilience as a framework for real sustainability
- ❑ Join land use planning with infrastructure planning
- ❑ Multi-scale solutions/strategies for better adaptation, resilience to extreme events
- ❑ Blend smart design with smart semi-autonomous districts
- ❑ Encourage solutions with multiple benefits instead of sector-only benefits

Nest green buildings
into green neighborhoods
to make resilient cities
to make resilient regions



Resilience in all planning areas

- Shoreline planning
- Comprehensive plan updates
- Neighborhood plan updates
- Transit Oriented Development
- Disaster mitigation planning
- Campus planning
- Master planned developments
- Utility/infrastructure planning
- Climate change strategies
- Capital planning (10-year CIP)

How can we adapt regulations to accommodate changing conditions?



Discussion



Credits

- Opening Video: “Facing Climate Change: Coastal Tribes”; Benjamin Drummond and Sara Joy Steele, producers.
- Photos & graphics: Swinomish Indian Tribal Community, Collins Woerman, Wikipedia Commons, Flickr Creative Commons.
- Swinomish Climate Change Initiative supported by a grant from the U.S. Department of Health & Human Services, Administration for Native Americans.
- Snover AK, Whitely Binder LC, Lopez J, Willmott E, Kay J, Howell D, Simmonds J (2007) ***Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments.*** In association with and published by ICLEI, Oakland, CA.
- 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, Cambridge University Press, United Kingdom and New York.
- Zervas C (2005) ***Response of extreme storm tide levels to long-term sea level change.*** NOAA Center for Operational Oceanographic Products and Services.