



# Ocean Acidification in Washington State

## *From Knowledge to Action*

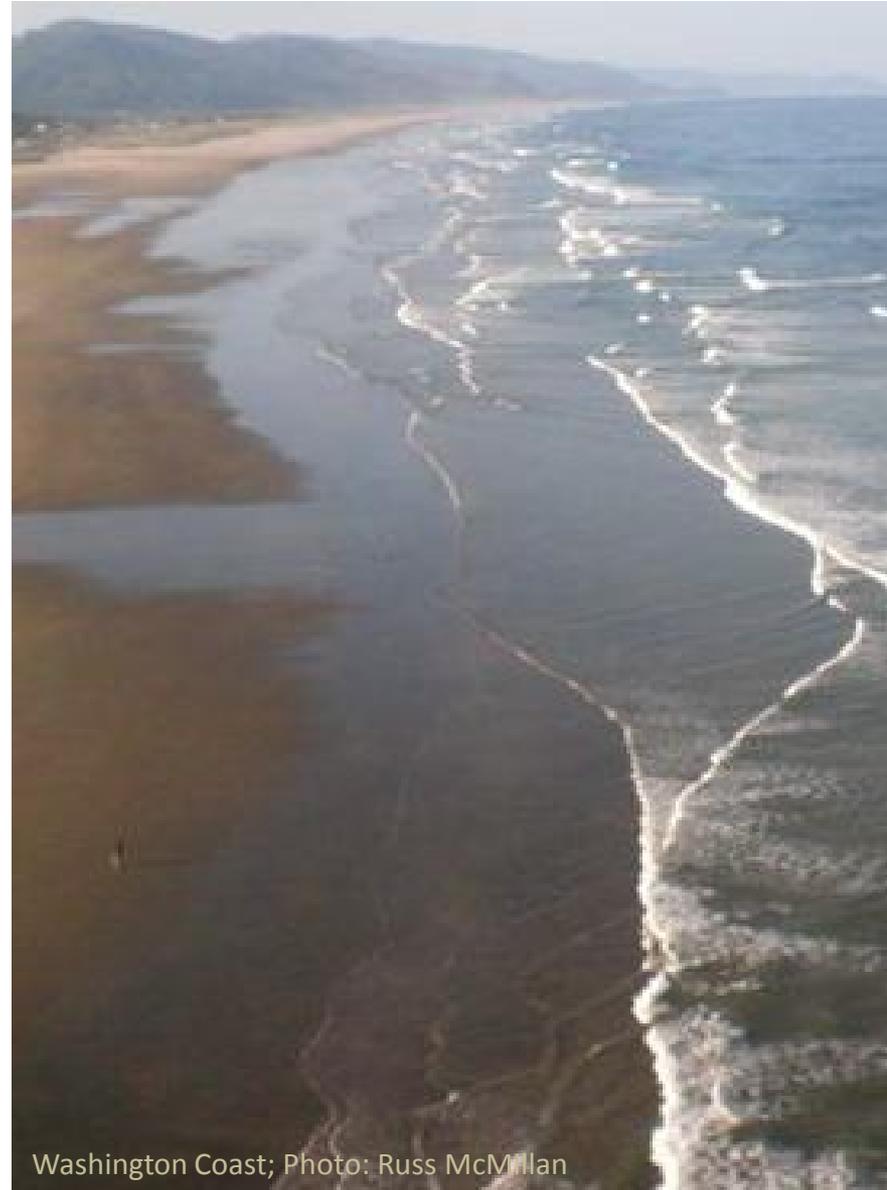
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***Washington Department of Ecology***

# Washington is Particularly Vulnerable to Acidification

A combination of regional factors can exacerbate acidification caused by global CO<sub>2</sub> emissions:

- Coastal upwelling of CO<sub>2</sub>-rich waters
- Runoff of nutrients and organic carbon from land
- Decay of organic matter in subsurface waters
- Emissions of acidifying gasses (NO<sub>x</sub> and SO<sub>x</sub>)



Washington Coast; Photo: Russ McMillan

# What's at Stake for Washington's Economy?



The most productive commercial shellfish industry on the West Coast generating \$270 million annually and accounting for almost 85% of U.S. West Coast sales (including Alaska).

Impacts to marine food webs could affect Washington's seafood industry, which generates over 42,000 jobs in Washington and contributes at least \$1.7 billion to gross state product.

# What's at Stake for Washington's Tribes?

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## Continued identity and cultural survival of Washington's coastal tribes

- Washington tribes depend upon shellfish for food, income, and connection to their cultural heritage.

# Developing the Response: The Blue Ribbon Panel on Ocean Acidification

- Convened by Governor Gregoire in Feb. 2012 under auspices of WA Shellfish Initiative
- A first-of-a-kind comprehensive state-level effort to address ocean acidification.
- Charged with reviewing the best available science, and producing recommendations to guide Washington's response.
- Scientists, decision makers, industry, tribal representatives, and conservation community representatives produced a comprehensive set of actions.



Gov. Gregoire and Bill Dewey of Taylor Shellfish Company discuss growing and harvesting techniques for oysters in the tide flats in Samish Bay.

# Washington State Panel Reports

NOAA OAR Special Report

*Washington Shellfish Initiative  
Blue Ribbon Panel on Ocean Acidification*

## Scientific Summary of Ocean Acidification in Washington State Marine Waters



*Ocean  
Editors*

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## Washington State Blue Ribbon Panel on Ocean Acidification



# Ocean Acidification: From Knowledge to Action

*Washington State's Strategic Response*

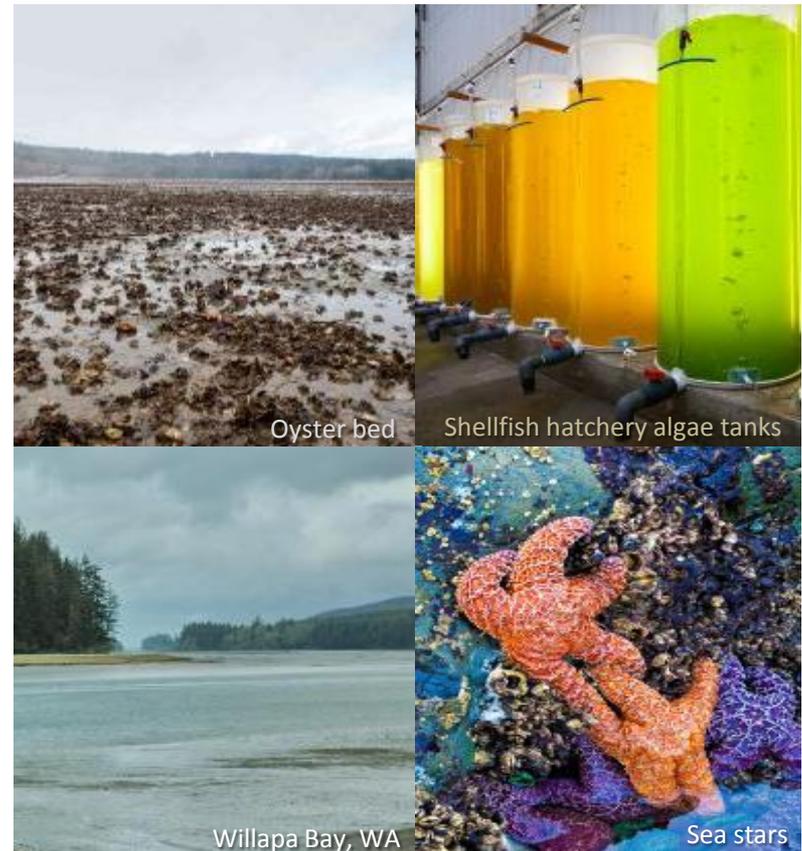


November 2012

# Panel Recommendations

42 recommendations, that will:

1. Address CO<sub>2</sub> emissions;
2. Reduce local land-based pollutants;
3. Foster adaptation and mitigation;
4. Increase research and monitoring;
5. Inform, educate, and engage the public; and
6. Maintain a coordinated focus on ocean acidification.



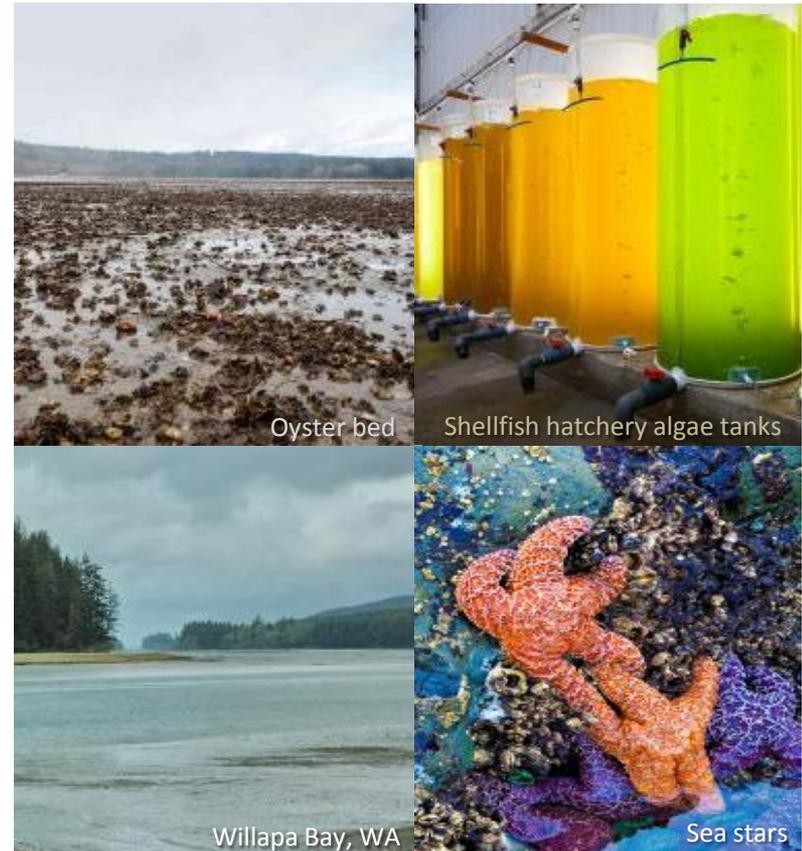
# 18 Key Early Actions

- A sub-set of Key Early Actions (KEAs) were selected based on:
  - Urgency and relative importance
  - Need to sequence actions in a particular order
- KEAs are essential next steps for reducing risks of ocean acidification
- Availability of funding or political feasibility were not considered
- KEAs are not “low-hanging fruit”



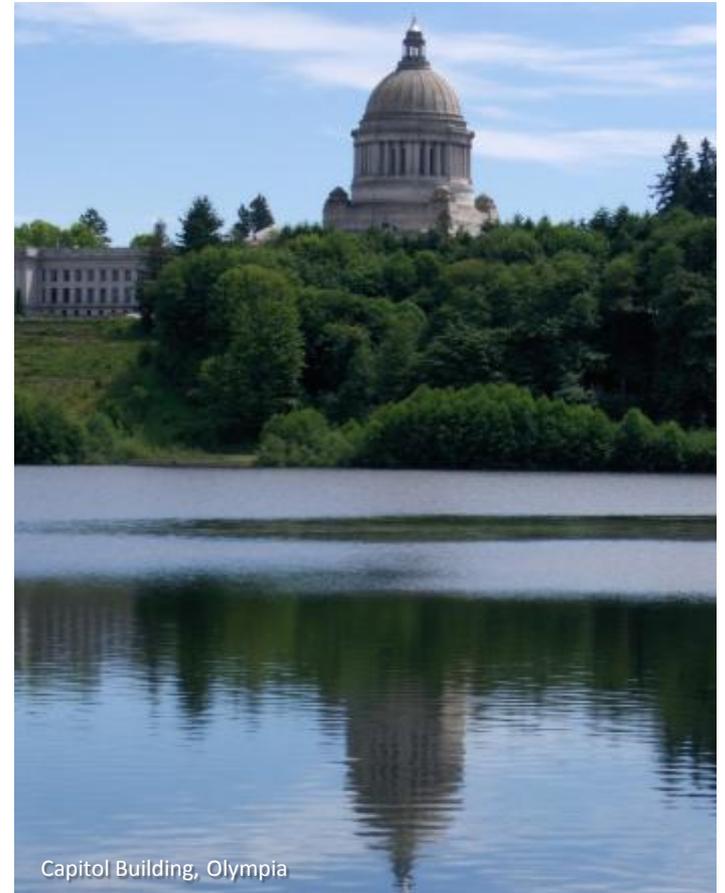
# Recommendations to Reduce Emissions of Carbon Dioxide.

- Take actions to reduce carbon dioxide:
  - Working BC, CA, and OR under Pacific Coast Collaborative on climate and energy – agreement signed 10/28/13
  - Climate Legislative and Executive Workgroup – Governor and four legislators- developing actions and policies to reduce GHG emissions
  - Governor appointment to the President’s Climate Task Force



# Recommendations to Reduce Local Land-Based Contributions

- Strengthen and augment existing pollutant reduction actions to reduce nutrients and organic carbon
- Support and reinforce planning and programs that address the impacts of nutrients
- Request EPA assess water quality criteria relevant to ocean acidification
- Adopt legislation that will allow sewer connections in rural areas



Capitol Building, Olympia

# Recommendations to Reduce Local Land-Based Contributions, cont.

- Impose stringent controls on point sources contributing significantly to acidification:
  - **If** determined necessary as result of additional research, monitoring, and modeling; and
  - Funding of advanced treatment technologies has been identified.



# Recommendations to Adapt to and Remediate the Impacts of OA

- Remediate sea water chemistry by using vegetation in upland areas and in cultivated shellfish beds to remove carbon
- Increase capacity of shellfish industry to adapt by continuing to monitor water quality
- Enhance resilience of native and cultivated shellfish by protecting and managing refuges



# Science Recommendations

- Invest in WA's ability to monitor and investigate the causes and effects of ocean acidification
  - **See the other presentation**



# Recommendations to Inform, Educate and Engage.

- Share information showing that ocean acidification is a real and recognized problem in WA
- Increase understanding among stakeholders and local communities to help implement recommendations
- Provide a forum for agricultural, business and others to engage in developing solutions
- Develop, and use curricula on OA in K-12 and higher education.



# Recommendations to Maintain a Sustainable Focus on OA

- Charge an entity to function as a “central coordinator” to:
  - Advance OA recommendations
  - Coordinate efforts by state, federal, tribal and local agencies
  - Help bridge science and policy needs
  - Coordinate with organizations in and outside WA
  - Build awareness and support
- Create an ocean acidification science coordination team to promote scientific collaboration



# Response by the Governor and Legislature

- Executive Order 12-07 – directs agencies to implement the Panel's recommendations
- Creation of Washington Marine Resources Advisory Council to coordinate and advise on ocean acidification
- Creation of Washington Ocean Acidification Center to coordinate research and monitoring and suggest strategies to mitigate local effects
- \$1.82 million funding for the Center



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Signing Exec Order 12-07, Nov 27, 2012

# Other News

## West Coast Collaboration

- MOU between California and Oregon established the West Coast Ocean Acidification and Hypoxia Science Panel:
  - Interdisciplinary West Coast Panel, includes WA and B.C.
  - Builds on the work of WA Blue Ribbon Panel
  - WA UW Center is represented

## Potential Litigation under Clean Water Act

- Center for Biological Diversity filed with EPA, in July 2013, a request for reconsideration of approval of WA and OR's lists of impaired waters lists.

# For More Information...

Washington Department of Ecology :  
<http://www.ecy.wa.gov/water/marine/oceanacidification.html>

NOAA Pacific Marine Environmental Laboratory:  
<http://www.pmel.noaa.gov/co2/story/Ocean+Acidification>