An integrated assessment of the impacts of climate change on Washington State

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February 14, 2008
The Water Center's 18th Annual Review of Research 2008

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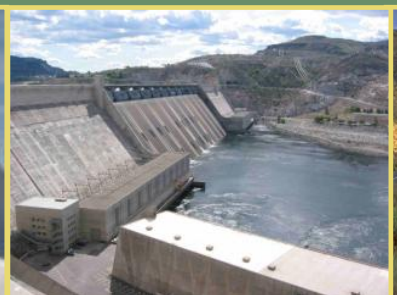
Climate science in the public interest

Department of Civil and Environmental Engineering


Washington State Climate Impacts Assessment

CLIMATE IMPACTS GROUP

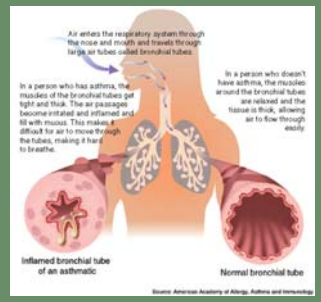
STATE OF WASHINGTON
DEPARTMENT OF COMMUNITY, TRADE AND ECONOMIC DEVELOPMENT

WASHINGTON STATE
Department of Ecology

Funding Source: Clean Air/Clean Fuels House Bill 1303

Answers to FAQ regarding HB 1303 from the Washington State Legislature website:
http://apps.leg.wa.gov/billinfo/default.aspx

Human Health



Infrastructure

Agriculture

Water Resources

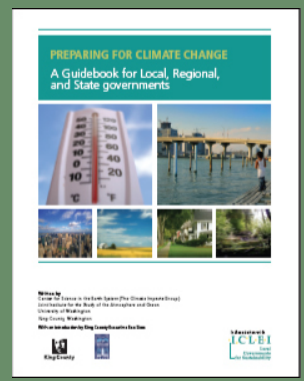
A comprehensive state climate change assessment that includes the impacts of global warming

Coasts

Energy

Forest Resources

Adaptation / Legal Barriers



Salmon

Goals of the Impacts Assessment

- Evaluate impacts of climate change into the next century
  - use IPCC 2007 climate scenarios
  - show regional impacts and areas of high and low sensitivity to climate change
  - characterize barriers to adaptation to these impacts (e.g., legal, institutional) with help from UW Law School
  - provide tools for policy makers and user groups
  - collaborate with Governor's Climate Change Challenge team

To be completed December 2008

CHRISTINE O. GREGOIRE
Governor

STATE OF WASHINGTON

OFFICE OF THE GOVERNOR

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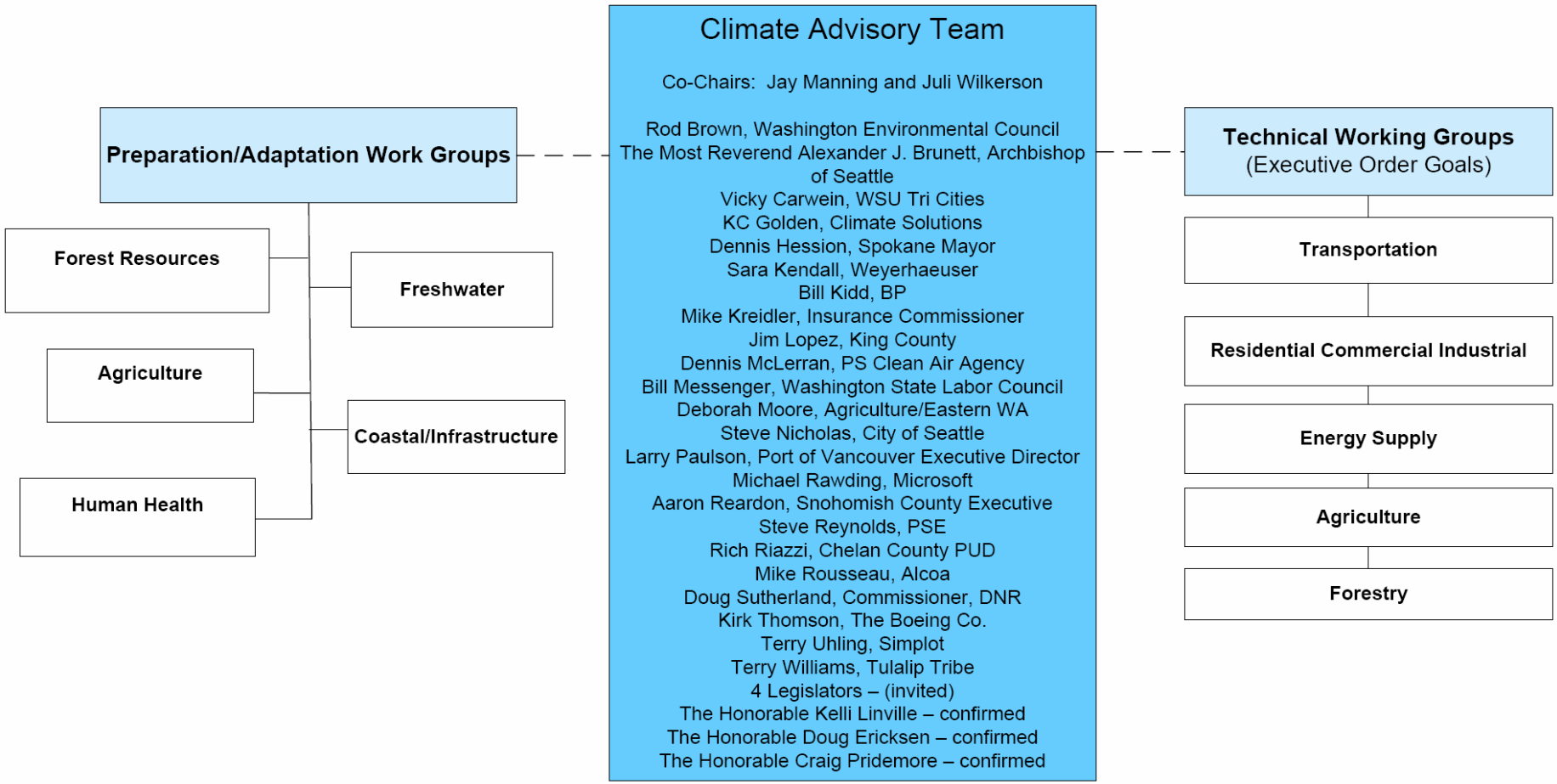
EXECUTIVE ORDER 07-02

WASHINGTON CLIMATE CHANGE CHALLENGE

- Evaluate current and proposed actions to reduce CO_2 emissions
- Make recommendations on improved preparedness and adaptation

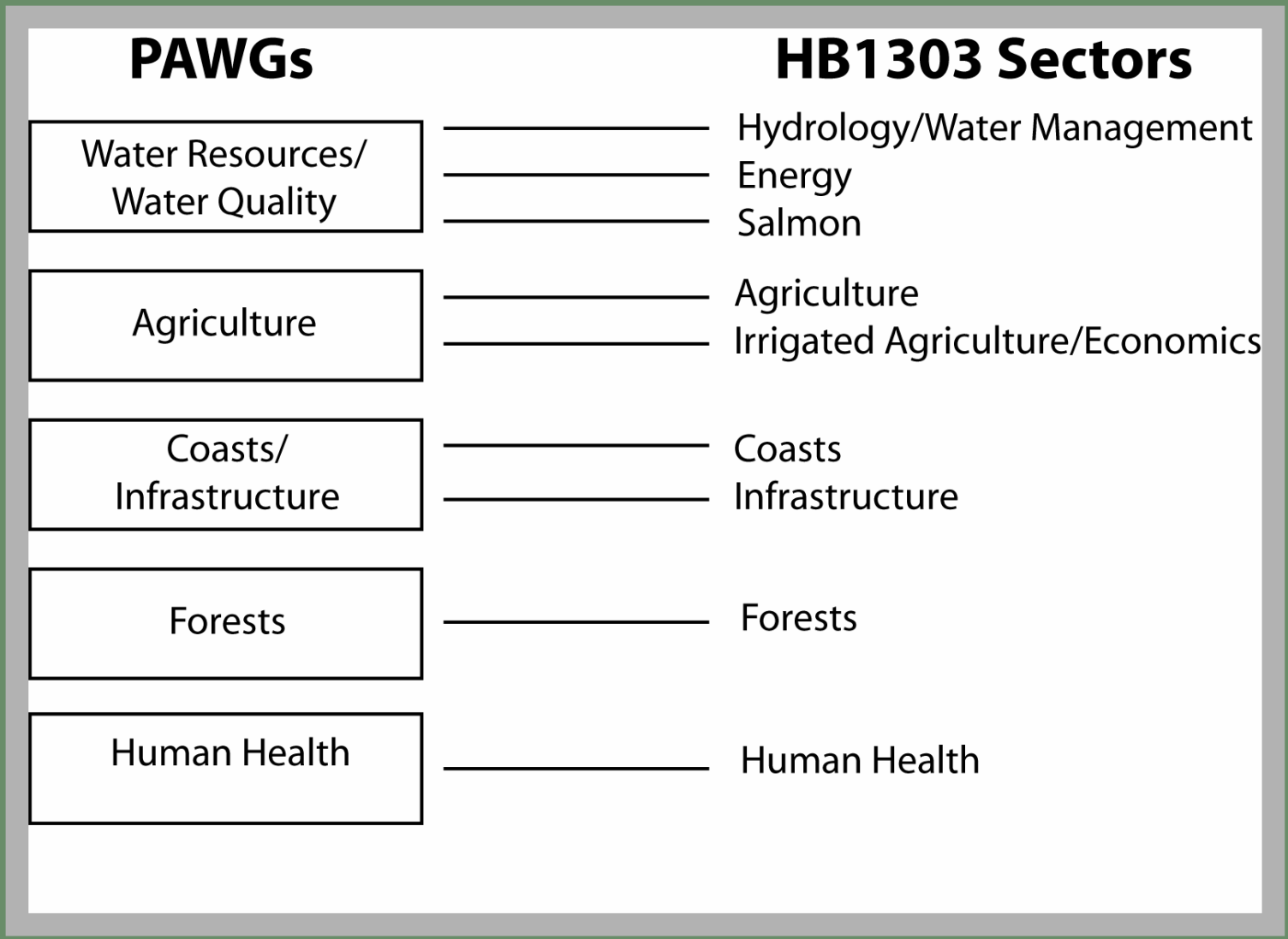
Draft recommendations — Complete
Final report — February 2008

WASHINGTON CLIMATE CHANGE CHALLENGE



05/30/07

Relationship between PAWGs and HB1303 Sectors

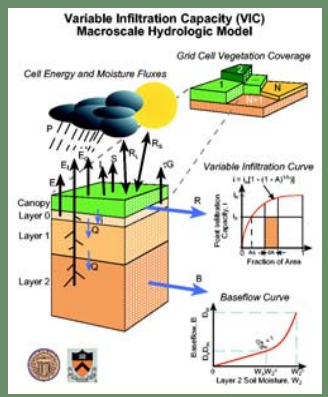


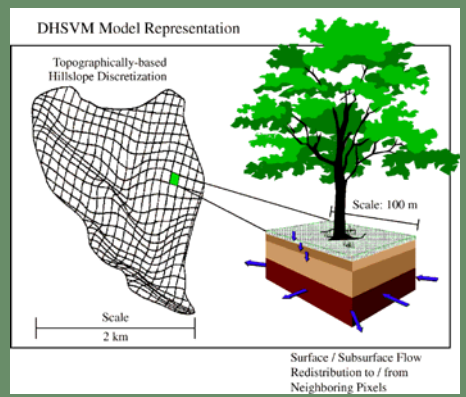
Data Needs to Support a 21st Century Planning Framework Incorporating Climate Information and Uncertainty

2 Emissions Scenarios x 20 GCMs x 2 Downscaling Approaches

IPCC Climate Scenarios

Hydrology Modeling

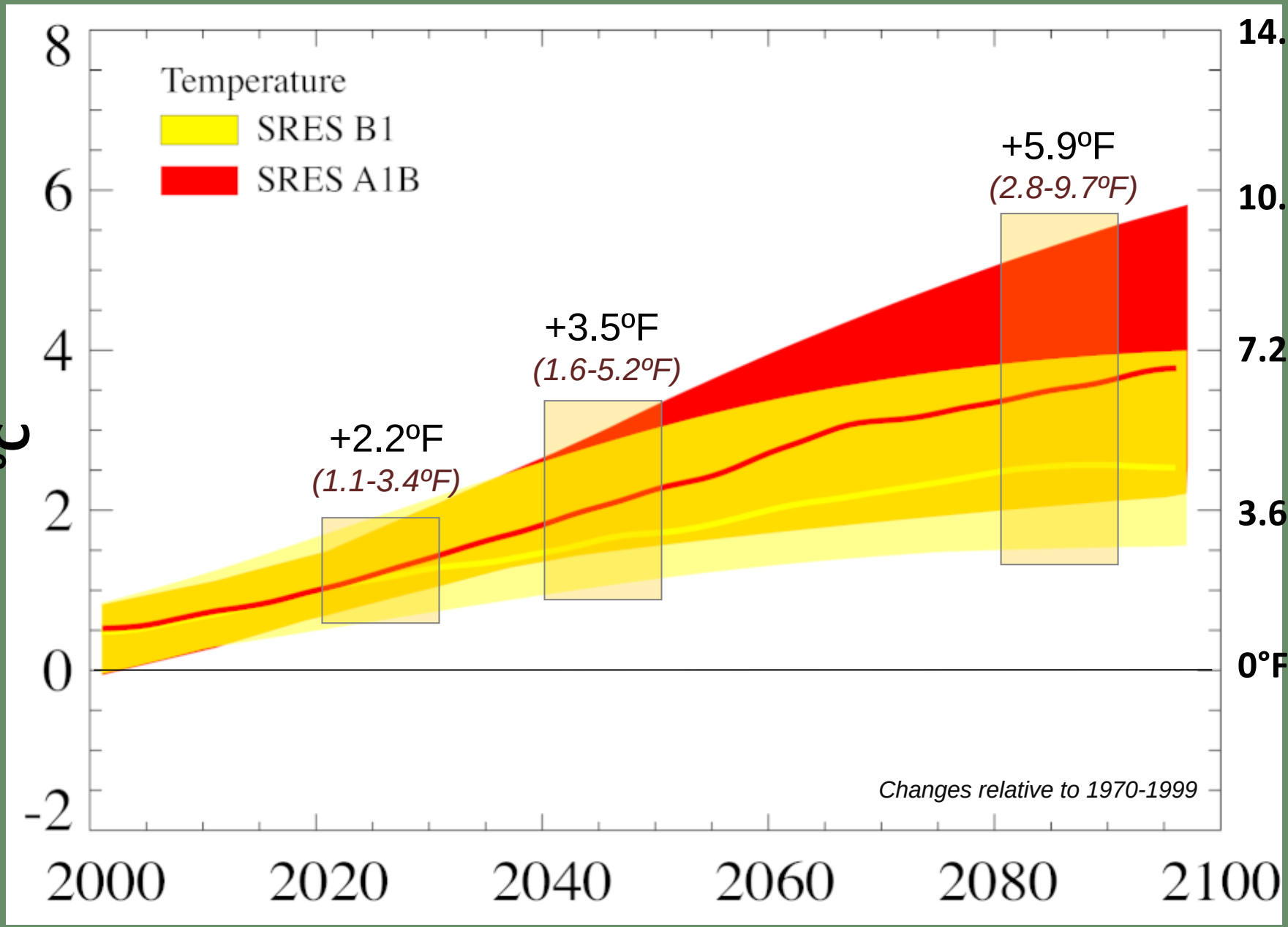




Approach provides ensemble of variables that can be used to evaluate impacts of climate change

- Precipitation
- Air Temperature
- Streamflow
- Soil Moisture
- PET
- VPD
- And more!

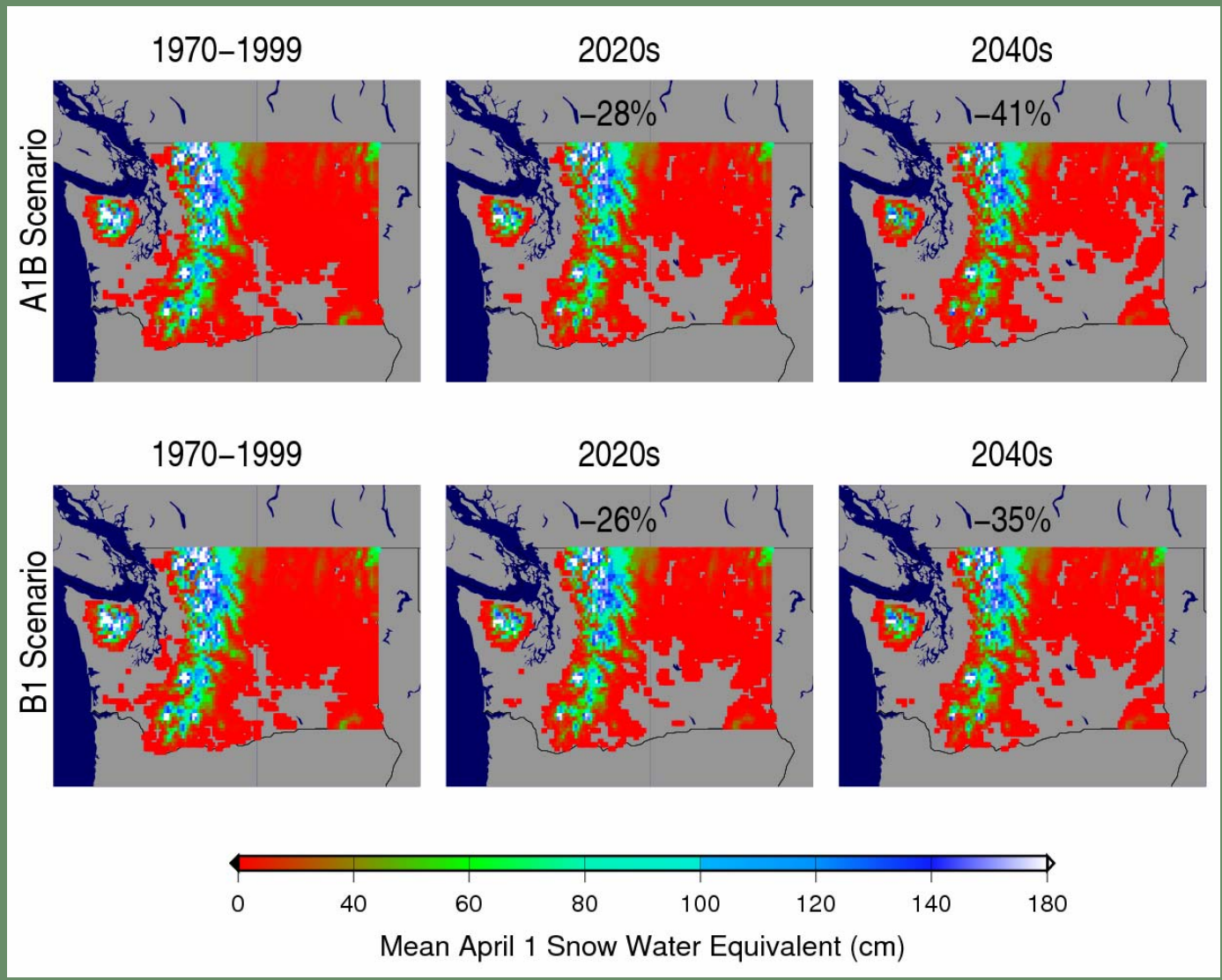
Projected Increases in PNW Temperature



Hydrology and Water Resources

Reduced snowpack and changes in soil moisture will occur.

Declines in April 1 SWE vary between 35%-41% for the 2040s, depending on the emissions scenario.



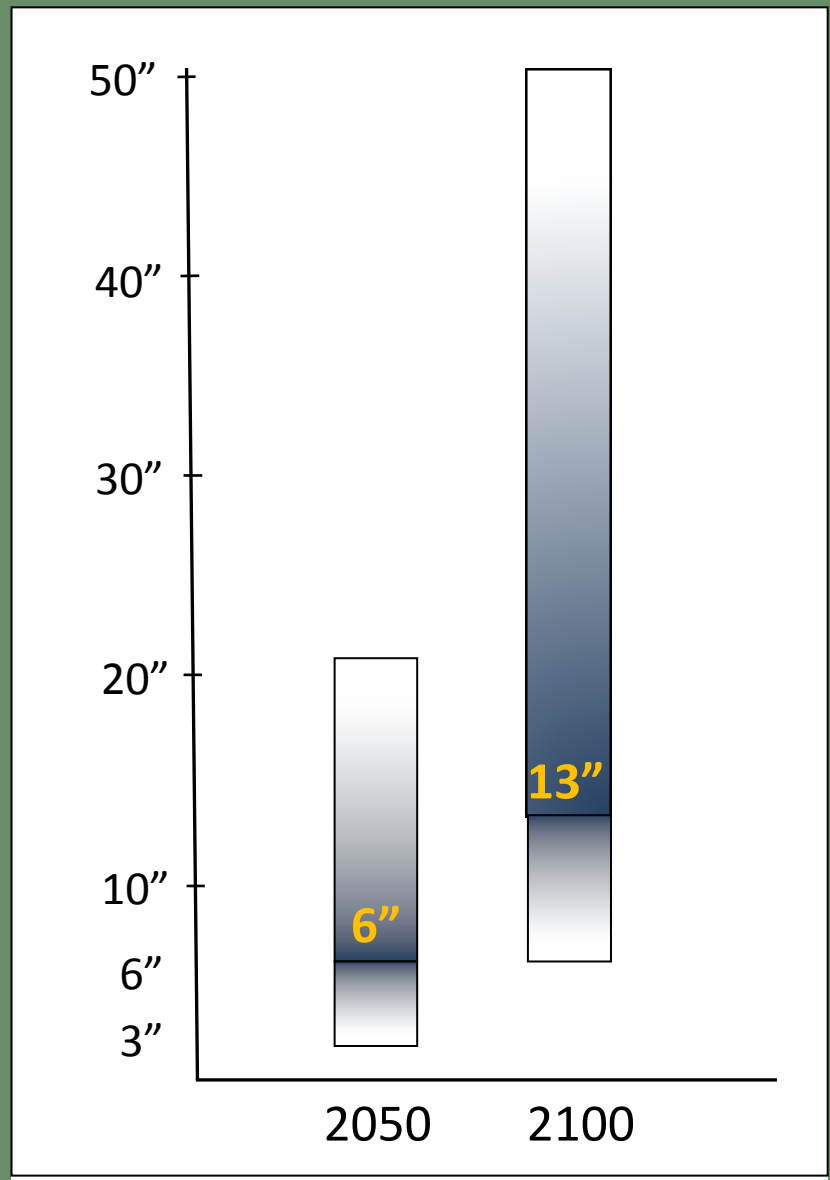
Coasts

Rising sea levels will increase the risk of flooding, erosion, and habitat loss along much of Washington's 2,500 miles of coastline.

Medium estimates of SLR for **2100:**

+2″ for the NW Olympic Peninsula
+11″ for the central/southern coast
+13″ for Puget Sound

Higher estimates (up to 4 feet in Puget Sound) cannot be ruled out.



Projected sea level rise in Washington's waters relative to 1980-99, in inches. Shading roughly indicates likelihood.

Agriculture

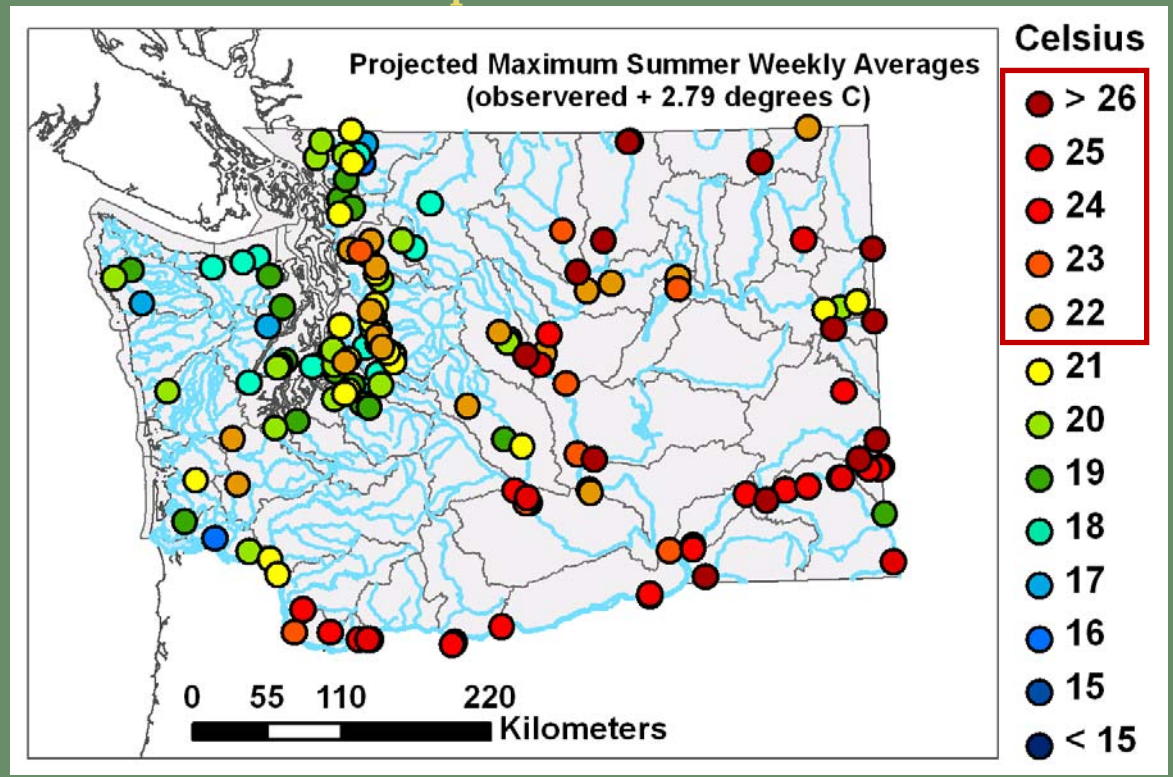
- Irrigation supplies are likely to decline significantly as a result of changes in snowpack, resulting in more frequent and more stringent prorationing of water to junior water rights holders.
- For dryland agriculture, climate change will force agricultural practices to adapt to longer growing seasons, reduced summer precipitation, and increasingly competitive weeds.
- Diseases will generally become more problematic over the next century, especially as a result of warmer temperatures.

Salmon

Water temperature is already a problem in many WA stream reaches.

Exceedences of WQ criteria for temp, especially in summer, will increase with warmer summer temperatures and reduced low flows due to earlier snowmelt.

Projected Maximum Weekly Average Water Temperatures – 2040s



49% of stations exceed the 21ºC (70°F) water quality criteria (changes relative to 2001-2007)

Forests

- Wildfires are strongly associated with climate, especially in eastside forests.
- Mountain pine beetle poses a significant threat to Washington's pine forests.
- Tree species composition will change as species respond uniquely to a changing climate.
- Productivity of Douglas-fir forests is likely to decrease statewide.

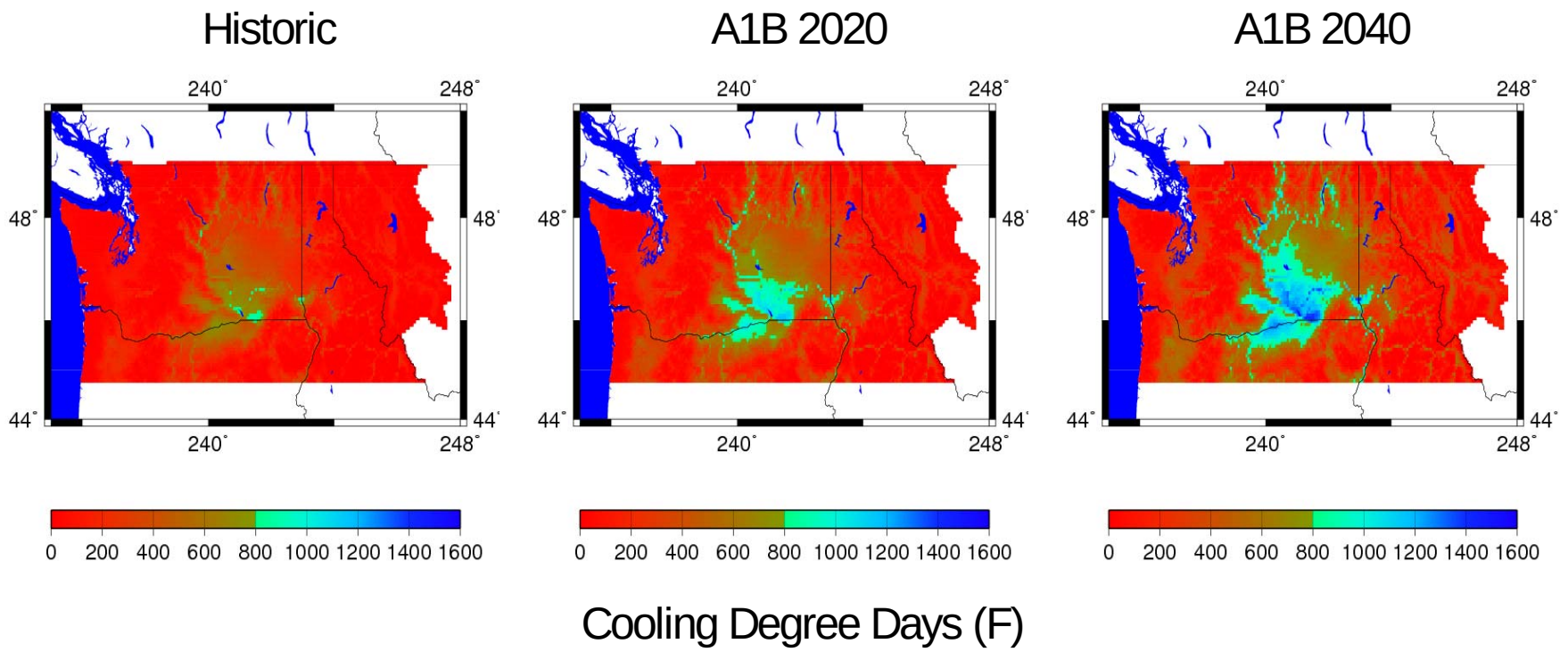
Infrastructure

- Stormwater impacts and management already carry significant economic costs for municipalities throughout western WA, as well as the rest of the state.

- The potential for changes in precipitation intensity would increase these costs.

Energy

- Heating degree days will continue to dominate in the 2020s and 2040s, but cooling degree days become a much more important factor in eastern WA as the region warms.



Human Health

- Summer heat waves are expected to increase.
- Warmer summer air temperatures are likely impact air quality, increasing ozone concentrations and fine particulates
- Increased temperatures and flooding may alter the habitat and range of disease reservoirs and vectors (e.g., mosquitoes)
- The most vulnerable populations include infants, children, the elderly, the mentally ill, and the poor

More information on the Climate Impacts Group or WA State Climate Impacts Assessment

The Climate Impacts Group

www.cses.washington.ed/cig

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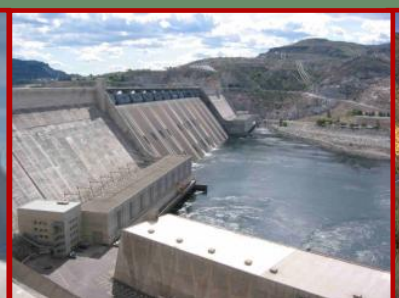

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