Planning for Climate Change in the Puget Sound Region

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TOOLBOX Peer Networking Series - Climate Adaptation: From Policies to Action
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The UW Climate Impacts Group

Science for climate resilience

Working since 1995 to....

- Produce scientific information that is both useful to and used by decision makers
- Conduct decision-relevant climate research
- Support the interpretation and application of climate science in decision making
We live in a world of embedded expectations about climate
And it is local, county, and state governments that are **on the front line** when problems occur.
Key Changes

Substantial warming
Increasing heavy rainfall
Changes in hydrology (snow, streamflow)
Sea level rise
Changes in ocean conditions
(on top of continued natural variability)
Substantial Warming, Variable Rainfall

Temperature Difference
(Relative to 1950–1999 average)

Precipitation Change
(Relative to 1950–1999 average)
Our heaviest 24-hour rain events are projected to be more intense (+22%) and more frequent (from 2 to 7 days/yr) by the 2080s. Mauger et al. 2015; results for a high (RCP 8.5) greenhouse gas scenario, relative to 1970-99.
Snowpack is expected to decline

Projected loss in April 1 snowpack, Puget Sound region:
2050s: -29%
2080s: - 55%

Mauger et al. 2015; results for a moderate (A1B) greenhouse gas scenario, relative to 1970-99
Image: Chester Morse Reservoir, Nov 2015, Seattle Public Utilities
Streamflow:
More in winter, less in summer

Important caveats:

Naturalized flows (flows without the influence of dams)
Does not include atmospheric river events (important in rain, mixed rain-and-snow basins)
100 year flood flows increase +18% to +55%, on average, by the 2080s in the 12 largest Puget Sound rivers

Mauger et al. 2015; results for a moderate (A1B) greenhouse gas scenario, relative to 1970-99
Minimum summer streamflows decrease -16% to -51%, on average, by the 2080s in the 12 largest Puget Sound rivers.

Summer stream temperatures increase.

Increasing Risks for West-side Forests

By the 2080s, the area burned by wildfire in Puget Sound is projected to increase by +150 to +1000% (note: difficult to model)

Potential for insect, disease outbreaks exacerbates risk

Relative to 1970-1999, for a low (B1) and moderate (A1b) GHG scenario; Mauger et al. 2015
Summer air quality is likely to be affected by warmer summer temperatures and growing fire risk (east and west of the Cascades)

Jackson et al. 2010; photo: August 2015 forest fire haze in Seattle, Seattle Times
Sea level is projected to rise

<table>
<thead>
<tr>
<th>Year</th>
<th>Rise</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2050</td>
<td>+6 in.</td>
<td>-1.0 to +19 in</td>
</tr>
<tr>
<td>2100</td>
<td>+24 in.</td>
<td>+4 to +56 in</td>
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Values for Seattle, from NRC 2012; Photo: Vashon Island, photo: King County
Sea Level Rise: Low-lying Areas at Risk
More than inundation….

Sea level rise increases the risk of:

- flooding,
- storm surge reach,
- shore/bluff erosion,
- habitat loss,
- toxics mobilization,
- salt water intrusion

These impacts will affect coastal areas long before permanent inundation.
Implications for Planning: Which Climate are We Planning For?
Implications for Planning

You want to be asking:

How does climate change affect what we want to accomplish?

And in particular:

1. Can we **achieve our goals** in a changing climate?
2. How do we **protect our investments** as climate changes?
3. What is necessary to **reduce risks** associated with a changing climate?
4. How do we **avoid creating new risks**?
5. What **opportunities** should we prepare for?
“I wish we could do it faster,” Mark Cowin, director of California’s Department of Water Resources, said in an interview. “I wish we would have started decades ago.”

-- “As drought squeezes California, thirsty crops still being planted”

*The New York Times, April 5, 2015*
Who Is working on Adaptation in WA?
For more information...

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