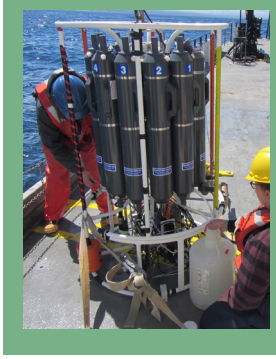
Oregon Ocean Acidification and Hypoxia

Action Plan

2019 - 2025



About this Document

This ***Oregon Ocean Acidification and Hypoxia Action Plan*** was developed in recognition of the impacts that we see today, in hopes of minimizing the impacts for tomorrow, and to alter the trajectory of ocean changes for future generations - for Oregon, the Nation, and the world.

Oregon's OAH Action Plan, as adopted by Governor Brown, will guide Oregon's efforts and become Oregon's submission to the ***International Alliance to Combat Ocean Acidification***, and thus will be shared with the region and world. Because Oregon is one of the first states to feel the impacts of OAH, it is our hope that these actions can serve as a model for others to apply to their own geographical and political context. This work will also help demonstrate that local actions are meaningful in fighting the global challenges of climate and ocean changes.

For electronic copies of Oregon's Action Plan visit the OAH Council's website:
oregonocean.info/index.php/ocean-acidification

For printed copies of Oregon's Action Plan please contact:
Oregon Department of Fish and Wildlife • Marine Resources Program
2040 Marine Science Drive • Newport, OR 97365 • (541) 867-4741

KATE BROWN
Governor

August 19, 2019

Dear fellow members of the International Alliance to Combat Ocean Acidification:

With this letter, Oregon hereby presents the Ocean Acidification and Hypoxia Action Plan, as developed by the Oregon Ocean Acidification Coordination Council. Oregon endorses the Alliance's Global Call to Action, and commits to advance key goals that:

- Advance scientific understanding of ocean acidification.
- Reduce the causes of acidification.
- Protect the environment and coastal communities from the impacts of a changing ocean.
- Expand public awareness and understanding of acidification.
- Build sustained support for tackling this global problem.

This action plan is intended to provide guidance and policy directives to state agencies and local governments on the frontlines of combatting ocean acidification and hypoxia. I urge state agencies to consider and integrate the relevant recommendations within Oregon's Ocean Acidification and Hypoxia Action Plan into current management strategies by:

- Evaluating potential management and data gaps for ocean acidification and hypoxia,
- Incorporating funding needs for ocean acidification and hypoxia into 2021-2023 budgeting, and
- Promoting intra-agency communication and collaboration on projects and actions identified in the action plan.

Oregon is proud to submit our Ocean Acidification and Hypoxia Action Plan, and looks forward to leveraging current and future partnerships to combat the impacts of climate change on our lands, oceans, and people.

Sincerely,

Kate Brown

Governor Kate Brown

GKB:jm,kl

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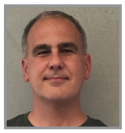

Dr. Kristen Sheeran, Ex-Officio
Governor's Natural Resources Office, Governor Kate Brown

Oregon Coordinating Council on Ocean Acidification and Hypoxia

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For electronic copies of these appendices, visit the Council's website: oregonocean.info/index.php/ocean-acidification

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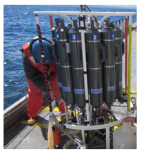
Executive Summary

Oregon OAH Action Plan

The Oregon Ocean Acidification and Hypoxia (OAH) Action Plan outlines actions that Oregon will take to adapt to and mitigate OAH impacts. Through this Action Plan, Oregon joins British Columbia, Washington, California, and other global partners in our commitment to building solutions for OAH impacts to better prepare for the future. Every action requires state leadership and resources to implement projects that lead to better understanding of OAH and to adaptation and mitigation steps. Broad partnerships with all Oregonians are essential to the success of this Action Plan.

Here are 5 ACTIONS the State of Oregon has identified to address OAH impacts over the next six years



1) Advance scientific understanding to address OAH vulnerabilities

- Invest in Oregon's existing research sites and tools
- Invest in monitoring of ocean life
- Assess the socio-economic impacts of OAH in Oregon

2) Develop and use strategies to reduce causes of excess CO_2 and other causes of OAH

- Enhance local and global communication networks working on CO_2 reduction
- Support research on effective and efficient ways to reduce excess CO_2 and OAH stressors
- Implement measures to reduce excess CO_2 and OAH stressors in Oregon

3) Support resilience to OAH in Oregon's ecosystems and communities

- Support data collection, synthesis, and modeling
- Restore, protect, and sustain native shellfish stocks and submerged aquatic vegetation
- Develop Best Management Practices based on current ecosystem and economic research

4) Share OAH science, impacts, and solutions to raise awareness

- Build OAH communications plan and outreach materials
- Provide timely updates to Oregon's decision-makers and affected communities
- Evaluate the effectiveness of OAH communications

5) Build sustained support and mobilize agencies to address OAH

- Governor issues a 2019 policy to address Oregon's OAH priorities
- Leadership, coordination, and policy guidance by Governor's Natural Resource Office
- Oregon agencies work to fill gaps in State OAH efforts

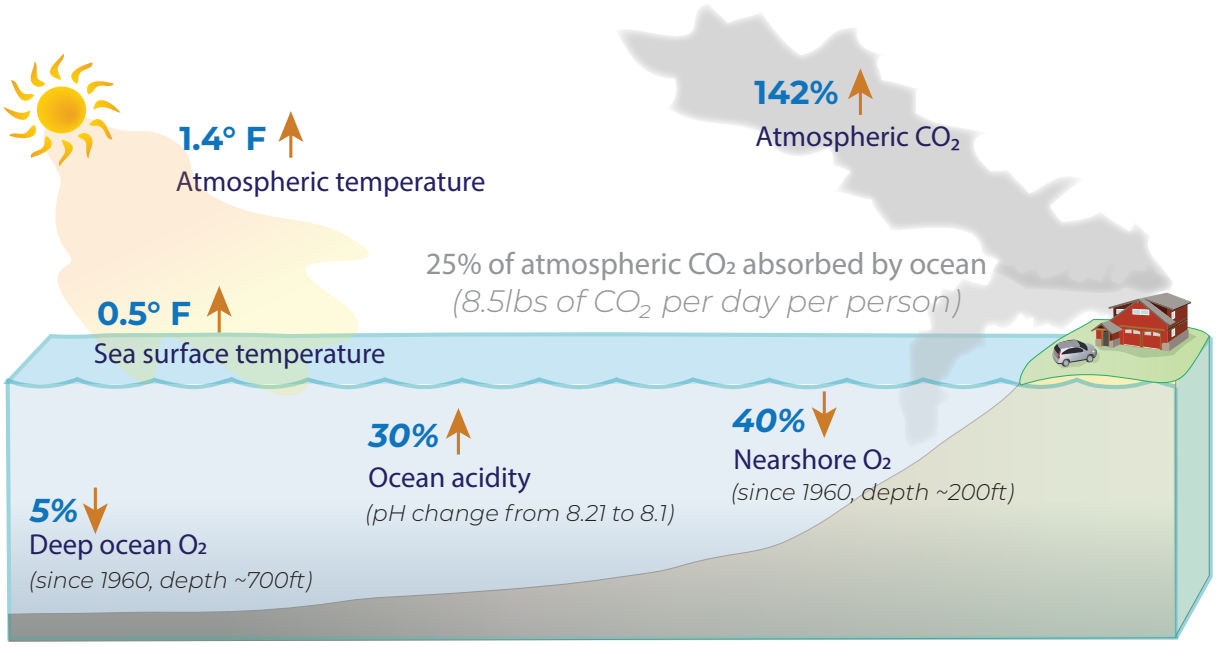
Why is this OAH Action Plan Needed?

Ocean acidification and hypoxia (OAH) are increasing, and are related to the same factor that is causing climate change.

The culprit? **Fossil fuel combustion and related accumulation of CO_2 and other greenhouse gases.**

The solution? **Local actions will lead to a brighter future, for the oceans, its species and the communities that depend on them. We can and must act now!**

Ocean Change since the Industrial Revolution *(Late 1800s)*



Referenced Data:
Pierce, S. D., J. A. Barth, R. K. Shearman and A. Y. Erofeev, 2012. Declining oxygen in the Northeast Pacific. J. Phys. Oceanogr., 42, 495-501
Schmidtko, S., L. Stramma & M. Visbeck, 2017. Decline in global oceanic oxygen content during the past five decades. Nature, 542, 335–339
https://earthobservatory.nasa.gov/world-of-change/DecadalTemp
https://www.epa.gov/climate-indicators/climate-change-indicators-sea-surface-temperature

The Oregon OAH Action Plan identifies ways that our government and individual Oregonians can make a difference to slow these impacts and adapt to the changes we are already seeing. Ocean Acidification and Hypoxia (OAH) are harmful to ocean life and the economic stability of the Oregonians who rely on a healthy ocean.

To learn more about OAH science, impacts, and solutions, please visit the Oregon OAH Council's website:

oregonocean.info/index.php/ocean-acidification

What is at risk in Oregon?

> ***"The cost of inaction to me is about how it is going to become a lot harder to address ocean acidification and hypoxia the longer we wait. Over time I think that we are going to start to erode what were good options as the ecosystems change. Then it becomes a situation of "coulda, woulda, shoulda"***
>
> Dr. Francis Chan
> Department of Integrative Biology, Oregon State University

Oregon's history is one of cultural and economic value in ocean and estuarine fisheries and in the natural beauty and bounty of the ocean – all of these rely on our healthy ocean communities. Salmon, halibut, Dungeness crab, razor clams, oysters, pink shrimp, lamprey, and rockfish have supported Oregon's coastal economies for generations. Yet, Oregon's ocean is changing, and each of these species has already shown signs of distress from ocean acidification and hypoxia (OAH).

Ocean acidification and hypoxia are increasing, and are related to the same factor that is causing climate change in our own human habitats. The culprit?

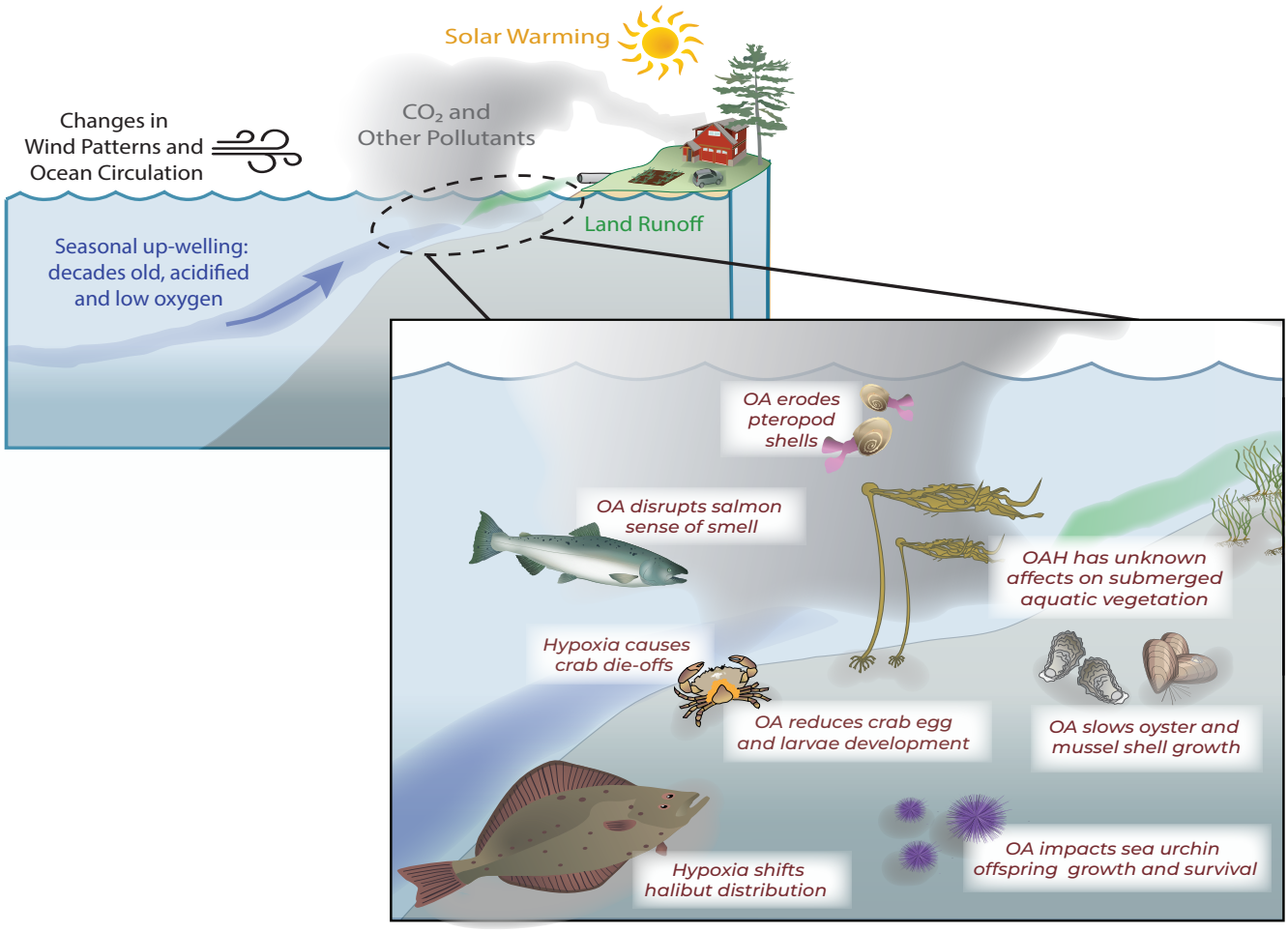
Fossil fuel combustion and related accumulation of **carbon dioxide (CO_2)** and other greenhouse gases has led to climate change, ocean acidification and ocean deoxygenation (hypoxia). The earth's oceans have absorbed 30% of the excess CO_2 produced from fossil fuel combustion since the Industrial Revolution (mid 1800s). When absorbed by seawater, CO_2 undergoes chemical reactions that lower seawater pH (making it more acidic), and thus hampers shell formation in marine life. Hypoxia (low oxygen) conditions are also on the rise as a result of climate change, due to changing wind and weather patterns. This is leading to extended periods of hypoxia in some of Oregon's coastal waters, impacting a wide range of marine animals from crabs to fish. This has led to major ecosystem and economic impacts, which are already reverberating through our tourism and seafood industries.

Oregon's commitment to understand, actively adapt to, and mitigate OAH requires us to invest funding and time to build a more predictable future. Oregon's approach to solving these problems requires addressing excess CO_2 and OAH stressors simultaneously (see **Appendix B** for a description of Oregon's actions of managing CO_2 and climate change). To build the brightest future for the ocean and its species and the communities that depend on them, and despite uncertainty, we can and must act now in a pro-active way that will improve ecosystem outcomes for resilience, as a "no-regrets" strategy.

This Oregon OAH Action Plan recommends ways to invest in our future, to better adapt to and mitigate the problems we are already seeing, and which will worsen in the decades to come.

The results of increasing OAH have had far-reaching consequences, for both the ocean ecosystem and the economy, consequences that we, as a society, are only just beginning to understand and quantify. Shifting food webs, loss of fishery productivity and lost economic opportunities are just some of the many impacts we are expecting to see as a result of increasing OAH.

Climate and other human drivers of ocean change ...



... impacts economically and ecologically important marine species.

For more information see:

Oregon Climate Change Adaptation Framework. December 2010. https://digital.osl.state.or.us/islandora/object/osl:4014

Oregon OAH Action Plan (2019-2025)

> ***"I think it is an obstacle that there are so many things changing in the environment, it is sometimes hard to make OAH a priority. But this should be a top priority - before we start to lose our shellfish, crab, salmon, and lamprey."***
>
> Mark Healey
> Marine Resource Manager, Coquille Tribe

This OAH Action Plan builds on the 2018 Report of the Oregon Coordinating Council on Ocean Acidification and Hypoxia, submitted to the Oregon Legislature and the Oregon Ocean Policy Advisory Council. The 2018 Report articulated 12 Recommendations and 38 Actions, organized under five Themes. Each of these actions are key to addressing OAH impacts at all levels, from science to policy, from education to adaptation. In creating this 6-year OAH Action Plan, the OAH Council considered the urgency of need, anticipated value of actions, and appropriate phasing of implementation steps for each action (see **Appendix C** for more detail on how the Report and Action Plan were developed).

It may not be possible to implement all actions immediately; this Action Plan articulates what needs to be addressed first. Below are 5 priority actions for Oregon.

1. **Invest in Oregon's monitoring network to document oceanographic and biologic conditions, and socio-economic vulnerabilities relating to OAH**
2. **Develop and integrate strategies to reduce causes of excess carbon dioxide (CO_2) and Ocean Acidification and Hypoxia (OAH)**
3. **Support activities and initiatives that promote adaptation and resilience to OAH, for Oregon's human communities and ecosystems**
4. **Communicate OAH science, impacts, and solutions to raise awareness and support decision-making**
5. **Mobilize agencies to address OAH priorities**

Oregon joins our regional partners (British Columbia, Washington, and California) in describing our intent and commitment to action, to fulfill the state's role in OAH and its solutions. For many years, the West Coast has provided critical leadership on OAH problem-solving, policy development, and supporting local actions to effect global change. Notably, the West Coast has conceived of and launched the International Alliance to Combat Ocean Acidification (OA Alliance). Oregon is a founding member of the OA Alliance, which has rapidly grown to a multi-national, multi-governmental collaborative body. The OA Alliance promotes voluntary government actions to address OAH, as part of our global responsibility to manage the problems from fossil fuel combustion.

Action Descriptions

With this document, Oregon fulfills our promise to global partners to develop and adopt an OAH Action Plan. For each of the five priority actions that are included in this OAH Action Plan, there are four distinct considerations for implementation that are described below.

Actions: Actions needed in order to achieve the vision.

Vision: The future Oregon we intend to create, as a result of the action(s).

Steps: Specific measures to implement the action, including who will implement the step. Order of steps are not necessarily an implication of time sequence.

Timeline and funding needs: Within each step, the timelines are specified for the start year, or range of years, as well as the timeframe over which the step is anticipated to occur. In ***Appendix A***, preliminary estimated funding needs are also provided, to indicate the scale of need for each action. All estimates are subject to further refinement as each action is implemented and specific budgets are developed.

Cross-Reference to the 2018 OAH Report: This text box, included at the bottom of each priority action section, lists the OAH Council Recommendations and Actions, as originally included in the September 2018 OAH Council Report, which would be implemented in whole or in part, by implementing the steps in this OAH Action Plan.

ACTION 1 - Invest in Oregon's monitoring network to document oceanographic and biologic conditions, and socio-economic vulnerabilities relating to Ocean Acidification and Hypoxia (OAH)

"I think that the best thing that we can really hope for now is to gather baseline data and gain a better understanding. I think we know what is causing Ocean Acidification and Hypoxia, but we need to know what the effects are going to be."

Bernie Lindley
Owner/Operator of F/V Sea Jay, Brookings, Oregon

VISION

Oregon has a robust monitoring network that produces long-term time series for physical, chemical, and biological properties of Oregon's nearshore ocean and estuaries. These data are used to understand Oregon's ecosystem and socio-economic vulnerabilities, to inform adaptation and mitigation efforts.

Step 1

Allocate state funding to use existing research reference sites and tools to enhance Oregon's oceanographic monitoring network.

- Re-establish oceanographic monitoring to complement an historical time-series in Yaquina Bay, an economic, research, and management hub for Oregon.
  (Start: 2019-2020 and continuing)

- Co-locate OAH oceanographic monitoring (intertidal and subtidal) alongside existing Marine Reserves biological sampling to leverage Oregon's existing research investments in Marine Reserves.
  (Start: 2021-2023 and continuing)

- Provide sustained funding for OAH oceanographic monitoring in Tillamook Bay, where a pilot program funded by Oregon Watershed Enhancement Board (OWEB) is providing baseline oceanographic observations for this Oregon hub of economic, research, and management activity.
  (Start: 2021-2023 and continuing)

- Support the maintenance of existing and installation of new climate grade OAH instruments in communities and at-risk industry locations.
  (Start: 2021-2023 and continuing)

Step 2 Allocate state funding to invest in monitoring of Oregon's ocean life by implementing consistent monitoring of the biological response to OAH.

- Conduct a workshop to determine priority biological metrics for monitoring in Oregon coastal waters, including consideration of research results from regional partners.
  (Start: 2021 and continuing)

- Augment on-going funding for the Newport Hydrographic Line to add biological and chemical OAH monitoring sensors and analysis to get the most value out of this existing monitoring program.
  (Start: 2021-2023 and continuing)

- Augment Oregon Department of Fish and Wildlife's (ODFW) Shellfish assessment team to increase frequency and spatial scale of shellfish and submerged aquatic vegetation (SAV) observations.
  (Start: 2023-2024 and continuing)

Step 3 Allocate state funding to a socio-economic vulnerability assessment to determine Oregon's vulnerabilities to OAH.

- Fund competitive grants and/or match (e.g. through the Oregon Ocean Science Trust), and use results to inform decision-making and investments.
  (Start: 2021 – 2023 and continuing)

Cross-Reference to 2018 OAH Report

Action 1.1.a. Maintain and support oceanographic and biological monitoring at significant research reference sites that provide high value to Oregon due either to prior State investments, the geographic location and/or historical data collection activities at that site. **Action 5.2.a.** Continue and expand State support for science funding entities in Oregon that provide grant funds to OAH science and response (e.g., Oregon Watershed Enhancement Board, Oregon Ocean Science Trust (OOST)). **Action 5.2.b.** Ensure the OOST has the institutional structure needed to receive and redistribute funds to support the State's OAH priorities. **Action 5.2.c.** Facilitate the acquisition of funding from a diversity of sources to address the State's OAH priorities. **Action 4.2.d.** Academics and researchers: Communicate research needs to build OAH solutions, as identified by the OAH Council and the OAH Action Plan. **Action 5.3.a.** Maintain Oregon's leadership role on OAH science by supporting prioritization of OAH research, education and outreach by Oregon universities. **Action 4.2.b.** At-risk industries and professions: Communicate with industries affected by OAH to strengthen cultural values of healthy and sustainable seafood and seafood industry and build relationships to strengthen collaborative solutions development. **Action 1.1.c.** Expand and implement monitoring to track the biological responses to OAH, to inform State natural resource decisions and management activities.

ACTION 2 - Develop and integrate strategies to reduce causes of excess carbon dioxide (CO_2) and Ocean Acidification and Hypoxia (OAH)

"Our oceans take a large brunt of the excess carbon. This is exactly what we should be relating climate change to and nothing can be more tied to CO_2 emissions than ocean acidification."

Charlie Plybon
Ocean Policy Coordinator, Oregon Surfrider

VISION **Oregon measurably has reduced carbon dioxide (CO_2) emissions and Ocean Acidification and Hypoxia (OAH) stressors to achieve ecosystem and economic benefits for both ocean and inland systems.**

Step 1 **The OAH Council works with the Governor's Natural Resource Office to establish regular communication and coordination pathways with state agencies and other State entities to address excess CO_2 and OAH stressors locally and globally.**
(Start: 2019 and continuing)

• Relevant state agencies (see Appendix D for agency descriptions) include:

o Oregon Department of Fish and Wildlife (ODFW)
o Department of Land Conservation and Development (DLCD)
o Department of Environmental Quality (DEQ)
o Oregon Department of Agriculture (ODA)
o Department of State Lands (DSL)
o Oregon Department of Forestry (ODF)
o Oregon Health Authority (OHA)
o Oregon Department of Energy (ODOE)

- Other relevant state entities include:

    - o Oregon Ocean Science Trust (OOST)
    - o Oregon Watershed Enhancement Board (OWEB)
    - o Oregon Ocean Policy Advisory Council (OPAC)
    - o Oregon Global Warming Commission (OGWC)
    - o Oregon's 4-year universities

- Relevant state entities (as described above) promote Oregon's continued participation in organizations and collaborations working to reduce excess CO_2 and promote OAH adaptation and mitigation. Entities include:

    - o Pacific Coast Collaborative
    - o International Alliance to Combat Ocean Acidification
    - o West Coast Ocean Alliance (regional ocean partnership)

Step 2 Allocate state funding to support scientific research leading to recommendations on effective and efficient ways to reduce excess CO_2 and OAH stressors.

- Fund competitive grants (e.g. through the Oregon Ocean Science Trust, or through the Oregon Watershed Enhancement Board); use outcomes to inform decision-making and future investments.
  (Start: 2021 – 2023 and continuing)

Step 3 Relevant state agencies implement measures to reduce excess CO_2 and OAH stressors and encourages action, as identified in Step 2 and other relevant processes.

(Start: 2021 and continuing)

Cross-Reference to 2018 OAH Report

Action 2.1.b. Strengthen communication and coordination on CO_2 and OAH management and mitigation among the OAH Council, State agencies, and other government entities (e.g., Oregon Global Warming Commission). **Action 5.2.a.** Continue and expand State support for science funding entities in Oregon that provide grant funds to OAH science and response (e.g., Oregon Watershed Enhancement Board (OWEB), Oregon Ocean Science Trust (OOST)). **Action 1.3.b.** Establish research priorities to identify effective measures to remove excess CO_2 from marine waters through technological means, sequestration, or bioremediation (e.g., culture and harvest kelp, thus removing CO_2 from local waters). **Action 5.2.b.** Ensure the Oregon Ocean Science Trust (OOST) has the institutional structure needed to receive and redistribute funds to support the State's OAH priorities.

ACTION 3 - Support activities and initiatives that promote adaptation and resilience to Ocean Acidification and Hypoxia (OAH), for Oregon's human communities and ecosystems

"Impacts of Ocean Acidification on the shellfish industry was really the first time that an economic cost could be associated with acidified sea water. This was the first time people could put a price on the effects of Ocean Acidification."

Dr. Chris Langdon
Oregon's Molluscan Broodstock Program

VISION

Oregon agencies and local governments promote Ocean Acidification and Hypoxia (OAH) resilience in management decisions, and Oregon's industries and communities work together to support thriving ecosystems and economic resilience to future changes.

Step 1

State agencies, in consultation with academia and industry, identify strategies to restore, protect, and sustain native shellfish stocks and submerged aquatic vegetation (SAV) in Oregon's estuaries and nearshore waters.

- Allocate state funding for competitive grants and/or match to identify how to achieve ecosystem and economic resilience for Oregon. Examples of project topics are listed below. ***(Start: 2020-2023 and continuing)***

    - o Productivity of nursery habitat for economically valuable shellfish species
    - o Restoration and protection of submerged aquatic vegetation (SAV) and native shell fish that provide ecosystem services
    - o Restoration and protection of water quality throughout Oregon's estuaries and near shore
    - o Effects of OAH on marine organism life history to identify vulnerable species.
    - o Ability of Oregon's coastal communities and marine industries to achieve economic resilience to OAH

- Industry and academic support continued research of resilient shellfish aquaculture strains. ***(Start: 2021 and continuing)***

Step 2 Allocate state funding to support data collection, synthesis, and modeling to inform strategies that promote OAH resilient ecosystems.

(Start: 2020-2023 and continuing)

- Develop maps to address the following information needs to promote resilience in decision-making in estuary and nearshore waters:

    - o SAV and native oyster core distribution areas – including historical and persistent regions
    - o Priority areas for habitat restoration and habitat protection

- Allocate state funding for competitive grants and/or match to conduct ecosystem modeling of estuary and nearshore ecosystems, including hydrodynamic and biogeochemical processes as well as SAV.

    - o Possible regions that could be considered for blue carbon and/or carbon mitigation offsets (if such programs are developed in Oregon)
    - o To inform aquaculture practices in Oregon's bays and estuaries

Step 3 Agencies will develop Best Management Practices (BMPs), based on current ecosystem and economic research (as determined in Step 1) focused on Oregon's estuaries and nearshore.

- Develop precautionary BMPs to ensure that coastal activities are sustainable and does not exacerbate OAH stressors. Examples of BMPs that might be developed are listed below. ***(Start: 2023-2024 and continuing)***

    - o Dredging
    - o Coastal development and infrastructure
    - o Aquaculture

Cross-Reference to 2018 OAH Report

Action 1.2.a. Develop and conduct an ecosystem vulnerability assessment to identify species vulnerable to OAH from among Oregon's commercially, recreationally, culturally, and ecologically important species. From this, identify research priorities for building adaptation and resilience strategies for species and species groups. **Action 1.2.d.** Establish research priorities to determine the benefits of conserving and restoring native species and vegetation in building ecosystem and socio-economic resilience. **Action 1.3.b. E**stablish research priorities to identify effective measures to remove excess CO_2 from marine waters through technological means, sequestration, or bioremediation (e.g., culture and harvest kelp, thus removing CO_2 from local waters).

ACTION 4 - Communicate Ocean Acidification and Hypoxia (OAH) science, impacts, and solutions to raise awareness and support decision-making

"People must understand the root problem. Without that they may turn a blind eye to CO_2 emissions and only focus on understanding and documenting OAH, which is not enough."

Catherine Corbett
Chief Scientist, Columbia River Estuary Partnership

VISION **Policy-makers, agencies, and the public have information on Ocean Acidification and Hypoxia (OAH) science, impacts, and solutions. This information supports decision-making across the state and leads to publicly-supported approaches to OAH adaptation and mitigation.**

Step 1 The OAH Council builds a communications plan and outreach materials to communicate OAH science, impacts, and solutions.

- The OAH Council convenes an advisory working group with regional education/outreach specialists to identify OAH outreach needs.
  (Start: 2019 and continuing)

- The OAH Council develops a communications plan and outreach materials to meet the needs of diverse stakeholders and provide solutions-oriented messages on OAH science and impacts.
  (Start: 2019-2021 and continuing)

Step 2 The OAH Council provides timely updates to Oregon Legislature, other policy-makers, and affected communities in Oregon to inform decisions on how best to invest in OAH research, adaptation, and mitigation.

- The OAH Council reports to the Oregon legislature on recommended OAH actions, through a biennial report (see step 1).
  (Start: 2020 and continuing)

- The OAH Council convenes "State of OAH" workshops for communities on OAH science, impacts, and solutions with policy makers as well as communities and at-risk industries.
  (Start: 2020 and continuing)

- The OAH Council provides information in a variety of forms to impacted audiences including policy makers, at-risk industries, and coastal communities.
  (Start: 2019-2025 and continuing)

Step 3 The OAH Council evaluates the effectiveness of OAH communication tools in filling information needs.

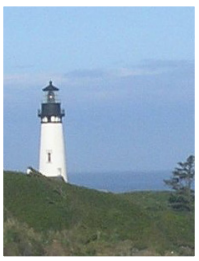
- The OAH Council develops communications evaluation tools to assess the OAH Council's outreach efforts and inform future outreach activities.
  (Start: 2021-2023 and continuing)

- The OAH Council revises outreach efforts and materials based on evaluation.
  (Start: 2023 and continuing)

Cross-Reference to 2018 OAH Report

Action 4.2.b. At-risk industries and professions: Communicate with industries affected by OAH to strengthen cultural values of healthy and sustainable seafood and seafood industry and build relationships to strengthen collaborative solutions development. **Action 4.1.b.** Build solutions-oriented messages on OAH science, impacts and solutions. Messages should include: simple language, positive tone, local connections, and actions for individuals and governments. **Action 4.2.a.** Policy makers and legislative staff: Inform decision-makers on the science, impacts and solutions, to help them shape strategic policy decisions. **Action 4.1.c.** Create an information resource and outreach catalog for the OAH Council and others that highlights OAH science, impacts and solutions using the positive messages strategy.

ACTION 5 - Mobilize agencies to address Ocean Acidification and Hypoxia (OAH) priorities



"Functionally, without a policy framework that directs the natural resource agencies to work collectively on an issue, we are then isolated in our resource management and in our planning processes. We are then not collectively maximizing the progress we could be having on Ocean Acidification and Hypoxia."

Davia Palmeri
Climate Change Policy Coordinator,
Oregon Department of Fish and Wildlife

VISION

Oregon state agencies have Ocean Acidification and Hypoxia (OAH) issues integrated into regular planning processes for budget, staffing, and management outcomes. Agencies have clear, defined goals to address projected ecosystem and economic impacts from OAH.

Step 1

Governor issues a 2019 policy, urges relevant state agencies to consider work they are doing and their plans to address OAH priorities in the context of this Action Plan.

- Agencies document both existing and needed programs and regulations (including compliance), that address OAH impacts, adaptation, and mitigation. Agencies report plans to address the gaps to the Legislature and Governor in February 2021.
  (Start: 2019 and continuing)

- Agencies propose anticipated needs in biennial agency budget development process, starting with agency budget proposals for the 2021-2023 biennium.
  (Start: July-December 2019 and continuing)

- The OAH Council incorporates agencies' reports into ongoing development of recommendations to the State on programs within and across agencies.
  (Start: 2021 and continuing)

Relevant state agencies (see **Appendix D** for agency descriptions) include:

- o Oregon Department of Fish and Wildlife (ODFW)
- o Department of Land Conservation and Development (DLCD)
- o Department of Environmental Quality (DEQ)
- o Oregon Department of Agriculture (ODA)
- o Department of State Lands (DSL)
- o Oregon Department of Forestry (ODF)
- o Oregon Health Authority (OHA)
- o Oregon Department of Energy (ODOE)

Step 2 **Governor's Natural Resources Office provides leadership, coordination, and policy guidance to agencies on OAH action priorities.**

- Expand expertise on ocean science and regulations within the Governor's Natural Resource Office.
  (Start: 2019 and continuing)

Step 3 **State agencies implement measures to fill gaps, as described in agency OAH planning (Step 1), in alignment with the Oregon Climate Adaptation Framework (2010), and with guidance from the Governor's Natural Resources Office.**
(Start: 2021-2025 and continuing)

Cross-Reference to 2018 OAH Report

Action 5.1.a. Develop and implement policy, directing agencies to address OAH priorities in agency planning. **Action 3.1.a.** Conduct an inventory of Oregon State agency programs and authorities that are relevant to OAH; identify opportunities to incorporate OAH adaptation and resilience strategies into current and future management actions, including implementation of Statewide Planning Goals. **Action 3.1.b.** Anticipate specific management and regulatory decision-making processes, into which OAH adaptation and resilience strategies can be incorporated. **Action 5.1.b.** Prioritize staffing in the Governor's Natural Resources Office to include expertise to provide leadership on ocean science and policy, to help guide and address OAH action priorities.

Evaluation

> *"One of the reasons I think monitoring is so important, is because a lot of the other OAH actions talk about strategies that we can implement to have an impact, mitigate bad responses, or try to make a resiliency strategy. Without having base monitoring, and the knowledge of the interactions in the ecosystems, it is going to be difficult to measure our success."*
>
> York Johnson, North Coast Basin Coordinator
> Oregon Department of Environmental Quality

The Oregon Coordinating Council on Ocean Acidification will review the status of this and subsequent Oregon OAH Action Plans in biennial reports to the Oregon Legislature, Oregon Ocean Policy Advisory Council (OPAC), and Governor (September of even years). Evaluation will inform the contents and focus of future recommendations by the OAH Council to Oregon.

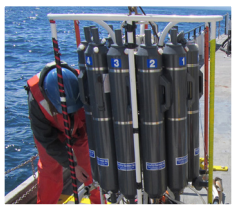
OAH Action Plan progress will be evaluated by the OAH Council based on the following factors:

- Timely completion of identified actions
- Successful implementation of actions at achieving the vision and goals in this OAH Action Plan
- Achievement of criteria or benchmarks developed on a per action basis, as each is implemented
- Updated research priorities as they are identified

Take Action

The Oregon Ocean Acidification and Hypoxia (OAH) Action Plan outlines actions that Oregon will take to adapt to and mitigate OAH impacts. We need all Oregonians to help make a difference facing this global problem.

Here is how YOU can help make a difference



Help Monitor Ocean Change

- Establish local and regional community-based monitoring networks
- Join an existing research or management survey as a volunteer

Reduce Excess Carbon and Prevent OAH Stressors

- Plant and maintain trees and restore coastal habitats
- Support State regulatory and voluntary programs to improve water quality
- Be mindful of your personal carbon footprint and reduce where you can - food waste, water usage, home heating/cooling/lighting, and driving patterns

Build Resilience to Ocean Change

- Work with industry, managers, and researchers to develop OAH specific adaptation/mitigation steps
- Support sustainable and adaptable local coastal business growth as OAH impacts occur

Learn about OAH Science and Solutions

- Encourage local schools and universities to teach about OAH
- Attend science and policy lectures, speaker series, and outreach events
- Use your network to share information about OAH science, impacts, and solutions

Encourage and Participate in Public Processes

- Support your local communities, cities, or organization to join coalitions and formulate their own OAH Action Plans
- Speak with and organize letters to your state and local government representatives for OAH Action

As requested by
Oregon's Governor Kate Brown

Recommended Citation:
Oregon Governor's Natural Resource Office. Oregon Ocean Acidification and Hypoxia Action Plan 2019 - 2025. August 2019. URL: https://www.oregonocean.info