

Ocean acidification in Washington's waters

Ocean acidification is an emerging problem caused primarily by carbon from the atmosphere, and it poses a threat to Washington's economy, marine ecosystem and quality of life.

Shellfish growers were the first to experience the effects of the ocean's changing chemistry. Between 2005 and 2009, billions of oyster larvae died at Pacific Northwest hatcheries, which raise young oysters in seawater. Scientists soon identified the reason: acidic (low pH) seawater was interfering with the oysters' ability to fully form protective shells.

Ocean acidification leads to conditions that are corrosive for shellfish and other key organisms in the food chain, risking food sources for larger species such as herring, salmon and whales.

With the shellfish, fishing, and tourism industries, ocean ecosystem and cultural resources at risk, Gov. Gregoire appointed in early 2012 a Blue Ribbon Panel to study ocean acidification, making ours the first state in the nation to study this issue in depth.

The panel of policymakers and scientists reviewed the most current scientific information about ocean acidification in our state and issued recommendations in November 2012.

Why the chemistry of the ocean is changing



Oceans absorbed about 25 percent of the carbon dioxide released in the atmosphere since the beginning of the industrial era more than 250 years ago, changing the chemistry of seawater. As global carbon dioxide emissions have increased – spurred by human use of coal and oil – so too have the impacts on oceans.

Regional factors aggravate ocean acidification. A process called coastal upwelling brings cold water rich in carbon dioxide and low in pH from the deep ocean onto Washington's coast and eventually into the Puget Sound. Runoff and wastewater discharges also contribute carbon and nutrients that further worsen conditions, though to unknown degrees. The current rate of acidification is outpacing the ocean's capacity to restore its pH, giving marine organisms, marine ecosystems and humans inadequate time to adjust.

MORE INFORMATION

Ocean acidification is related to but distinct from climate change.

Ocean acidification and climate change share a common cause — increasing carbon dioxide in the atmosphere.

Climate change encompasses the effects associated with changes in the Earth's temperature, which cause global warming and changes in weather patterns.

Ocean acidification refers to the lowering of ocean pH resulting from its absorption of CO₂ released from the atmosphere. Ocean acidification does not include the warming of the ocean. (C.L. Sabine)

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From knowledge to action

Gov. Gregoire issued an executive order in response to the Panel's recommendations. Among those is the establishment of a new center at the University of Washington to better understand the sources and impacts of ocean acidification, help hatcheries forecast acidic conditions and adapt, and increase public awareness.

The most pressing recommendations are to cut our state's carbon dioxide emissions and continue a leadership role in regional, national and international emission reduction efforts. Local actions, including local source reduction and adaptation and remediation, are recommended to "buy time" while society collectively works to reduce global carbon dioxide emissions.

Gov. Gregoire proposed in her 2013-15 budget \$3.31 million as a down payment on ocean acidification strategies, including money to start the Ocean Acidification and Adaptation Center at the University of Washington.

Reducing carbon dioxide emissions

As a result of leadership in climate change, Washington already has some strategies in place to reduce emissions in Washington. Since 2005, the state has:

- Adopted clean cars and alternative fuel standards.
- Established a standard for renewable energy in Washington.
- Adopted changes in the energy code to achieve a 70 percent reduction in building energy by 2030 compared to 2006.
- Invested in green building and energy efficiency projects for public buildings and low-income properties.
- Expanded its fleet of hybrid, all-electric and alternative-fuel vehicles, which produce fewer emissions and cut fuel consumption.
- Adopted landmark legislation to end the burning of coal for power generation at the TransAlta power plant, which will lead to large reductions in carbon dioxide and other harmful gases.

These are important steps to reduce the primary cause of ocean acidification, but much more work is needed to protect Washington's resources from this threat.

More resources

Ecology's ocean acidification website:

<http://www.ecy.wa.gov/water/marine/oceanacidification.html>

The Governor's proposed budget for ocean acidification:

<https://fortress.wa.gov/ecy/publications/publications/1201018.pdf>

Ocean Acidification: From Knowledge to Action - Washington State's Strategic Response (Blue Ribbon Panel Report):

<https://fortress.wa.gov/ecy/publications/publications/1201015.pdf>

Scientific Summary of Ocean Acidification in Washington State Marine Waters:

<https://fortress.wa.gov/ecy/publications/publications/1201016.pdf>

Frequently asked questions: <https://fortress.wa.gov/ecy/publications/publications/1201017.pdf>

