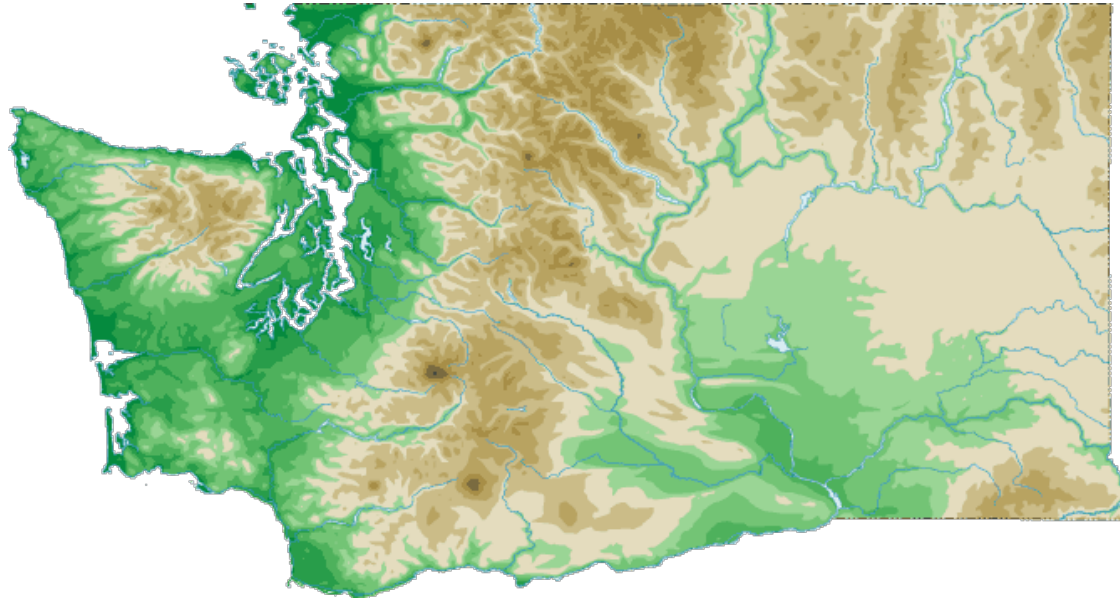


Climate Change and Public Health in Washington State



Jerrod Davis
Washington State Department of Health
September 10, 2014

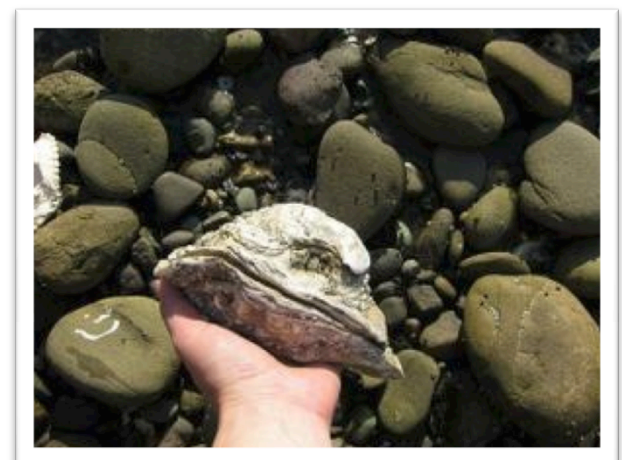
What are we observing now?

- Threats to our food supply
- Threats to our drinking water supply
- Threats to air cleanliness
- Ocean acidification

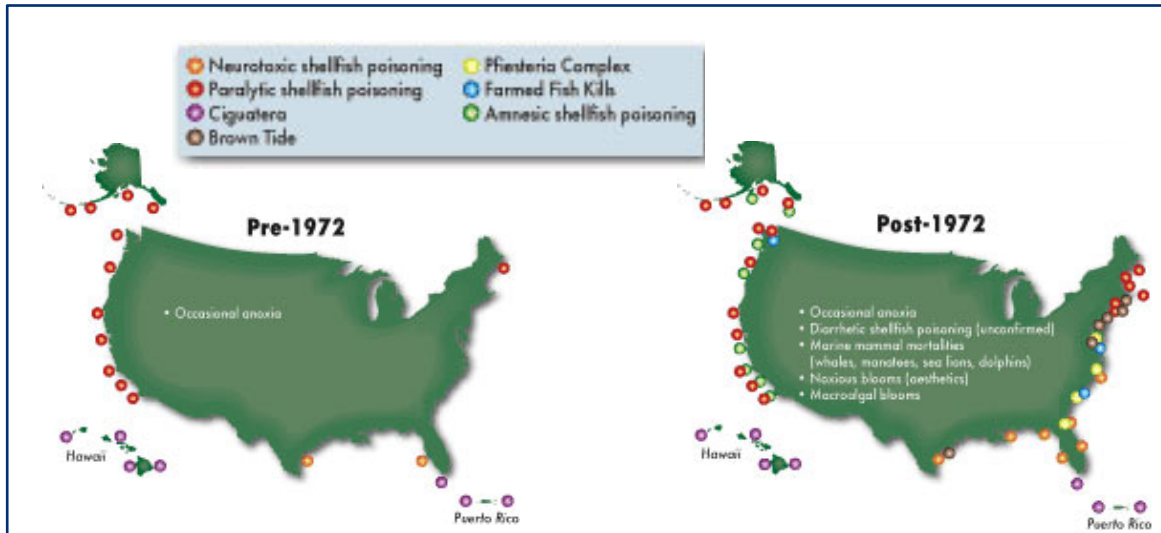


Threats to our food supply

- ❖ Shellfish: new toxins are appearing and toxic bloom season is lengthening
- ❖ Water shortages and temperatures could impact agriculture & aquaculture production and food availability (for example, CA drought)
- ❖ Water in Puget Sound is becoming too acidic for oyster shells to form properly and these conditions promote more toxic algae blooms
- ❖ The Natural Resources Defense Council's *Climate Change, Water, and Risk* report determined that 1,100 counties (1/3 of all counties in the lower 48 states) face higher risks of water shortages by 2050 due to climate change



HABs are Increasing in the United States and Around the World

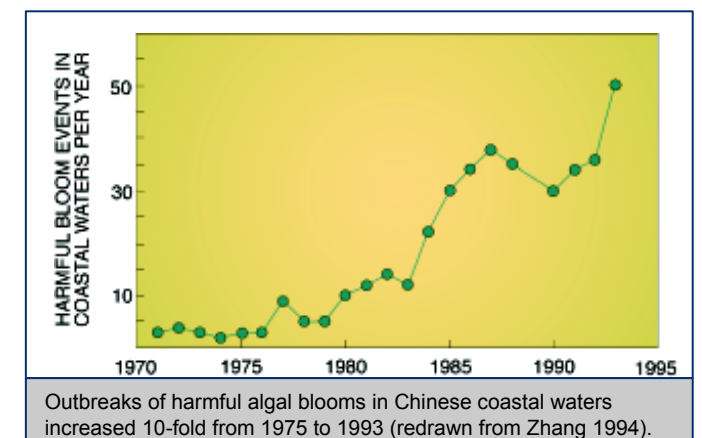
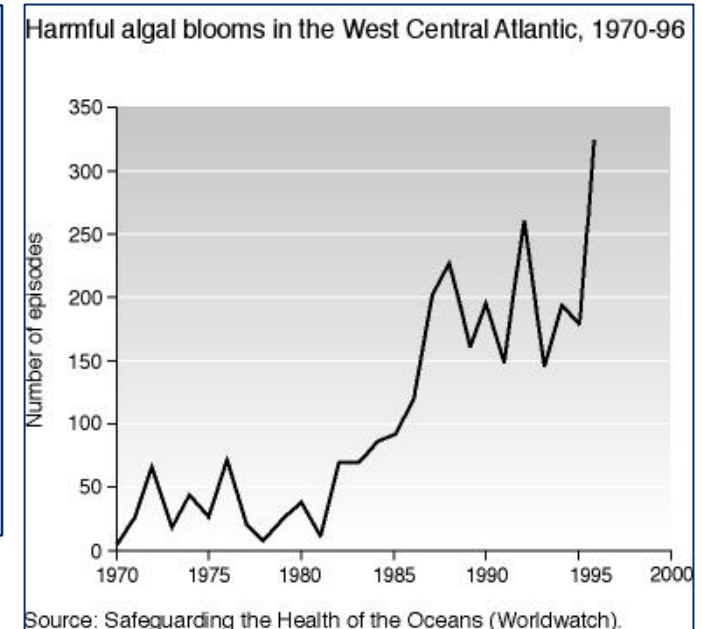


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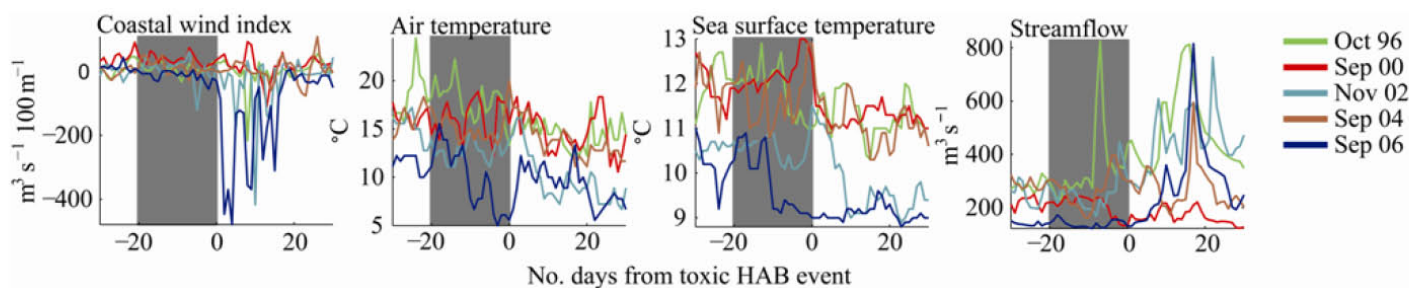
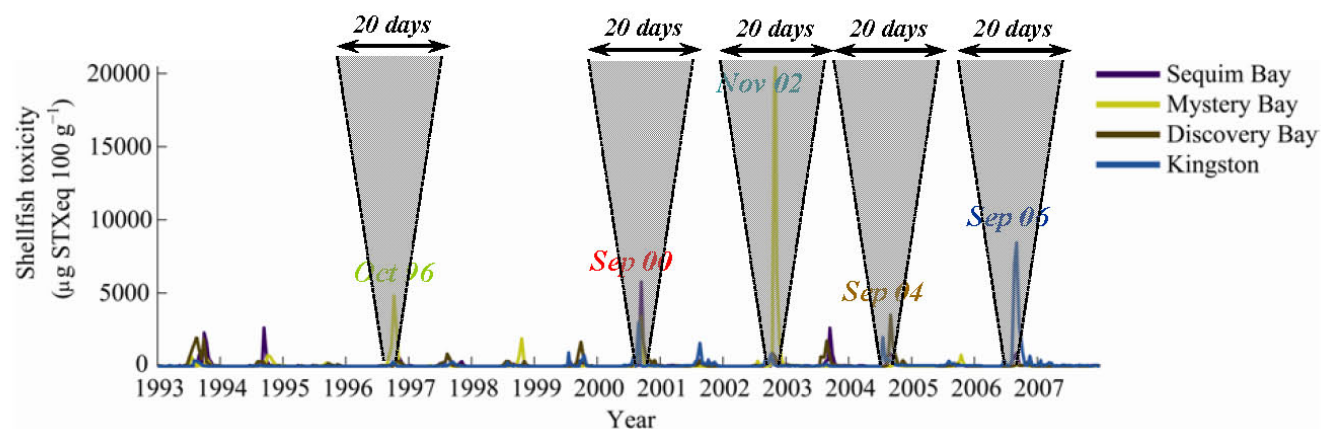
Don Anderson and Jayne Doucette, WHOI. Retrieved 13:17, January 12, 2010 from <http://www.whoi.edu/page.do?pid=23997&tid=441&cid=26891&ct=61&article=14086>

Harmful algal blooms in the West Central Atlantic, 1970-96. (2001). In *UNEP/GRID-Arendal Maps and Graphics Library*. Retrieved 19:42, June 16, 2009 from [http://maps.grida.no/go/graphic/harmful algal blooms in the west central atlantic 1970 96](http://maps.grida.no/go/graphic/harmful%20algal%20blooms%20in%20the%20west%20central%20atlantic%201970%2096).

GEOHAB, 2001. Global Ecology and Oceanography of Harmful Algal Blooms, Science Plan. P. Glibert and G. Pitcher (eds). SCOR and IOC, Baltimore and Paris. 87 pp.



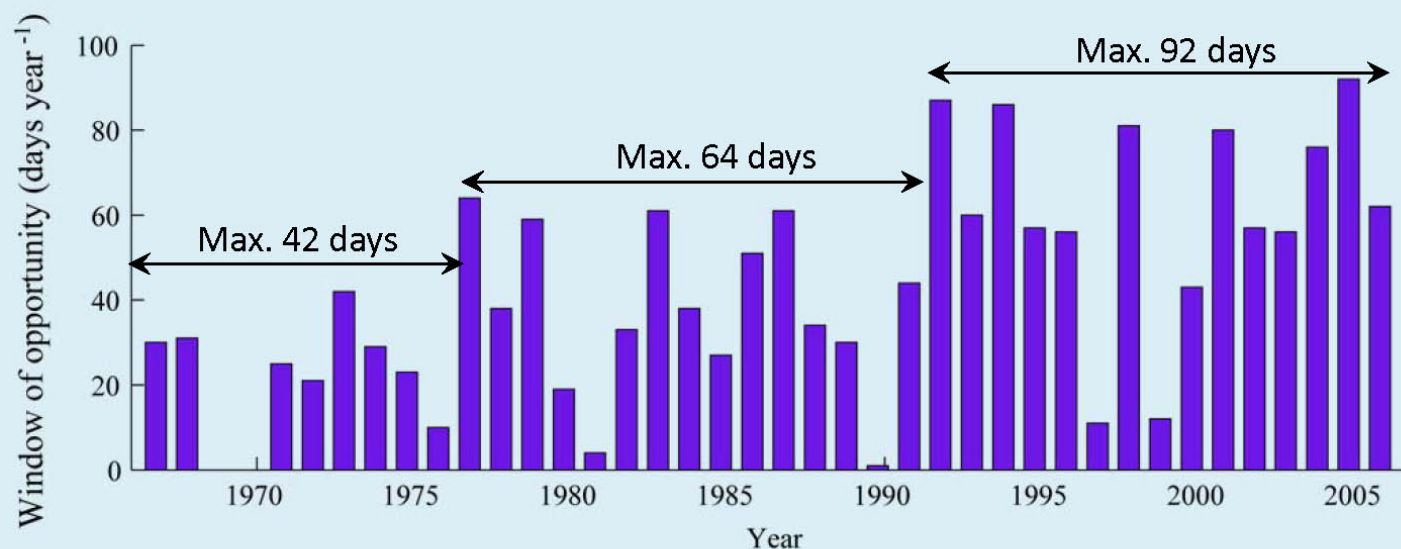
Five most toxic HAB events at hot spot sites



What did the weather and environmental parameters look like during these events?



Has the Window of Opportunity Changed in the Past?

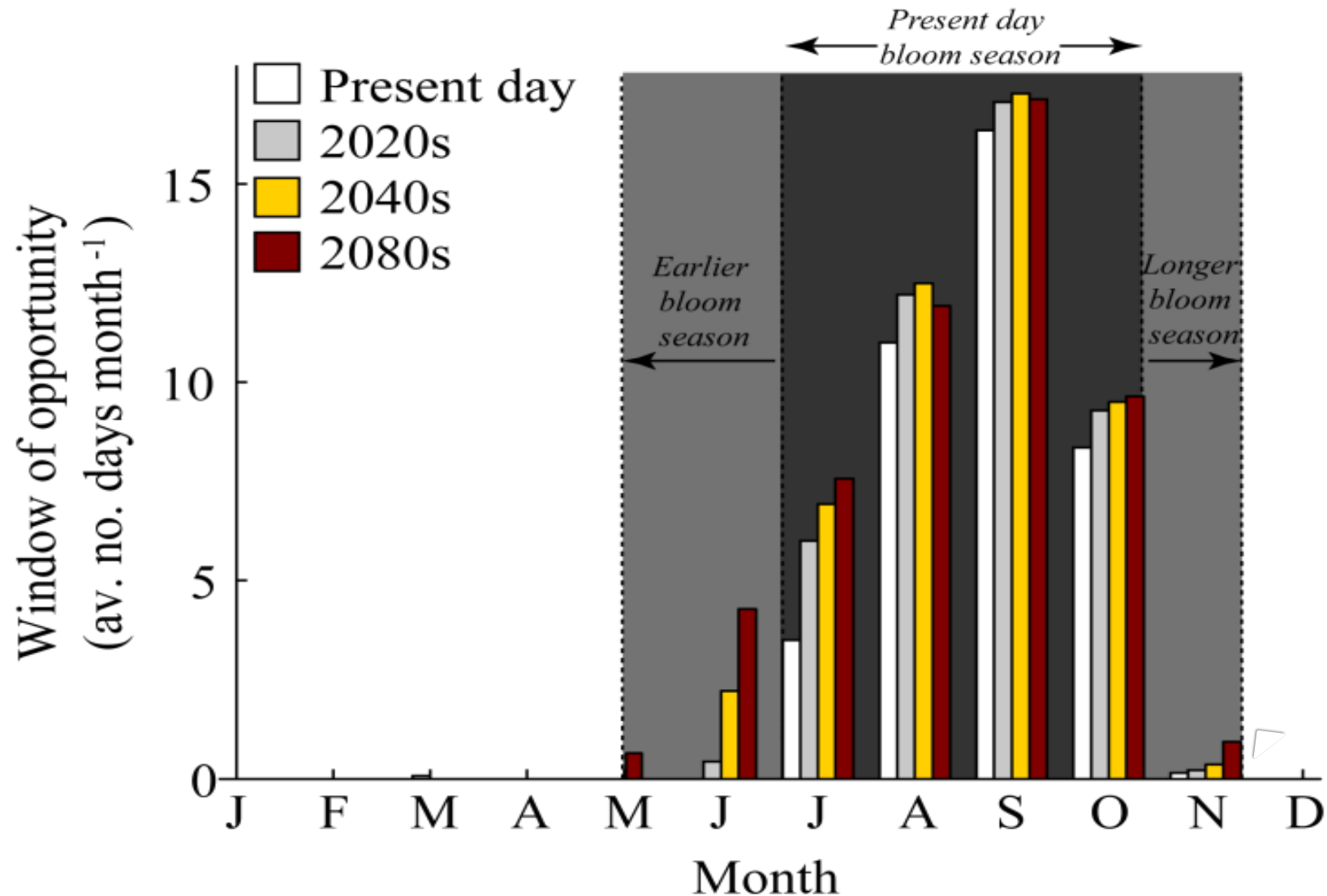


These increases occurred in “steps” in 1977 and 1991 marking new ceilings for values attained by the window of opportunity

Moore *et al.*, Submitted

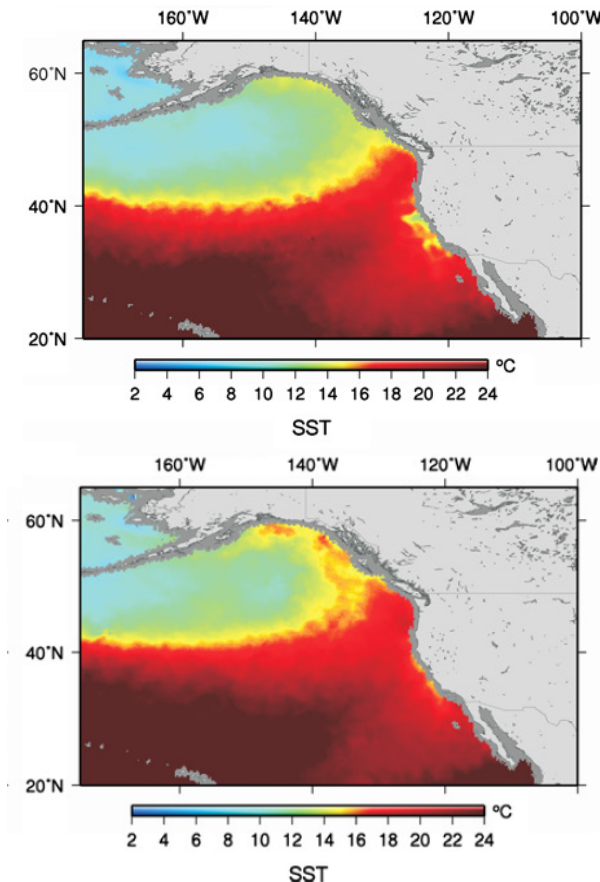


Longer Seasons for Toxic Blooms



Impacts on Shellfish

- *Vibrio parahaemolyticus*:
 - Presence in higher levels
 - Expanded seasonality
 - Expanded range
 - Emergence of new strains
- *Vibrio vulnificus*:
 - Presence in higher levels
 - Emergence of new strains
- Emergence of novel species
- Greater number of wound infections due to water exposure



Martinez-Urtaza et. al. 2010.

L. Wigand

Threats to our water supply



Decreased irrigation supply reliability

Risk of “water short year” (70% level of prorating) in the Yakima increases from 14% (1970-2005) to 32% (2020s), 36% (2040s) and 77% (2080s) (*Vano et al. 2010*)



Less summer / more winter hydropower production

Columbia River basin summer production falls -10% by the 2020s, -15% by the 2040s, -20% by the 2080s, while summer cooling demands increase up to 400% (vs. 1917-2006) (*Hamlet et al. 2010*)



Continued reliability of Puget Sound municipal drinking water supplies

Puget Sound water suppliers project sufficient supply through at least 2050. **Impacts on groundwater**

uncertain (*Vano et al. 2010, SPU*)

A. Snover

Reduced Air Quality

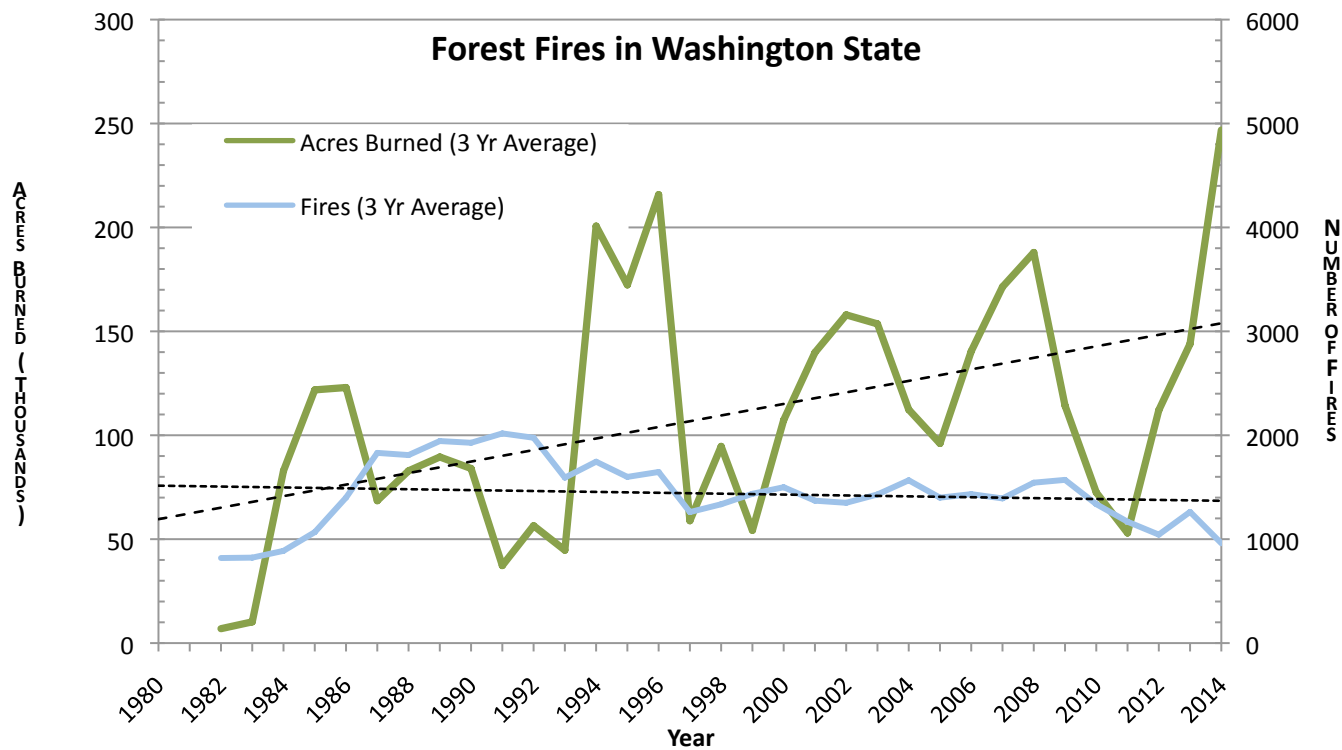
Warmer summer temperatures affect air quality via:

- Increasing wildfires
- Increase in ground-level ozone
- Longer pollination season and increase in allergy-causing proteins
- Increases potential for more cardiovascular disease, respiratory disorders (e.g. asthma), mortality



Smoke hangs heavy over the Pasayton Wilderness, creating air-related health concerns.

Forest Fires and Public Health



Forest Fires & Public Health

- Environmental Public Health's response to wildfires
 - 2014 Event (Okanogan County)
 - 45 public water systems affected, of which 16 were placed on boil-water advisories
 - 300 livestock perished in the fire, posing the issue of animal disposal
 - Of 11 large on-site sewage systems with the area, 8 were at risk
 - Some areas reached “unhealthy “ levels of air quality
 - 2012 Event
 - 350 additional hospitalizations due to breathing problems
 - 3,500 additional student absences compared to the previous year
 - 2012
- Models project increases in the future

Ocean Acidification & Public Health

- Water in Puget Sound is becoming too acidic for oyster shells to form properly
- Conditions promote more toxic algae blooms
- Negative impacts to Recreational, Commercial, and Tribal shellfish harvest



Other Public Health Impacts

- Infectious, Vector-borne, and Fungal Diseases
- Extreme Heat Events
- Flooding and Sea Level Rise
- Water/Wastewater Infrastructure
 - City of Olympia's Response to Sea Level Rise
 - King County Addresses At-Risk Structures
 - Redesigning King County's West Point Wastewater Treatment Facility

L. Wigand

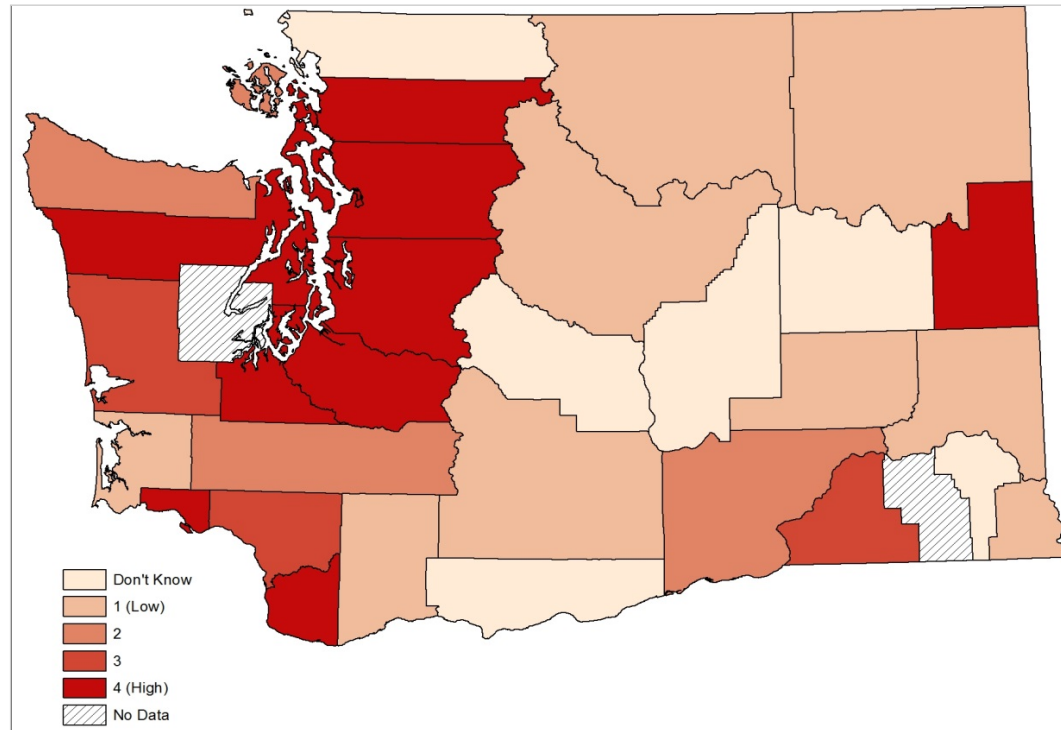
Department of Health's Response

- Formation of Cross Agency Climate Change Workgroup
- Assessment of LHJ perceptions and activities
- Develop a suite of climate change focused indicators
- Engage with Ocean Acidification mitigation efforts
- Expand current and create new partnerships
- Support Governor Inslee as member of President Obama's Task Force
- Increased outreach and education



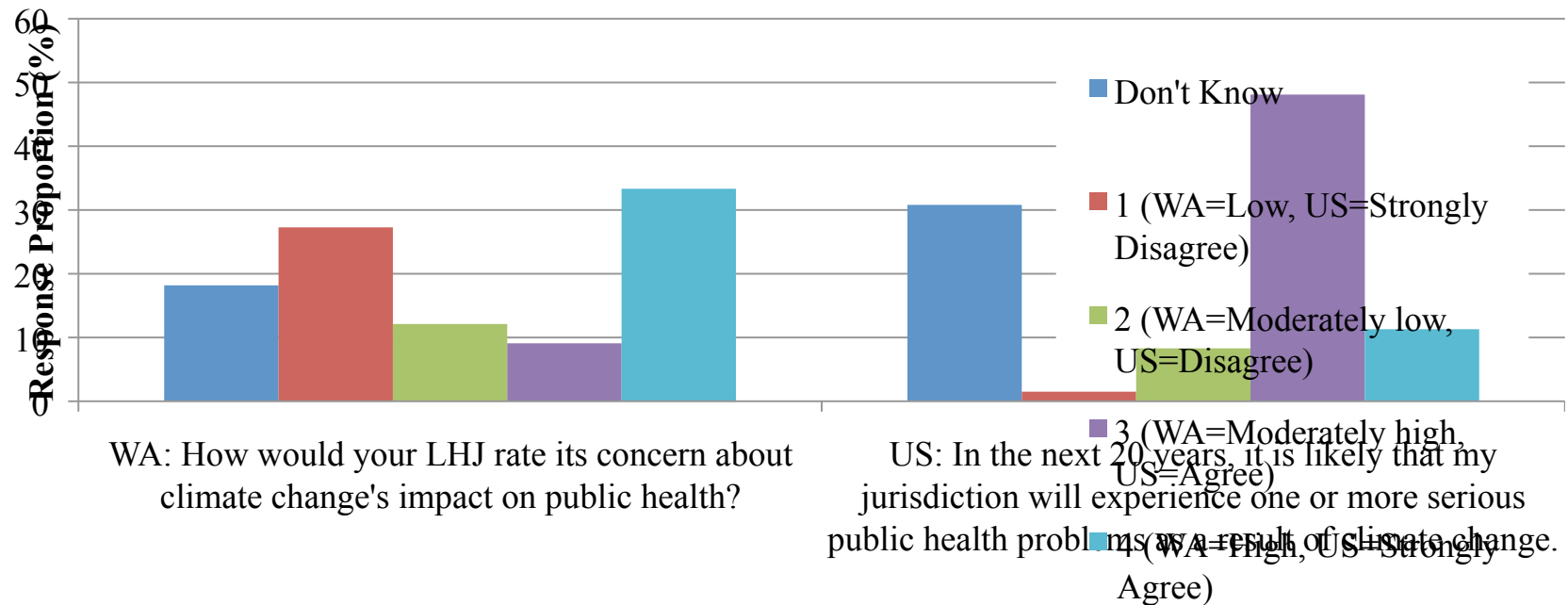
Findings

- Perceptions : How would your LHJ rate its concern of climate change's impact on public health?



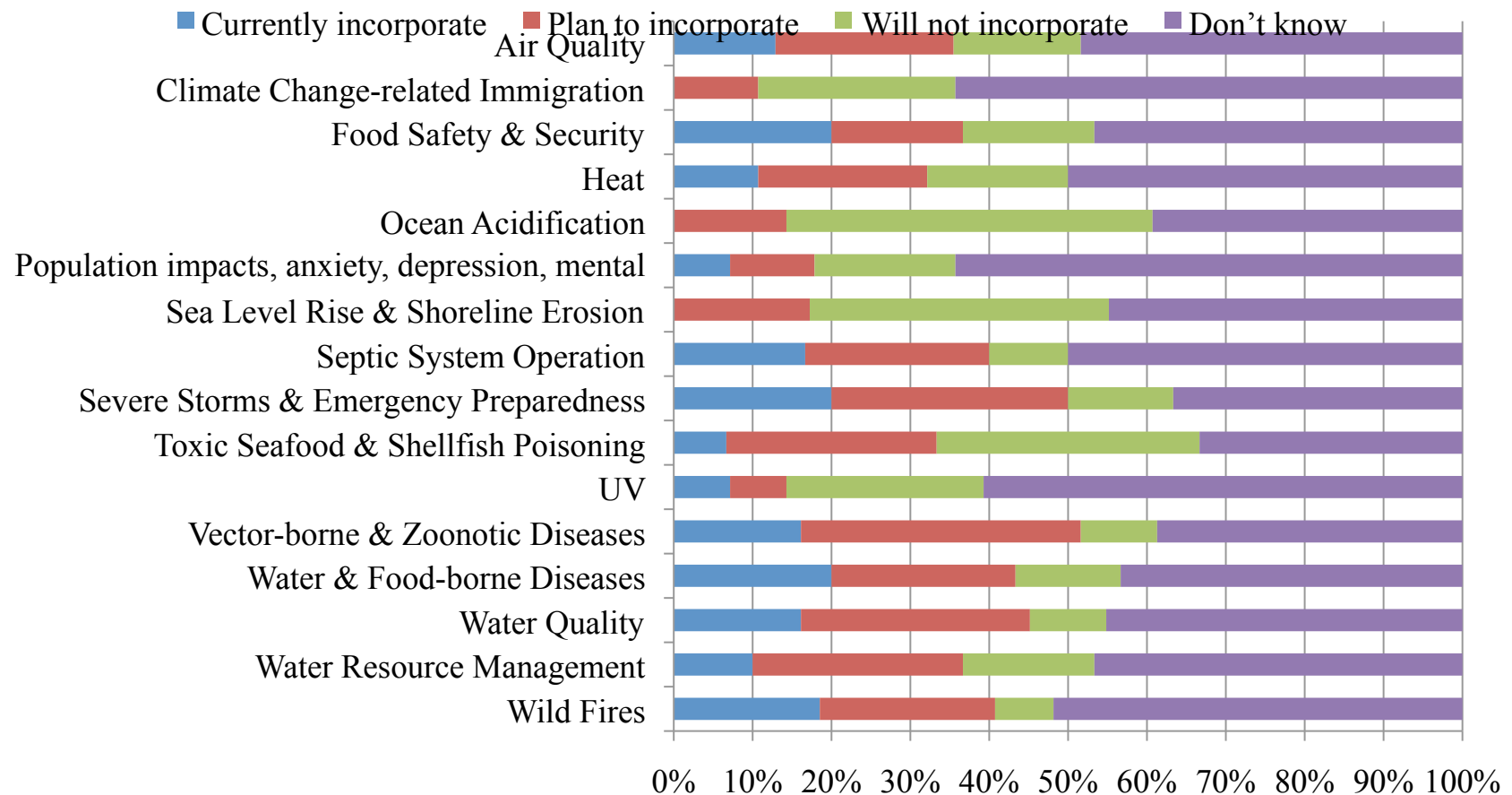
Findings

- Perceptions : Washington v. U.S.



Findings

- Activities: Issue-specific activities incorporating climate change information



Department of Health – Next Steps

- Raise Awareness
 - Compile compelling stories
- Influence Policy (internal and external)
- Reduce our carbon footprint
- Track public health indicators of climate change
- Partner with academia, researchers, and others
 - CIG/UWSPH - Heat, drinking water and shellfish
 - NOAA – early warning system to predict shellfish toxicity
 - Get economic data on public health impacts



PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND
HEALTHIER WASHINGTON

Thank you

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