



2024 Annual Report

State of California
Ocean Protection Council



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November Photo of the Month: Claire Fackler / Claire's daughter swimming through a healthy kelp forest at Anacapa Island Landing Cove in NOAA's Channel Islands National Marine Sanctuary.

Introduction

The California Ocean Protection Council (OPC) is committed to improving scientific understanding, increasing resilience, raising awareness, and integrating changing coastal and ocean conditions into California's state government policies, planning, and operations. In the **Strategic Plan to Protect California's Coast and Ocean 2020-2025** (Strategic Plan), OPC committed to annually reporting on the status of activities that advance OPC's strategic priorities and to provide an overview of critical issues impacting California's coast and ocean. The **2022** and **2023** Annual Coast and Ocean Reports provided foundational steps in identifying initial indicators to assess the health of California's coast and ocean, and to report a retrospective of activities and accomplishments made to advance the priorities in the OPC Strategic Plan. This Annual Report captures OPC's achievements and progress made throughout 2024 in meeting the objectives of the Strategic Plan, and does not include an assessment of the state of California's coast and ocean as final indicators are developed and assessed for the release of the **2025 California Coast and Ocean Report Card**.

Throughout 2024, OPC investments and programmatic work advanced efforts across each of the four Strategic Plan goals centered on: Climate Change, Advancing Equity, Enhancing Biodiversity, and a Sustainable Blue Economy.

- **Updated State of California Sea Level Rise Guidance:** The **State of California Sea Level Rise Guidance: 2024 Science and Policy Update**, adopted by OPC in June 2024, marks the fourth iteration of statewide guidance for state and local decision-makers to incorporate best available science into planning, design, permitting, investments, and other decisions.
- **SB 1 Sea Level Rise Adaptation Planning Grant Program and Launch of Technical Assistance:** Throughout 2024, the **Senate Bill 1 Sea Level Rise Adaptation Planning Grant Program** awarded funding to 15 projects across California – from Del Norte and Humboldt Counties to Los Angeles County – to support sea level rise adaptation planning. As a



complementary effort, OPC launched the Senate Bill 1 Technical Assistance Program (SB 1 TA Program) in March 2024, in partnership with Coastal Quest, to support eligible local, regional, and tribal governments in preparing applications for the SB 1 Grant Program.

- **Tribal Small Grants Program:** To support implementation of OPC's **Tribal Engagement Strategy**, OPC awarded up to \$500,000 to Kai Poma, a tribal non-profit representing 3 tribes, and up to \$500,000 to the ytt Northern Chumash Nonprofit representing the yak titʻu titʻu yak titʻini (ytt) Northern Chumash Tribe in support of **Tribal Nature Based Solutions** projects on California's coast.
- **Environmental Justice Advisory Board:** OPC partnered with Better World Group to convene the inaugural **Environmental Justice Advisory Board for California's Coast and Ocean** that can help provide guidance and advice to better address the ocean and coastal needs of California communities.
- **Environmental Justice Small Grants Program:** The pilot **Environmental Justice Small Grants Program** launched in March, in partnership with Justice Outside, resulting in 24 local projects awarded statewide. This initiative aims to create more inclusive and accessible funding pathways to support community engagement in ocean and coastal projects, policies, and research.
- **Designation of the Chumash Heritage National Marine Sanctuary:** This past year, California saw the new designation of the **Chumash Heritage National Marine Sanctuary**, the first tribally nominated Sanctuary and the third largest in the nation. Effective November 30, 2024, the sanctuary encompasses 4,543 square miles off the Central California Coast and will protect areas of cultural significance to California Native American tribes, prioritize tribal stewardship, and safeguard marine life and habitats.
- **Conserving 30% of Coastal Waters by 2030 (30x30):** The **Draft Decision-Making Framework for Coastal Waters**, released by OPC in June 2024, advances the state's commitment to conserve 30% of California's coastal waters by 2030. The final 30x30 Decision-Making Framework for Coastal Waters is anticipated to be presented for Council consideration and approval in 2025.

- **Offshore Wind Environmental Monitoring Guidance:** OPC has continued to advance development of [comprehensive environmental monitoring guidance for offshore wind](#), in partnership with the California Marine Sanctuary Foundation. The guidance will serve as a foundational framework for building a comprehensive monitoring program statewide, offering insights into the long-term impacts of offshore wind development from local to regional scales.

Anniversary of the California Ocean Protection Council

2024 also marked the 20th anniversary of the OPC, established by the [California Ocean Protection Act](#) signed into law September 23, 2004. This Act directs OPC to coordinate state agency activities, improve the collection and sharing of scientific data, and identify policy recommendations to protect and conserve California's coast. Over the past 20 years, OPC has established meaningful partnerships with state and federal agencies and external partners and made significant investment and policy contributions to support healthy marine ecosystems and coastal communities, and ensure decisionmaking impacting California's coast and ocean is informed by the best available science. OPC has also taken important steps to improve engagement with California Native American tribes and underserved communities to advance equity and include local knowledge and expertise into California's coastal management and policy efforts.

Together, these actions and investments have protected wildlife and habitat, supported advancements in critical science, and established a network of partners, within and outside state government, that will support coastal and ocean conservation into the future.



2024 Council Members

Wade Crowfoot, Secretary for Natural Resources, Council Chair

Yana Garcia, Secretary for Environmental Protection

Malia Cohen, State Controller

Ben Allen, State Senate

Dawn Addis, State Assembly

Alexis Jackson, Public Member

Megan Rocha, Public Member



2024 Investments

Goal 1: Climate Change ●	
Coastal Resilience & Sea Level Rise	\$14,655,287
Ocean Acidification & Hypoxia	\$561,072
Goal 2: Equity ●	
Tribal Engagement	\$1,000,000 ¹
Equity and Community Engagement	\$1,000,000 ²
Goal 3: Biodiversity ●	
Protecting & Restoring Coastal & Marine Ecosystems	\$9,575,000
Marine Protected Areas	\$2,250,000
Kelp	\$775,000
Sustainable Fisheries	\$1,825,000
Goal 4: Sustainable Blue Economy ●	
Offshore wind	\$1,065,052
Cross-cutting	\$540,000
TOTAL	\$33,246,359

1 Approved by Council for distribution in 2023, selected projects were awarded in 2024.

2 Approved by Council for distribution in 2023, selected projects were awarded in 2024.

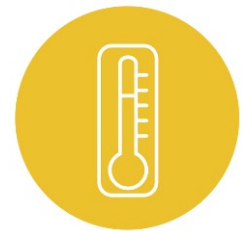


2024 Accomplishments & Progress





Goal 1: Safeguard Coastal and Marine Ecosystems and Communities in the Face of Climate Change

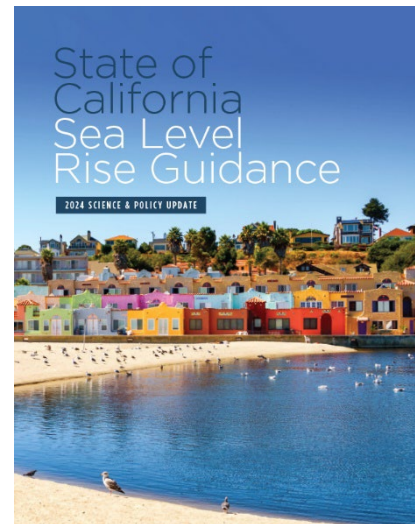


Objective 1.1: Build Resiliency to Sea Level Rise, Coastal Storms, Erosion, and Flooding

State of California Sea Level Rise Guidance: 2024 Science and Policy Update

To support sea level rise preparedness in California, OPC, in partnership with Ocean Science Trust (OST) and an interdisciplinary Sea Level Rise Science Task Force, developed and adopted the **Sea Level Rise Guidance: 2024 Science and Policy Update** (Guidance) with the best available science and guidance for planning and decision-making.

This Guidance replaces the 2018 Update of the State of California Sea Level Rise Guidance previously adopted by OPC and features the best available science with updated sea level rise projections through 2150. This Guidance is updated approximately every five years to reflect updated projected sea level rise and guidance to help state, tribal, local, and regional jurisdictions integrate this science into coastal adaptation projects, resilience planning, and investments. Findings from the 2024 Guidance:



- **Land movement, either rising or sinking**, is the primary driver of local variations in sea level rise across the state.
- **There is greater certainty in the amount of sea level rise expected in the next 30 years**, with a statewide average of 0.8 feet of rise projected by 2050. By 2100, statewide sea levels are expected to rise between 1.6 feet and 3.1 feet, and even higher amounts cannot be ruled out.
- **Beyond 2100, the range of projected sea level rise becomes increasingly large** due to uncertainties associated with physical processes, such as earlier-than-expected ice sheet loss and resulting future sea level rise. By 2150, statewide sea levels may rise from 2.6 feet to 11.9 feet, although even higher amounts are possible.
- **Today's coastal storms provide a glimpse into our future** in which storm events will become more damaging and dangerous as climate change and sea level rise continues.
- **Sea level rise will increase the frequency of coastal flooding events.** California communities need to be aware of and prepared for a likely rapid increase in the frequency of coastal flooding in the next decade, even beyond the increases in coastal flood frequency already occurring.
- **Groundwater rise poses a threat to below-ground infrastructure and freshwater aquifers under future sea level scenarios.** In areas with shallow unconfined groundwater, the water table will generally rise with sea level, depending on local geomorphology.

San Francisco Bay Regional Shoreline Adaptation Plan (RSAP)

Sea level rise poses a significant threat to communities, infrastructure and habitats around San Francisco Bay, requiring coordinated and cohesive regional adaptation planning and projects to build resilience and to effectively protect public health and safety, and public access. In December 2024, the San Francisco Bay Conservation and Development Commission (BCDC) adopted the **Regional Shoreline Adaptation Plan** (RSAP), which integrates the best available science and guidance provided in the **Sea Level Rise Guidance: 2024 Science and Policy Update** and **supported by OPC**, a region-wide plan for the San Francisco Bay shoreline that guides how local governments will create coordinated, locally planned sea level rise adaptation actions that work together to achieve regional resilience and a shared One Bay Vision.

Senate Bill 1 Sea Level Rise Adaptation Planning Grant Program

The State of California is committed to helping tribal, regional, and local governments prepare and increase resilience to the impacts of sea level rise, such as flooding, erosion, and habitat degradation and loss. OPC launched the **Senate Bill 1 Sea Level Rise Adaptation Planning Grant Program** (SB 1 Grant Program) to provide local assistance for sea level rise adaptation planning and implementation projects, resulting in **15 local projects amounting to \$14,655,287,**

approved in 2024 to prepare for sea level rise. Of the 15 projects approved,

7 are located in the San Francisco Bay, and 8 are along the Outer

Coast. The majority (13) of the awarded grants support sea level

rise adaptation planning across the state (from San Diego

to Del Norte County), while two advance urgent

projects to help prepare the coast and shoreline

for the impacts of sea level rise (located in

Orange County). The below table shows the

disbursement of project funding across

Track 1 and Track 2, as well as by

location (Outer Coast and San

Francisco Bay) by Track.



Photo Courtesy of California King Tides Project

	Track 1 (Planning)	Track 2 (Implementation)	Total
Outer Coast	\$4,579,537	\$3,176,250	\$7,755,787
SF Bay	\$6,899,500	N/A	\$6,899,500
Total	\$11,479,037	\$3,176,250	\$14,655,287

Technical Assistance Program: OPC launched the Senate Bill 1 Technical Assistance Program (SB 1 TA Program) in March 2024, in partnership with Coastal Quest. Complementing the SB 1 Grant Program, the SB 1 TA Program supports eligible local, regional, and tribal governments facing significant sea level rise threats along the California coast and San Francisco Bay shoreline in preparing applications for the SB 1 Grant Program. Services include grant requirement guidance, proposal development, project conceptualization, and more.

Further details regarding the SB 1 Grant Program and eligibility for the SB 1 TA Program can be found on the [SB 1 Funding webpage](#).

Tools to Inform Sea Level Rise Adaptation

The State of California plays an important role in providing technical assistance and developing science-based tools and resources to support tribal, local, regional governments and help alleviate some challenges these governments face in preparing for sea level rise. In 2024, OPC advanced research and projects to inform and advance sea level rise adaptation planning across the state, including:

Sea Level Rise Adaptation Planning Inventory. OPC funded the development of the California Coastal Adaptation Planning Inventory in 2021 to evaluate planning and decision-making methods and assess planning and policy outcomes along the California coast. In October 2024, a [new supplemental report](#) was released that included background and relevant planning information for four additional categories of coastal lands: the San Francisco Bay Area; federal lands; tribal lands; and California State Parks. Key findings from the report noted that adaptation planning in the San

Francisco Bay Area has made significant progress, with most local governments completing shoreline vulnerability assessments. Although, the report also found that fewer local governments have moved forward with actionable adaptation plans, a challenge shared across California's coastal communities. The report also discusses the importance of collaboration across jurisdictions, integration of local and regional plans, and leveraging federal and tribal efforts as essential for effective statewide adaptation to sea level rise.

California Beach Resiliency Plan. In 2024, OPC, in partnership with UC Santa Barbara's Center for Ocean and Coastal Policy, launched the California Beach Resiliency Plan, a statewide effort to assess beach vulnerability and develop science-based strategies for long-term resilience. The project's first in-person scoping meeting was hosted at UC Santa Barbara, where team members gathered to refine the project's goals, scope, and expected outcomes. The project was also introduced to local government and state agency representatives at the Sea Level Rise State and Regional Support Collaborative meeting. The project team continues to lead data assessments and synthesis, engage stakeholders and collect feedback and input, and consider best practices for beach ecology, adaptation investments, and public access.

October Photo of the Month: Laurel Meleski / Duncan's Landing Overlook, HWY 1 near Bodega Bay



Mitigating Climate Change Through Nature-Based Solutions

California's Nature-Based Solutions Climate Targets. On Earth Day of 2024, California Natural Resource Agency (CNRA) released 81 targets to help absorb carbon emissions through millions of acres across multiple habitats statewide, the first for the state and among the most comprehensive in the world. **California's Nature-Based Solutions Climate Targets**, as called for by Governor Newsom's California Climate Commitment, the 81 targets for nature-based solutions will strategically harness the equivalent of more than half of the state to fight the climate crisis and help California achieve its world-leading climate goals, including carbon neutrality by 2045. The specific targets call for 1.5 million of deserts and beaches to be managed to protect fragile ecosystems and 233,000 acres of wetlands and seagrass to protect coastal ecosystems.

Blue Carbon Ecosystem Data and Model Assessment. OPC, in collaboration with the California Air Resources Board (CARB) and Dr. Melissa Ward from Windward Sciences, released the **Blue Carbon Ecosystem Data and Model Assessment Report** in July 2024. This report supports the development of models or inventories of blue carbon ecosystems and can guide investments to support effective blue carbon strategies. The report outlines criteria and data required for including novel ecosystems in CARB's 2027 update to the 2022 Scoping Plan for Achieving Carbon Neutrality, with a focus on coastal wetlands.

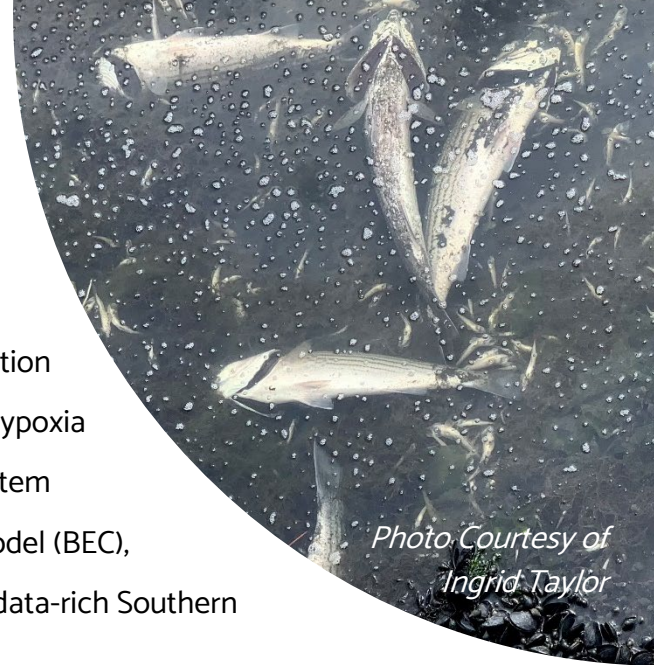
Objective 1.2: Minimize Causes and Impacts of Ocean Acidification and Hypoxia

Improving Understanding of Ocean Acidification and Hypoxia Vulnerability

Modeling the Effects and Strategies to Address Ocean Acidification and Hypoxia

The California coast is vulnerable to ocean acidification and deoxygenation, which are exacerbated by global climate change. Following the West Coast OAH Science Panel (2013) recommendations, OPC has provided foundational funding in partnership with the National Oceanic and Atmospheric

Administration (NOAA) to support the development of a coupled physical-biogeochemical model for the entire West Coast to help managers better understand and forecast the effects of ocean acidification and to determine whether reduction in local pollution inputs can mitigate ocean acidification and hypoxia stress to marine resources. The Regional Ocean Modeling System (ROMS), coupled to the Biogeochemical Elemental Cycling model (BEC), modeling project has centered on three questions within the data-rich Southern California Bight:



- What is the effect of anthropogenic nutrients on algal blooms, oxygen, and pH?
- What are the biological effects of these changes?
- What are the effects of nitrogen management alone or in combination with potable water recycling?

In 2024, peer-reviewed scientific publications from the model continued to support earlier findings that coastal nutrients, primarily from wastewater treatment plant effluent, have a significant effect on ocean acidification and hypoxia within the Southern California Bight. Specifically, this research indicates that human sources of nutrients cause measurable changes in ocean chemistry (reduction of subsurface pH and oxygen, and production of persistent algal blooms) and that these changes have the potential to cause vertical compression of ocean habitat by over 25% of the Southern California Bight (approximately 278,400 km² in size) during 3 months of the year in late summer to early fall.

OPC **expanded upon funding** originally approved by the Council in 2020 that extended this effort to the San Francisco and Monterey coasts. Preliminary results suggest a substantial effect of nutrients from San Francisco Bay on algal production, including harmful algal blooms, and ocean acidification and hypoxia on the San Francisco and Monterey coasts. However, higher resolution data is needed to improve understanding of the contributions of land-based nutrients and inform potential management strategies that can address and mitigate the impacts of ocean acidification.

Enhancing California's Ocean Acidification and Hypoxia Monitoring Network

OPC has invested in a coordinated effort to better connect and standardize biological and chemical monitoring to create a statewide ocean acidification and hypoxia monitoring network. In 2023, this project advanced environmental monitoring on the U.S. West Coast, specifically targeting ocean acidification impacts. Existing programs, including the NOAA West Coast Ocean Acidification Regional Survey Cruises, Southern California Coastal Water Research Project Southern California Bight Regional Monitoring Program (Bight Program), California Current Ecosystem Long-term Ecological Research, California Cooperative Fisheries Investigation, and Applied California Current Ecosystem Studies worked collaboratively to integrate biological and chemical measurements, focusing on sensitive species such as pteropods and crab larvae.

Advancing Assessment of Ocean Acidification Impacts

The federal Clean Water Act requires states to report on the quality of surface waters, including ocean waters, every two years. In February 2024, the State Water Board released the final **2024 California Integrated Report**, prepared every two years by the State Water Board pursuant to the federal Clean Water Act, to include the first state assessment of ocean acidification. Informed by OPC-funded research and California Bight Regional Monitoring Program data, this assessment applied **methodology** developed by the State of Oregon, in partnership with technical working group members from Oregon, California, Washington, and Alaska. Further coordination with federal and external partners is underway to address data gaps and research to increase confidence in the data assessment for future ocean acidification assessments.

Objective 1.3: Improve Understanding of Climate Impacts on California's Coast and Ocean

Advancing Climate Data, Research, and Dissemination

Eelgrass Habitat Suitability Model Update for San Francisco Bay

OPC invested in an eelgrass habitat suitability model update to inform targeted, climate-smart eelgrass restoration in San Francisco Bay. The project integrated the expertise and data sources

from a broad consortium of technical stakeholders to develop a state-of-the-art **habitat suitability model** intended to maximize the effectiveness and efficiency of eelgrass habitat protection, restoration, and mitigation in San Francisco Bay. In doing so, the project helped build resiliency to sea-level rise and coastal erosion by creating a transferable tool for use by resource managers and policy makers to strategically target eelgrass protection/restoration efforts.





Goal 2: Advance Equity Across Ocean and Coastal Policies and Actions



Objective 2.1: Enhance Engagement with Tribes

Tribal Small Grants Program

OPC's **Tribal Engagement Strategy** was adopted in 2023 and crafted in close collaboration with California Native American tribes and outlines specific actions that OPC will undertake to enhance tribal engagement in all aspects of its work – such as providing new funding opportunities for tribes, increasing co-management of ancestral lands and waters, and strengthening pathways for the consideration of Traditional Knowledges in policy decisions. and outlines specific actions that OPC will undertake to enhance tribal engagement in all aspects of its work.

To support implementation of OPC’s **Tribal Engagement Strategy**, OPC approved \$1 million in 2023 to launch the Tribal Small Grants program; this funding was integrated into the California Natural Resources Agency’s **Tribal Nature-Based Solutions** (TNBS) grant program to streamline application processes and reduce administrative burden on tribes applying for state funding.

In 2024, OPC awarded up to \$500,000 to Kai Poma, a tribal non-profit representing 3 tribes, and up to \$500,000 to the ytt Northern Chumash Nonprofit representing the yak titʻyu titʻyu yak tiʻhini (ytt) Northern Chumash Tribe in support of TNBS projects on California’s coast. This investment comes as part of a larger commitment by Governor Gavin Newsom to award up to \$107.7 million for 34 projects statewide that support tribal priorities related to ancestral land return, restoring culturally important habitats and species, workforce development, improving tribal access to the coast and ocean, and supporting tribally-led stewardship.

Objective 2.2: Enhance Engagement with Underserved Communities

Environmental Justice Small Grants Program

OPC adopted its first-ever **Equity Plan** and approved funding to establish a pilot Environmental Justice Small Grants Program in 2022, providing direct action to implement a strategic priority within the Equity Plan. In 2023, OPC announced its partnership with grantee, Justice Outside, to support the development and administration of OPC’s Environmental Justice Small Grants Program.



Auguste Research



Un Mar de Colores



Reel Guppy

The \$1 million program was designed to support investments for organizations to fulfill small and short-term projects across coastal regions that create positive impacts in California’s environmental justice communities (**OPC Equity Plan**, Strategy 1.3.7) and advance coastal and ocean conservation priorities in OPC’s Strategic Plan. The program launched in March 2024, resulting in 24 local projects statewide. This initiative aims to create more inclusive and accessible funding pathways to support community engagement in ocean and coastal projects, policies, and research.

Environmental Justice Advisory Board

In April 2023, OPC continued its partnership with Better World Group Advisors (BWG) to advance implementation of key Equity Plan priorities, including pathways for direct engagement with public members representing environmental justice and tribal communities. Through this effort, BWG developed and convened an **Environmental Justice Advisory Board** (EJ Advisory Board) in 2024 that can help provide advice to better address the ocean and coastal needs of California communities. The recruitment, including the call for application for the inaugural EJ Advisory Board, launched in February 2024, resulting in seven community leaders representing California’s diverse regions and communities.

- Frank Buncom IV (he/him) – San Diego
- Patricia J. Flores Yrarrázaval (she/they) – Los Angeles
- Sonya Hammons (she/they) – San Francisco Bay Area
- Hannah Lent (she/her) – Central Coast
- Carlos Moran (he/him/él) – Los Angeles
- Luis Neuner (he/him) – North Coast
- Mario Ordoñez (he/him) – San Diego

The EJ Advisory Board’s overarching purpose is to provide equity and environmental justice expertise, advising the State of California on how to advance these priorities across its coastal and ocean programs and policies.



Goal 3: Enhance Coastal and Marine Biodiversity



Objective 3.1: Protect and Restore Coastal and Marine Ecosystems

Managing California's Marine Protected Area Network

The 2023 Marine Protected Area (MPA) **Decadal Management Review** provided 28 priority recommendations to advance adaptive management of the MPA Network. This ten-year retrospective included updates from across the four pillars of the MPA management program (outreach, research, policy, and enforcement) and results from long-term MPA monitoring.

The Decadal Management Review indicate that MPAs are working to protect California's unique coastal and marine biodiversity. Specifically, the Decadal Management Review showed that, in

many cases, California's MPAs are supporting larger and/or more abundant sea life. Moreover, the Review suggested that some marine communities protected by MPAs, including tidepools and kelp forests, were more resilient to a marine heat wave than similar communities outside of MPAs.

In August 2024, the California Department of Fish and Wildlife (CDFW) presented an [update on its progress](#) to implement these recommendations to the California Fish and Game Commission (FGC). Since the release of these priority recommendations, OPC staff have worked closely with state and external partners on supporting tribal stewardship, advancing critical monitoring priorities, and assessing proposed changes to the MPA Network.

MPA Monitoring: Enhanced long-term monitoring of sandy beach, kelp forest, rocky intertidal, and estuary habitats across the state is vital for adaptive management of the MPA Network by providing necessary information to evaluate MPA performance, and to inform broader fisheries management and climate resilience.

OPC, in partnership with the California Department of Fish and Wildlife and California Sea Grant, launched a [2025 California Mid-Depth Rocky Reef MPA Monitoring Request for Proposals \(RFP\)](#) to inform management of California's MPA Network through improved monitoring of mid-depth rocky reef habitats. Requested projects including mid-depth monitoring during the 2025 and 2026 seasons, building from the key findings and recommendations of a [2024 Technical Expert Panel](#), and research to refine sampling design and monitoring approaches for these habitats. Selected projects are anticipated to be presented for Council consideration and approval in March 2025.

Community-Driven Petition Process: The Fish and Game Commission invited the public to submit [science-based and community-driven petitions](#) to modify California's MPA Network in late 2023. In September 2024, CDFW released a webpage that [provides information on current petitions](#) to modify California's MPA Network. Throughout 2024, OPC worked with CDFW and the Fish and Game Commission staff to develop an objective, transparent, and science-based evaluation process to assess these petitions into 2025.

To support evaluation of these community-driven petitions, the **Council approved key investments** in September 2024 to develop and update existing public-facing tools: 1) the SeaSketch mapping tool and 2) the MPA Connectivity Model. Users will be able to use SeaSketch to visualize changes to MPA size and spacing and overlaps of MPA petitions with important locations and habitats. Updates to the MPA Connectivity Model will ensure results are more representative of current and future ocean conditions and fill key gaps in near-shore habitat mapping. The mapping tools will become publicly available beginning in March 2025 and the initial outputs of the new connectivity model will be available in Summer of 2024.

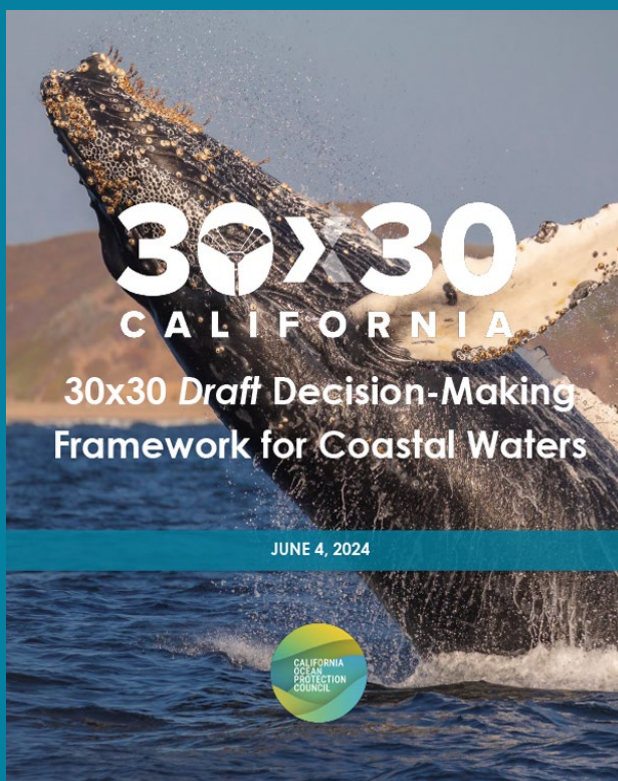
Designation of the Chumash Heritage National Marine Sanctuary

In October 2024, California saw the designation of the **Chumash Heritage National Marine Sanctuary** by the National Oceanic and Atmospheric Administration (NOAA). The new Chumash Sanctuary represents the first tribally nominated sanctuary and is the third largest in the nation. Effective November 30, 2024, the sanctuary encompasses 4,543 square miles off the Central California Coast and will protect areas of cultural significance to California Native American tribes, prioritize tribal stewardship, and safeguard marine life and habitats in an exceptionally biodiverse region.



Conserving 30% of Coastal Waters by 2030

California’s lands and coastal waters are home to biodiversity found nowhere else on Earth. On October 7, 2023, Governor Newsom signed **Senate Bill 337** (Min, chapter 392, statutes of 2023), codifying the state’s goal (originally established through **Executive Order N-82-20** in 2020) to conserve 30% of the state’s lands and coastal waters by 2030 (30x30). California’s 30x30 initiative is part of an international movement to conserve natural areas across the planet to combat the triple planetary crisis of climate change, biodiversity loss, and pollution.



OPC **leads the state’s effort** to achieve 30x30 in coastal waters. The **Draft Decision-Making Framework for Coastal Waters**, released by OPC in June 2024, advances the state’s commitment to conserve 30% of California’s coastal waters by 2030 and will ultimately inform the evaluation of coastal waters that count as “conserved.”

This framework translates policy objectives for 30x30 Conservation Areas (protecting biodiversity, expanding access to nature, and building climate resilience) into objective, transparent, science-based criteria.

Following several months of robust public comment and tribal consultation last year, the final 30x30 Decision-Making Framework for Coastal Waters is anticipated to be presented for Council consideration and approval in 2025; with 16.2% of coastal waters currently conserved, adoption of the framework will help set priorities for the conservation of an additional 500,000 acres of coastal waters by 2030.

16.2%
of coastal waters
currently conserved

California 30×30 Partnership Summit

The **California 30x30 Partnership Summit** on October 3, 2024 brought together tribal leaders, policymakers, and community partners in Sacramento to advance the state’s goal of conserving 30% of its lands and coastal waters by 2030. This year’s Summit, hosted by the California Natural Resources Agency (CNRA), focused on three key themes – inspire, innovate, and integrate – and was centered on the importance of collaboration and partnership-building to durably protect California’s biodiversity. The California Natural Resources Agency also released the **30x30 Annual Progress Report**, highlighting success stories from across the state and our collective progress toward conserving 30% of California’s lands and coastal waters by 2030.



Intertidal Biodiversity DNA Barcode Library

The intertidal environment is fundamental to California’s marine biodiversity. However, intertidal habitats are impacted by changing climatic conditions and anthropogenic disturbances, including sea level rise, marine heatwaves, pollution, terrestrial runoff, and wildfires, all of which are expected to increase in both frequency and magnitude in the coming decades. To address concerns about environmental degradation and species loss in intertidal habitats, the California Legislature included a one-time General Fund appropriation of \$9.5 million in the Budget Act of 2023 to support the creation the Intertidal Biodiversity DNA Barcode Library.

In February 2024, **OPC approved \$9.5 million** to Coastal Quest to advance the development of an Intertidal Biodiversity DNA Barcode Library. The resulting DNA library will allow resource managers to better protect and conserve California’s rich biodiversity, allowing for new insights into species’ distributions and movements along the coast, and is consistent with the goals and directives of Executive Order B-54-18 and Executive Order N-82-20. This project will be the first of its kind at this scale, building from national efforts undertaken by the Smithsonian Natural History Museum and the federal National Aquatic Environmental DNA Strategy, to preserve and conserve intertidal genetic diversity at the ecosystem level.

California Artificial Reef Program Plan

Artificial reefs are human-made structures on the seafloor that may mimic some of the characteristics of a natural reef. As California seeks to achieve its ambitious goals related to climate and biodiversity, requests to construct artificial reefs to support a broad suite of ecological and socioeconomic benefits are increasing. To address knowledge gaps regarding the potential benefits and impacts of artificial reefs, as well as best practices for siting, design, establishing performance metrics, and monitoring, **OPC approved \$550,000** to support the development of a California Artificial Reef Program Plan in partnership with CDFW and California Sea Grant. The development of the Plan will include tribal consultation and public process to provide:

- Brief history of artificial reefs in California
- Summary of knowledge regarding artificial reefs in California and globally
- General criteria for design, materials, and location
- Proposed requirements for various types of artificial reefs, including reefs constructed for restoration, species enhancement, recreational opportunities, compensatory mitigation, shoreline protection and multi-benefit projects
- Potential benefits and risks of artificial reefs
- Monitoring recommendations
- Governance framework

Objective 3.2: Protect and Restore Kelp Ecosystems

Development of the Kelp Restoration and Management Plan & Advancing Kelp Forest Research and Restoration

To address the catastrophic loss of kelp across the state, and to adaptively manage these vital marine ecosystems, CDFW is leading the development of a statewide, ecosystem-based **Kelp Restoration and Management Plan (KRMP)** in partnership with OPC. The goal of the KRMP is to develop an adaptive, climate-ready approach to managing, protecting, and restoring giant and bull kelp forest ecosystems statewide. A Science Advisory Committee, composed of experts from across California and representing a broad scope of disciplines, and representing non-governmental conservation organizations (NGOs), divers, fishermen, local businesses, commercial harvesters, and tribes met throughout 2024 to identify and refine conditions that affect the health of kelp forests and to develop recommendations for management actions that can support the restoration of California kelp forests.

In December 2024, **OPC approved \$775,000**, in addition to \$5.6 million awarded for projects to **accelerate kelp research and restoration in 2023**, to support two projects that advance adaptative management and resilience of kelp forest ecosystems. This includes the first-ever assessment of commercial and recreational harvest for giant and bull kelp, and a comprehensive analysis of genetic diversity for giant and bull kelp across the state of California. Both projects directly informed the development of the KMRP by addressing critical knowledge gaps around kelp harvest potential and the role that genetics play in conferring climate resilience in kelp populations.

*September Photo of the Month: Wayne Kotow / Giant kelp (*Macrocystis pyrifera*) canopy off San Clemente, the southernmost of the Channel Islands.*



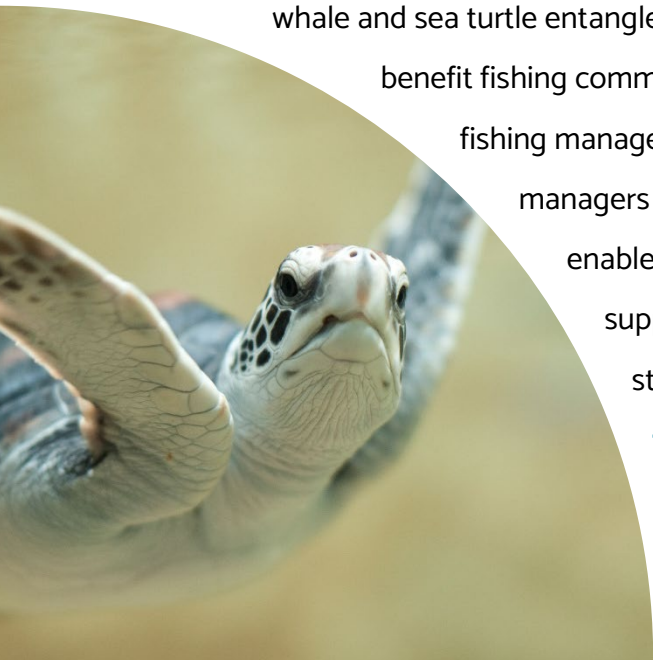
Objective 3.3: Support Sustainable Marine Fisheries and Thriving Fish and Wildlife Populations

Reducing Marine Life Entanglement in Fishing Gear

Reports of whale and marine life entanglement in fishing gear off the California coast have increased dramatically since 2014. Changing ocean conditions, changes in fishing effort, increased public awareness and reporting, and other factors, have likely contributed to this rise in reported entanglements.

The 2018-2019 Governor's Budget included a \$7.5 million General Fund appropriation to OPC to address whale and sea turtle entanglement in California fishing gear. Prior to 2024, OPC had invested nearly \$6 million to advance the 2019 Strategy for Protecting Whales and Sea Turtles & Ensuring Thriving Fisheries, resulting in a dynamic, data-driven, collaborative approach to fisheries management, helping to reduce entanglement risk. These funds supported a variety of projects, including **industry-led whale surveys**. The Nature Conservancy, in collaboration with the California Coast Crab Association, coordinated a multi-year pilot survey with 19 fishing vessel captains to conduct 22 whale surveys. The project demonstrated the value of community science to inform the real-time management of entanglement risk in the California commercial Dungeness crab fishery under the **Risk Assessment and Mitigation Program**.

In 2024, **OPC approved \$1.825 million** to support four projects identified in close partnership with the CDFW and administered by the Pacific States Marine Fisheries Commission to reduce the risk of whale and sea turtle entanglement in fishing gear, inform management efforts, and directly benefit fishing communities. These projects include the development of a ropeless fishing management portal which will allow fishermen and resource managers to track gear on the sea floor, the purchase of marked line to enable managers to identify the source of marine life entanglements, support for large whale entanglement response, and strengthening and expanding a community-based **ropeless fishing gear library**.



Objective 3.4: Improve and Protect Coastal and Ocean Water Quality

Once-Through Cooling Interim Mitigation

In April 2024, the State Water Resources Control Board (State Water Board) adopted a resolution and revision to the Interim Mitigation Payment Calculation for the Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling to ensure annual payments appropriately compensate for impacts to marine life based on current mitigation costs. OPC staff worked with the State Water Board to update the interim mitigation costing since the analysis of the 2012 Expert Review Panel (ERP II) was completed in 2012, based on data derived from mitigation projects initiated since the ERP II and meet the statutory directive of Senate Bill 846 (chapter 239, statutes of 2022). The adopted Interim Mitigation Resolution updates the following components of the interim mitigation payment:

- Default cost for entrainment increased from \$5.65 per million gallons to \$12.51 per million gallons.
- Default cost for impingement increased from \$0.80 per pounds of fish impinged to \$100.73 per pounds of fish impinged.
- The annual inflation escalator from 3% to at least 3% or greater reported by the California Department of Finance, whichever is greater.

The Resolution also applies the default entrainment cost multiplier to Diablo Canyon Nuclear Power Plan instead of a site-specific entrainment cost multiplier, and a site-specific cost multiplier of \$33.46 per pounds of fish impinged. An updated interagency Memorandum of Understanding between OPC, the State Water Board, and the State Coastal Conservancy is anticipated to be finalized in 2025, reflecting tribal and community priorities received between 2023 and 2024 during public listening sessions and tribal consultation.



Implementation of the Statewide Microplastics Strategy

OPC adopted a first-of-its-kind **Statewide Microplastics Strategy** in 2022, pursuant to Senate Bill 1263 (Portantino, chapter 609, statutes of 2018), which recommends early actions and research priorities to reduce microplastic pollution in California’s marine environment. Since the adoption of the Strategy, OPC has worked with federal, state, and local partners to share information and identify priority investments, such as the development of a statewide plastics monitoring network to fill critical knowledge gaps and inform management action.

OPC approved over \$4 million to advance key projects in 2023 that address these knowledge and data gaps, and to meet the priority objectives outlined in the Statewide Microplastics Strategy: Research, Monitoring, and Implementation/Pollution Prevention.

These projects are initiated and ongoing, with final completion dates ranging from 2025 to 2026.

Statewide Plastics Monitoring Plan: OPC approved and initiated two foundational projects were approved and initiated that build from past OPC investments (ex: **Trash Monitoring Methods and**

Assessments Playbook) to support the development of a coordinated statewide plastics monitoring network:

- Microplastics field sample collection method standardization in ambient water, stormwater, sediment, and biota, such as fish tissue and shellfish.
- Development of statewide plastic (large debris) and microplastic monitoring plan.

In 2024, OPC, in partnership with the San Francisco Estuary Institute (SFEI) and the State Water Board through the Water Quality Monitoring Council, has actively advanced the development of consistent, coordinated Statewide Plastics Monitoring Plan. This Plan is intended to inform a statewide plastics monitoring network to leverage existing data collection requirements and efforts, and establish a pilot program by the end of 2025 to establish a baseline of plastic and microplastic contamination statewide, evaluate impacts, track the state's progress in reducing plastic pollution, and inform future management measures to prevent the proliferation of plastics in California's aquatic environment.

Early public engagement took place March – February 2024 through **virtual webinars** to receive public feedback and include community priorities in the development of the plan, to increase public awareness of state monitoring efforts related to plastic pollution, and to understand where existing efforts are taking place and could contribute to a statewide monitoring network. A Draft Statewide Plastics Monitoring Plan is anticipated to be released for public comment in 2025.

California Coastal Cleanup Day: 40th Anniversary

California Coastal Cleanup Day celebrated its 40th anniversary on September 21, 2024. Led by the California Coastal Commission, Coastal Cleanup Day is a volunteer-driven event that takes place in almost every California county from the coast to inland waterways. Coastal Cleanup Day has led to the successful diversion of trash and plastic debris from the ocean and provided a long-term dataset on plastic pollution, including data on the top ten items collected over the last several decades. To participate in this year's Coastal Cleanup Day, visit the **California Coastal Commission webpage** to locate a site near you.

Ocean Dumping: dichloro-diphenyl-trichloroethane (DDT)

DDT, an insecticide banned in 1972, has harmful impacts on wildlife and potential carcinogenic effects on humans. The unknown extent and impacts of deep ocean DDT and associated chemicals (DDT+) initiated a call to action by researchers, national and state leadership, and the broader Southern California community. The California Legislature appropriated \$5.6 million to the State Water Board in 2022 to provide financial assistance for DDT cleanup near Southern California, matching a \$5.6 million federal investment in DDT+ research.

The University of Southern California (USC) Sea Grant Program and the California Sea Grant Program jointly released **A Deep Ocean DDT+ Research Needs Assessment for the Southern California Bight** in January 2023 and a public-friendly **storymap** of the results. This report, in partnership with OPC and state partners, informed the **competitive selection of four projects** to understand the extent, migration, and risk of community exposure to DDT+. **Community meetings** were held both in person and virtually in January and October 2024 to introduce DDT scientists, discuss their latest findings on deep-water DDT pollution, and how DDT could be impacting humans and wildlife.



California's International Leadership to Conserve Biodiversity and Protect Marine Ecosystems

United Nations Biodiversity Conference (COP 16)

In October 2024, OPC joined California leaders, including Secretary Crowfoot and legislative members, to showcase California's leadership on biodiversity at the 16th meeting of the **United Nations Biodiversity Conference** (the 16th Conference of Parties, or COP 16) in Cali, Colombia. The Conference focused on implementation of the **Kunming-Montreal Global Biodiversity Framework**, which was adopted by more than 195 countries at COP 15 in Montreal in 2022 and aims to halt and reverse biodiversity loss by 2030. California has been an official observer to the United Nations Convention on Biological Diversity since 2021 and, as a strong champion for biodiversity and climate action at the subnational government level, has become a leading voice in these international convenings.



Through speaking engagements, panel discussions, and meetings with national and subnational leaders from across the globe, **California highlighted its progress** toward conserving 30% of state lands and coastal waters by 2030 and showcased that protecting nature and fighting climate change are essential for economic security and prosperity. COP 16 also provided a critical opportunity to strengthen international partnerships established in Montreal, including the High Ambition Coalition Subnational Government Task Force, which brings together regions from across the world that have committed to achieving the 30x30 target and is co-led by California and Quebec. Now more than ever, subnational leadership is needed to conserve and protect the world's biodiversity, and OPC looks forward to continuing our strong international engagement in the lead-up to the next biodiversity COP.

United Nations Intergovernmental Negotiations on Plastic Pollution (INC-4)

OPC has a long-standing commitment to address and prevent marine debris and plastic pollution, beginning with an **OPC Resolution on Reducing and Preventing Marine Debris** in 2007, subsequent California Ocean Litter Strategy (OLS) in 2008, and its 2018 update to the **California Ocean Litter Strategy**. OPC endorsed the **Top Ten Recommendations to Address Plastic Pollution in California's Coastal and Marine Ecosystems** in 2021, which include the recommendation for OPC to champion support for a United Nations Treaty on Plastic Pollution, and later adopted the nation's first **Statewide Microplastics Strategy** in 2022.



To advance the efforts to develop a global treaty to end plastic pollution, OPC participated in the fourth United Nations Intergovernmental Negotiating Committee (INC-4) session in Ottawa, Canada in April 2024, alongside representatives from the Department of Resources Recycling and Recovery (CalRecycle). OPC **highlighted California's leadership** and actions taken to reduce and prevent plastic pollution through the **Statewide Microplastics Strategy** and emphasized source reduction as a key solution, sharing insights on microplastics research and policy implementation with other local and regional governments around the globe.



Goal 4: Support Ocean Health Through a Sustainable Blue Economy



Objective 4.4: Guide Sustainable Renewable Energy Projects

Informing Offshore Wind Development

Assembly Bill 525 Strategic Plan for Offshore Wind Development. Assembly Bill 525 (Chiu, chapter 231, statutes of 2021) directed the California Energy Commission (CEC) to complete and submit a strategic plan for offshore wind development in federal waters off the California coast, in coordination with the California Natural Resources Agency. In July 2024, the California Energy Commission adopted the final **Assembly Bill 525 Offshore Wind Energy Strategic Plan**. This

Strategic Plan covers a range of topics pertaining to offshore wind development in California, including the permitting processes for offshore wind facilities, potential impacts on coastal resources, fisheries, tribal, and underserved communities. The Plan also includes a discussion of strategies to address potential impacts such as avoidance, minimization, mitigation, and adaptive management informed by environmental monitoring.

Offshore Wind Environmental Monitoring Guidance. With **funding from OPC**, the California Marine Sanctuary Foundation launched development of **comprehensive environmental monitoring guidance for offshore wind** in Spring 2024. Five working groups of technical experts were convened to support the project (Marine Mammals and Sea Turtles; Birds and Bats; Data, Technology and Innovation; Habitats and Ecosystems; and Fish and Invertebrate Ecology). The working groups met regularly through 2024 and will continue through 2025. The guidance will serve as a foundational framework for building a comprehensive monitoring program statewide, offering insights into the long-term impacts of offshore wind development from local to regional scales. Interim guidance is expected to be released in Spring of 2025 and final guidance will be released in Spring of 2026.

Tools to Inform Offshore Wind

Humboldt Bay Eelgrass Distribution Mapping and Spatial Modeling. Seagrasses are one of the most critical and threatened marine habitats in the world and provide a broad range of ecosystems services including nursery areas for marine species and the commercially important Dungeness crab, food for birds and other marine species, carbon sequestration, nutrient cycling, sediment stabilization. With the proposed expansion of the Port of Humboldt Bay to support offshore wind infrastructure, understanding of the status of the eelgrass population is critical to inform this expansion and ensure the long-term sustainability of eelgrass in Humboldt Bay.

OPC approved an updated eelgrass survey by Merkel & Associates, in collaboration with tribal and local partners, to update the eelgrass distribution mapping and habitat suitability model (HSM) for eelgrass to identify and understand impacts to future habitat baywide. The HSM is built upon a similar effort that OPC had invested in for San Francisco Bay, the modeling efforts for which

completed in early 2024. This project integrated the expertise and data sources from a broad consortium of technical stakeholders to develop a state-of-the-art HSM intended to maximize the effectiveness and efficiency of eelgrass habitat protection, restoration, and mitigation in San Francisco Bay. The tool is intended to be transferable for use by resource managers and policy makers to strategically target eelgrass protection/restoration efforts across the state.

2024 California Fisheries Delays & Closures

In 2024, several California fisheries experienced closures and restrictions in response to climate change and a variety of other threats. Low salmon abundance forecasts due to adverse habitat conditions caused by drought and wildfire, the reclassification of Quillback rockfish as federally overfished, and ongoing entanglement risk for large whales and turtles resulted in continued restrictions for California fisheries.

Salmon. In response to continued low abundance forecasts driven by historic drought, wildfires, impacts to spawning habitat, harmful algal blooms, and shifting ocean conditions, California closed commercial and recreational salmon fisheries for the second consecutive year. This continued closure has severely impacted fishing communities and California Native American tribes who prize salmon for its economic and cultural value. In response to the myriad threats to this vital species, California is taking bold actions to restore salmon populations through implementation of the **California Salmon Strategy for a Hotter Drier Future.**



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Governor Newsom at Klamath River dam removal project.

Notably, this year marked the completion of the largest dam removal in history; nearly 400 miles of the Klamath River was reopened to salmon and other native fish species. This fall, Chinook salmon were spotted upstream of removed dams for the first time in over 100 years! While it may take several years for salmon to repopulate upstream spawning grounds, this represents an incredible milestone for salmon restoration, and highlights the value of state, federal, and tribal partnerships in protecting this iconic species.

Groundfish. In 2024, **California regulations** provided additional fishing opportunity while protecting Quillback rockfish, a species declared overfished in 2021, by alternating between allowing fishing inshore (less than 20 fathoms) and offshore (greater than 50 fathoms). California officials also subdivided the central Groundfish Management Area at Point Lopez to allow greater fishing opportunity since Quillback rockfish are rarely sighted south of the point. While these regulations were more permissive than the nearshore closures driven by Quillback rockfish in 2023, they still resulted in lost fishing opportunity across the state. These actions highlight the value of flexible management to protect imperiled species while maximizing fishing opportunity and underline the ongoing need for accurate species data to inform management decisions.

Dungeness Crab. California opened the 2023-2024 Commercial Dungeness crab season north of Point Arena on January 5, 2024, and statewide on January 18, 2024. The season opener was delayed due to entanglement risk with marine megafauna. Despite these delays, in 2024, five humpback whales were entangled in California Commercial Dungeness crab fishing gear and thirteen humpbacks were entangled in unidentified gear. CDFW will continue to conduct risk assessments to reduce the risk of large whale and sea turtle entanglement for the 2024-2025 season. The state continues to explore methods to mitigate the impact of this and other trap fisheries on whales and leatherback sea turtles, while minimizing costs to fishermen and local economies. Current strategies include piloting electronic monitoring devices, implementing line marking to identify lost fishing gear, developing more accurate predictors of whale and sea turtle distributions, and testing innovative ropeless fishing gear that reduces vertical line in the water.

These three fisheries provide a stark reminder of the ongoing and increasing risk that climate change, and other threats, pose to culturally and economically valuable fish species. California has already taken steps towards restoration of key habitats and improved monitoring and management of fish species. However, as environmental change continues to accelerate, California must keep pace with innovative strategies and increased support for fishing communities.



Completed Proposition 84 Projects

In 2018, the Council **unanimously approved 24 research projects** totaling \$6 million in funding through the Proposition 84 Competitive Grants Program. The projects were administered by California Sea Grant and University of Southern California (USC) Sea Grant to support state priorities related to sea level rise adaptation and coastal resilience, coastal sediment management, marine pollution, and marine renewable energy. Projects were completed with final data and deliverables received in 2024.

Projects administered by University of Southern California Sea Grant: sea level rise adaptation and coastal resilience, coastal sediment management, marine pollution, and marine renewable energy:

- **Coastal Flood Projections and Socioeconomic Impacts Due to Sea Level Rise and Storms for the North Coast Using the Coastal Storm Modeling System (CoSMoS).**
P. Barnard, United States Geological Survey (USGS), M. Fitzgibbon, Point Blue Conservation Science, and M. Hayden, Our Coast Our Future. Administered by USC Sea Grant
- **Groundwater inundation hazards and socioeconomic impacts due to sea level rise across the California coast.** *P. Barnard, United States Geological Survey (USGS), M. Fitzgibbon, Point Blue Conservation Science, and K. Befus, University of Arkansas. Administered by USC Sea Grant.*
- **Tribal Intertidal Digital Ecological Surveys (TIDES) Project: Using Large-Area Imaging to Assess Intertidal Vulnerability to Sea Level Rise with Coastal Indigenous Nations.**
J. Smith and S. Giddings, University of California, San Diego. Administered by USC Sea Grant.
- **Using Green Engineering Techniques to Restore Coastal Sand Dunes in Border Field State Park, San Diego, CA.** *H. Elwany and F. Scarelli, Coastal Environments, Inc, D. Hubbard, University of California, Santa Barbara. Administered by USC Sea Grant.*

- **Statewide assessment of California cliff erosion and retreat.** A. Young and M. Merrifield, *University of California, San Diego. Administered by USC Sea Grant.*
- **Humboldt Coastal Resilience Project (HCRP): Analyzing beach-dune morphodynamics and vegetation controls on coastal resiliency to develop decision support tools and adaptation measures for sea level rise and extreme events along the Eureka Littoral Cell, Northern California.** I. Walker, *Arizona State University* and A. Pickart, *United States Fish and Wildlife Service. Administered by USC Sea Grant.*
- **Interaction Between Microplastics and Pathogen Pollutants in Marine Ecosystems: Implications for Seafood Safety.** K. Shapiro, *University of California, Davis* and C. Rochman, *University of Toronto. Administered by USC Sea Grant.*
- **Advancing Portable Detection Capabilities of Harmful algal Bloom species in California Waters.** H. Bowers, *San Jose State University* and J. Smith, *San Jose State University. Administered by USC Sea Grant.*
- **Multiple Stressors and Toxic Pseudo-nitzschia Blooms in California Waters: Understanding the Complex Interactive Impacts of Nutrients, Temperature, and Carbonate Chemistry.** D. Hutchins, *University of Southern California* and F. Feixue, *University of Southern California. Administered by USC Sea Grant.*
- **Linking Terrestrial Pollution to Estuarine Water Quality: Quantification of the Role of Groundwater in the Transport, Transformation, and Removal of Agricultural Pollutants in Elkhorn Slough, CA.** M. Zimmer, *University of California, Santa Cruz. Administered by USC Sea Grant.*
- **Wave Energy Conversion in California under the present and future Climate and economic feasibility analysis of different technologies (WE3C).** B. Reguero, *University of California, Santa Cruz. Administered by USC Sea Grant.*

- **California Offshore Wind: Workforce and Grid Integration Analysis.** *R. Collier, University of California, Berkeley. Administered by USC Sea Grant.*

Projects administered by California Sea Grant: ocean acidification and hypoxia, and sustainable fisheries and aquaculture:

- **Improving management under MLMA by accounting for effects of MLPA MPAs on fisheries.** *L. Botsford, University of California, Davis. Administered by California Sea Grant.*
- **Benefits beyond biomass: Bio-physical feedbacks within Marine Protected Areas may promote ecosystem resilience in the face of global climate change.** *A. Stier, University of California, Santa Barbara. Administered by California Sea Grant.*
- **A DNA Metabarcoding Approach to Monitoring Fish Spawning and Population Connectivity in Coastal Southern and Central California.** *R. Burton, University of California, San Diego. Administered by California Sea Grant.*
- **A multi-faceted approach to enhance sustainability of the California spiny lobster fishery.** *K. Hovel, San Diego State University. Administered by California Sea Grant.*
- **Understanding ocean warming impacts on shrinking body sizes of California fishes Linking pattern & mechanism to support future sustainable fisheries.** *L. Komoroske, University of Massachusetts, Amherst. Administered by California Sea Grant.*
- **The population Dynamics of Southern California Paralabrax spp. in the face of a changing ocean.** *B. Semmens, University of California, San Diego. Administered by California Sea Grant*
- **Habitat characterization, fishery development and stock structure of swordfish off California.** *C. Sepulveda, Pflieger Institute of Environmental Research. Administered by California Sea Grant.*

- **Sea Feeds: Identification and culture of Californian marine macroalgae capable of reducing greenhouse gas production from ruminant livestock.** *L. Gardner, San Jose State University. Administered by California Sea Grant.*
- **Present and Future Climatic Drivers of Domoic Acid Toxicity in Coastal Ecosystems of California.** *W. Cochlan, San Francisco State University. Administered by California Sea Grant.*
- **Assessing the combined effects of ocean acidification and warming on disease susceptibility and restoration success of the critically endangered white abalone.** *K. Aquilino, University of California, Davis. Administered by California Sea Grant.*
- **Geography of Stress: Impacts of Ocean Acidification Along the California Coast.** *T. Hill, University of California, Davis. Administered by California Sea Grant.*
- **An ecophysiological framework to assess hypoxia driven habitat loss in the California Current Ecosystem.** *C. Deutsch, Princeton University. Administered by California Sea Grant.*



December Photo of the Month: Christine Esler / Sunset at Morro Bay



OPC Science Advisor

In 2024, as OPC Science Advisor, the **Ocean Science Trust (OST)** convened key technical experts to advance the scientific understanding of several ocean and coastal issues in California. Together, these activities and projects inform and ensure that OPC's policy decisions are aligned with best available science.

Accomplishments & Ongoing Efforts

State of California Sea Level Rise Guidance Update

Through 2022 and 2023, OST convened an interdisciplinary and multi-institutional **Task Force** of scientific experts, policymakers, and boundary spanners to inform the **Sea Level Rise Guidance: 2024 Science and Policy Update** (Guidance). Scientific experts on the Task Force synthesized the best available and most recent advancements in sea level rise science to update California's current statewide sea level rise projections. Based on those updated projections, OPC developed policy and planning recommendations for how to prepare for sea level rise in California.

2025 California Coast & Ocean Report Card

Through 2023 and 2024, OST convened the OPC SAT to provide scientific advice for developing science-based indicators to form the basis of the **2025 California Coast and Ocean Report Card**. In February 2024, an **initial list of indicators** was developed by the OPC Science Advisory Team. This initial list was refined through thoughtful and iterative dialogue with partners focused on relevance, data availability, and OPC priorities.

OPC and OST worked in partnership throughout 2024 to convene scientific experts to continue this work and develop the 2025 California Coast and Ocean Report Card. The Report Card is intended to serve as a tool to inform the public and decision-makers about the status of ocean health and to highlight areas where the state can focus solutions. Input is welcome from the public and especially from monitoring programs, community science groups, science networks, and community

organizations. OST **solicited public input** on this inaugural California Coast and Ocean Report Card through December 9, 2024.

30x30 Technical Advisory Panel

OPC and OST convened a **Technical Advisory Panel**, beginning in December 2023, to support a science-informed approach to 30x30 in coastal waters. Panel members were identified by soliciting informal nominations from the OPC Science Advisory Team, as well as OST's and OPC's scientific networks, in consultation with OPC staff. Members include leaders in marine ecology, fisheries, marine spatial planning, and environmental justice.

The panel met throughout 2024 to develop clear scientific guidance to translate policy objectives for 30x30 Conserved Areas – such as durability, effective management, and biodiversity benefits – into clear and objective criteria. OPC worked closely with OST to develop the **Draft Decision-Making Framework for Coastal Waters** and is in the process of finalizing the framework for Council adoption in 2025.



OPC Summer Internship Program

In summer 2024, OPC hosted a cohort of five undergraduate interns who helped advance priorities in OPC's Strategic Plan to Protect California's Coast and Ocean while gaining meaningful professional experience within state government.



Anushka Vijay (Junior, Stanford University studying Earth Systems, concentration in Human Environmental Systems and Feminist, Gender, and Sexuality Studies) joined OPC through a merit-based award from the Haas Center for Public Service's Undergraduate Fellowships Program at Stanford University, the seventh year of an ongoing partnership between OPC and Stanford.



Four students were selected for the fourth year of OPC's ten-week paid summer internship program, which is focused on providing undergraduate college students with the opportunity to build a foundational background, professional experience, and robust overview of California's coastal and ocean science, policy, and management work.



Mina Adabag (Sophomore, University of California, Berkeley, studying Molecular Environmental Biology)

Lawrence Chen (Senior, University of California, Davis, studying Marine and Coastal Sciences, emphasis in Marine Ecology and Organismal Biology)



Leah Hawkins (Senior, California Polytechnic State University, San Luis Obispo, studying Marine Sciences)

Arianna Lawrence (Junior, Pomona College, studying Public Policy Analysis, concentration in Environmental Analysis)



During their internship, each student worked closely with staff mentors projects and programs ranging from advancing California’s goal of conserving 30 percent of state coastal waters by 2030 (30x30) to climate-ready fisheries to sea level rise planning and adaptation. Each student had the opportunity to tailor the internship based on their interests, including supporting interagency meetings, engaging with external partners, and incorporating equity and community considerations into OPC projects and programs. While the goal of OPC’s summer internships is to provide students with an opportunity to increase their skills, knowledge, and exposure to ocean and coastal conservation in California, the benefit OPC has received from their effort is significant. We look forward to seeing what the future holds for these dynamic and dedicated students who will surely bring positive change to the future of ocean conservation.



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