

**House Committee on
Agriculture, Land Use, Natural Resources, and Water**

Re: HB 3786 – The Blue Economy Bill

The Oregon Ocean Science Trust, one of only two national ocean science trusts in the United States, supports the passage of HB 3786, the Blue Economy Bill.

The Trust was established by the Oregon Legislature in 2013 to promote peer-reviewed competitive research and monitoring to increase knowledge and understanding of Oregon's ocean and coastal resources and enhance the state's capacity. We identify the highest priority research and monitoring needs by convening the state's best research scientists to identify those priorities, then host competitive grant processes to solicit projects deemed to best meet those priorities. We form ad hoc committees of experts to work with us to develop the RFPs and vet the proposals we receive. We mandate sharing the outcomes, data, and information from Trust-sponsored research projects with other scientists and the public.

To date, the Trust has funded 14 multi-year research projects, totaling almost \$2 million, with partners in three key areas:

- Ocean acidification and hypoxia (7 research projects)
- Nearshore data collection, monitoring, and assessment; and (6 research projects)
- Assessing marine reserves

The Trust has funded research:

- To better understand when and where acidic and low oxygen conditions occur along the Oregon coast and how changing coastal winds and marine heat waves are influencing these conditions. This research helps Oregon's seafood and fishing industries and natural resource managers adapt to changing ocean conditions.
- That created the first ecosystem model of Coos Bay that combines physical, biological, and chemical data to understand how changes to Coos Bay influence how the bay functions. The results of this research helped determine areas where eelgrass conservation and restoration could improve local pH and oxygen levels might respond to ecosystem changes or mitigations.
- That created science-based guidance for best co-management practices for sustaining eelgrass and oyster aquaculture in Oregon bays and estuaries.
- To assess Oregon's marine reserves program. The Trust played an integral role in finding the funding to conduct the independent assessment of the program, which evaluated balancing the goals of conserving Oregon's coastal marine life while avoiding negative social and economic impacts for coastal communities.

Research projects in progress include:

- Determining how well native Olympia oysters grow in different locations of Yaquina Bay under changing environmental conditions, which will inform efforts to restore native Olympia oysters in Oregon.
- Enhancing ODFW's data for commercial regional rockfish stock assessments using cutting edge genetic techniques to a) identify juvenile rockfish, which are difficult to identify using traditional methods and b) understand the importance of nearshore habitats to these important commercial fisheries.
- Developing a kelp forest model to forecast how different management interventions may benefit kelp forest communities along the Oregon coast. Kelp forests support species of conservation concern, and economically important fisheries but have suffered dramatic declines in recent years concurrent with declines in kelp forests.
- Filling the one remaining data gap for Oregon's nearshore rocky reef ecosystems by collecting high-resolution seafloor maps. Rocky reef systems are critical for supporting Oregon's largest remaining kelp forests, the largest and most robust commercial sea urchin fishery, the largest Stellar sea lion rookery, and a potential site for reintroduction of sea otters in Oregon.

To consider the relevance of HB 3786, it's important to put Oregon's ocean and coast in the context of Oregon's economy and its people. In 2021, the ocean sector GDP was estimated at \$2.5 billion, Oregon's coastal economy supported more than 800,000 jobs, and more than 40% of Oregon's population worked in coastal sectors. Oregonians value the ocean and coast for many things:

- its contribution to salmon and other fish species and shellfish production
- the habitats it provides for migratory and native birds that use ocean habitats
- its potential for valued species of interest for reintroduction, such as sea otters
- its sense of space and place for people to recreate or simply take a walk on a beach
- its estuaries and their role as fish nurseries, storm buffers, and water purifiers, to name a few
- its role as a key economic engine for Oregon's economy
- and many, many more.

But there is a lot at stake as the ocean warms, becomes more acidic, and holds less oxygen, as sea level rises, and as storm surge and coastal erosion threaten property values and transportation infrastructure, which threatens public safety. We have to have the science and data to address these challenges and respond in an informed way.

House Bill 3786 would provide \$3 million in funding for ocean and coastal research and monitoring in Oregon to both continue and kickstart much-needed research to address 3 important topics:

- The risks and vulnerabilities that threaten Oregon’s economy and ecosystems from changing ocean conditions, including warmer, more acidic, and less oxygenated ocean water
- Sandy beach management and dune ecosystems research to inform strategies to address coastal erosion, which has and will continue to affect transportation and other coastal systems
- Nearshore data collection to understand changing ocean conditions and its effects on species and ecosystems

The Oregon Ocean Science Trust strongly supports the passage of HB 3786.

Lisa DeBruyckere, Oregon Ocean Science Trust



Assessing Oregon's Marine Reserves

WHAT: In 2021, the OOST coordinated an award to conduct an assessment of the social, economic, and environmental factors of Oregon's marine reserves and marine protected areas. The assessment set out to determine:

- 1) if Oregon's marine reserves were effectively designed and implemented to achieve the goals identified in Oregon Ocean Policy Advisory Council's (OPAC) 2008 Oregon Marine Reserve Policy Recommendations. Read the recommendations at <https://tinyurl.com/OMRPolicyRec>
- 2) if the Oregon Department of Fish and Wildlife successfully executed the legislative mandates for marine reserve implementation. Read the final 2022 assessment at <https://tinyurl.com/2022ODFWAssessment>.

WHO: Oregon State University

WHY THIS MATTERS: The assessment, required by the Oregon Legislature, revealed:

- Oregon's marine reserves are effectively designed and implemented to achieve the goals and objectives set forth in legislation and OPAC recommendations.
- Ongoing monitoring and research are needed to better evaluate localized socioeconomic impacts and whether some ecological goals will be met.



Learn more about assessing marine reserves.

FOR MORE INFORMATION

To learn more about the OOST and sign up to receive updates on funding opportunities:

- **Visit** OregonOceanScience.com
- **Email** OOST@OregonOceanScience.com
- **Follow us** @OceanSciOR on LinkedIn and Instagram

WINTER 2025



Recent Projects

The Oregon Ocean Science Trust (OOST) secures resources to support and fund ocean and coastal science and monitoring specific to the needs of Oregon. In recent years, we've funded research to address Oregon's changing ocean conditions, conduct science and monitoring in the nearshore, and support an assessment of Oregon's marine reserves and protected areas. The research has been conducted by teams consisting of universities, nonprofits, community organizations, and local residents.

Ocean Acidification and Hypoxia (OAH)

WHAT: With funding from Oregon Legislature, the OOST received and disbursed \$1,000,000 to grant recipients to conduct research and monitoring to address the effects of changing ocean conditions and improve how we communicate the importance of this issue and its effects to Oregonians.

WHY THIS MATTERS: Oregon's ocean is changing, and many species have already shown signs of distress. Just as humans need calcium to build their bones, sea creatures need calcium carbonate to build strong skeletons and shells. The ocean absorbs a lot of carbon dioxide, which is changing the ocean's chemistry and prevents the development of calcium carbonate. This is called **ocean acidification**.

As a result of the changing chemistry, we are seeing sea creatures' skeletons and shells becoming thinner or more brittle. Climate change is also the cause of **hypoxia**, as warmer waters hold less oxygen. As the Pacific Ocean warms, its ability to hold a lot of oxygen declines. The term "hypoxia" refers to low or depleted oxygen in a body of water. Because most organisms need oxygen to live, few organisms can survive in hypoxic conditions. Local actions will lead to a brighter future, for the oceans, its species, and the communities that depend on them.



SPOTLIGHT ON: Develop best practices for sustainable shellfish cultivation in Oregon

San Diego State University, Cascadia Visualizations LLC, and Oregon State University developed recommendations to:

- Maximize the abundance of wild shellfish, cultured shellfish, and aquatic vegetation in Oregon's estuaries.
- Develop best management practices for conducting shellfish cultivation in a way that protects or promotes health of our estuaries.

This work synthesizes difficult-to-find information on policies and data associated with shellfish and aquatic vegetation in Oregon and will be a key resource for community members, policymakers, and managers. Similarly, the team developed a mapping tool that can be used to visualize where shellfish and aquatic vegetation habitats overlap across the state.



Learn more about ocean acidification and hypoxia projects.





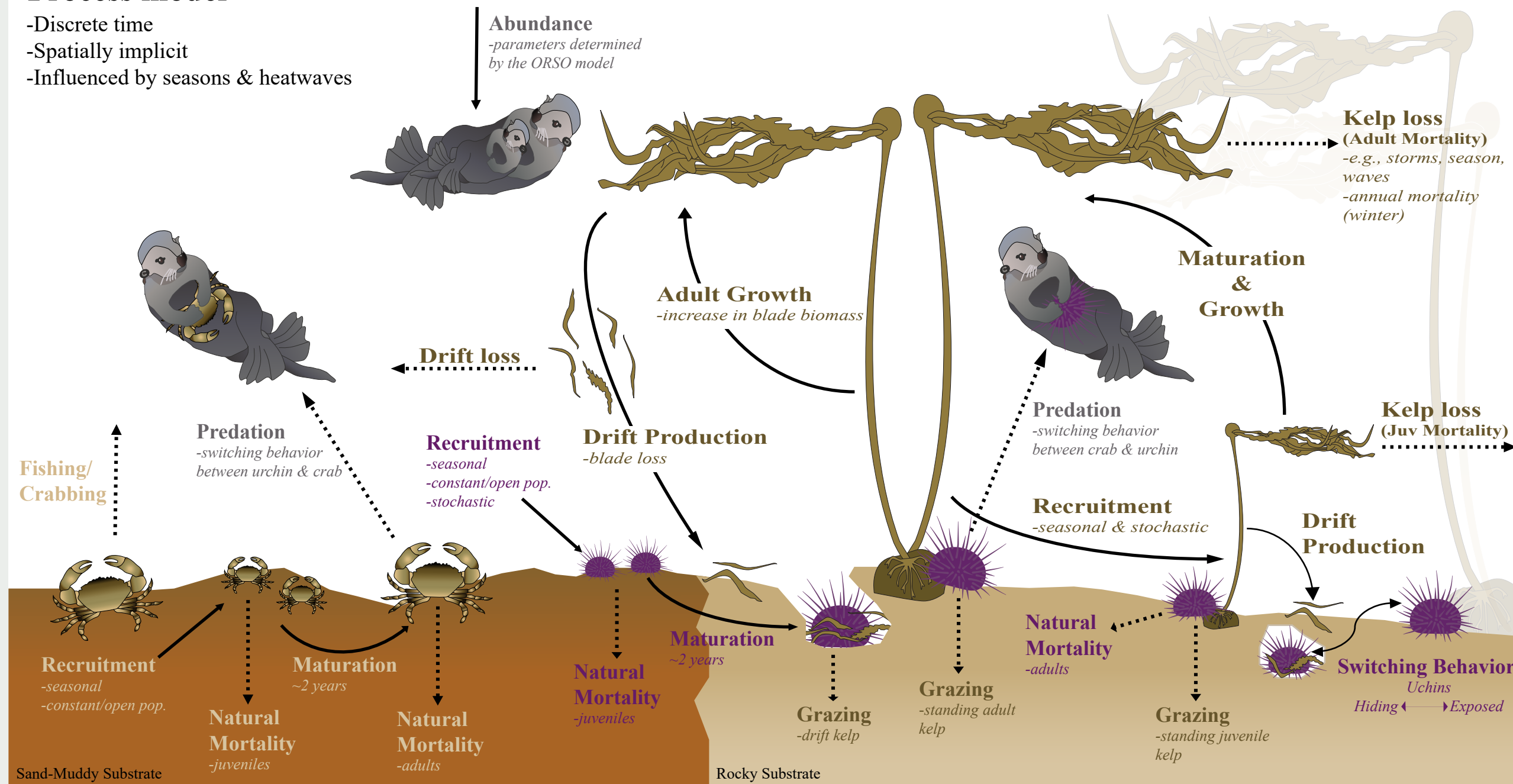
SPOTLIGHT ON: Kelp habitat

Kelp forests are an important part of Oregon's coastal ecosystem, but they face threats from marine heatwaves and grazing by sea urchins. A variety of management options could address these threats, from kelp restoration to urchin removal to the introduction of sea otters, an urchin predator. However, these ecosystems are complex. Two project teams seek to understand our rocky reef habitats and the kelp connection.

- **Trophic modeling of Oregon's nearshore reefs:** Oregon State University is developing a mathematical model of predator-prey relationships in Oregon kelp forests using simulations to predict the results of different management actions. This work will provide information to resource managers on the expected outcomes of different management and restoration actions. Preliminary results indicate that a combination of urchin removal and kelp restoration may help reduce kelp forest losses during a marine heatwave.

Process model

- Discrete time
- Spatially implicit
- Influenced by seasons & heatwaves



- **Kelp communities in transition:** The Oregon Department of Fish and Wildlife is exploring how rocky reef habitats differ in places that have lost kelp versus areas where kelp beds persist. Commercial sea divers and trained science divers are conducting underwater surveys to document presence of sea urchins, sea stars, and abalone across reefs with kelp beds and places where kelp has declined.

As our ecosystems experience this critical period of transition along the Oregon coast, understanding habitat conditions is urgent to understand the rate of change and establish baselines for managers.

Original illustration attribution: Urchin by Jess K. Hopf; Crab by Kim Kraeer & Lucy Van Essen-Fishman; Sea Otter by Tracey Saxby; Kelp by Jane Thomas; Sourced from ian.umces.edu/media-library.

Species: Sea otter (*Enhydra lutris*), Bull Kelp (*Nereocystis luetkeana*), Dungeness crab (*Metacarcinus magister*), Urchins (*Strongylocentrotus purpuratus* & *Mesocentrotus franciscanus*). Illustrations modified by Andrés Pinos-Sánchez.



SPOTLIGHT ON:

Climate monitoring at Yaquina Bay

The Hatfield Marine Science Center and Oregon State University maintain a suite of scientific instruments called the Climate Monitoring Station (CMS) that monitors OAH in real time in the Yaquina Bay Estuary. The station builds on data sets established more than 40 years ago to monitor trends in coastal Oregon waters.



In those 40 years, sea level has risen more than 4 inches, the ocean has become more acidic, and hypoxia (low oxygen) zones have grown to the size of the Willamette Valley during some summer months, all hastened by human carbon emissions. The CMS long-term monitoring will continue to track these changes and will inform our understanding of their impacts.

The CMS team recently tested an innovative sensor to capture high quality images of phytoplankton – these samples will be used to train an artificial intelligence (AI) system to detect potential harmful algal blooms in Yaquina Bay!

Nearshore Ocean and Coastal Research

WHAT: During the last two years, OOST received \$1,000,000 from the Oregon Legislature to advance science and monitoring for nearshore ecosystems and keystone species, including sea otters and eelgrass. To date, we have disbursed these funds to six grant recipients to inform status and changes in Oregon's nearshore ecosystems.

WHY THIS MATTERS: Oregon's nearshore includes coastal and marine areas that extend from the shore to three nautical miles offshore and include habitats such as rocky and sandy shores and estuaries. Nearshore ecosystems are among the most diverse and productive systems on Earth. The nearshore provides many benefits, from producing nurseries for commercial and recreational fish and shellfish, to providing opportunities for recreation and sightseeing.

There are growing pressures on Oregon's nearshore resources as human populations grow and climate change stressors affect species and habitats. Understanding how the nearshore functions, the abundance and distribution of species and habitats, and how these resources are responding to climate change, can inform strategies that lessen the effects of human activities on nearshore habitats and species.



Learn more about nearshore ocean and coastal research projects.



SPOTLIGHT ON:

Ocean acidification and hypoxia monitoring network for Oregon's marine reserve system.

WHO: Oregon State University, CIMERS (Cooperative Institute for Marine Ecosystem and Resources Studies)

Oregon is at the epicenter of the impacts of ocean acidification and hypoxia, which is changing the chemistry of the ocean and depleting oxygen levels. Ocean acidification and hypoxia can directly impact our marine habitats and species, commercial and recreational fisheries, and coastal communities. Monitoring ocean conditions allows resource managers to respond to changing conditions, mitigate risks, plan effectively, and protect our marine resources. Two Trust-funded projects in the intertidal and subtidal regions of Oregon's marine reserves build robust monitoring capabilities by using Oregon's world class scientists and technology in these living laboratories.

LONG-TERM MONITORING: These projects extended OAH monitoring that began in 2009 and provide a baseline of data to enable coastal managers to document and respond to ocean acidification and hypoxia to protect our natural resources.

OUTREACH AND ENGAGEMENT: Stories discussing this research were featured in the Washington Post, the Seattle Times, magazines, and federal websites. The articles highlighted the cutting-edge science conducted on the coast, expanding awareness of Oregon's coastal threats, and providing a blueprint for OAH monitoring around the world. Early research results from the monitoring network resulted in more than \$5 million in federal funding to continue OAH research across the West Coast.

Collaborative ocean observing partners: Members of the fishing industry and coastal communities volunteered to deploy and monitor ocean sensors to collect ocean data across the marine reserves. The value of this research is recognized by many Oregonians, as they are pitching in to help understand our changing ocean conditions to better protect marine ecosystems and their associated industries and livelihoods.



2025-2027 budget requests to support progress

Oregon’s ocean, public beaches and estuaries are a beloved part of the state’s identity and a key economic driver for coastal communities. The ocean plays a critical role in our climate, which is having devastating impacts on land in the form of fire, drought and heat waves. Meanwhile, at sea, changing ocean conditions are having profound effects on species abundance, distribution and biodiversity. All this affects the well-being of all Oregonians across the state.

Oregon boasts some of the best ocean and coastal scientists in the world. In December 2023, an Oregon Ocean Science Summit convened over 50 ocean and coastal scientists from around the state

to determine the top research priorities to support decision makers with good policy outcomes for today’s emerging issues. OOST considered the top priorities that will build on investments already made to date for critical monitoring and to address issues of statewide importance and identified the top three priorities for 2025-2027 budget requests below.

For over a decade, the OOST has demonstrated success in directing state funds to the highest and best use for science and research, including for Ocean Acidification and Hypoxia (HB3114) and Nearshore Science and Monitoring (HB5202). We hope to continue this important work into the next biennium.

Oregon Ocean Science Trust’s 2025-2027 budget requests

Topic	Description	Request
<i>Ocean acidification and hypoxia research</i>	Build on investments to date to continue ocean acidification and hypoxia research	\$1 million
<i>Sandy shores and coastal erosion</i>	Targeted research to fill data gaps and inform management decisions to address erosion issues	\$1 million
<i>Investigate changing ocean conditions and effects on species and ecosystems</i>	Research for high priority management needs (commercial and recreational fisheries, ecosystem disruptions, reintroduction of key species)	\$1 million

Why Oregon needs us

Established by the Oregon State Legislature in 2013, the Oregon Ocean Science Trust (OOST) secures and distributes funding to promote ocean and coastal knowledge, research, and monitoring to ensure the sustainable use of Oregon’s resources, enhance coastal resilience, and support long-term ocean health for all Oregonians. The OOST operates at the nexus of physical, biological, and social and economic research, bringing the three together to holistically synthesize data and knowledge of our ocean and coastal resources.

Where we add value

The Oregon Ocean Science Trust:

- Secures resources to support Oregon ocean and coastal science and monitoring
- Leverages resources through partnerships
- Is nimble, responsible, and cost-effective, and not limited to biennial budget cycles
- Fosters an understanding of the importance of a healthy ocean to people’s livelihoods and well-being

What we need to do

To date, the OOST has furthered important work to assess marine reserves, study ocean acidification and hypoxia, and collect information about Oregon’s important nearshore resources. In 2023, the OOST hosted a summit that convened leading thinkers in ocean and coastal policy, management, and research to assess priorities and opportunities for the coming years. Based on this summit, the OOST has identified three key priorities:



Improve our understanding of changing ecosystem and species conditions. Characterize shifts in ecosystem structure and function, species life history, and biodiversity hotspots.

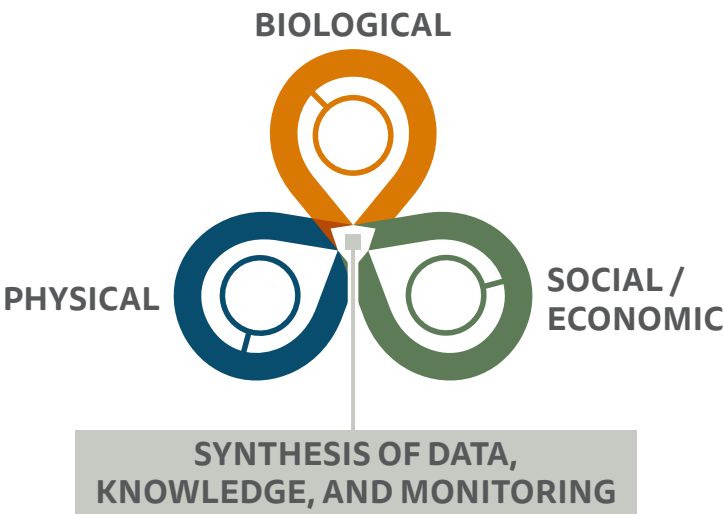


Enhance social well-being and resilience of ocean and coastal communities. Better understand the relationship between community well-being and coastal economy, including historic, current, and future ocean and coastal uses.



Operate the OOST with the highest standards of accountability, seeking long-term sustainable funding and capacity to achieve our mission. Conduct the work of the OOST in a fiscally-responsible manner, emphasizing actionable and transdisciplinary science and knowledge that informs ocean and coastal policy and management issues.

TYPES OF RESEARCH WE SUPPORT



Achieving our priorities

In the near term, the OOST aims to support science and monitoring that informs policy and management for three key issues:

- 1 Carbon and climate impacts to ocean conditions
- 2 Sustainable food production and fisheries
- 3 Coastal and ocean development and infrastructure



Our vision is to support science and monitoring projects



Climate: Identify the most appropriate and actionable climate solutions to protect, restore, and manage nearshore habitats as well as sequester carbon, improve coastal resiliency, and enhance adaptations to coastal hazards and sea level rise.

Priorities this supports: ① ② ③



Energy: Build understanding of emerging ocean infrastructure and its effects on ecosystems and people.

Priorities this supports: ① ③



Fisheries: Understanding the sustainability of populations of key species in the face of changing ocean conditions and high fishery demand.

Priorities this supports: ① ②



Knowledge and data gaps: Identify and fill knowledge and data gaps, improve accessibility, and synthesize existing data. Explore development of new tools, such as AI. Support knowledge co-production.

Priorities this supports: ① ② ③



Species and habitat: Build and enhance capacity for long-term monitoring to develop indicators for resilience. Understand changes in species distribution and abundance with changing ocean conditions.

Priorities this supports: ① ②

FOR MORE INFORMATION

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- Follow us @OceanSciOR on LinkedIn and Instagram

Why ocean and coastal science is important for Oregon

- **A healthy ocean supports a healthy economy:** Oregon's commercial fisheries generate about \$558 million per year, supporting nearly 10,000 jobs. Tourism to Oregon's coast continues to be one of the leading economic drivers for our coastal communities, bringing \$1.9 billion to the coast and leading to employment of more than 20,000 people. People from throughout the state and country travel to Oregon's coast to recreate and enjoy its scenic beauty.
- **Good information informs good decisions:** Management and policy decisions set the course for the future and have real implications for all Oregonians that depend on our marine resources for cultural, social, and economic well-being. Actionable science supports good ocean stewardship and management decisions for the benefit of all.
- **We become more resilient as we prepare for an uncertain future:** Our ocean and coast are changing and will continue to change. Proactively working to better understand current and historic conditions will help us make better-informed decisions about what to expect in the future and help provide predictability for our coastal communities and all Oregonians.

Key successes to date

Since 2013, the Oregon Legislature has invested \$2 million in the OOST to further actionable ocean and coastal research in our state. Important milestones include:

- Ocean acidification and hypoxia (OAH) research, monitoring, and communications, are contributing to a regional effort to address risks and vulnerabilities OAH pose to our economy and ecosystems. Recent science has revealed the West Coast is experiencing ocean acidification at twice the global rate, impacting species like Dungeness crab and salmon.
- Nearshore science and monitoring for keystone species, kelp and eelgrass habitat, and blue carbon sequestration. The resulting six projects have furthered understanding about commercially and recreationally important fish species, impacts of climate change, nearshore habitats, and shifts in rocky reef habitats for kelp, sea urchins, abalone, and sea stars.
- Assessing Oregon's five marine reserves and nine adjacent marine protected areas, contributing to effective management of our state's marine reserves to meet social, economic, and environmental goals.