

Climate Impacts on the Northwest

Key findings from the Third National Climate Assessment

Amy Snover

Assistant Dean, Applied Research

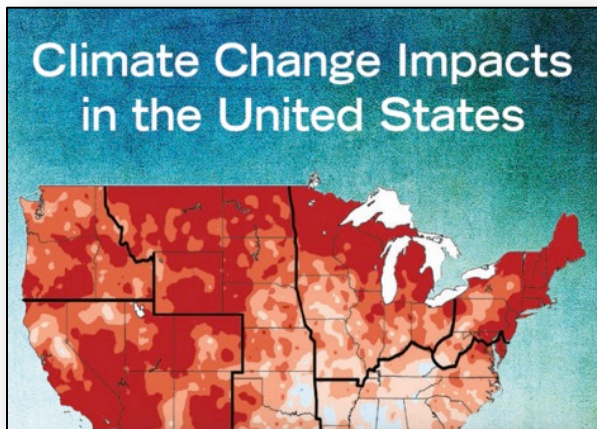
Director, Climate Impacts Group

University of Washington

PNW Climate Science Conference, September 2014



*Climate Science in the
Public Interest*



National Climate Assessment: NW

Convening Lead Authors

Philip Mote, Oregon State University

Amy Snover, University of Washington

Lead Authors

Susan Capalbo, Oregon State University

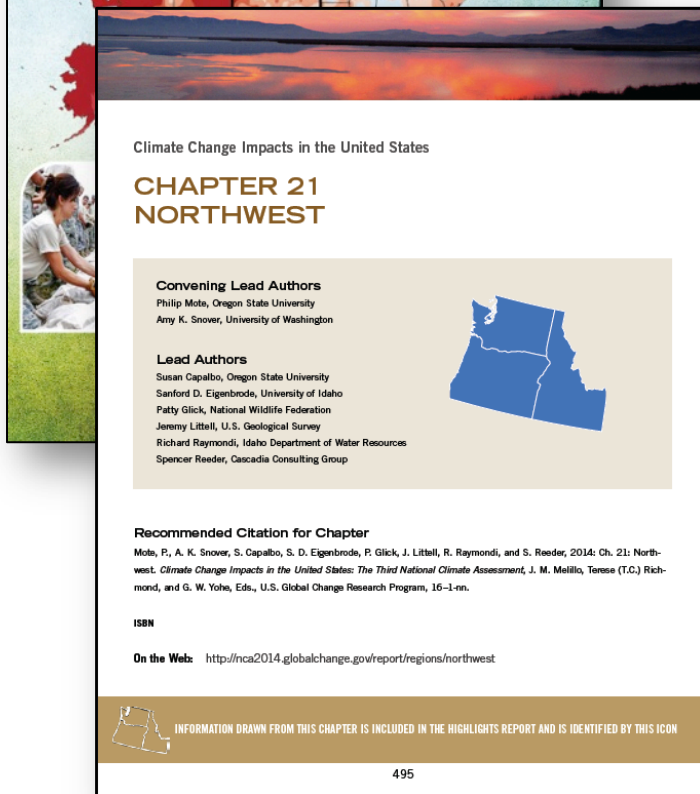
Sanford Eigenbrode, University of Idaho

Patty Glick, National Wildlife Federation

Jeremy Littell, U.S. Geological Survey

Richard Raymondi, Idaho Department of Water Resources

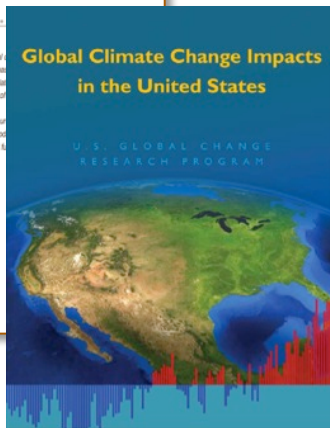
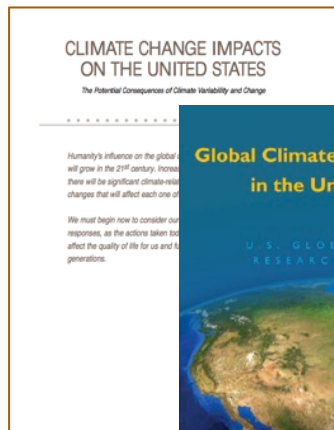
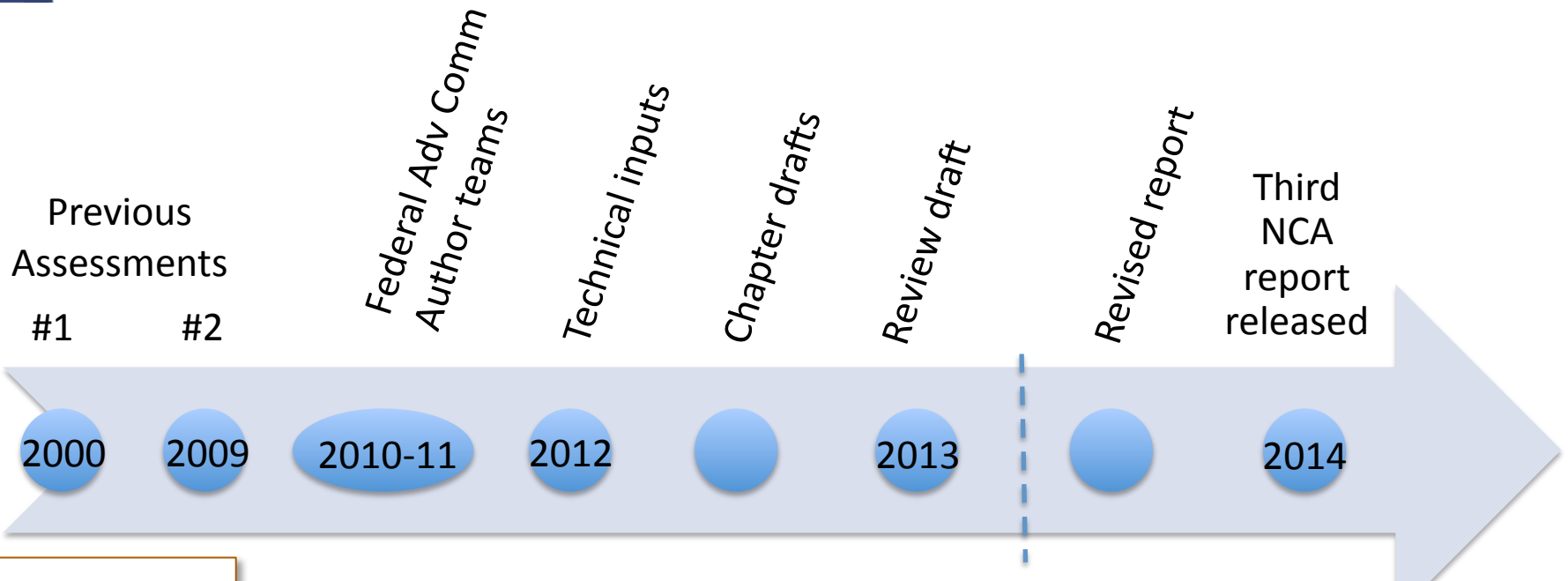
Spencer Reeder, Vulcan (prev. Cascadia Consulting Group)



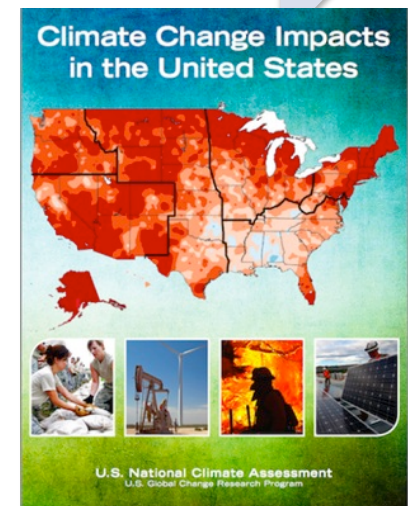
<http://nca2014.globalchange.gov/report/regions/northwest>



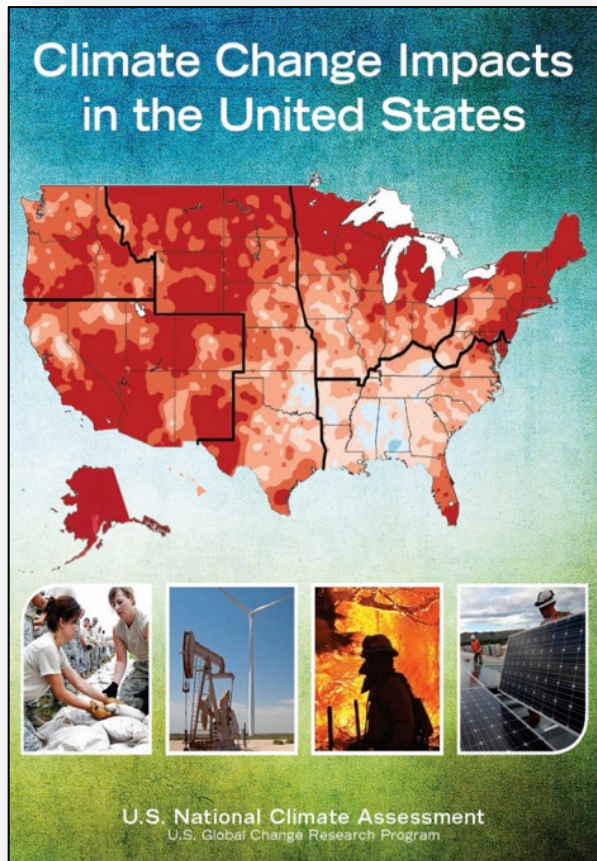
NCA Timeline



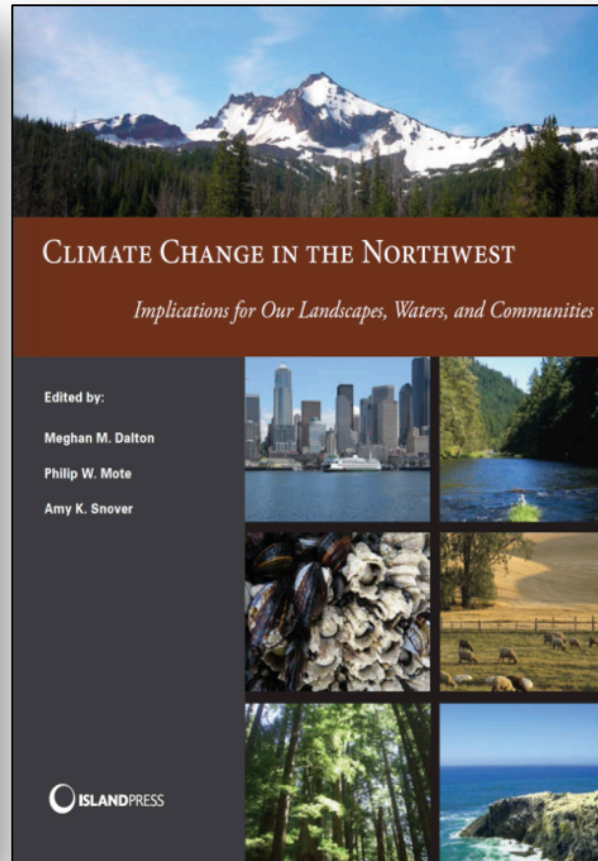
publication cut-off



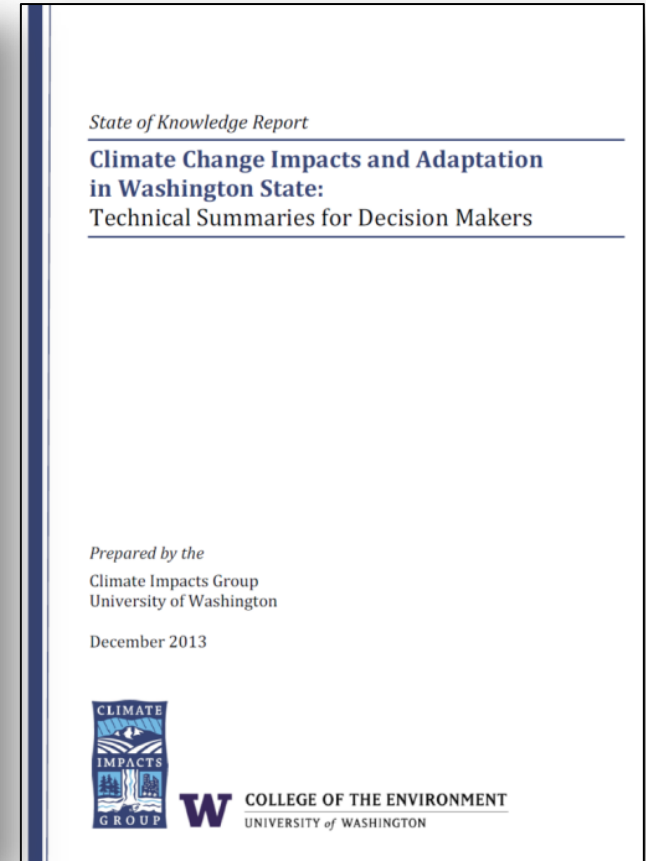
Third National Climate Assessment



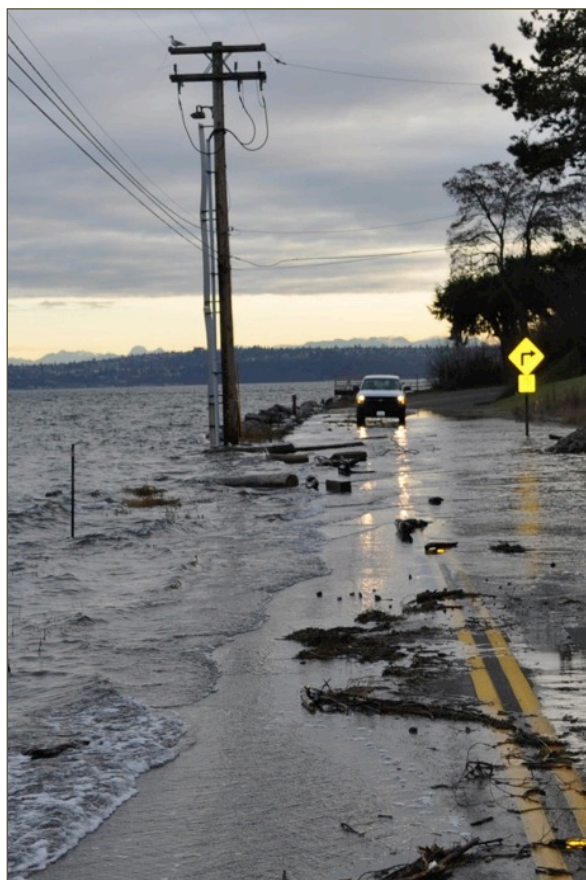
Melillo et al. 2014

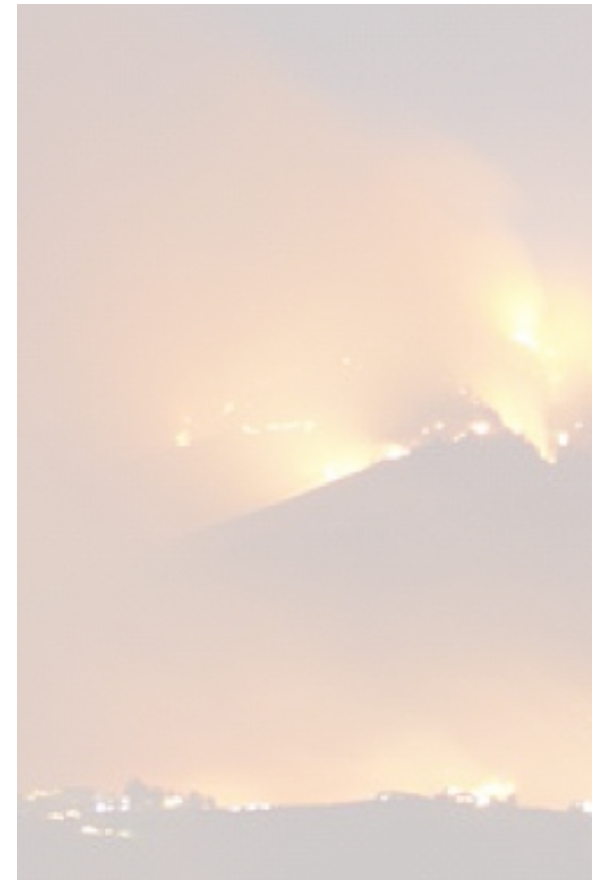
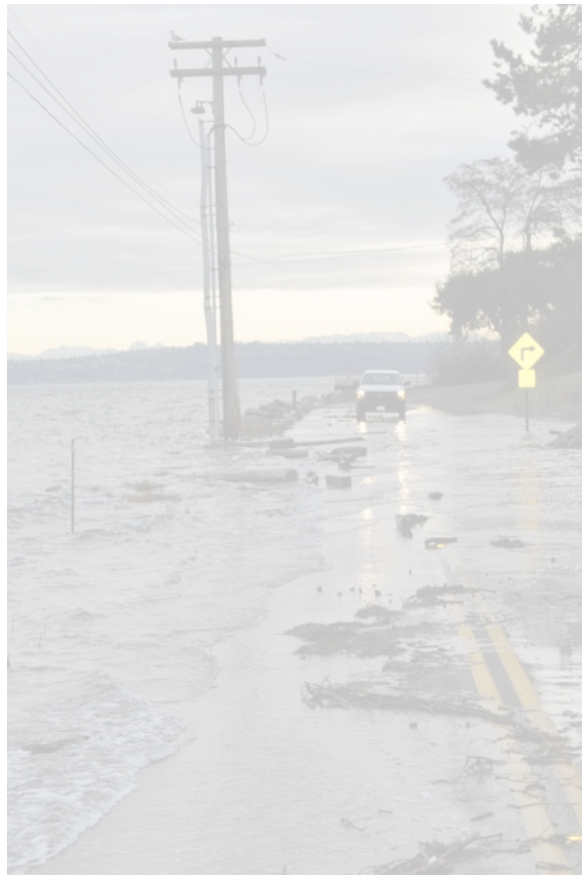


Dalton et al. 2013



Snover et al. 2013

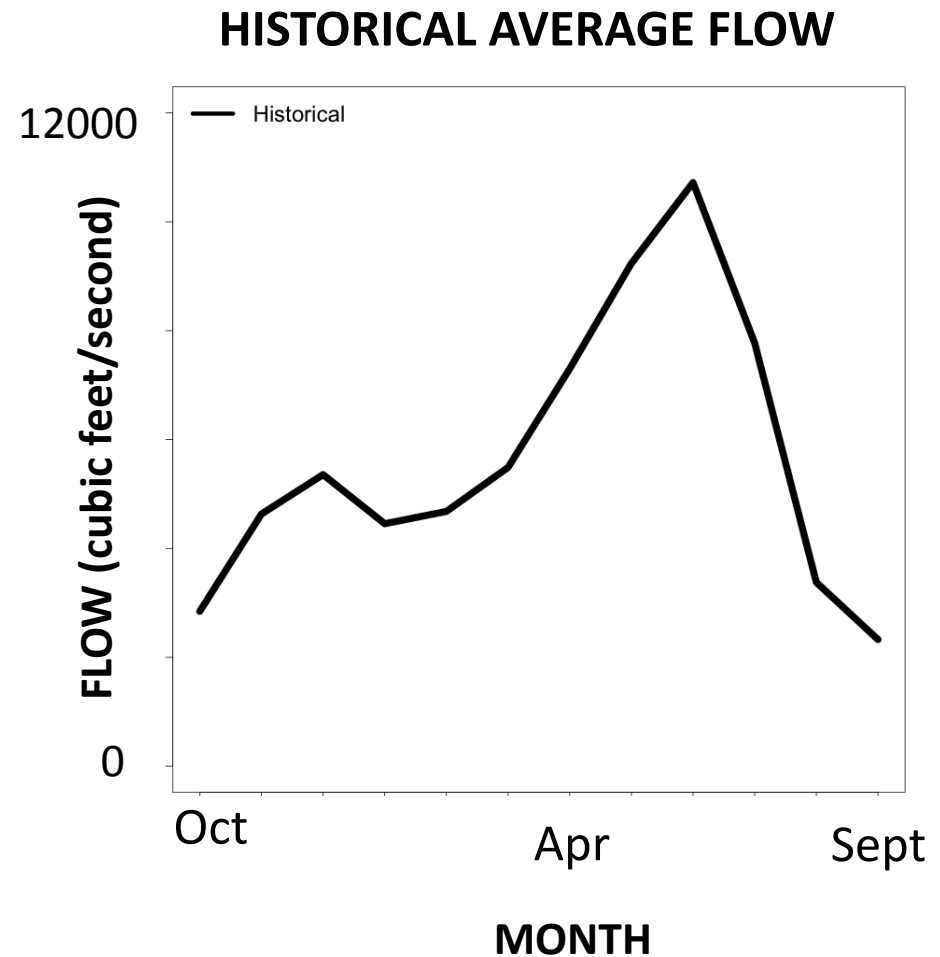






Water: Continuing change, increasing challenges

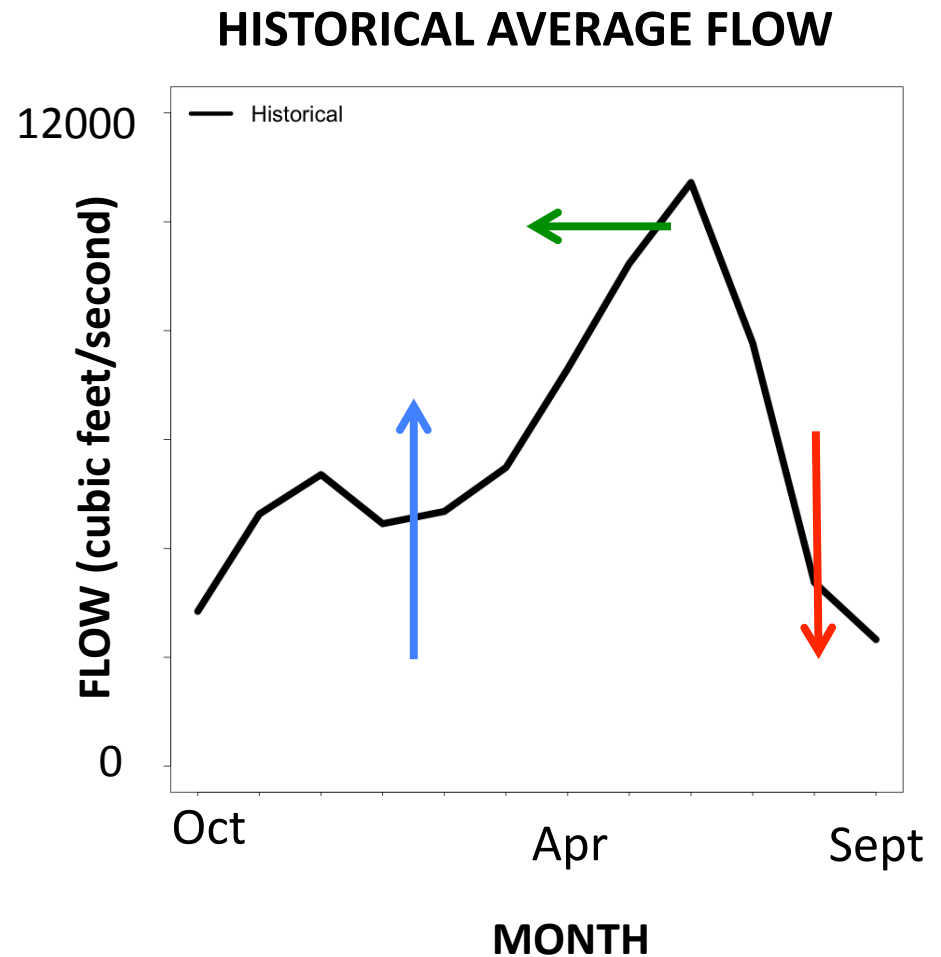
Continued changes in streamflow timing





Water: Continuing change, increasing challenges

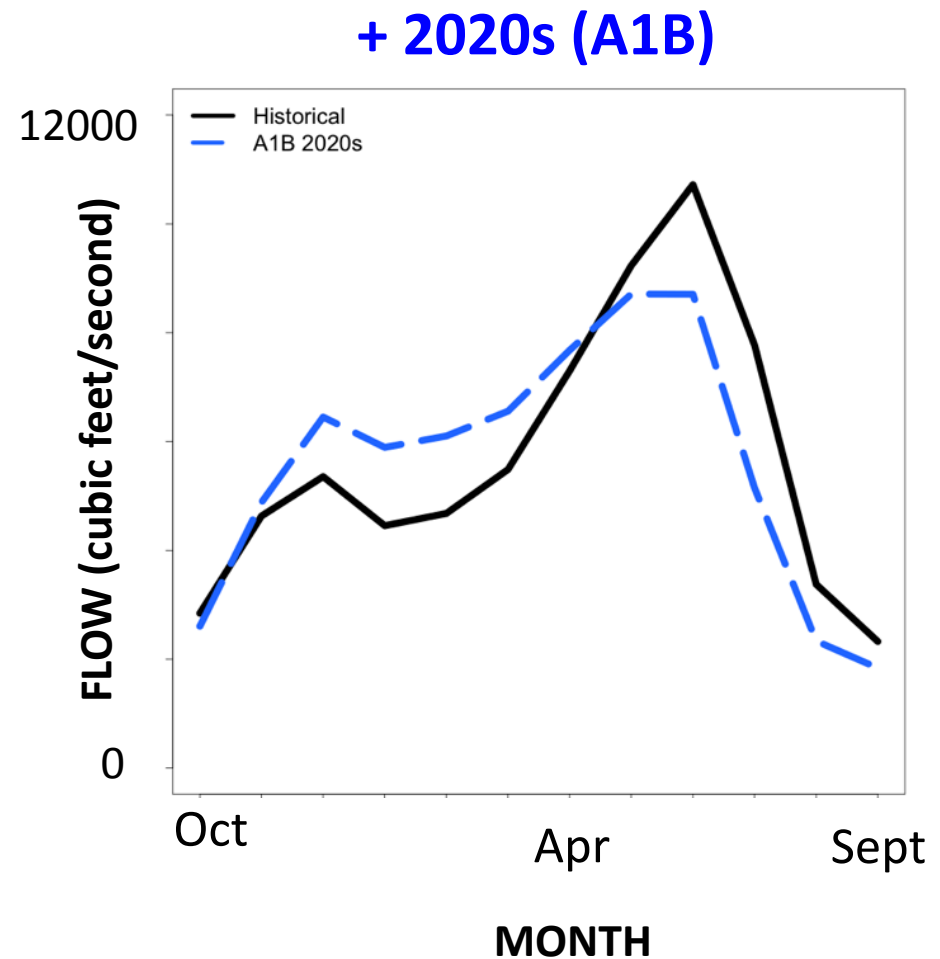
Continued changes in streamflow timing





Water: Continuing change, increasing challenges

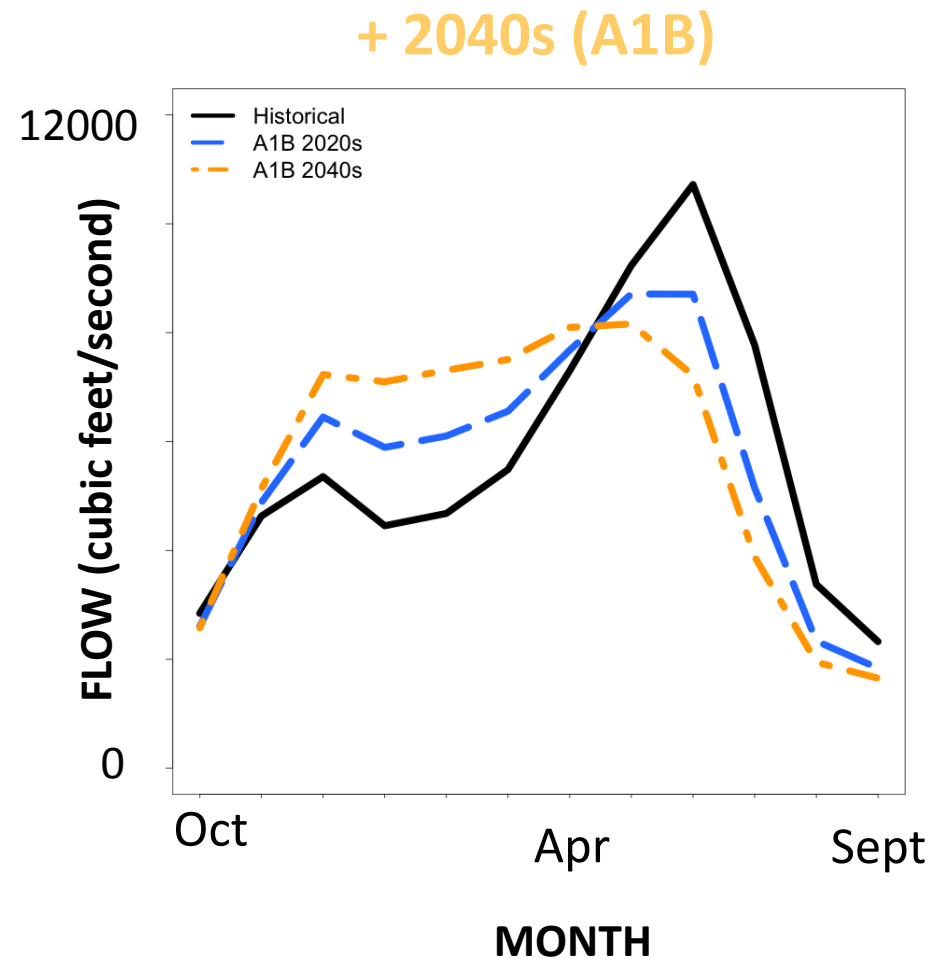
Continued changes in streamflow timing





Water: Continuing change, increasing challenges

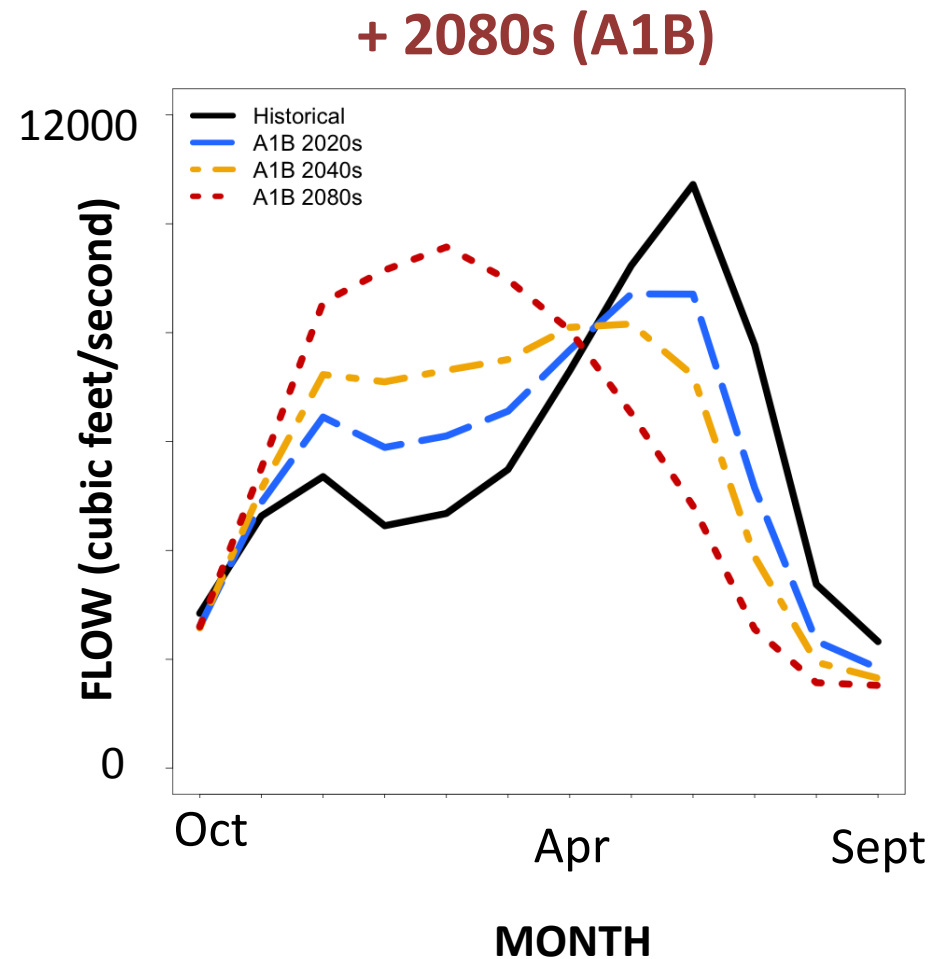
Continued changes in streamflow timing





Water: Continuing change, increasing challenges

Continued changes in streamflow timing



NCA Fig 21.2a



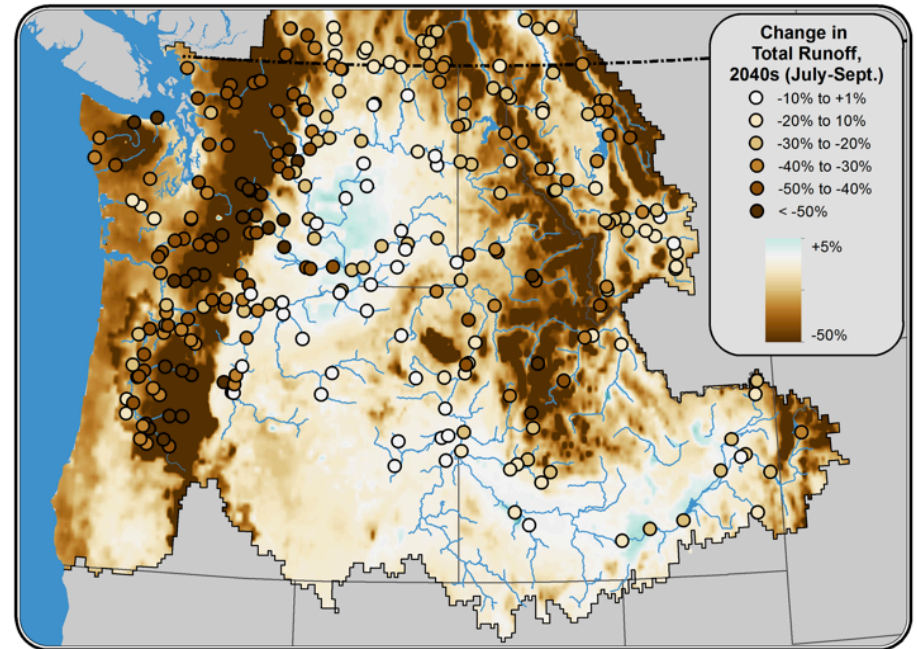
Water: Continuing change, increasing challenges

Continued changes in streamflow timing

Reduced water supply for competing demands

Increased demand, management challenges

Natural summer surface water availability



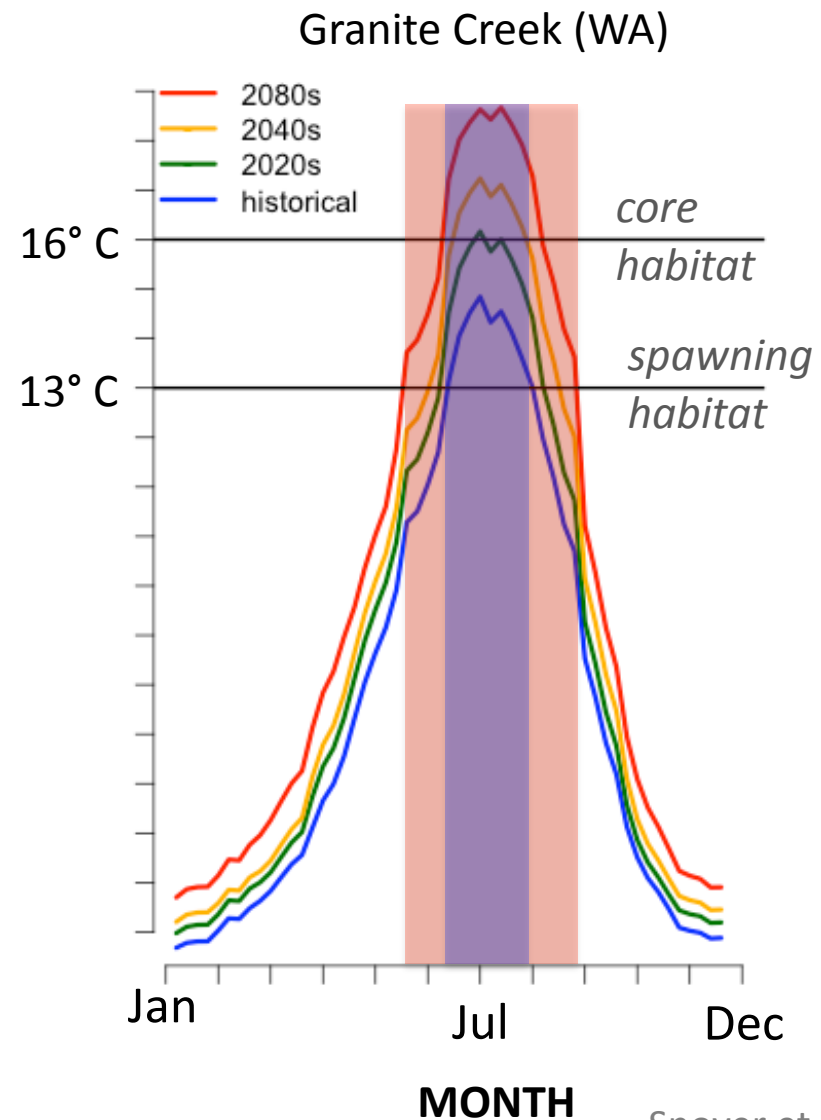
NCA Fig 21.2b



Water: Far-Reaching Consequences

Finer-scale analyses
showing negative
effects at various scales

Economic & ecological
consequences



Snoover et al. 2010

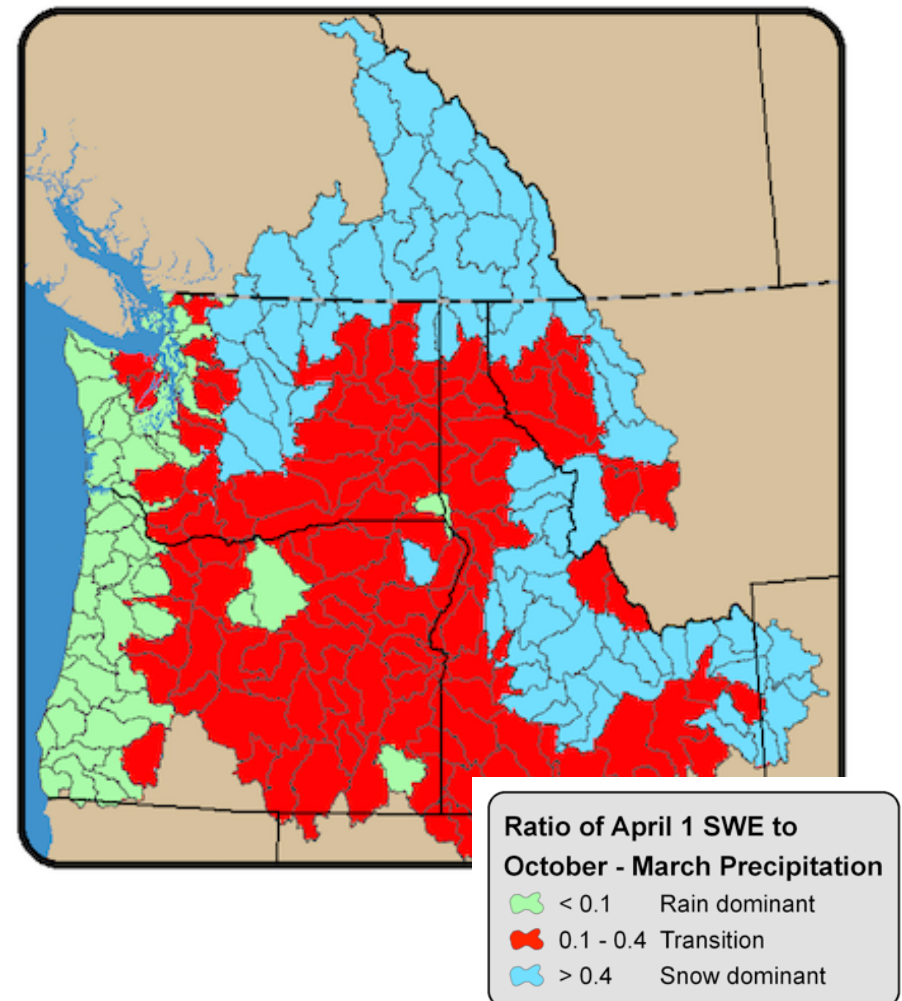


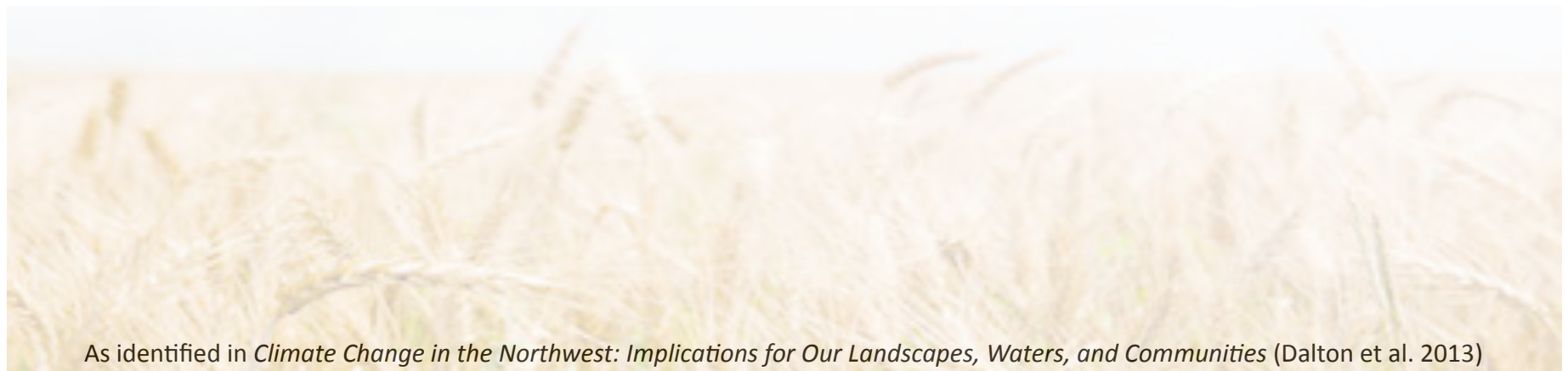
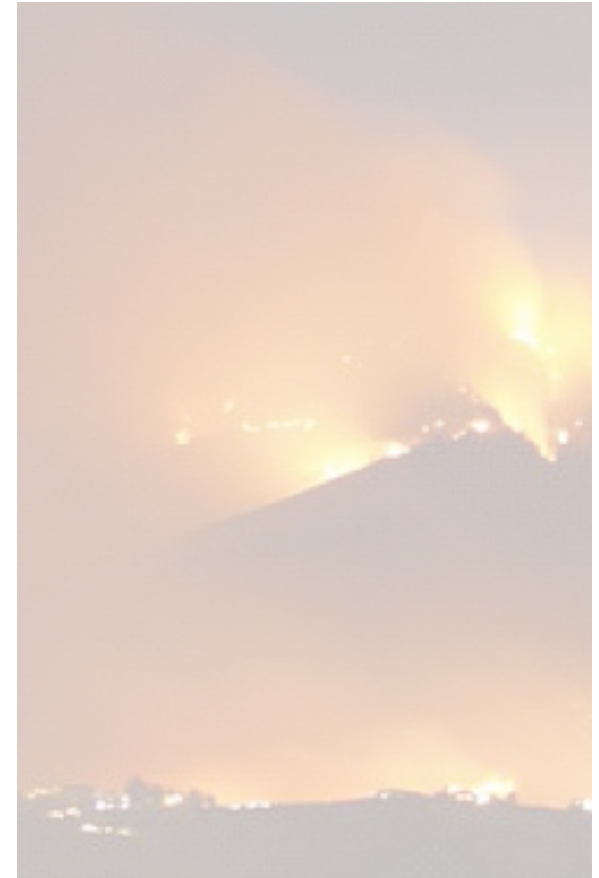
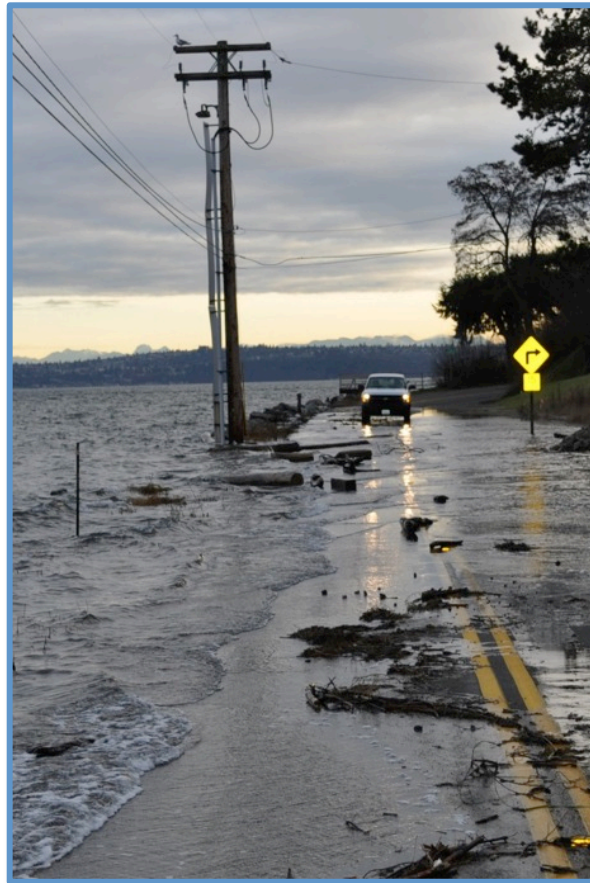
Water: Far-Reaching Consequences

Finer-scale analyses showing negative effects at various scales

Economic & ecological consequences

Vulnerability depends on hydrologic sensitivity and management flexibility







Coastal Threats: Multiple Drivers

Sea level rise

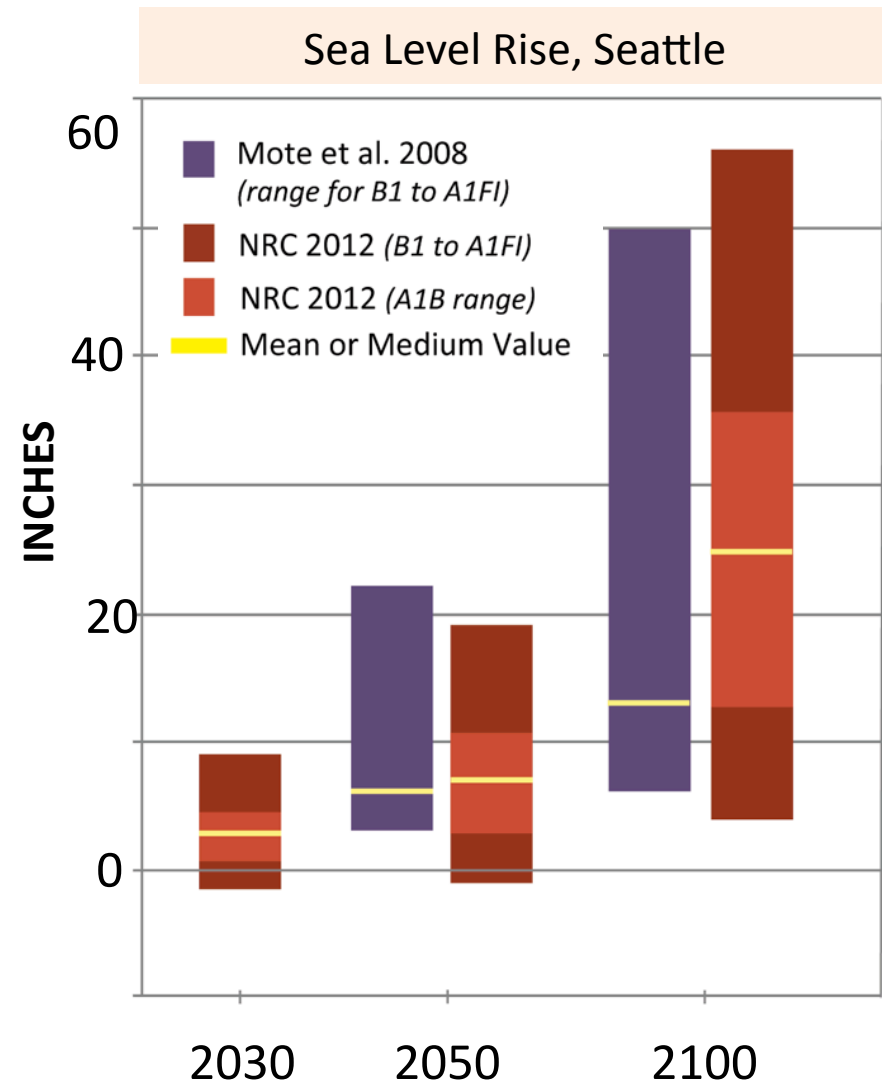
Physical, chemical and ecological conditions in coastal waters

Storms

River flooding

Development & human use

... erosion, inundation, threats to infrastructure & habitat





Coastal Change: Consequences

... for natural systems

habitats, species (fish, shorebirds), wetlands, harmful algal blooms



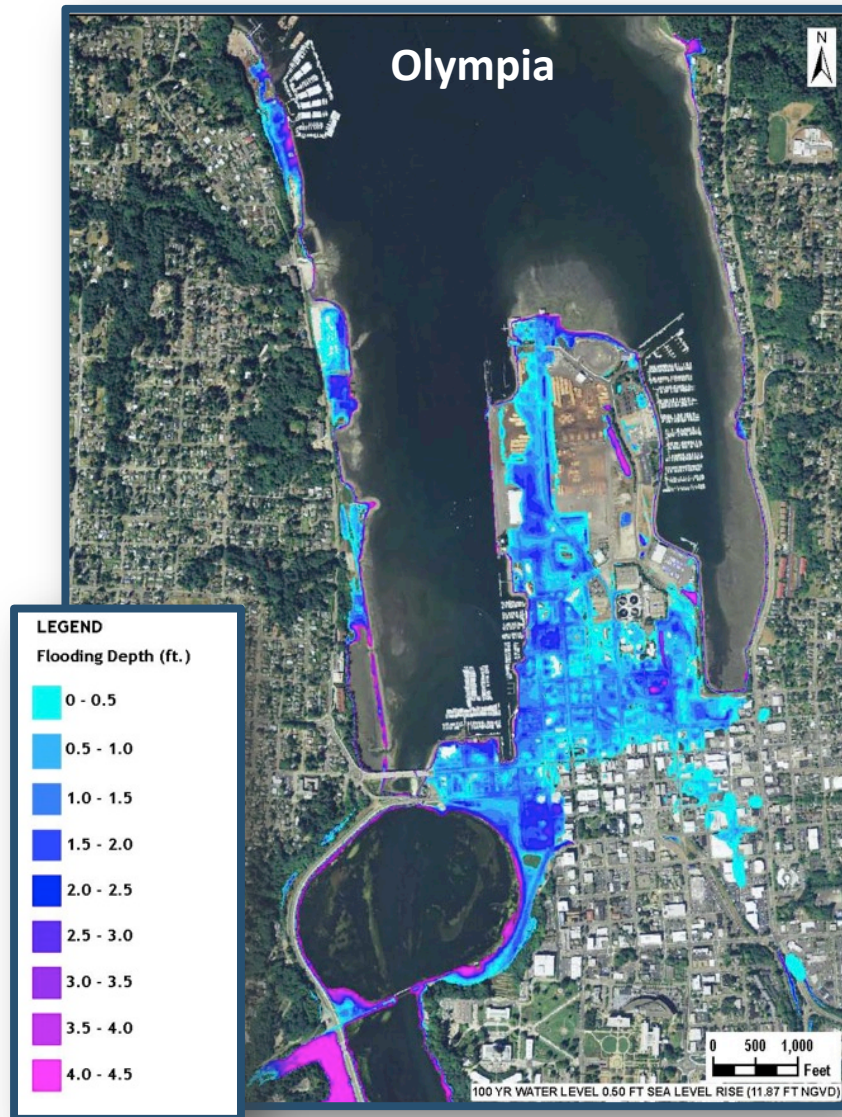
... for people

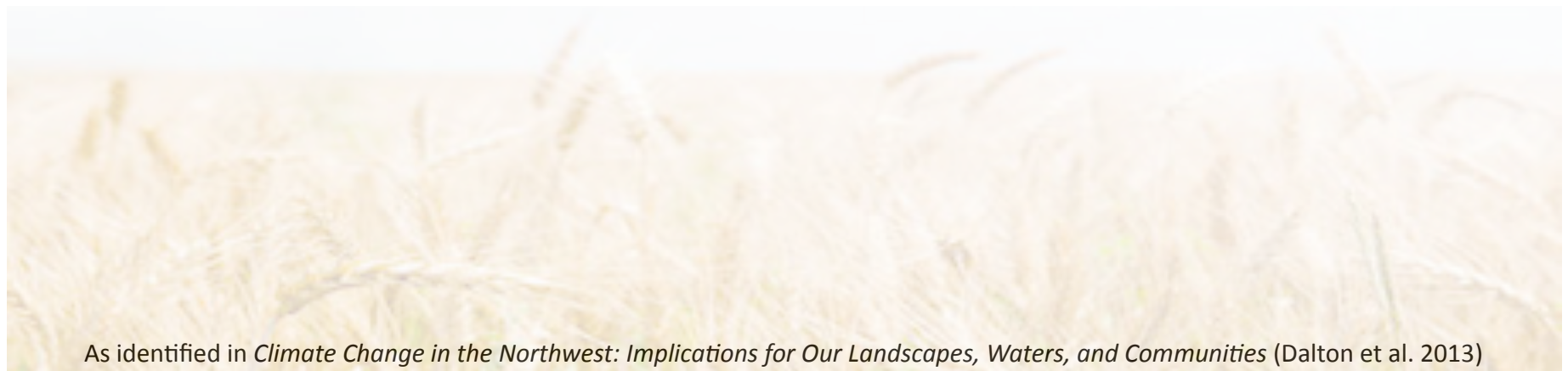
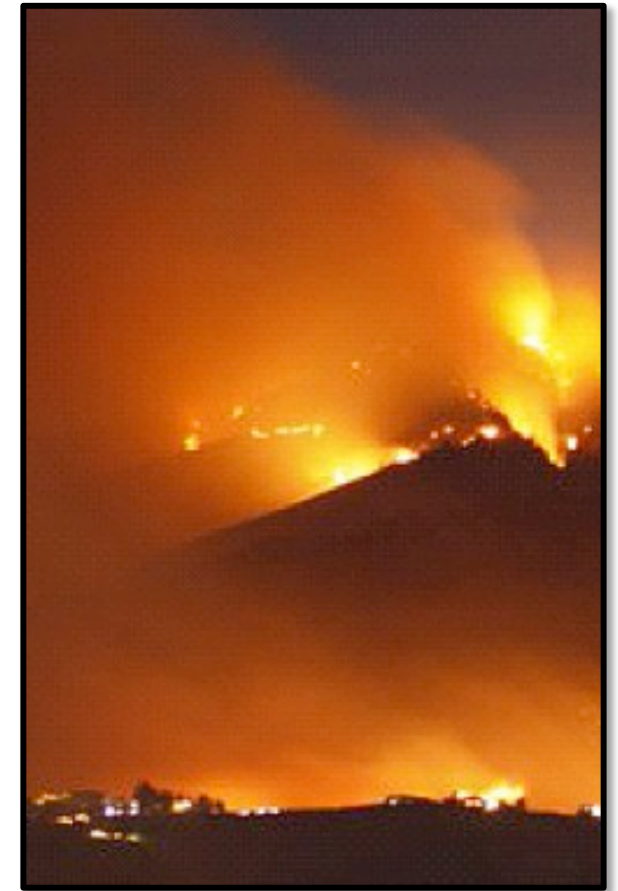
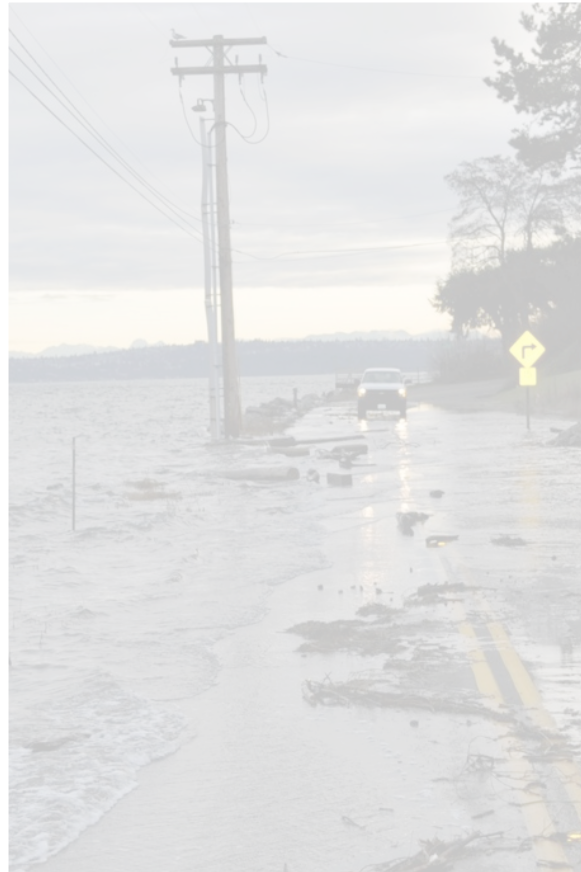
public & private property, utility & transportation infrastructure





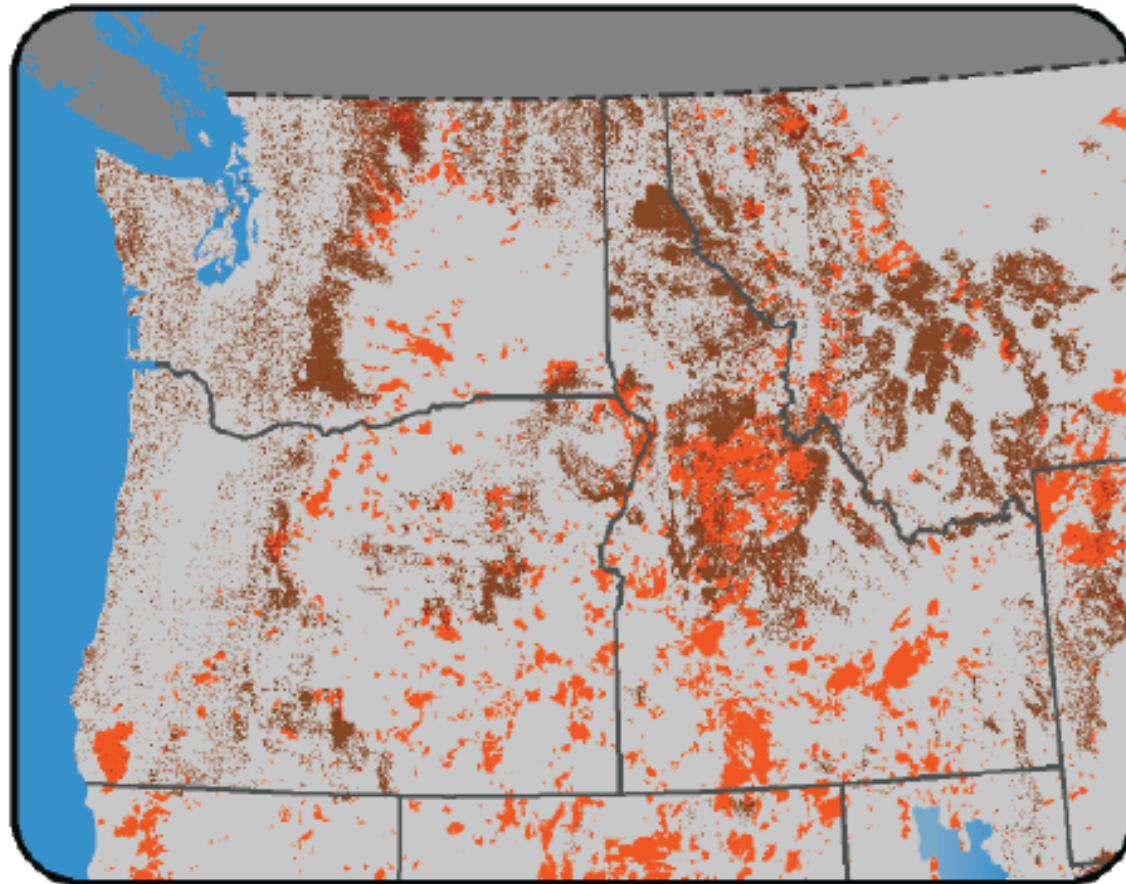
Communities identifying areas at risk







Forest Change: Recent Disturbance



Recent Disturbance



Fire area



Insect and
disease area

Mote et al. 2014; Data sources: Eidenshink et al. 2007; USGS 2012; USFS 2012

Increased wildfire risk

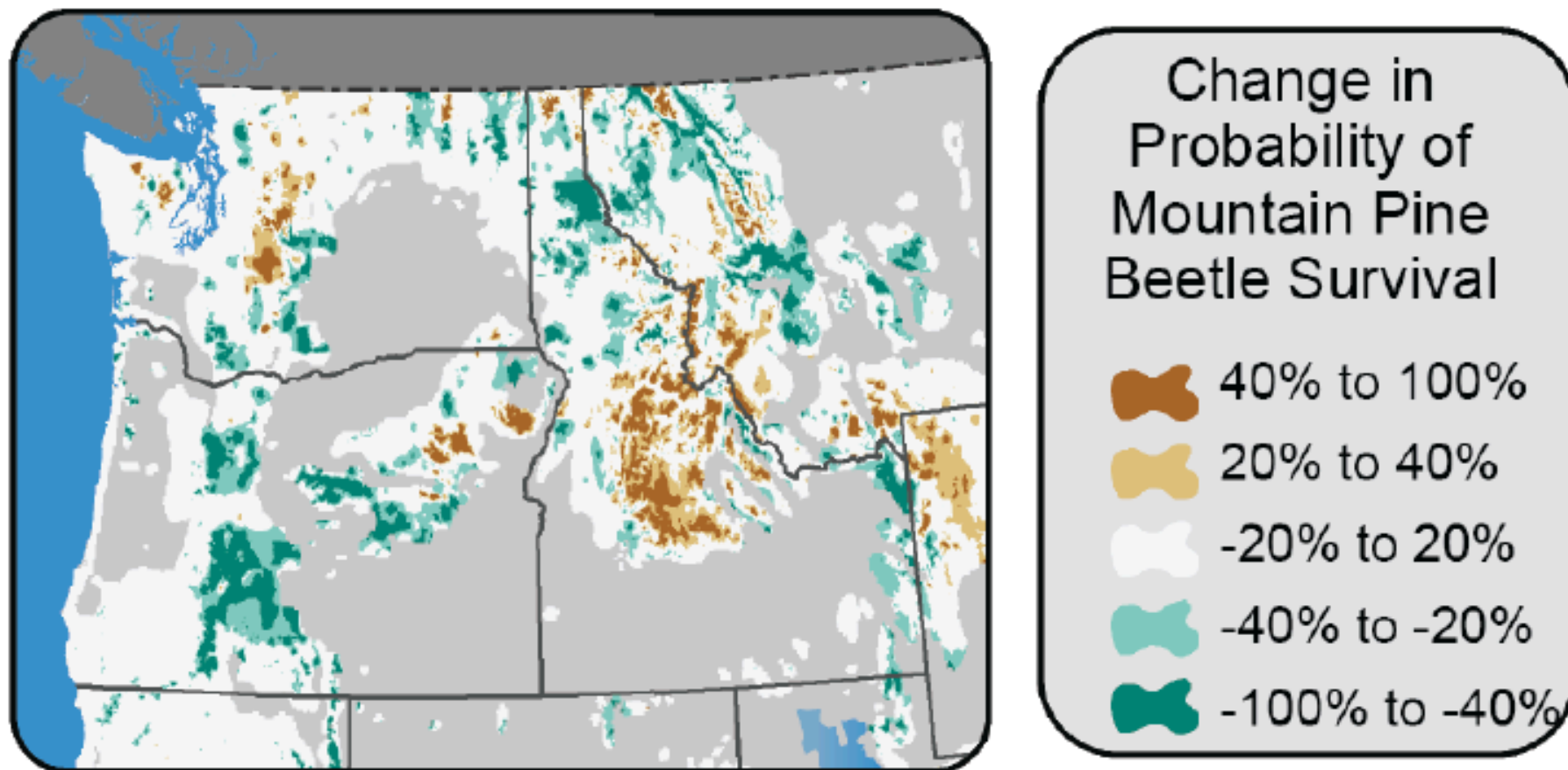
Area burned by fire in the Columbia River Basin is projected to double by 2020s, triple by 2040s, x5 by 2080s (relative to median for 1916-2006; medium emissions scenario).
(*Littell et al. 2010, 2012*)



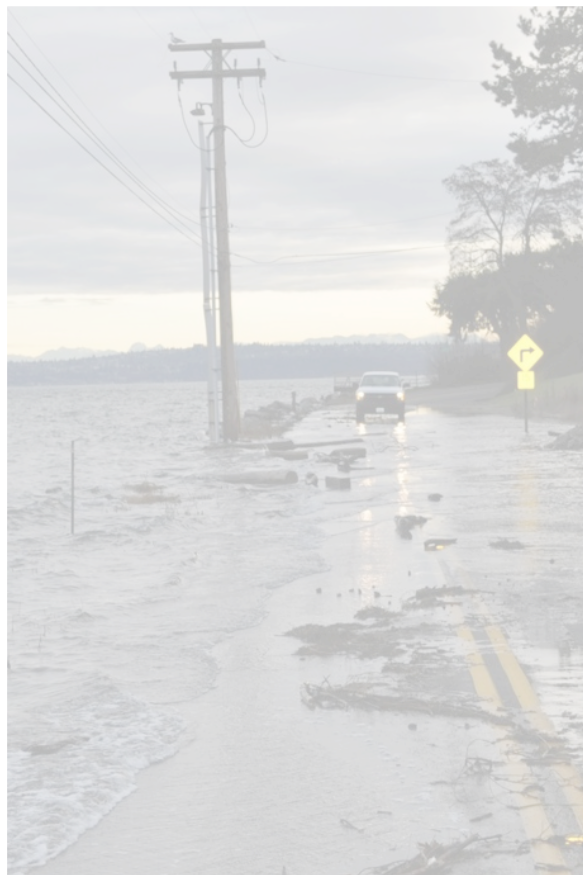
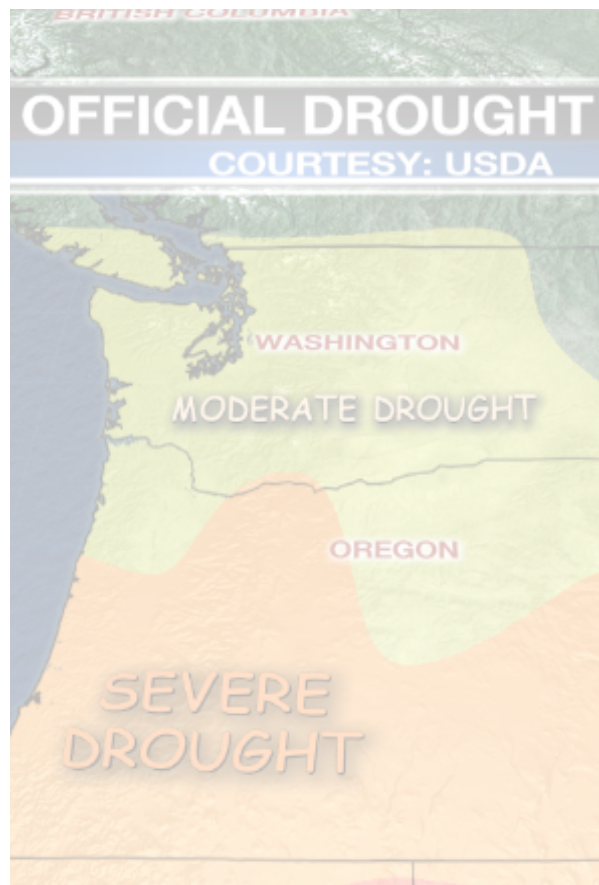
Discovery Fire burns near volatile stands of insect-damaged trees, 2009, DNR



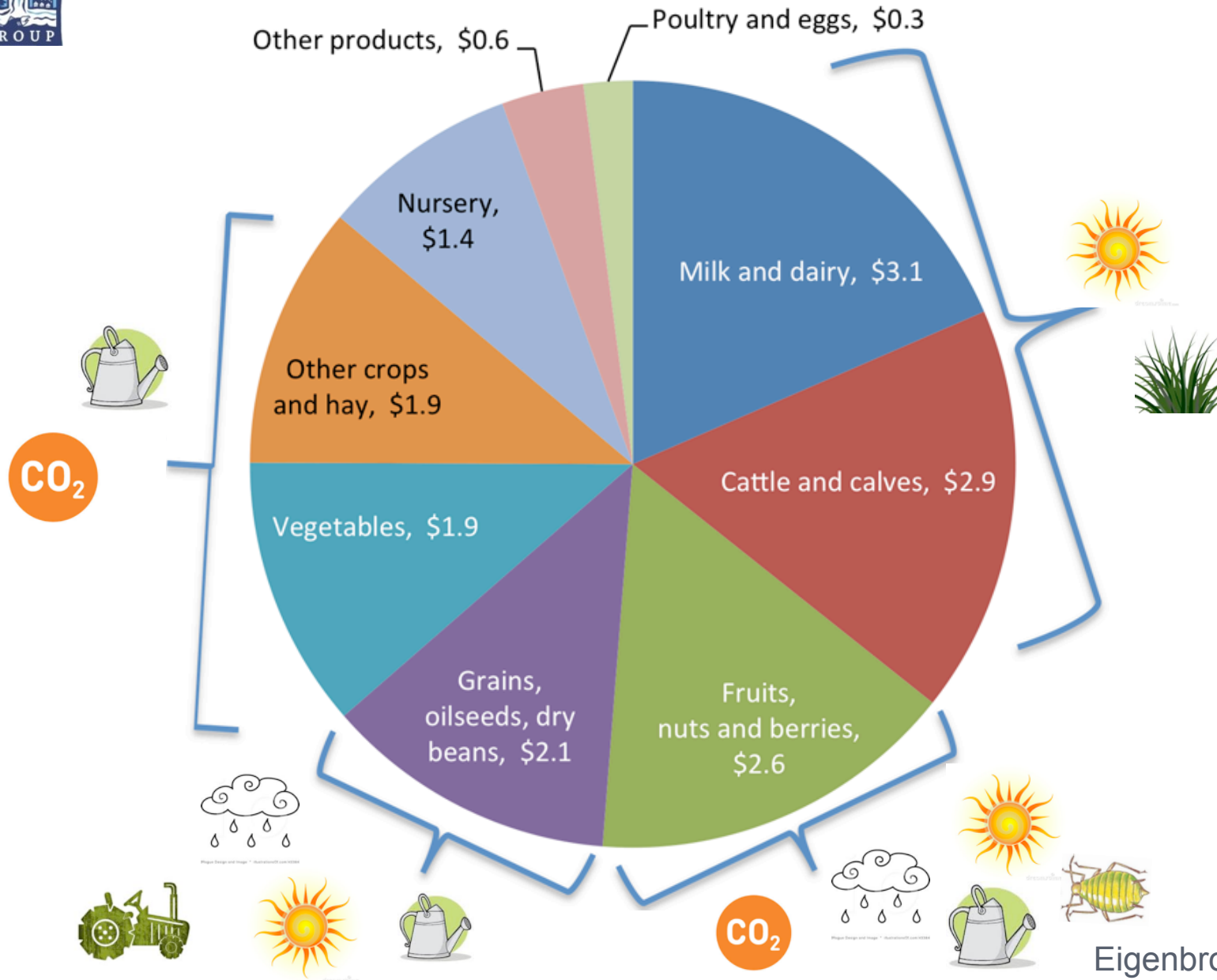
Forest Change: Mountain Pine Beetle



Mote et al. 2014, B. Bentz and J. Regeniére



Agriculture: Multiple (climate) drivers





Northwest Agriculture

Climate change effects vary

Significant, but comparable to climate variability

Other factors – including smart decision making – mute effects

Irrigation reductions remain concerning

Well-positioned for adaptation

Inherent flexibility and responsiveness to changing conditions indicate potential for a significant amount of autonomous adjustments.



Photo: WA DNR



Climate Change, Tribes, and Tribal Health

Psychological stress from loss of cultural identity in Native cultures due to:

- decline or loss of key plant and animal species,
- loss of reservation land,
- loss of cultural sites to sea level rise
- loss or changes in traditional foods



Coast Salish Canoe Journey 2009 landing in Pillar Point; photo by Carol Reiss, USGS



Climate change adaptation in the Northwest



Washington
Department of
**FISH and
WILDLIFE**





Climate Change: An issue for today

Wide-ranging impacts

Today's choices determine tomorrow's risks

- magnitude of change expected
- consequences of changes in motion

Time – and dialogue – required for action





NW climate assessment: main themes

Familiar outlook

Confirming decades of research

More details

New focus on areas of highest regional risk; sub-regional climate sensitivities and vulnerabilities increasingly specified

Nature's continued role

Variability remains important – will shape climate change *time of emergence*

Today's choices matter

Adaptation & mitigation efforts underway ... but insufficient to the challenge

Effective adaptation requires risk management, experimentation, learning

The NW: well-placed to prepare

Locally-specific projections; broad scientific engagement; local, regional, state, tribal and federal adaptation leadership



The Climate Impacts Group

<http://cig.uw.edu>



COLLEGE OF THE ENVIRONMENT

UNIVERSITY *of* WASHINGTON