



Technical tools for improving sea level rise risk assessment in Washington State

Special Session, Northwest Climate Conference

2:30 – 4:00 10 October 2017

Tacoma Convention Center, Tacoma, WA

Ian Miller, Washington Sea Grant

With

Guillaume Mauger, Climate Impacts Group

Harriet Morgan, Climate Impacts Group

Eric Grossman, US Geological Survey

Nathan Van Arendonk, Western WA University

Ray Weldon, University of Oregon

Tyler Newton, University of Oregon

David Schmidt, University of Washington

Mark Welch, University of Washington

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Andrea McLennan, Coastal Geologic Services

Tish Conway-Cranos, WA Dept Fish and Wildlife

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City of Tacoma
WASHINGTON





Washington Coastal Resilience Project

Will:

- Support an updated sea level rise and storm surge assessment for coastal Washington
- Develop better information on the contribution of waves and shoreline change to the changing community hazard profile
- Build climate resilience principles into state agency processes and plans
- Look for resilience benefit from ecological restoration investments in Puget Sound
- Create outreach tools, including “Resilience Ambassadors”, to facilitate implementation of resilience projects and plans





Speakers:

Speaker	Affiliation	Topic
Harriet Morgan	University of Washington Climate Impacts Group	Sea level in Washington State, extreme limits, probabilities, and “localizing”
Tyler Newton, (student speaker)	University of Oregon	A multi-methods analysis of vertical land movement in coastal Washington
Zhaoqing Yang,	University of Washington and Pacific Northwest National Lab	Storm surge modelling for Washington State
Nathan Van Arendonk, (student speaker)	Western Washington University	Wave modelling for Puget Sound



Sea Level Rise in the Coastal Waters of Washington State

A report by
the University of Washington Climate Impacts Group
and the Washington Department of Ecology

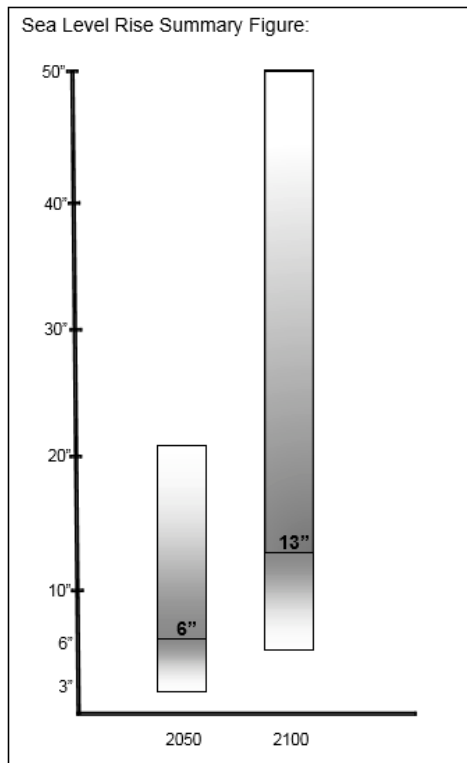
Prepared by Philip Mote, Alexander Petersen, Spencer Reeder, Hugh Shipman, and
Lara Whitely Binder

January 2008



Why an updated assessment?

- Also regionalized VLM – caused confusion
- Big projections ranges, but little guidance on uncertainty



“Lumped” vertical land movement

National Research Council, 2012. “Sea-level rise for the coasts of California, Oregon and Washington: Past, Present, Future”

TABLE 5.3 Regional Sea-Level Rise Projections (in cm) Relative to Year 2000

Component	2030		2050		2100	
	Projection	Range	Projection	Range	Projection	Range
Steric and dynamic ocean ^a	3.6 ± 2.5	0.0–9.3 (B1–A1FI)	7.8 ± 3.7	2.2–16.1 (B1–A1FI)	20.9 ± 7.7	9.9–37.1 (B1–A1FI)
Non-Alaska glaciers and ice caps ^b	2.4 ± 0.2		4.4 ± 0.5		11.4 ± 1.0	
Alaska, Greenland, and Antarctica with sea-level fingerprint effect ^c						
Seattle, WA	7.1	5.4–9.5	16.0	11.1–22.1	52.7	32.7–74.9
Newport, OR	7.4	5.6–9.5	16.6	11.7–22.2	54.5	34.1–75.3
San Francisco, CA	7.8	6.1–9.6	17.6	12.7–22.3	57.6	37.3–76.1
Los Angeles, CA	8.0	6.3–9.6	17.9	13.0–22.3	58.5	38.6–76.4
Vertical land motion ^d						
North of Cape Mendocino	-3.0	-7.5–1.5	-5.0	-12.5–2.5	-10.0	-25.0–5.0
South of Cape Mendocino	4.5	0.6–8.4	7.5	1.0–14.0	15.0	2.0–28.0
Sum of all contributions						
Seattle	6.6 ± 5.6	-3.7–22.5	16.6 ± 10.5	-2.5–27.8	61.8 ± 29.3	10.0–143.0
Newport	6.8 ± 5.6	-3.5–22.7	17.2 ± 10.3	-2.1–48.1	63.3 ± 28.3	11.7–142.4
San Francisco	14.4 ± 5.0	4.3–29.7	28.0 ± 9.2	12.3–60.8	91.9 ± 25.5	42.4–166.4
Los Angeles	14.7 ± 5.0	4.6–30.0	28.4 ± 9.0	12.7–60.8	93.1 ± 24.9	44.2–166.5

Didn't attempt to communicate a full range



Neither attempted to really dive into SLR interactions
with extreme coastal events



Photo: Alki, 29 Nov 14 by Melissa Poe (WA Sea Grant)



For this update we wanted to do 2 Things:

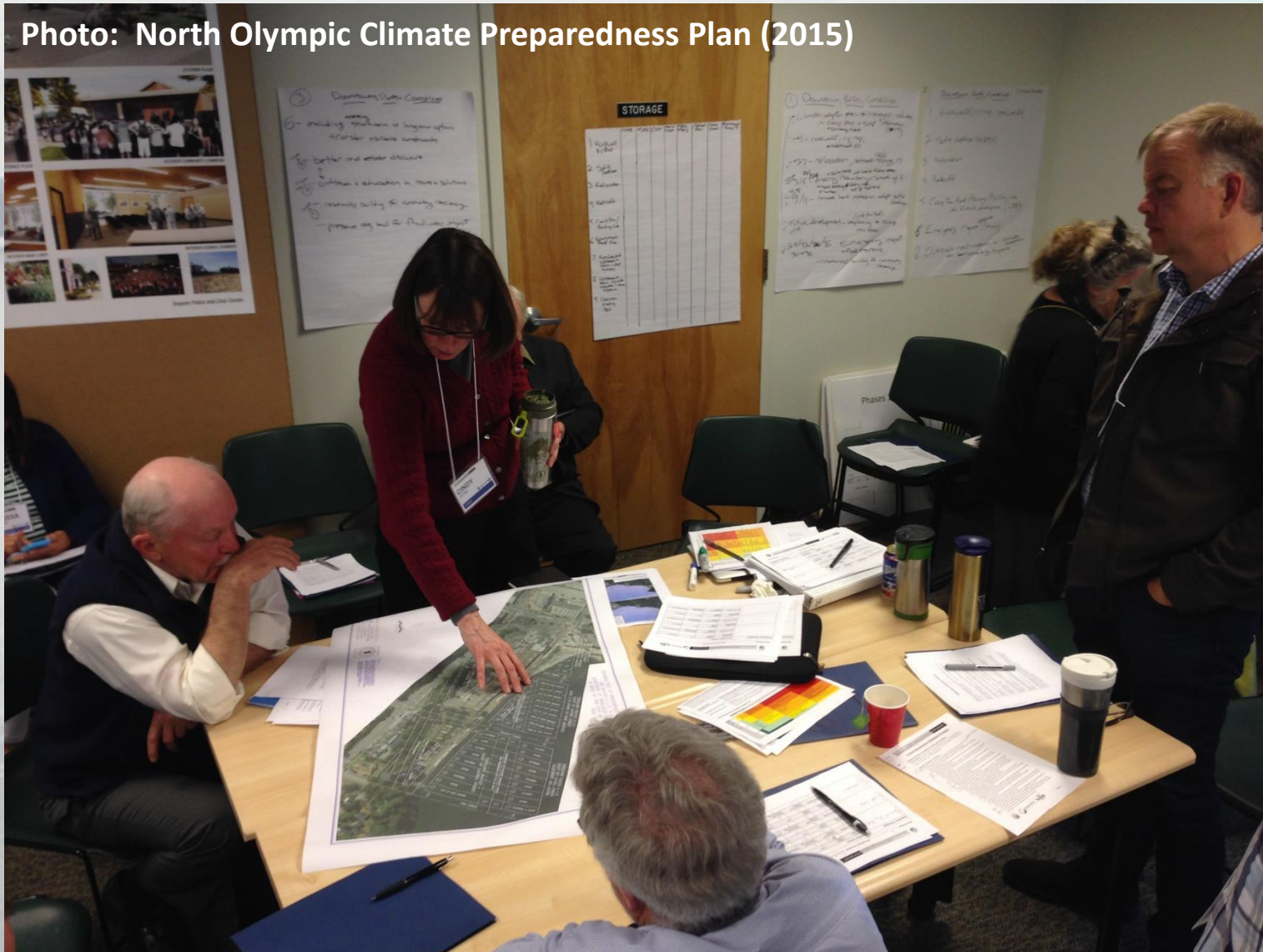
First, Technical Innovations (examples):

- Probabilistic or “likelihood” framework
- “Localize” using spatially explicit vertical land movement information
- Better account for processes (tides, storm surges, waves) that drive extreme events



Next, focus on community applications via planners and managers

Photo: North Olympic Climate Preparedness Plan (2015)



More credible,
useful
information for
vulnerability
assessment
and adaptation
planning



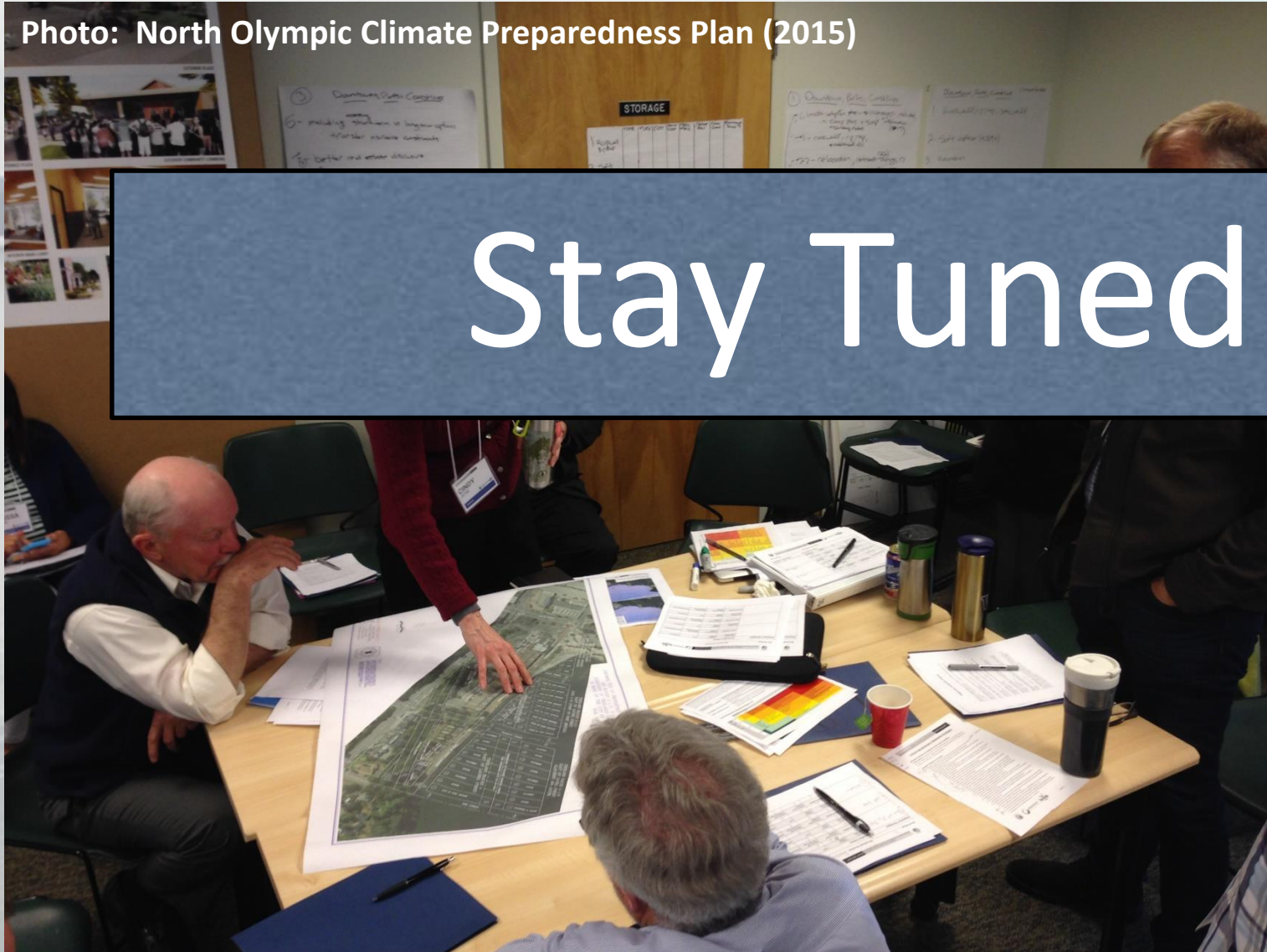
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Stay Tuned!

More credible,

assessment
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How about recent NOAA?

