

9

Maintain a Sustainable & Coordinated Focus on Ocean Acidification

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*Four Marine Resource Committees are working to restore native Olympia oysters, which are more resilient to ocean acidification.
Photo credit: Northwest Straits Commission*

Chapter 9 of the original 2012 Panel report outlined the importance of ongoing collaboration, well-coordinated strategies and actions, and efficient implementation of recommended actions. The state's effectiveness in addressing the impacts of changing ocean chemistry on Washington's marine ecosystems and coastal communities requires sustained leadership and support by the governor and other state officials and a coordinating mechanism to facilitate implementation of the Panel's recommendations. The problem should not be divorced from other ocean and coastal actions and priorities, however. The Panel's recommendations touched on a wide range of ocean and coastal activities involving multiple entities. Coordinating actions related to ocean health and coastal resources should reduce redundancies and inefficiencies. Additionally, coordination and collaboration among scientists, decision makers, and various interests should help the state address the problem.

This chapter describes accomplishments related to coordination since 2012, revised and new actions, and key next steps to continue progress in this area. Refer to Chapter 9 in the original 2012 Panel report for a full summary of why coordination measures are critical and for descriptions of each original action in this area.

9.1 Accomplishments since 2012

Creation and continued investment of the Marine Resources Advisory Council (MRAC):

The 2013 Legislature enacted Engrossed Senate Bill 5603 Section 4 creating MRAC within the Office of the Governor. MRAC's membership includes elected officials, representatives from state and federal agencies, nongovernmental organizations, academic institutions, and the private sector.

MRAC was established with the following powers and duties:

- To maintain a sustainable coordinated focus on ocean acidification
- To advise and work with the Washington Ocean Acidification Center on the effects and sources of ocean acidification
- To deliver recommendations to the governor and Legislature on ocean acidification
- To seek public and private funding resources to support the advisory council's recommendations
- To assist in conducting public education activities regarding ocean acidification

Since its inception, the council has worked to fulfill these duties, coordinating collaborative efforts across many partners, and broadly advancing ocean acidification activities across the state.

Establishment and continued investment in the Washington Ocean Acidification Center (WOAC):

The 2013 Legislature also established and funded WOAC to connect researchers, policymakers, industry, and others across Washington. WOAC advances the science of ocean acidification and provides a foundation for proactive strategies and policies to protect marine ecosystems and the people connected to them. WOAC is charged to lead the state in five priority areas of ocean acidification research:

1. Establish an expanded and sustained ocean acidification monitoring network to measure trends in local acidification conditions and related biological responses. This monitoring will allow detection of local acidification conditions and increase our scientific understanding of local species responses.
2. As part of the monitoring network, ensure continued water quality monitoring at the six existing shellfish hatcheries and rearing areas to enable real-time management of hatcheries under changing pH conditions. The monitoring data have enabled hatchery operators to avoid drawing acidified water into the hatcheries and rearing areas.
3. Establish the ability to make short-term forecasts of corrosive conditions for application to shellfish hatcheries, growing areas and other areas of concern. A real-time online tool has been developed and is accessible to shellfish growers and managers to track acidification on a scale of days to weeks, giving them time to change or adjust their hatcheries' operation.
4. Conduct laboratory studies to assess the direct causes and effects of ocean acidification, alone and in combination with other stressors, on Washington's species and ecosystems. The studies focus on determining the biological responses of species of ecological, economic, and cultural significance to a full suite of stressors to which they are exposed, and will help estimate the genetic potential of these species to adapt to ocean acidification.
5. Investigate and develop commercial-scale water treatment methods or hatchery designs to protect larvae from corrosive seawater. Scientists from the University of Washington (UW) will help shellfish growers assess the effectiveness of the adaptation measures.

WOAC achieves these goals and others by:

- Bringing a regional focus to research priorities and serving as a regional hub for research endeavors
- Training the next generation of scientists, managers, and decision makers to face the challenges posed by ocean acidification
- Using a distributed network model of organization to join the expertise of UW scientists with that of other regional academic institutions, agencies, and organizations
- Engaging with industry representatives, state, local, federal, and tribal policy makers, and public opinion leaders through specific activities and through the formation of an advisory board and a science advisory team, both of which are being used to help guide the activities of WOAC
- Engaging the global research community and elevating ocean acidification science through its participation in international symposia



Representatives from the Washington Governor's Office joined other government and affiliate members of the OA Alliance at UN Headquarters June 5-9, 2017 in New York to attend The Oceans Conference. Photo credit: International Alliance to Combat Ocean Acidification



The World Ocean Summit has traditionally focused on financing and investing in our ocean resources. In 2017, the summit agenda featured an impressive suite of panels on climate impacts to the ocean, climate change risk and financing, and de-carbonization in shipping. Washington Governor Jay Inslee provided remote remarks and Washington's Chief Budget writer, David Schumacher, participated on a panel to discuss the economic risk of ocean acidification to Washington state. Photo credit: International Alliance to Combat Ocean Acidification

Participation in local, regional, and international efforts to address ocean acidification:

While advancing important work at home and leading by example in taking action at the state and local levels, Washington state, through the Governor's Office, MRAC, WOAC, and state agencies, has also emerged as a leader in several regional and international efforts to address ocean acidification. These include:

- **Washington Shellfish Initiative:** The Washington Shellfish Initiative is a powerful partnership between state and federal government, tribes, the shellfish aquaculture industry, and non-government entities to promote critical clean-water commerce, elevate the role that shellfish play in keeping our marine waters healthy, and create family wage jobs. In 2011, following the launch of the National Shellfish Initiative under former Governor Gregoire's leadership, Washington was the first state in the nation to establish a shellfish initiative to advance the state's shellfish goals. Governor Jay Inslee reaffirmed the importance of the initiative when he launched Phase 2 of the Initiative in 2016.
- **Pacific Coast Collaborative:** The Pacific Coast Collaborative (PCC), representing California, Oregon, Washington, and the Canadian province of British Columbia, was formed in 2008 when the leaders of the participating states and province agreed to work together on energy, climate, ocean health, and other issues as a region. They have been addressing the causes and effects of ocean acidification since 2010. With large-scale oyster hatchery losses in 2007 and 2008, the West Coast has experienced some of the earliest and clearest impacts of acidification in West Coast marine waters. Early efforts by PCC jurisdictions brought together leading scientists, policy makers, tribes and First nations, other government agencies, and non-governmental organizations to address ocean acidification. PCC representatives have been the first to bring ocean acidification into the spotlight as an issue worthy of international dialogue at several United Nations, climate change conferences, including COP 21 in Paris, COP 22 in Marrakesh, and COP 23 in Bonn.
- **West Coast Ocean Acidification and Hypoxia Science Panel:** From 2013 to 2016, following on the success of the Panel, the California Ocean Science Trust convened the West Coast Ocean Acidification and Hypoxia Science Panel, comprised of 20 leading experts. The Panel developed a body

of products that serve as a scientific call to action, synthesizing the state of knowledge and identifying science-based options to address ocean acidification and hypoxia at the regional and local levels.

- **International Alliance to Combat Ocean Acidification:** In 2016, to advance local and regional strategies to a global scale, the Pacific Coast Collaborative formed the International Alliance to Combat Ocean Acidification (or OA Alliance). Members of the OA Alliance are committed to working collaboratively to bring awareness to the issue of ocean acidification and to taking individual actions that address the environmental and economic threat posed by ocean acidification within their region by creating their own unique Ocean Acidification Action Plan. Alliance members span multiple levels of jurisdictions – from cities to nations – and include Chile, France, New York, Washington, Oregon, California, British Columbia, and several Washington-based tribes.
- **Participation in other regional ocean planning partnerships:** The West Coast Regional Planning Body, formed in 2015, is a partnership between 13 federally-recognized tribal governments, U.S. federal agencies, and the states of Washington, Oregon, and California. The planning body is focused on coordinating ocean planning efforts and facilitating data- and information-sharing across West Coast ocean managers and stakeholders, including efforts and information that relate to ocean acidification. The West Coast Ocean Partnership, also comprised of federal, state and tribal representatives, facilitates ocean planning dialogue and manages the West Coast Ocean Data Portal, which links together existing data systems to provide an easy-to-use gateway to discover ocean and coastal information.
- **Supporting other jurisdictions in developing ways to address ocean acidification:** Washington state is a leader in the country and around the world in working to address ocean acidification. Several other states have looked to Washington's efforts as a template for developing a strategy to address ocean acidification in their marine waters, including Maine. Washington's role has helped establish the Pacific Coast Collaborative and researchers, industry representatives, and managers from the state as leaders integrated into national and international research and planning efforts related to ocean acidification.

More on the International Alliance to Combat Ocean Acidification (OA Alliance)

Since 2016, the OA Alliance – created by leaders from Washington's ocean acidification community – has brought together jurisdictions across the globe to combat ocean acidification and changing ocean conditions as an immediate and critical threat to coastal economies and ocean ecosystems. It invites individual members, both governments and affiliates, at all stages of learning about and responding to ocean acidification.

At the United Nations Conference to Implement Sustainable Development Goal 14 (Oceans Conference) hosted in June 2017 in New York, the OA Alliance – joined by representatives from the Washington Governor's Office – registered a voluntary commitment to the implementation of UN Sustainable Development Goal 14.3, addressing ocean acidification and the threats it poses.

As it continues to build momentum, the OA Alliance will work to advance scientific understanding of ocean acidification, take meaningful actions to reduce causes of acidification, protect the environment and coastal communities from impacts of a changing ocean, expand public awareness and understanding of acidification, and build sustained support for addressing this global problem.

It will also work in support of inclusion of ocean health and ocean acidification mitigation, adaptation and resiliency strategies in international climate agreements.

- Leveraging our resources and securing public and private funds to implement effective strategies: MRAC is focused on how best to efficiently leverage resources, both money and people, to ensure action on ocean acidification moves forward. Collaboration through MRAC has allowed parties to identify opportunities to work together and leverage resources. This has led to increased monitoring trips, with multiple agencies and scientists coming together to conduct research and collect information. Beyond sharing of data, working groups have formed to focus on implementing key actions called out by the Panel. MRAC and its partners have also been effective at leveraging state funds to secure additional funding from the private sector. State funds have been the incentive to get projects off the ground, and after demonstrating success, leverage additional funding.

9.2 Updated Actions

Specific revisions to the Panel’s 2012 action language are underlined for easy reference.

Action	Original Language	Updated Language	Rationale
9.1.1	Charge, by gubernatorial action, a person in the Governor’s Office or an existing or new organization to coordinate implementation of the Panel’s recommendations with other ocean and coastal actions	<u>Continue to</u> coordinate, <u>through the Marine Resources Advisory Council</u> , implementation of the Panel’s recommendations with other ocean and coastal actions	<ul style="list-style-type: none"> • Clarifies language to note that MRAC leads the coordination around implementation of the Panel’s recommendations
9.1.2	Create an ocean acidification science coordination team to promote scientific collaboration across agencies and organizations and connect ocean acidification science to adaptation and policy needs	<u>Continue operation of the Washington Ocean Acidification Center to act as the state’s</u> ocean acidification science coordination team to promote scientific collaboration across agencies and organizations and connect ocean acidification science to adaption and policy needs	<ul style="list-style-type: none"> • Clarifies language to note WOAC is established as an ocean acidification science coordination team

9.3 New Actions

Action	Language	Rationale
9.1.3	Coordinate Washington's efforts to address ocean acidification with those of other regional, domestic, and international groups	<ul style="list-style-type: none">• As Washington has solidified our role as leaders in the ocean acidification conversation, it has become increasingly apparent that we have much to offer at broader scales beyond just our state• The new action helps formalize our commitment to a continuing engagement in local, regional, and international efforts to address ocean acidification

9.4 Continuing Progress

In reviewing accomplishments and updated and new actions, the following were identified as key steps to continue progress related to sustaining a coordinated focus on ocean acidification over the next five years:

- Continue maintenance of MRAC and its efforts to identify and secure funds for ocean acidification-related priorities in Washington state
- Continue operations and research support through WOAC
- Continue coordination and collaboration with the PCC, the OA Alliance, and Maine Ocean Acidification Commission, among others

Making connections from local to global for ocean acidification data

Since 2013, WOAC has worked closely with the NOAA-funded Northwest Association of Networked Ocean Observing Systems (NANOOS), part of the U.S. Integrated Ocean Observing System, to expand and sustain the Pacific Northwest's own ocean acidification monitoring network to measure trends in local acidification conditions and related biological variables. This collaboration has enabled data access for PNW stakeholders and at the same time extended benefits beyond the region to a global network, the Global Ocean Acidification Observing Network (GOA-ON).

WOAC has coordinated and supported regional cruises, moorings, and nearshore monitoring throughout Washington's marine waters, including at shellfish sites, to measure physical, chemical, and biological variables relevant to OA. WOAC and its partners directly benefit from the federally-funded and user-friendly data portal "NVS" that NANOOS provides (www.nanoos.org) for visualizing and downloading data, some of which are transmitted in near real-time. The portal also delivers the WOAC-funded LiveOcean forecast model output, with the ability to compare model output to buoy data. Multiple regional entities provide data to this ocean data hub and collaborate with WOAC, including the Olympic Coast National Marine Sanctuary, the NOAA Pacific Marine Environmental Laboratory, Padilla Bay National Estuarine Research Reserve, Washington Departments of Ecology, Health, and Natural Resources, King County, Northwest Indian College, Seattle Aquarium, Taylor Shellfish,

Penn Cove Shellfish, Oregon Health and Science University, and Western Washington University, among others. Because the NANOOS data portal is part of the U.S. Integrated Ocean Observing System (IOOS) it is interoperable with and discoverable from national IOOS data holdings, including a NOAA-funded west-coast wide collaboration among Alaska, Washington, Oregon, California, and British Columbia, Canada (www.ipacoa.org) focused on OA data that NANOOS leads. WOAC leadership coordinates these efforts with the West Coast Ocean Acidification and Hypoxia Task Force, sponsored by Pacific Coast Collaborative, and WOAC is a contributing partner.

WOAC serves as a liaison to GOA-ON, ensuring that the broader ocean dataset is available across the world. Via WOAC leadership, the NANOOS system has been adapted to provide GOA-ON with a global data portal (www.goa-on.org), enabling OA data availability on local through global scales. This is critical for understanding ocean acidification, a global issue with locally-diverse responses. WOAC and U.S. West Coast leadership on ocean acidification have been recognized world-wide and is a clear benefit of Washington's investment. Further, WOAC is a science support partner with the International Alliance to Combat Ocean Acidification, relating OA information from Washington and the West Coast, and provides coordination with GOA-ON. WOAC participates in global-scale events to relate the success and progress Washington has made within this context.