

# MONITORING IN WASHINGTON MARINE WATERS

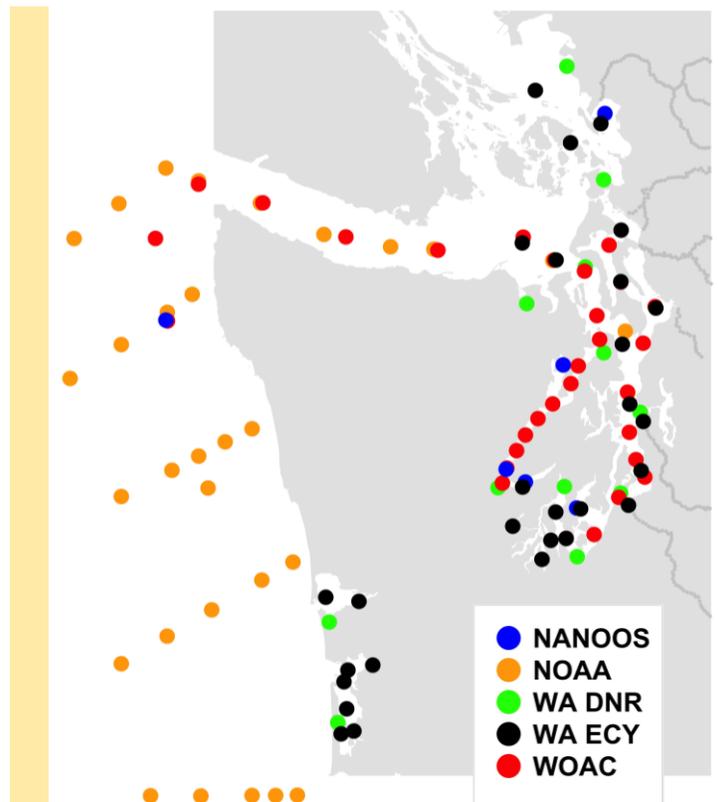
Ocean acidification conditions vary naturally from season to season and from year to year. Consistent and precise measurements are necessary to detect the creeping effects of human carbon dioxide emissions on water quality.

Ocean acidification conditions are more thoroughly monitored in Washington than in any other state – a reflection of our sensitivity to ocean acidification, and of political and scientific leadership in our region. Washington is setting the standard in monitoring ocean acidification.

## What We're Doing

In Washington, we have well-established programs that help us monitor ocean acidification:

- Scientific cruises in spring, summer, and fall integrate water sampling with biological monitoring in greater Puget Sound, led by the Washington Ocean Acidification Center (WOAC) since 2014.
- Sensors on buoys gather measurements around the clock, led by the Northwest Association of Networked Ocean Observing Systems (NANOOS) since 2014.
- Monthly expeditions sample water in greater Puget Sound, Willapa Bay, and Grays Harbor, led by the Washington State Department of Ecology since 2018.
- Sensors in nearshore areas with and without vegetation are integrated with biological monitoring in greater Puget Sound, Willapa Bay, and Grays Harbor, led by the Washington State Department of Natural Resources since 2015.
- Every other year, West Coast-wide cruises sample water off the Washington coast and into Puget Sound, led by the National Oceanic and Atmospheric Administration (NOAA) since 2007.



Ocean acidification monitoring in Washington is a highly-coordinated effort that connects chemical and biological observations and builds on decades of marine monitoring by universities and federal, state, and local governments. Partners are conducting different types of monitoring that come together to create a holistic understanding. The map above shows stations where acidification conditions are consistently measured.

## Translating Monitoring into Action

### Current work and ongoing key priorities include:

**Assisting vulnerable user groups:** Shellfish growers can use monitoring data to gauge when and where to pull water into their hatcheries and to plant juvenile shellfish into the water.

**Connecting local communities to science:** The Department of Natural Resources partners with community volunteers to monitor nearshore conditions and develop place-based and culturally relevant climate understanding.

**Indicators for public understanding:** Each year, Ecology distills monitoring data to report the number of consecutive days with surface water conditions favorable for shell building, growth, and other biological functions in species sensitive to ocean acidification. We expect this number to fall as carbon dioxide accumulates in coastal waters.

**Assessing the benefits of climate action:** In 2021, the Washington Legislature passed laws designed to reduce carbon pollution and eliminate our continuing contributions to climate change and ocean acidification. As these laws take effect alongside other state, federal, and international actions, monitoring will help us determine when the accumulation of carbon pollution in our waters begins to slow.

**Understanding impacts on fisheries:** Along with ocean warming and reductions in dissolved oxygen, ocean acidification will harm natural resources that support ways of life and healthy economies along our shorelines. When natural resources decline, a robust record of environmental conditions is essential to distinguish between potential causes and to develop solutions.

**Predicting future conditions:** Washington is lucky to have two computational models that simulate ocean acidification conditions in our region: LiveOcean and the Salish Sea Model. These models can generate projections days, or even decades, into the future and help us understand conditions prior to human impacts. Monitoring data are critical to improve the accuracy of these tools.



Ocean acidification monitoring depends on sustained investments in staff, vessels, and equipment. Support from the Washington State Legislature has allowed existing programs to expand into acidification science and report out to the public. Here, field scientists at the Department of Ecology collect water samples to measure acidification conditions.

This work supports Washington's strategy to invest in Washington's ability to monitor and investigate the effects of ocean acidification

Visit [www.oainwa.org](http://www.oainwa.org) to learn more about Washington's strategic response and the Marine Resources Advisory Council

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