May 1st, 3:30 PM - 5:00 PM

Coastal Impacts of Climate Change in the Northwest: A Summary of the Findings of the upcoming National Climate Assessment

Spencer Reeder
Cascadia Consulting Group, spencer@cascadiaconsulting.com

Amy K. Snover
Climate Impacts Group

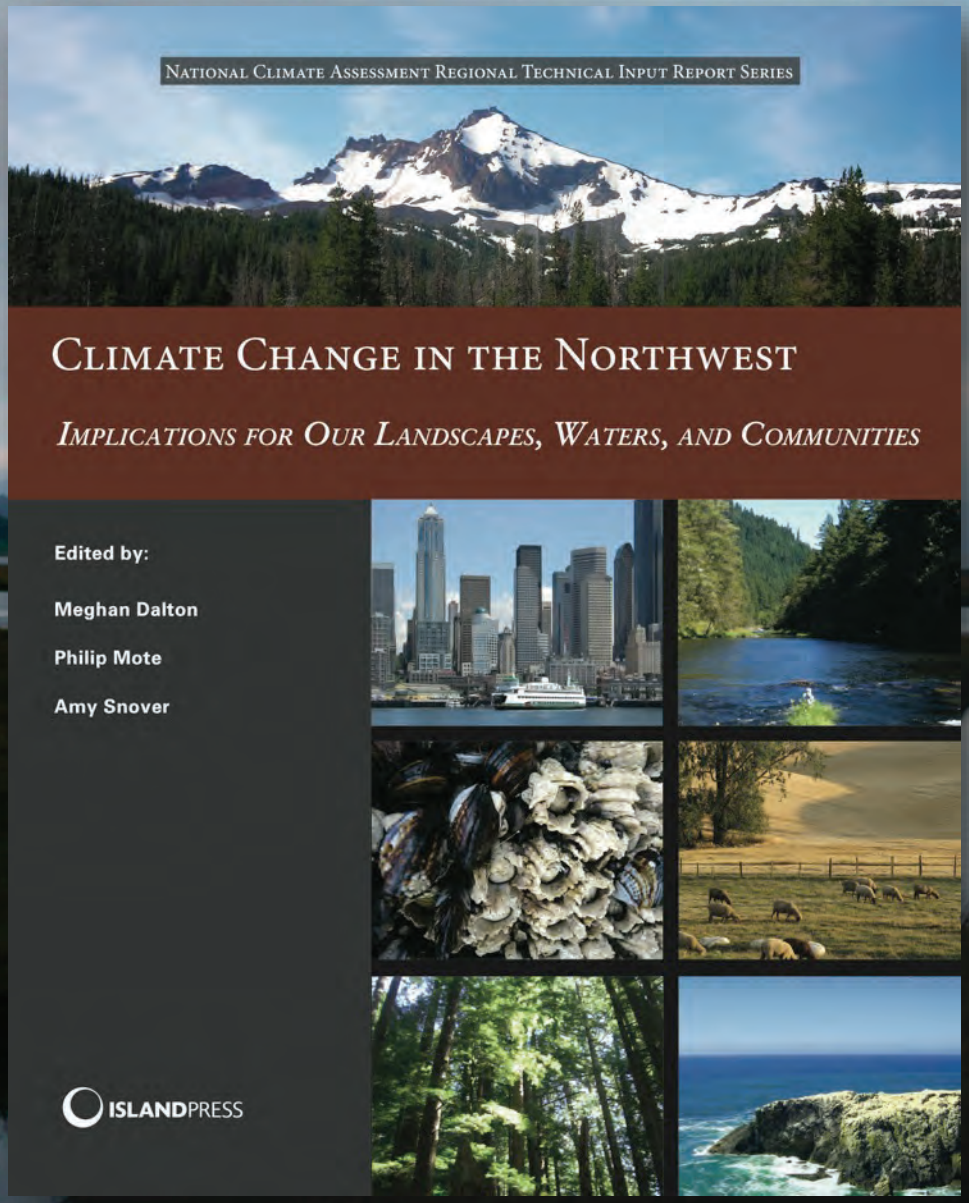
Preview of National Climate Assessment Findings for NW Coasts

Spencer Reeder

Vulcan, Inc. / Cascadia Consulting Group

Amy Snover

University of Washington



Contributing Co-Authors:

Peter Ruggiero (OSU)
Sarah Shafer (USGS)
Laurie Houston (OSU)
Patty Glick (WWF)
Jan Newton (UW)
Susan Capalbo (OSU)

Topics

Quick Overview of the National Climate Assessment (NCA)

Climate Trends: Global & Regional Context

Key Coastal Findings from the Northwest Chapter of the NCA

NCA Background

United States
Global Change
Research Program

U.S. Global Change Research Program
National Climate
Assessment

National Climate Assessment: GCRA (1990), Section 106

*"**…not less frequently than every 4 years**, the Council… shall prepare… an assessment which,"*

- **analyzes the effects of global change** on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and,

- analyzes current trends in global change, both human-induced and natural, and **projects major trends for the subsequent 25 to 100 years.**

U.S. Global Change Research Program
National Climate Assessment

Sectors

- Water resources
- Energy supply and use
- Transportation
- Agriculture
- Forestry
- Ecosystems and biodiversity
- Human health

Sectoral Cross-Cuts

- Water, energy, and land use
- Urban/infrastructure/ vulnerability
- Impacts of climate change on tribal, indigenous, and native lands and resources
- Land use and land cover change
- Rural communities and development
- Impacts on biogeochemical cycles

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Regional Chapters

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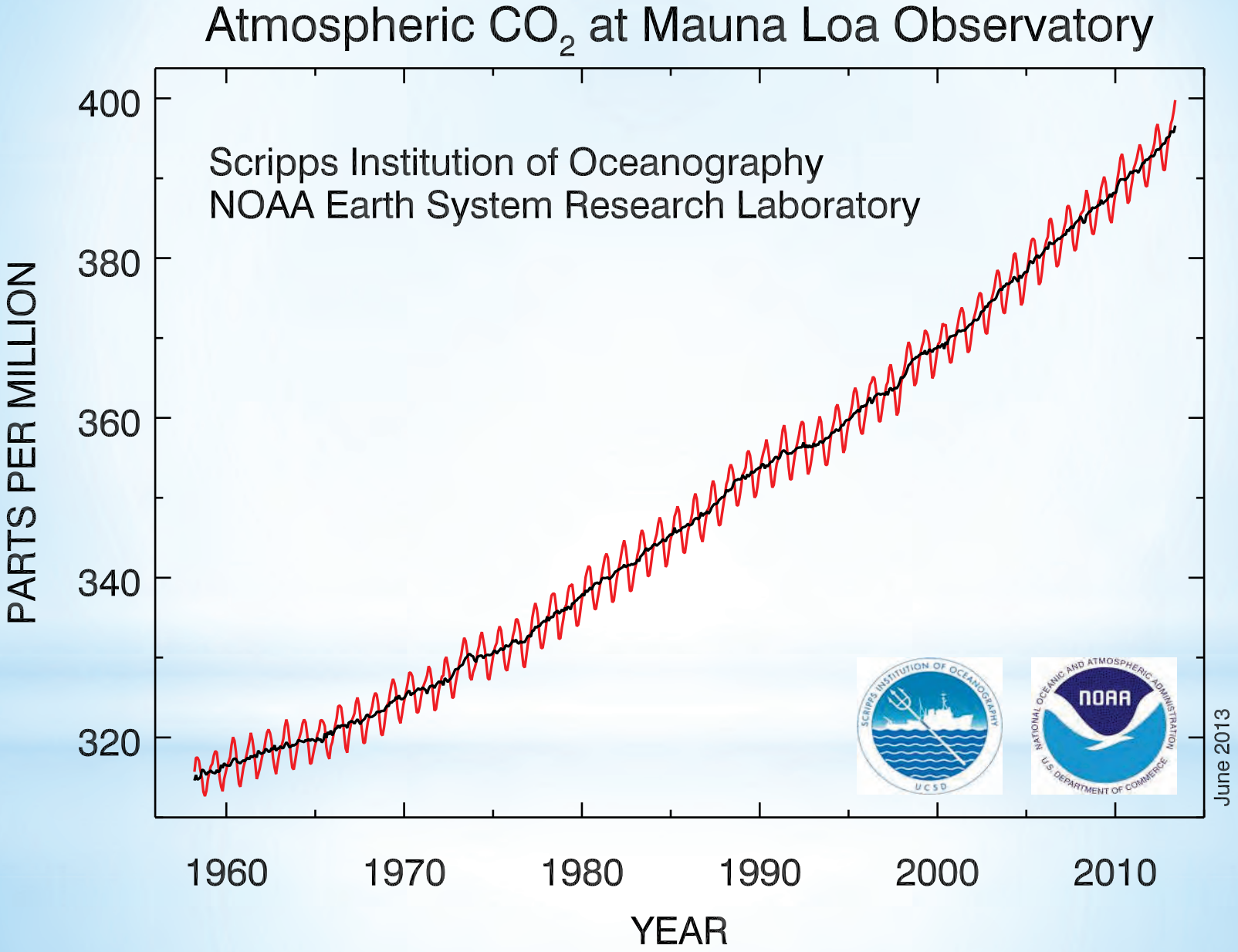
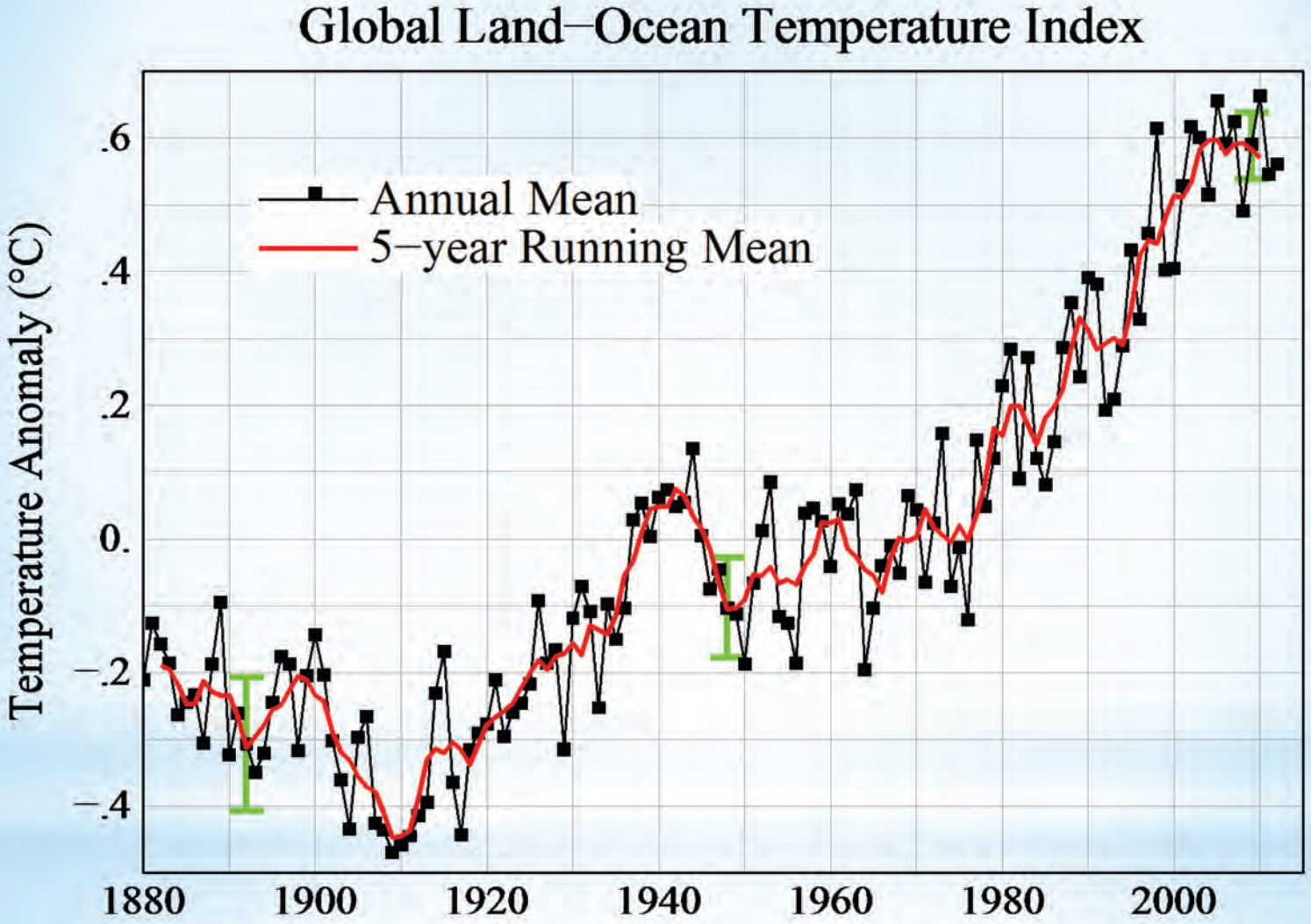
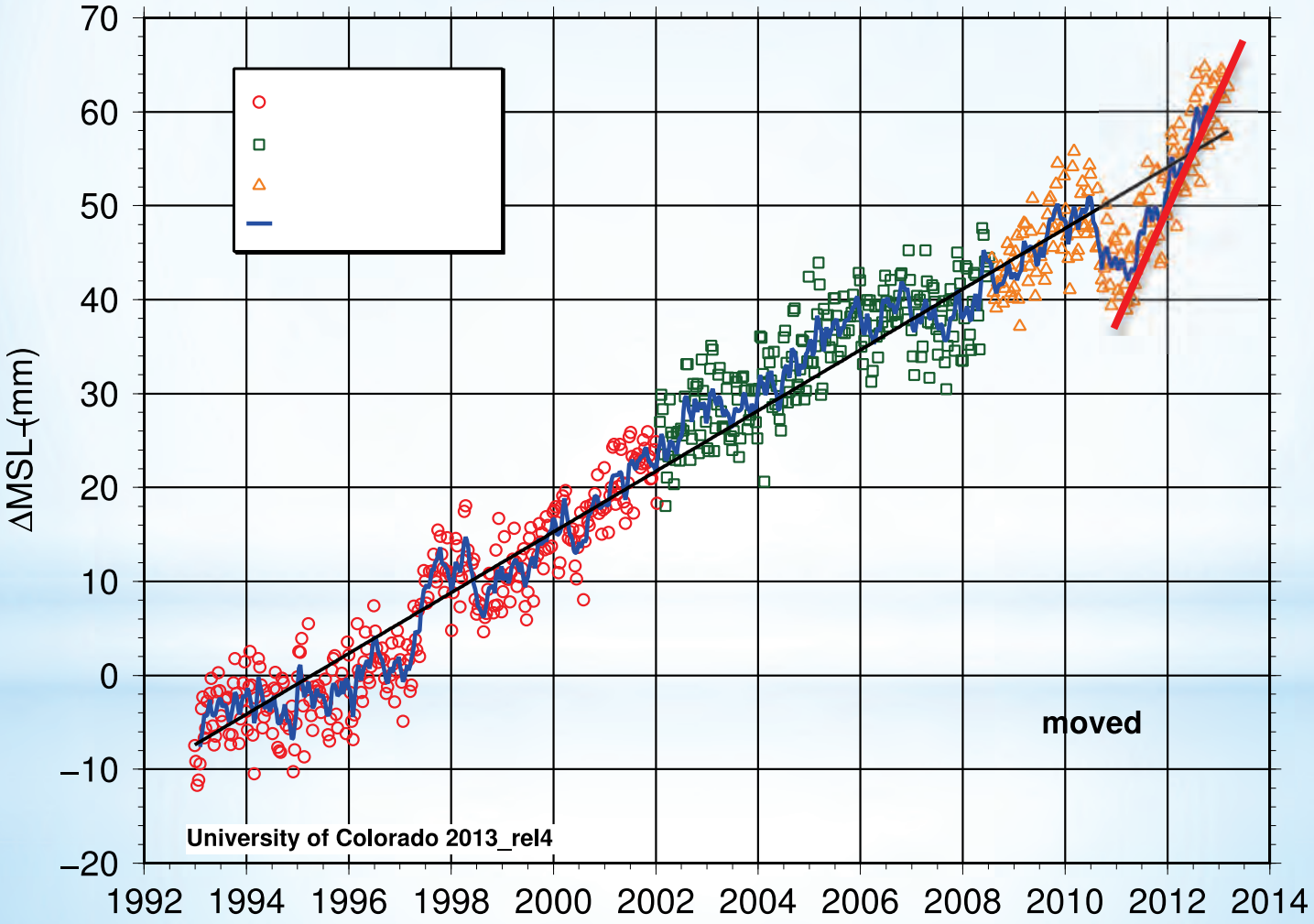

Atmospheric CO_2 at Mauna Loa Observatory
Scripps Institution of Oceanography
NOAA Earth System Research Laboratory
PARTS PER MILLION
400
380
360
340
320
1960
1970
1980
1990
2000
2010
YEAR
June 2013


Global Land–Ocean Temperature Index
Annual Mean
5–year Running Mean
Temperature Anomaly (°C)
.6
.4
.2
0.
–.2
–.4
1880
1900
1920
1940
1960
1980
2000

Source: NASA

Global Sea Level Trends



Local sea level change due to ocean density and circulation change relative to the global average

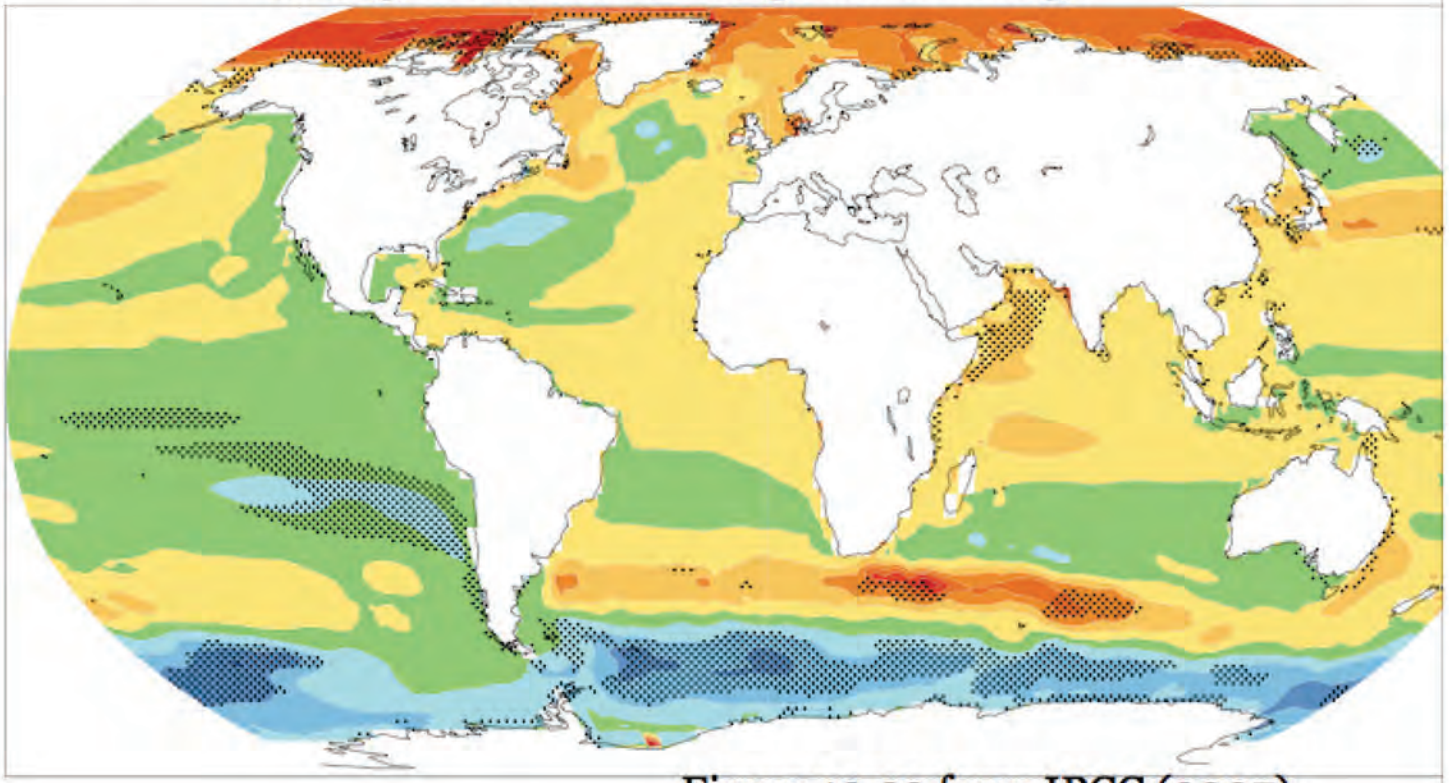
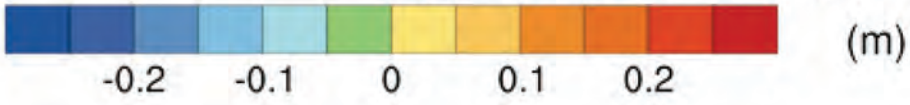
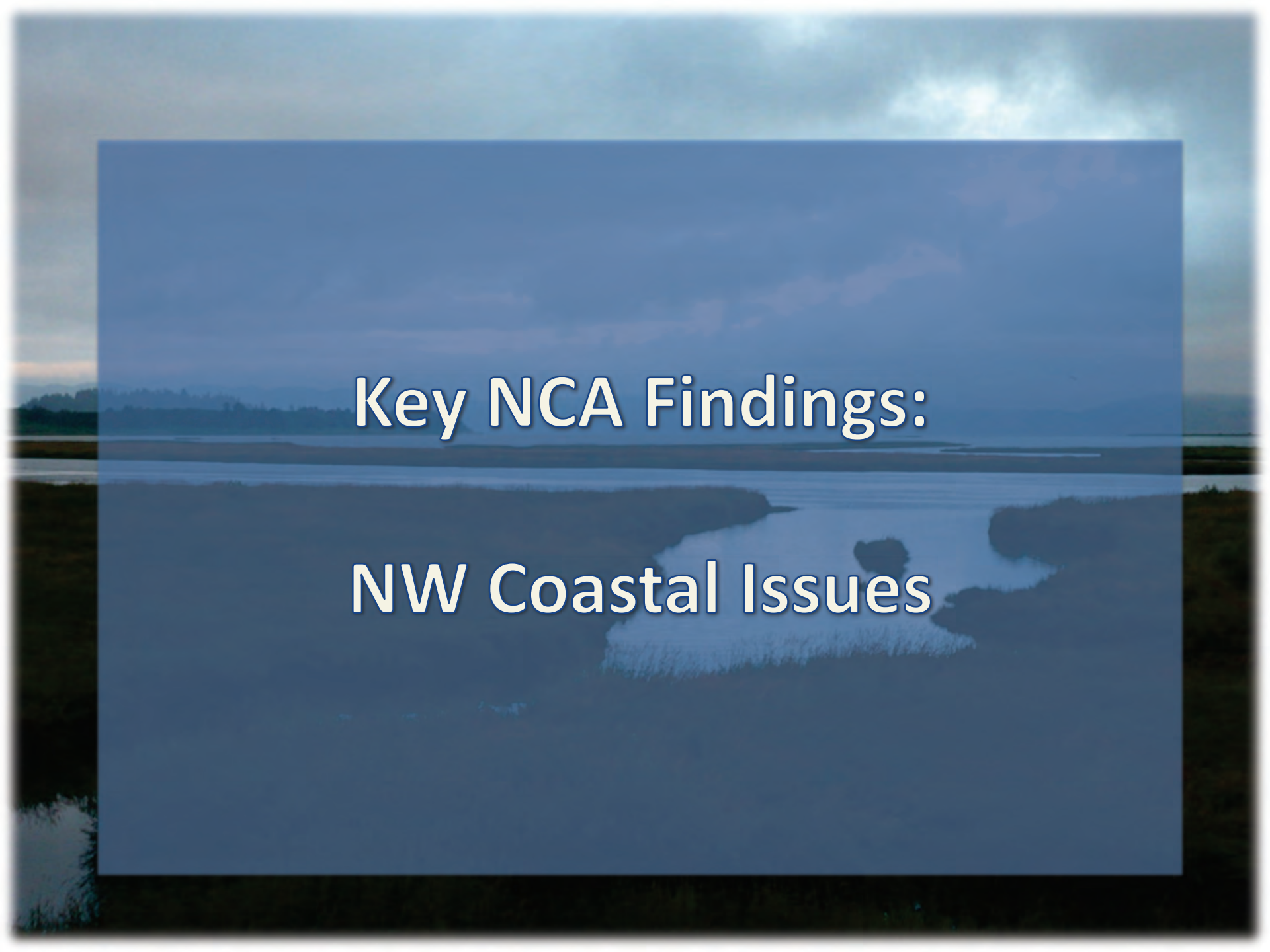


Figure 10.32 from IPCC (2007)





Key NCA Findings:

NW Coastal Issues

Loss of land to rising seas

More than 140,000 acres of coastal lands lie within 1 meter elevation of high tide in WA & OR, exposing public and private property, infrastructure, and habitat to climate impacts.

Multiple Compounding Factors

Sea level rise + river flooding + high tide + coastal storms = erosion + landslides + flooding + permanent inundation + …

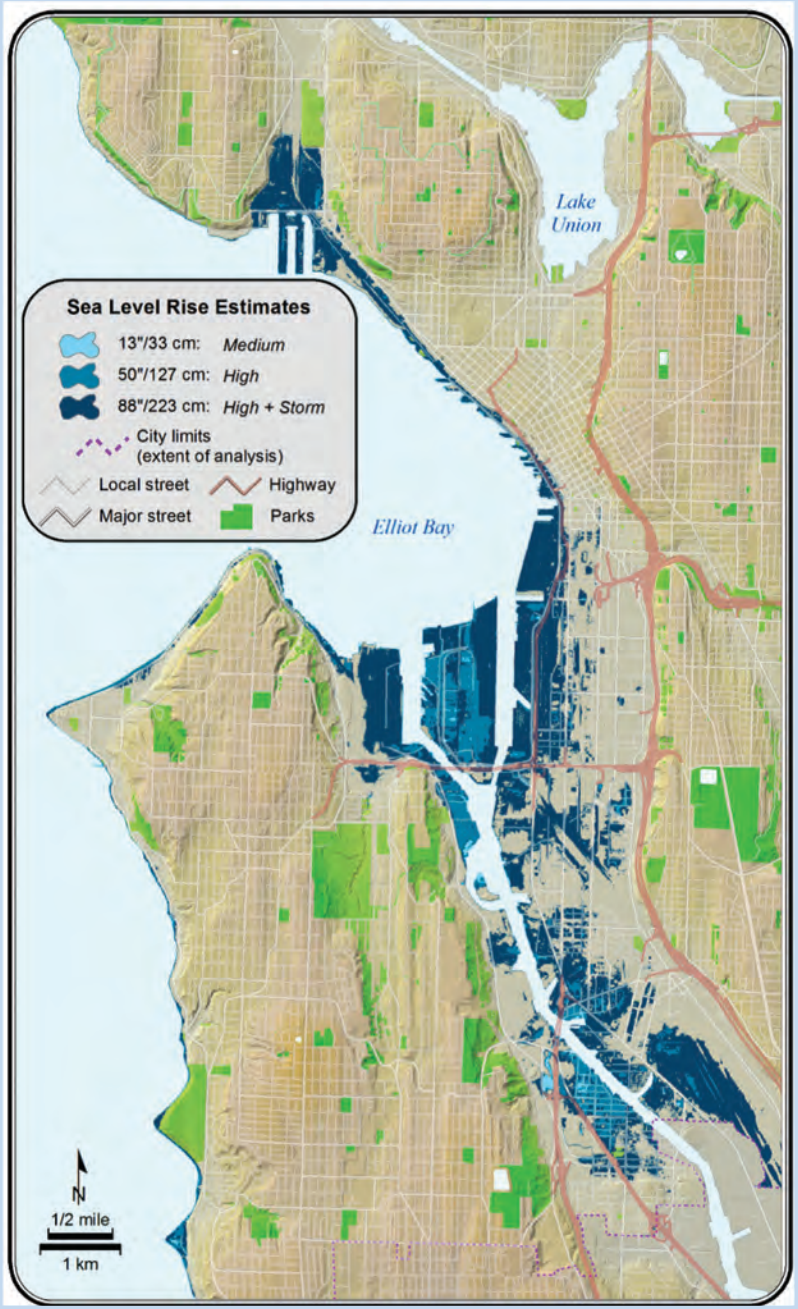
Diverse ecological impacts

Habitat loss: *shorebirds, juvenile salmon & forage fish*
Ocean acidification: *oysters and Pacific salmon*
Harmful blooms of algae: *paralytic shellfish poisoning*

Coastal Chapter Sections:

- Sea Level Rise
- Coastal Storms & El Niño-Southern Oscillation (ENSO)
- Ocean Acidification
- Ocean Temperature
- Effects of above on coastal & marine habitats
- Consequences for Coastal Communities & Infrastructure
- Economic Consequences
- Adaptation
- Research Needs

Long-term Consequences



Source: Seattle Public Utilities

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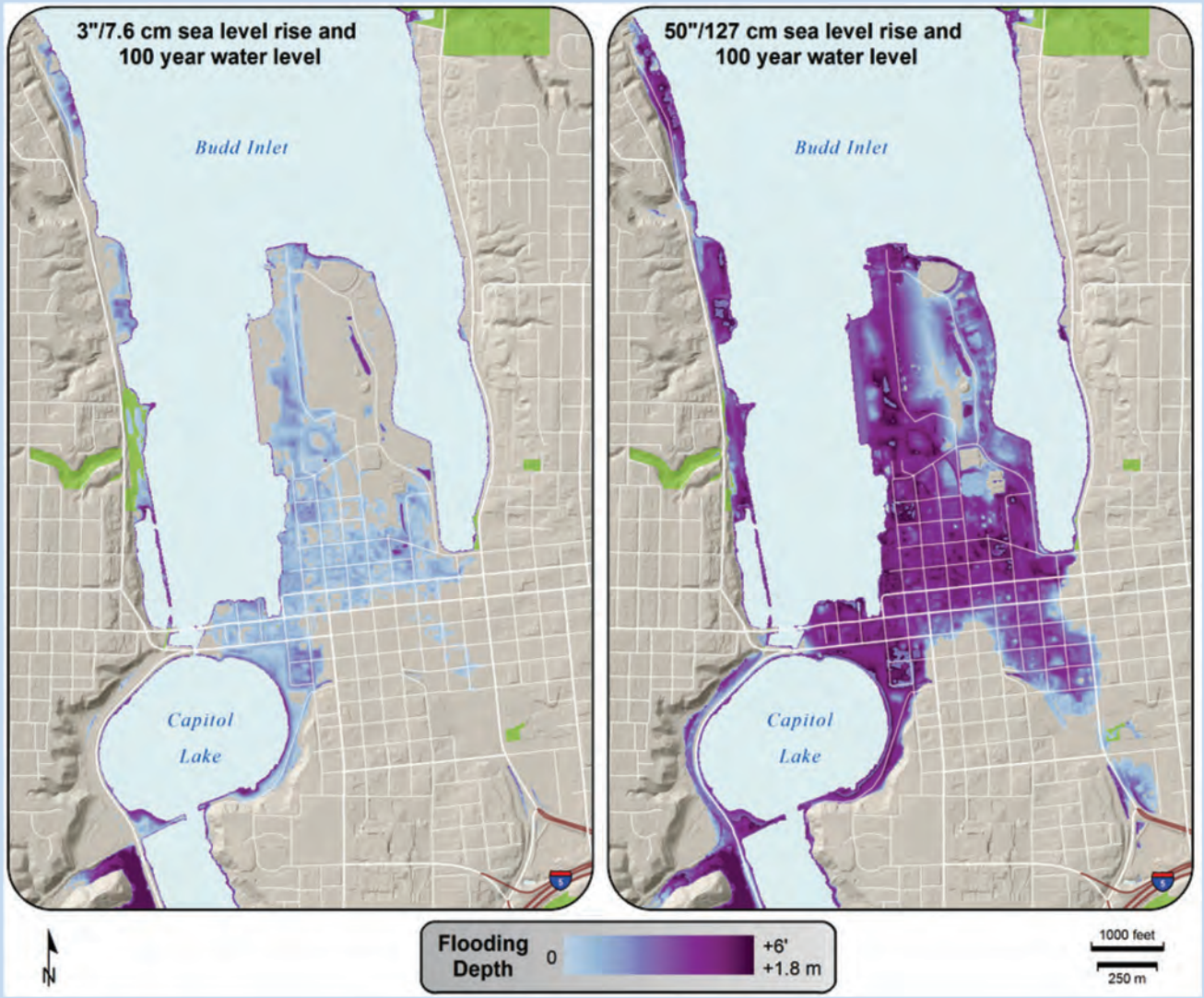

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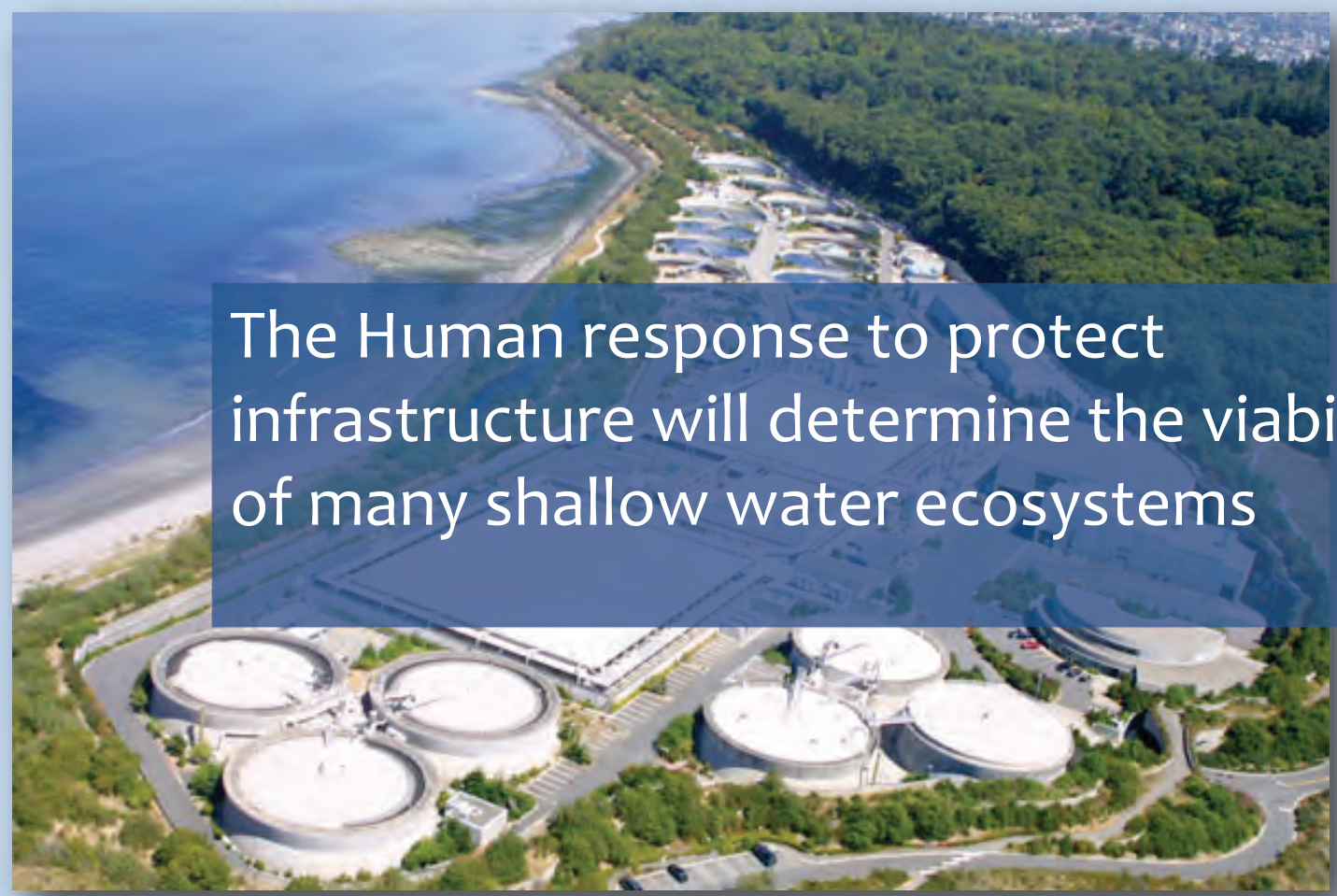
Source: City of Olympia

Sea Level Rise: Infrastructure Vulnerabilities



The Human response to protect infrastructure will determine the viability of many shallow water ecosystems

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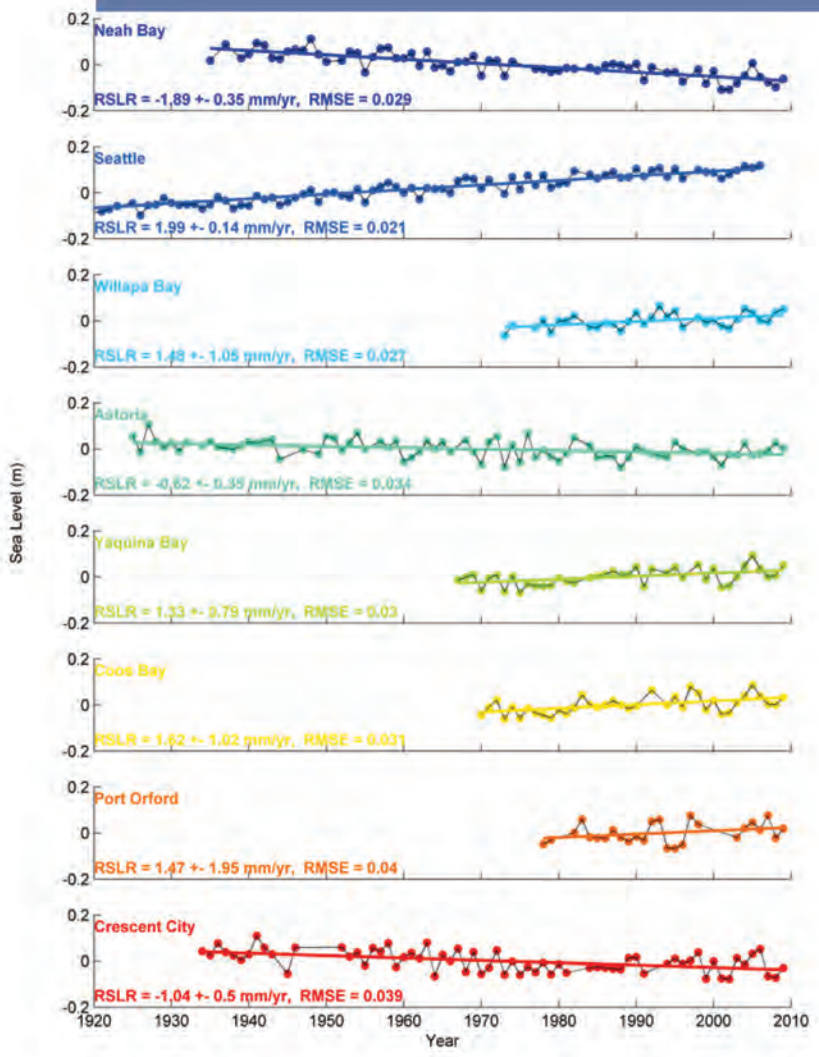
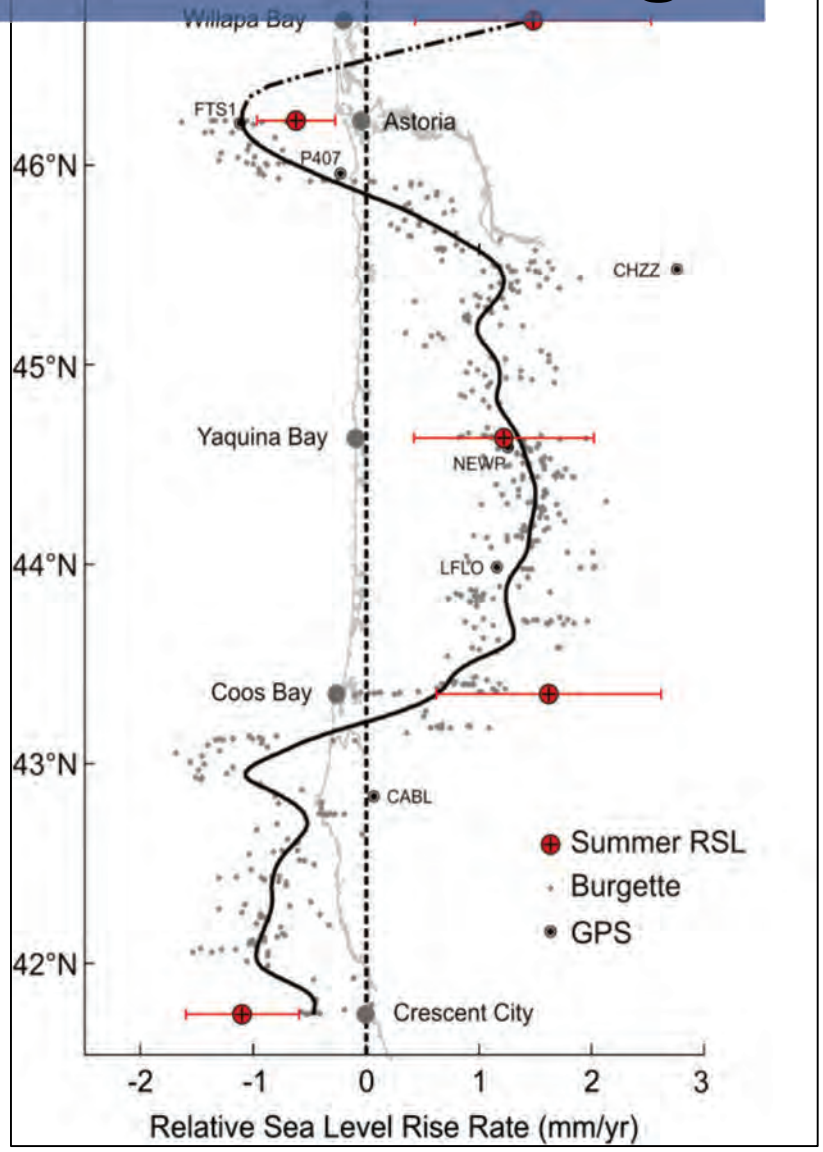
Regional Variability in Sea Level Change





What Accounts for the sub-regional differences?

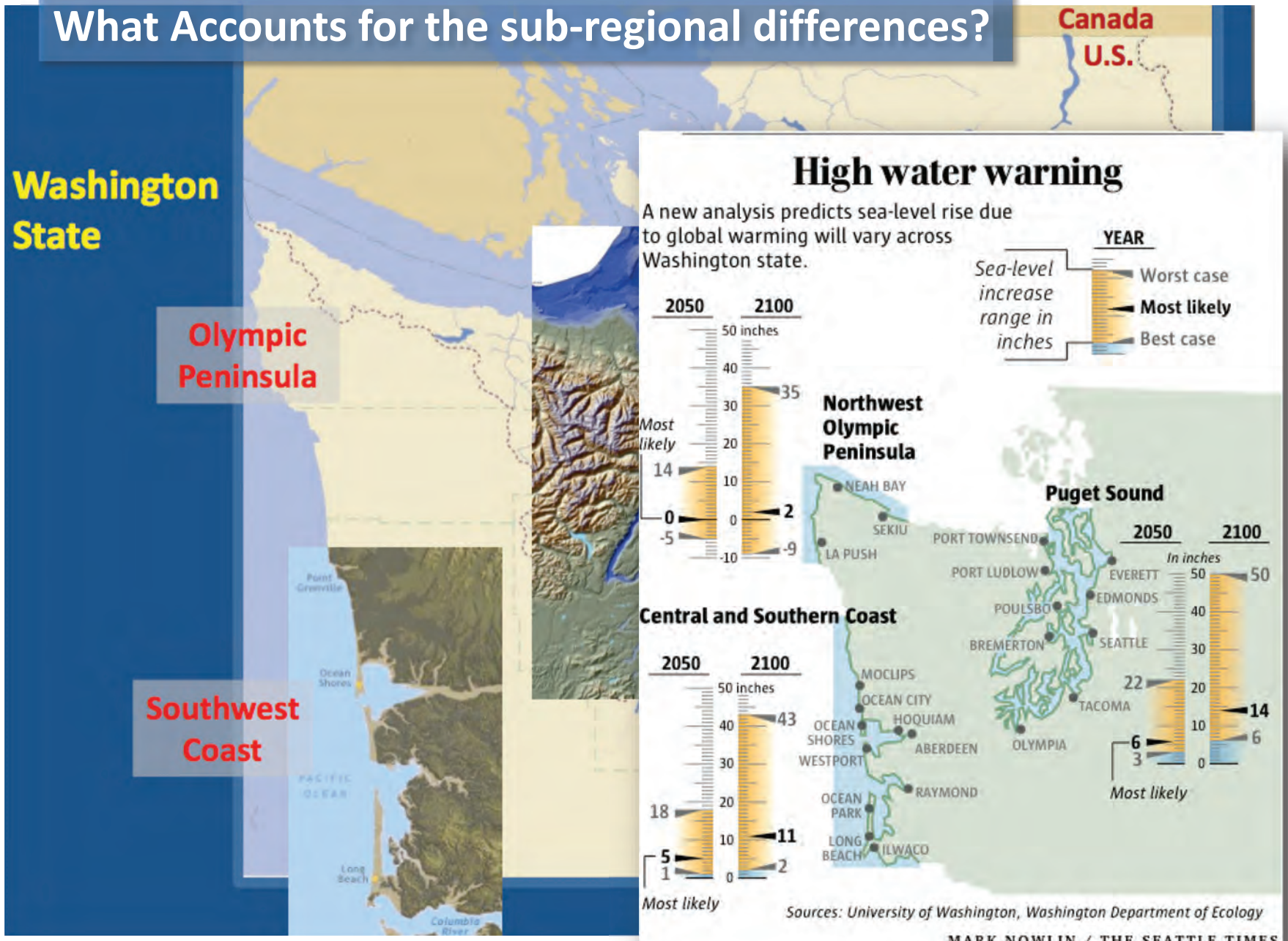
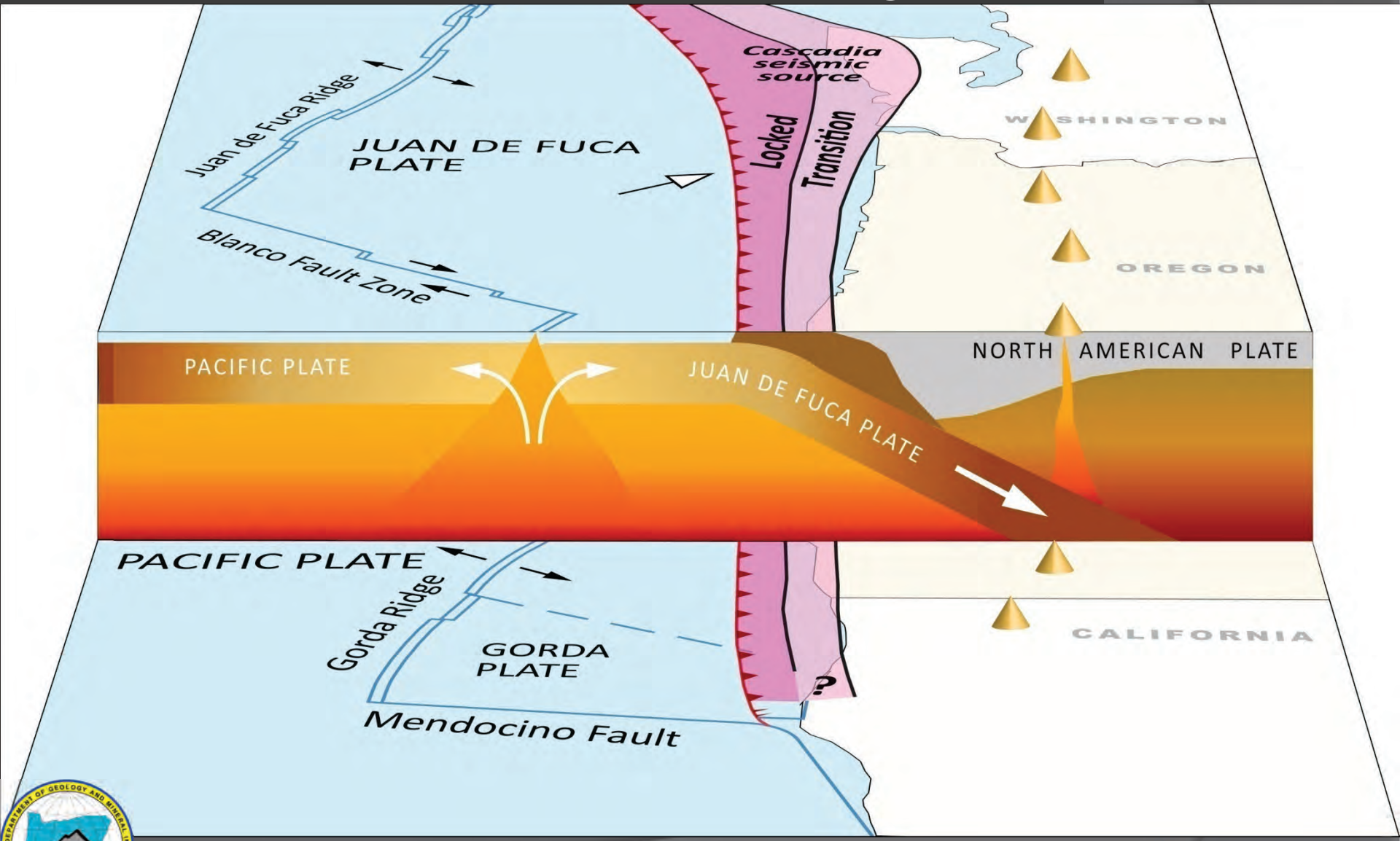
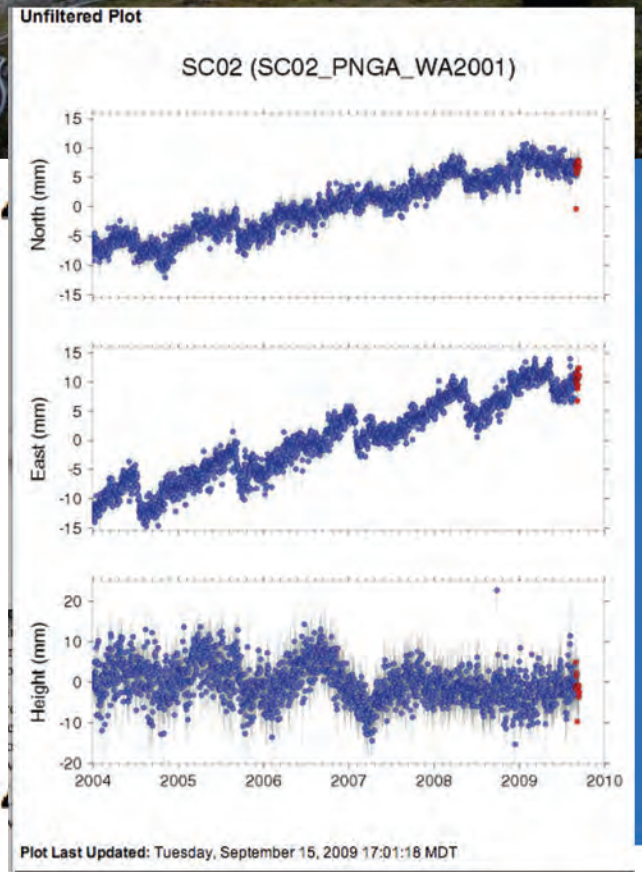
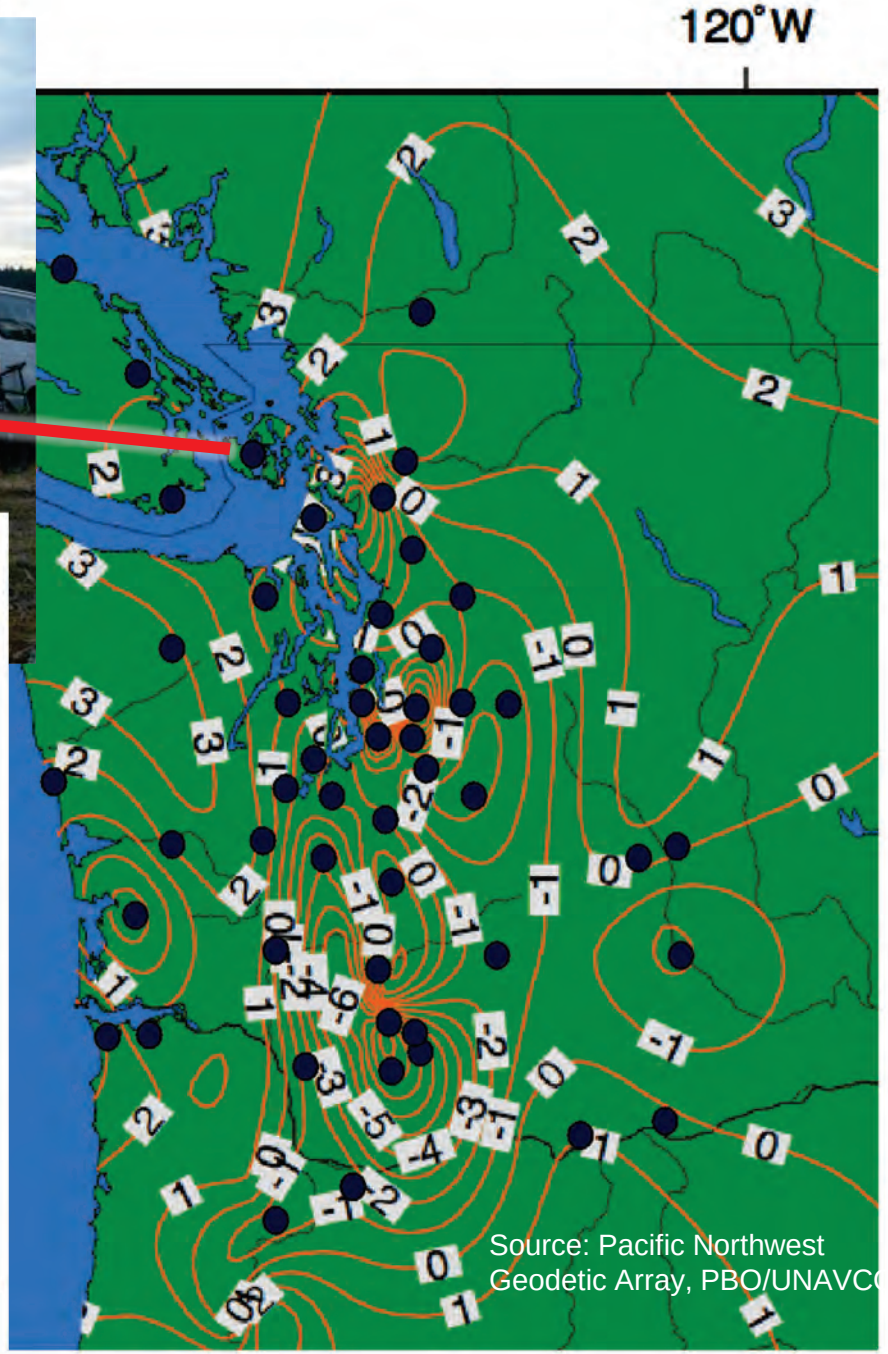


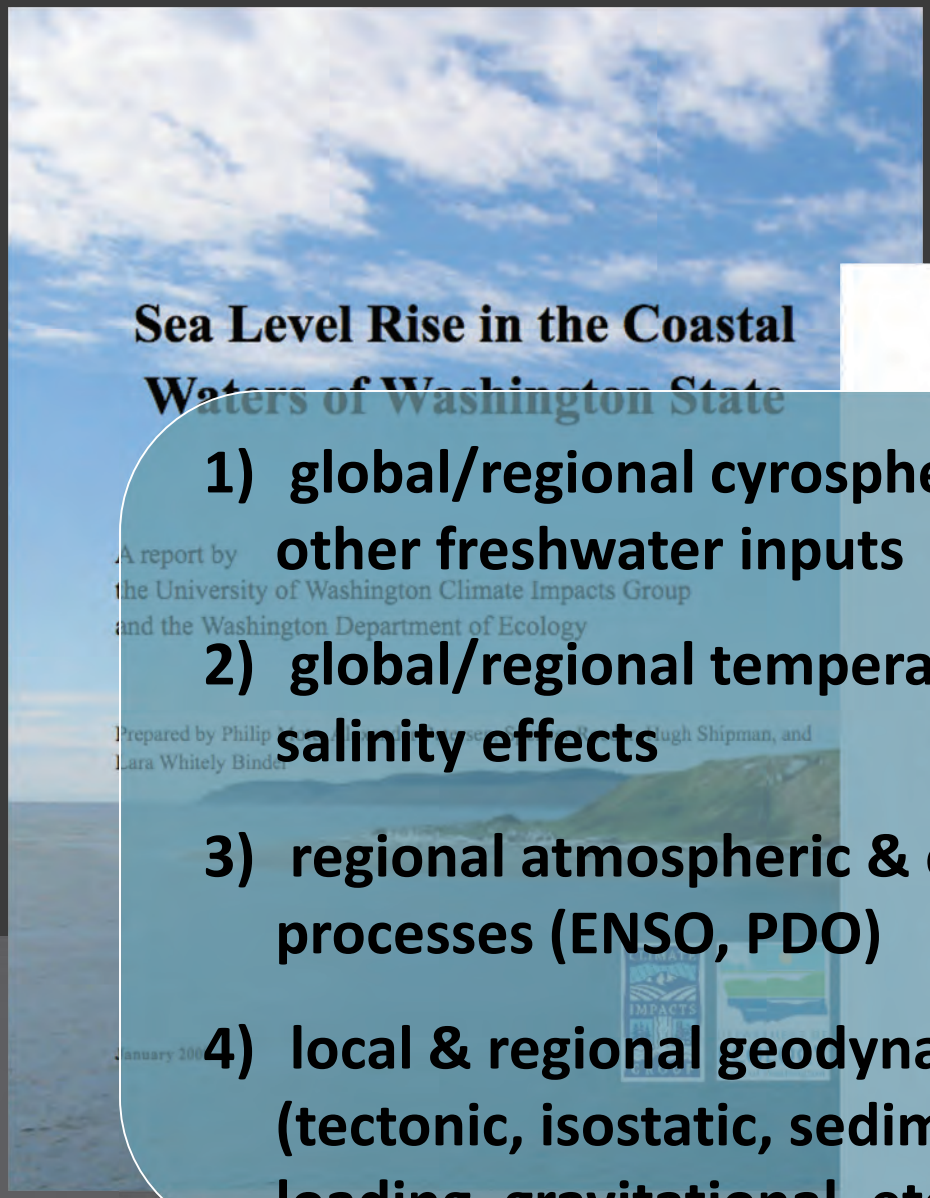
Plate Tectonic Map of the Pacific Northwest – the "Cascadia" Region

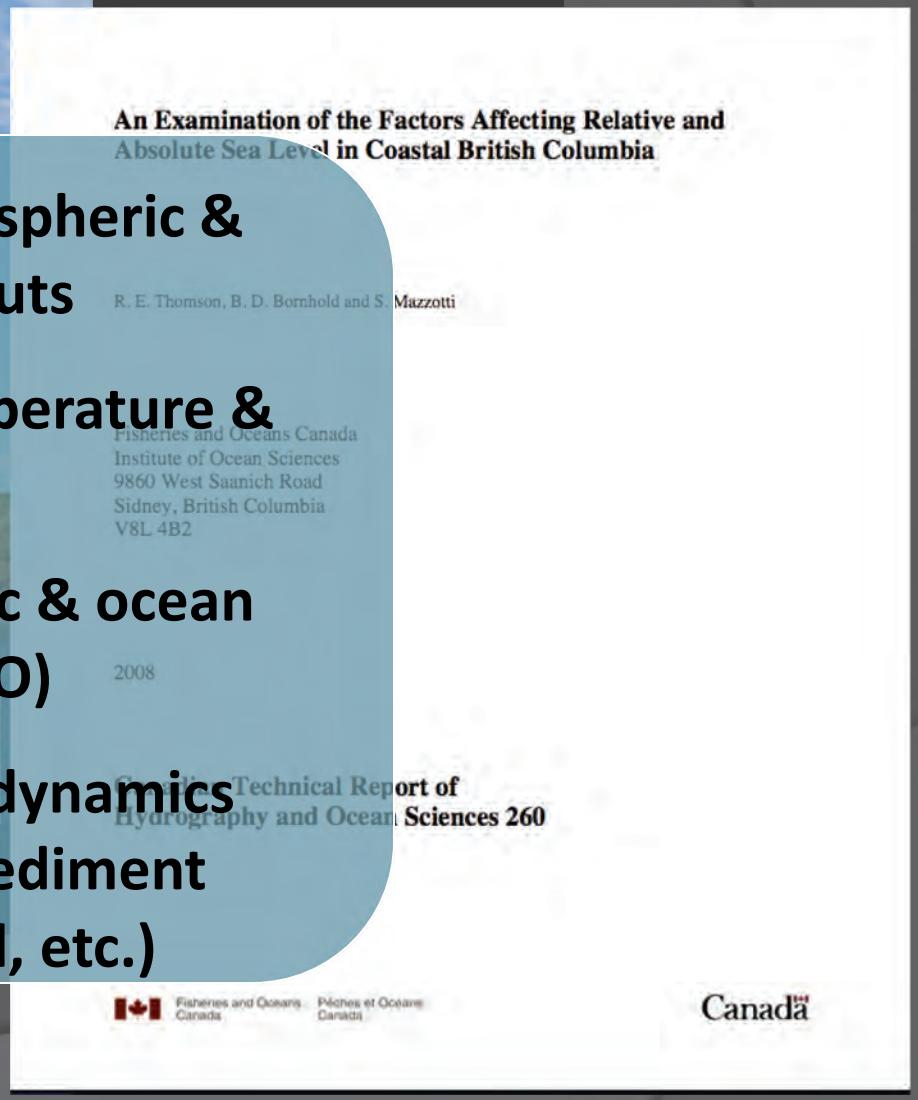


Taken from 2010 issue of ***Cascadia***, Oregon Dept. of Geology and Mineral Industries


Unfiltered Plot
SC02 (SC02_PNGA_WA2001)
North (mm)
East (mm)
Height (mm)
2004
2005
2006
2007
2008
2009
2010
Plot Last Updated: Tuesday, September 15, 2009 17:01:18 MDT


120°W
Source: Pacific Northwest
Geodetic Array, PBO/UNAVC





1) global/regional cyrospheric & other freshwater inputs
2) global/regional temperature & salinity effects
3) regional atmospheric & ocean processes (ENSO, PDO)
4) local & regional geodynamics (tectonic, isostatic, sediment loading, gravitational, etc.)

Projected Sea Level Rise for Newport, Oregon

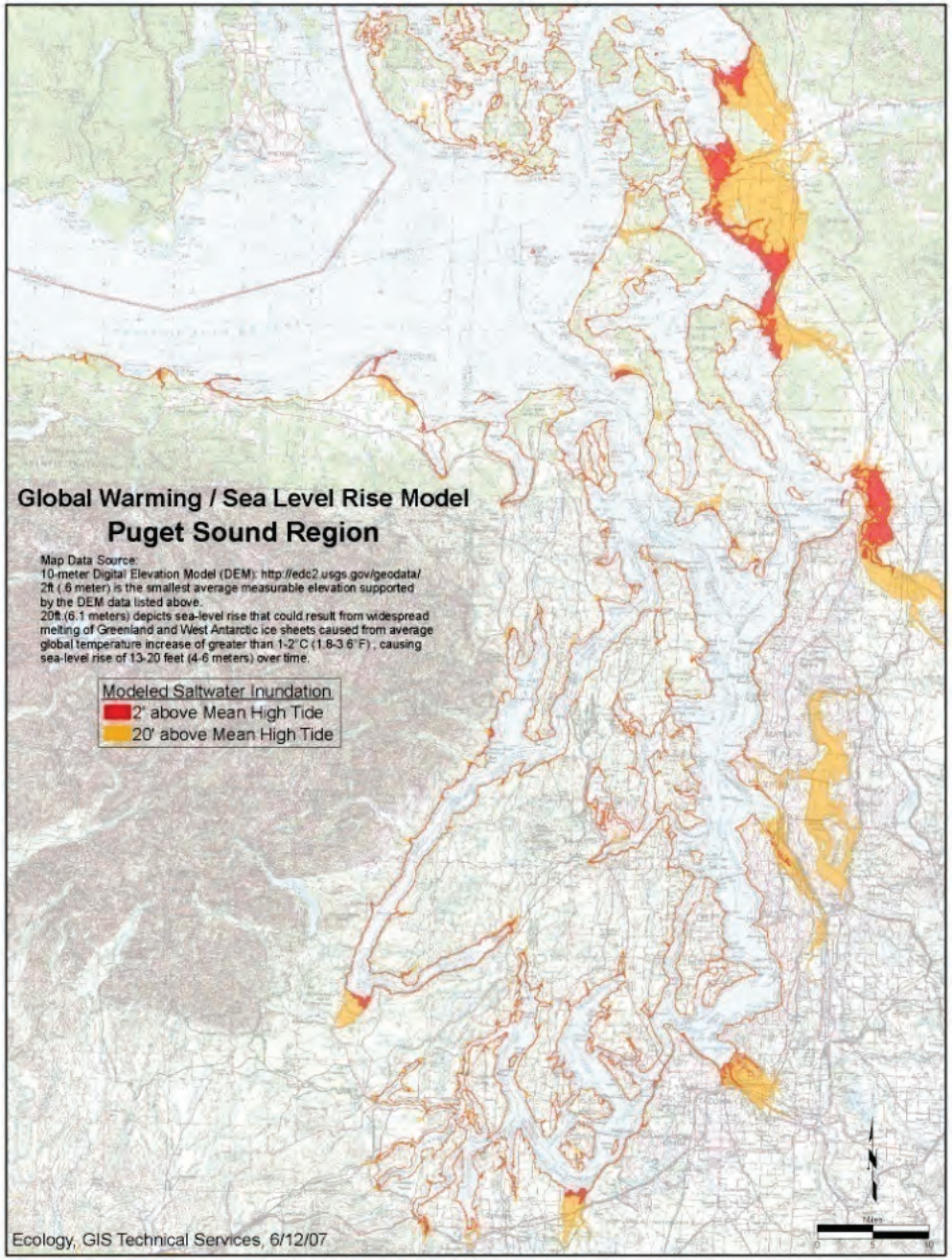
	IPCC (2007)	Mote et al. (2008)	NRC (2012)
Global	B1: 18-38 A1B: 21-48 A1FI: 26-59	34 (18-93)	83 (50-140)
NW Olympic Peninsula	--	4 (-24-88)	61 (9-143)[1]
Puget Sound	--	34 (16-128)	62 (10-143)[2]
Central & Southern Washington Coast	--	29 (6-108)	62 (11-143)[3]
Central Oregon Coast	--	--	63 (12-142)[4]
	(-1.4 to +8.9 in)	(-0.8 to +18.9 in)	(+4.6 to +56.1 in)

Adapted from National Research Council (2012)

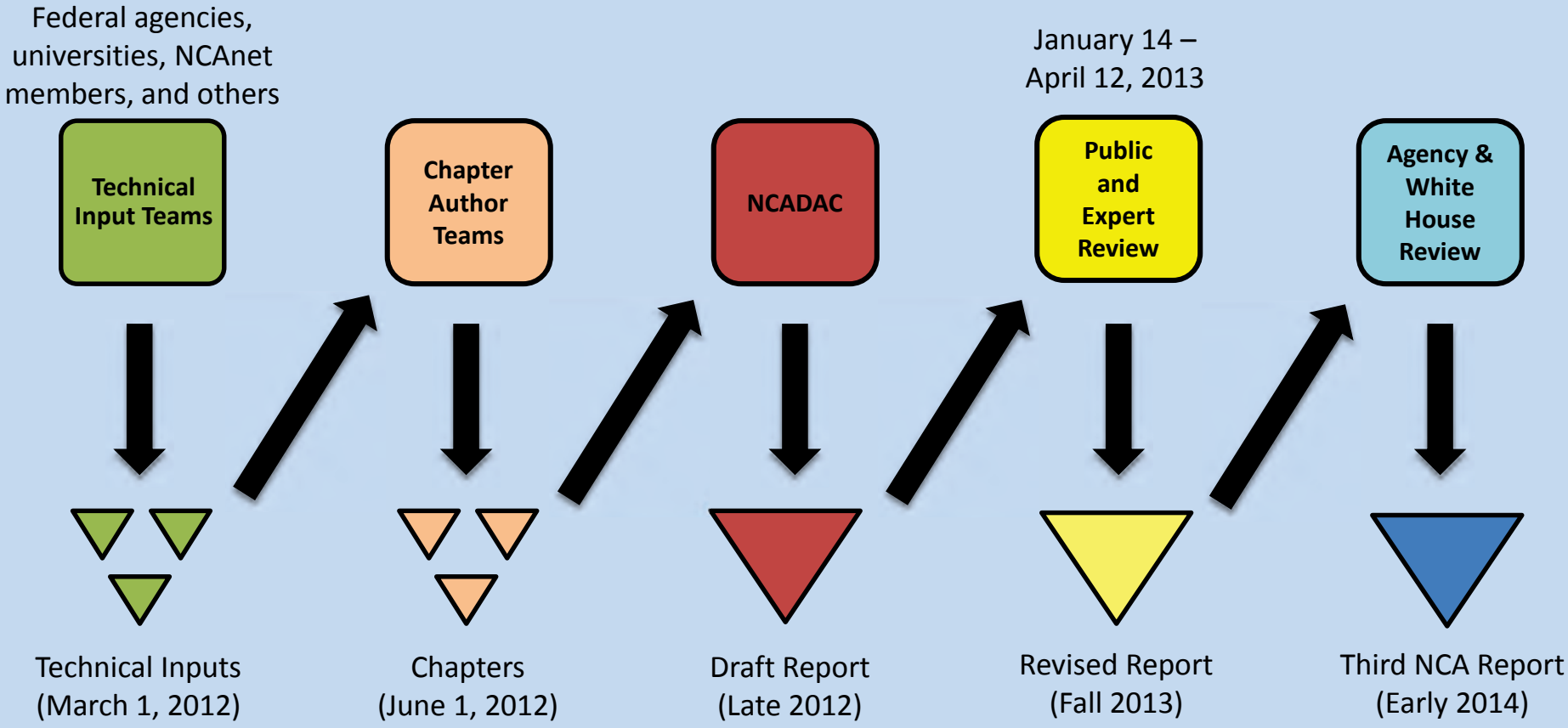

Questions?
Full report can be downloaded at:
http://cses.washington.edu/db/pubs/topic2.shtml

Inundation Maps

- **Emphasize large, low-lying areas, subject to flooding, but tend to miss beaches and steep bluffs subject to erosion and more developed areas subject to severe storm damage.**
- **Assumes static landscape with no geomorphic, or human, response to rising sea level**
- **Limited incorporation of engineered shorelines such as dikes and levees**
- **Maps only as good as scenarios….**



Third NCA Report Process



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