May 2014

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

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Reeder, Spencer and Snover, Amy, "Coastal Impacts of Climate Change in the Northwest: A Summary of the Findings of the upcoming National Climate Assessment" (2014). *Salish Sea Ecosystem Conference*. 274.  

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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
“...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.
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
Atmospheric CO₂ at Mauna Loa Observatory

Scripps Institution of Oceanography
NOAA Earth System Research Laboratory

YEAR

PARTS PER MILLION


June 2013
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: City of Olympia
Sea Level Rise: Infrastructure Vulnerabilities

The Human response to protect infrastructure will determine the viability of many shallow water ecosystems.
Regional Variability in Sea Level Change
What Accounts for the sub-regional differences?

High water warning

A new analysis predicts sea-level rise due to global warming will vary across Washington state.

Sources: University of Washington, Washington Department of Ecology

MARK NOWLIN / THE SEATTLE TIMES
1) global/regional cryospheric & 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.)
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<td>Central Oregon Coast</td>
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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

Federal agencies, universities, NCAnet members, and others

- Technical Input Teams
- Chapter Author Teams
- NCADAC
- Public and Expert Review
- Agency & White House Review

Technical Inputs (March 1, 2012)
Chapter (June 1, 2012)
Draft Report (Late 2012)
Revised Report (Fall 2013)
Third NCA Report (Early 2014)

January 14 – April 12, 2013

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