



## 2022 Accomplishments



Humpback whales feed in sanctuary waters. Photo: Douglas Croft

### ACCESS Research Cruise

In May, staff conducted a 10-day Applied California Current Ecosystem Studies (ACCESS) research cruise aboard the R/V *Fulmar* from northern Monterey Bay to Half Moon Bay alongside scientific partners Point Blue Conservation Science, with support from the National Marine Sanctuary Foundation. ACCESS data includes sightings of large whales, seabirds, marine vessels, marine debris, and crab pots. Water samples, plankton, and larval fish were collected using a hoop net and tucker trawl along designated transects. The surveys provide real time resource information, as well as data on ecosystem health, to help inform management decisions such as whale ship strikes and whale entanglement actions used by other agencies.

### Multi-year Report on Stormwater Pollutants

For the first time in 22 years of monitoring water quality during First Flush (the first storm of the season) in seven Monterey County cities, a decline in urban pollutant concentrations was reported. In partnership with the California Marine Sanctuary Foundation and Monterey Regional Stormwater Management Program, a new report summarizes results from 34 storm drain outfalls from 2000-2021. Cities implementing best management practices and public education have resulted in decreased concentrations of nitrate, copper, lead, and zinc detected in stormwater runoff. The report highlights how long-term water monitoring programs, such as First Flush, are critical to tracking water quality trends and strengthening collaborations with local jurisdictions to increase protection of sanctuary resources.

### Sanctuary Visitor Centers Reopen

After closures in March 2020 due to the COVID-19 pandemic, both the Sanctuary Exploration Center and the Coastal Discovery Center reopened to the public in summer 2022. Staff resumed operations, school field trips, and public and volunteer programs. Several exhibits were updated with recent sanctuary science, including the topics of microplastics, monitoring underwater sounds, and the discovery of the “octopus garden” near Davidson Seamount.

### New Coastal Signage

A comprehensive signage project addressed the need to replace outdated wayside interpretive signs along sanctuary coastal access areas from Cambria to Half Moon Bay. Working with partners City of Pacific Grove, City of Santa Cruz, California State Parks, City of Monterey, California Department of Fish and Wildlife (CDFW), Monterey Bay National Marine Sanctuary Foundation, and several harbor district offices, staff completed 40 new signs to educate the public on resource protection, sanctuary regulations, state marine protected areas, and local marine life.



Coastal sign near public access area. Photo: Amity Wood/NOAA

## Vessel Traffic Analysis Report

Vessel traffic was identified as a major issue of concern during designation of the sanctuary due to frequent use of coastal transit routes by large vessels, such as cargo ships. These vessels pose serious environmental threats from potential collisions, groundings, and spills. In June, the [Monterey Bay National Marine Sanctuary Vessel Traffic Analysis](#) report was released that summarized vessel traffic data from 2020 and 2021. The report analyzed Automated Information System data from Marine Traffic and the U.S. Coast Guard to evaluate compliance by cargo vessels and tankers with the International Maritime Organization (IMO) recommended vessel tracks. A customized alert zone was set up in [Marine Traffic](#) between Point Sur and Pigeon Point with a boundary 1.5 nautical miles east of the northbound IMO recommended track for vessels 300 gross tons and above. Monthly deviation rates through the alert zone and vessel speeds were analyzed to help inform resource managers about the risk of ship strikes to whales, in addition to assessing compliance with the IMO recommended tracks.

## Whale Entanglement Training and Responses

West Coast sanctuaries identified large whale entanglements as a priority resource protection issue. In 2022, reported whale entanglement continued to be higher than what had occurred historically prior to 2014, although reports were less than what was received during the peak years from 2015-2018. NOAA Fisheries confirmed 30 entangled whales off the coasts of Washington, Oregon, and California, or off the coast of other countries and states but entangled in U.S. west coast commercial fishing gear. The West Coast Marine Mammal Stranding Network, a coordinated effort among NOAA, cooperating scientific institutions, wildlife and fisheries agencies, federal and state law enforcement, and a network of trained volunteers, respond to whale entanglements. According to the [2022 West Coast Whale Entanglement Summary](#), 12 of the 30 whale entanglements were confirmed as seen in the sanctuary, with humpback whales being the most prevalent. Efforts by fishing fleets to follow best practices are helping to curb the number of entanglements, as well as commercial Dungeness crab fishery closure actions by CDFW to avoid overlap with migrating humpback whales. Coordinated actions with regulatory agencies and stakeholders are critical to preventing or reducing large whale entanglements.

## Deep-sea Observatory at Sur Ridge

Sanctuary staff continued a collaboration with the Monterey Bay Aquarium Research Institute to revisit the Deep-sea Coral and Sponge Observatory at Sur Ridge in March and June. Deep-sea expeditions recovered and deployed current meters, surveyed discrete transects, as well as sampled animals for isotopic and genetic analyses. Results of a year-long camera deployment at the observatory were published in "[Phenology in the deep sea: seasonal and tidal feeding rhythms in a keystone octocoral](#)," characterizing intra-annual dynamics of feeding activity for the deep-sea coral *Paragorgia*. The study provides the first evidence of behavioral rhythms in a coral species living deeper than 3,280 feet.

## West Coast Deep-sea Coral Initiative Report

NOAA's Deep-Sea Coral Research and Technology Program concluded a four-year West Coast Deep Sea Coral Initiative, highlighted in a [2022 Report to Congress](#). Research expeditions occurred within central California's marine protected areas, Essential Fish Habitat Conservation Areas, and Sanctuary Ecologically Significant Areas of Monterey Bay National Marine Sanctuary. Survey locations included Cabrillo Canyon, Soquel Canyon, West of Carmel Canyon, Point Lobos, La Cruz Canyon, Sur Canyon slot canyons, and Davidson Seamount. Scientists from California State University Monterey Bay and Moss Landing Marine Laboratories led surveys off the R/V *Fulmar* to characterize coral and sponge communities from 131-1,148 feet. These depths represent a poorly characterized area of the sanctuary that is deeper than standard scuba diving depth and shallower than most remotely operated vehicle surveys. The data gathered will improve scientific knowledge of deep-sea coral communities to better support management decisions.



Black coral (*Alternatipathes* sp.) on Davidson Seamount.  
Photo: MBARI/NOAA

## Agricultural Plastic Pollution Reduction

In September, staff presented at the 7<sup>th</sup> International Marine Debris Conference to highlight a collaborative effort with the California Marine Sanctuary Foundation on addressing the marine debris source of agricultural plastic pollution. Since 2019, staff have worked with agricultural stakeholders to identify solutions toward plastics replacement, reduction, recycling, and management. Efforts include the establishment of an irrigation drip tape collection center with the local waste management facility, and working with the strawberry industry and academic researchers to assess benefits and trade-offs related to the implementation of biodegradable plastic alternatives to plastic film mulch. The primary goal is to prevent pollution from two sources of agricultural field plastics—irrigation drip tape and plastic mulch.

## Davidson Seamount Research Cruise

As part of a long-term study to better understand the complex relationship between deep-sea currents and upwelling of nutrient-rich water to the surface above Davidson Seamount and its effect upon large concentrations of predators and their prey, staff conducted research aboard NOAA's FSV *Bell M. Shimada* to the Davidson Seamount Management Zone in July. The data collected included 2,869 marine mammal and 513 seabird sightings on 400 statute miles of surveys. Electronic instruments were deployed to depths of up to 6,500 feet for the collection of water samples analyzed for nutrients and environmental DNA. Tucker trawls and hoop net casts provided a sampling of available prey species, with additional manta trawl casts for the collection of surface microplastics.

## 12<sup>th</sup> Annual Whalefest Monterey

Each year, numerous community partners celebrate the sanctuary and whale migration during Whalefest Monterey held at Old Fisherman's Wharf. In March, the weekend-long event included exhibitors, a science symposium, music, and family friendly activities for thousands of attendees. This year's theme celebrated the 30th anniversary of Monterey Bay National Marine Sanctuary and 50th of the National Marine Sanctuary System. During the symposium, staff presented on 30 years of whale conversation across the system, highlighting collaborations in science, conservation, and outreach efforts to protect whale populations in sanctuary waters.



Vessel groundings pose threats to sensitive habitats.  
Photo: Bridget Hoover/NOAA

## Emergency Response Incidents Summary

Throughout the year, multiple vessel groundings, sinking, and spills occur in the sanctuary, threatening sensitive habitats and wildlife from the release of pollution and debris. In 2022, staff initiated emergency responses to seven incidents. Timely actions included conducting damage assessments and planning the appropriate response and cleanup effort in coordination with U.S. Coast Guard, NOAA Office of Law Enforcement, state and local agencies, and vessel owners, to significantly reduce the potential for serious environmental damage. Coordinated actions are critical to preventing or reducing potential lasting impacts from these incidents to sanctuary resources.

## Reducing Disturbances to Harbor Seals

Several Pacific Grove beaches are pupping areas for Pacific harbor seals from February to June each year, making them vulnerable to human disturbance. Sanctuary Bay Net volunteers are instrumental in monitoring and educating the public about local harbor seal populations, and noted negative impacts to pupping birth rates from early 2021 and 2022. After consultation with sanctuary staff, the Pacific Grove City Council unanimously passed a new amendment to an existing harbor seal protection ordinance to further reduce noise disturbance from road construction during the pupping season. This included provisions for the City to confer with local NOAA offices regarding the duration of pupping season and how to mitigate any emergency road work repairs needed during that time. The sanctuary's resource protection strategies include working alongside municipalities and community members to reduce marine mammal disturbances through collaborative policies and management practices.



Recipient of the Ed Ricketts Memorial Award. Photo: Amity Wood/NOAA

### Annual Ricketts Lecture and Award

In October, the Ed Ricketts Memorial Award was presented to Dr. Rick Starr, research faculty at Moss Landing Marine Laboratories. Dr. Starr delivered a public lecture entitled “*Chasing Seascapes: Patterns of Scale and Connectivity in Coastal Oceans*,” highlighting the science of seascape ecology and how it is advancing scientific understanding of coastal ocean habitats, species-habitat associations, and species connections. The Ed Ricketts Memorial Award was created in 1986 to honor scientists who have exhibited exemplary work throughout their career and advanced the status of knowledge in the field of marine science.

### Sanctuary Anniversary Events

2022 marked the 50th anniversary of the National Marine Sanctuary System (NMSS) and Monterey Bay National Marine Sanctuary’s 30th, which was celebrated through a series of public events. To commemorate the NMSS 50th milestone, the U.S. Postal Service (USPS) released 16 different [Forever® stamps](#) depicting diverse and iconic wildlife and ecosystems. In August, USPS held a First Day of Issuance ceremony at the Sanctuary Exploration Center in Santa Cruz, and speakers gave remarks on the significant connections made by national marine sanctuaries with local communities on ocean conservation and stewardship. In September, staff hosted “*Sanctuary Fest: enjoy, learn, protect*” at the Exploration Center and featured partner exhibitors, fish printing, and sanctuary science talks. Finally, staff coordinated free ocean recreation activities for the public such as paddle boarding from Cowell Beach and kayaking from the Santa Cruz Wharf.

### Tanker’s Reef Urchin and Kelp Project

Tanker’s Reef is an underwater area off Del Monte Beach in Monterey, where trained scuba divers with a valid fishing license can carefully cull purple and red urchins without harming the surrounding marine habitat within a defined grid area. Sanctuary divers and CDFW collaborators conducted underwater surveys of urchins and kelp along 18 transects each in the control area and the grid where urchin culling occurred. Kelp was found in both areas, but much more in the grid, where urchin densities were lower than in the control. On-going surveys by agency biologists provide an unbiased view of progress on this effort, and survey data are informing future plans to restore kelp forests in central California. The CDFW regulatory change for urchin culling will conclude in April 2024.

### Expanding Outdoor Education

In partnership with the National Marine Sanctuary Foundation, staff received a four-year educational grant from California State Parks Outdoor Equity Program to advance California’s “Outdoors for All” Initiative. The project serves students and families from Watsonville with in-class programs and field trips to the Sanctuary Exploration Center for 4th and 5th grade students annually, with a cumulative family “Dia de la Comunidad” event at the Sanctuary Exploration Center with bilingual programs. The project also supports internships for community college students to help lead programs. In the coming years, this work will enable staff to build stronger partnerships with teachers, schools, and families, while supporting multi-generational learning in the Watsonville community.

### Marine Protected Areas Brochure

Through a grant to the Santa Cruz and Monterey Marine Protected Areas (MPA) Collaborative Networks, staff worked with partners to develop a [Visitor’s Guide to Marine Protected Areas of the Central Coast](#) brochure and [website](#) to educate visitors about many state MPAs and the federally protected Monterey Bay National Marine Sanctuary and California Coastal National Monuments. More than 55,000 copies were distributed to 260 tourism outlets in the Santa Cruz and Monterey area, as well as the San Jose, Oakland, and Monterey airports. Visitors were directed to free activities along the sanctuary’s coast, including the Sanctuary Exploration Center in Santa Cruz.

## PISCO Kelp Sampling

In 1999, the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) designed and initiated a large-scale, long-term monitoring study of kelp forest ecosystems along 870 miles of coast stretching from southern California to southern Oregon. The study region spans distinct ecological and biogeographical provinces, and these data have been used to inform fisheries management, design and evaluate California's state marine protected areas, and assess the ecological consequences of climate change (e.g., marine heatwaves). Sanctuary staff co-authored the paper "[\*Large-scale, multidecade monitoring data from kelp forest ecosystems in California and Oregon\*](#)" describing details of the monitoring project.

## Diving Program

The sanctuary's dive unit consists of 10 scuba divers from Monterey Bay and Greater Farallones national marine sanctuaries, the West Coast Regional Office, and NOAA Fisheries. Sanctuary research ecologist and unit diving supervisor, Dr. Steve Lonhart, manages the administrative duties associated with the dive team. In November, Dr. Lonhart became the National Ocean Service deputy line office diving officer, which includes a seat on the NOAA Diving Control and Safety Board overseeing all NOAA diving operations.

## Healthy Soils Projects

A California Department of Food and Agriculture funded Healthy Soils Projects aims to store carbon dioxide (CO<sub>2</sub>) in the soils of working land as a climate mitigation measure. In collaboration with the California Marine Sanctuary Foundation and JSM Organics, the project concluded in August and reported the sequestration (process of capturing and storing atmospheric CO<sub>2</sub>) of 718 tonnes of CO<sub>2</sub> into the soil of a 14 acre study plot during the three year period. This is equivalent to the annual offset emissions of 52 cars. Increased carbon in soil can benefit the grower as crop yields increase, and increased soil carbon holds more water and reduces the need for irrigation.



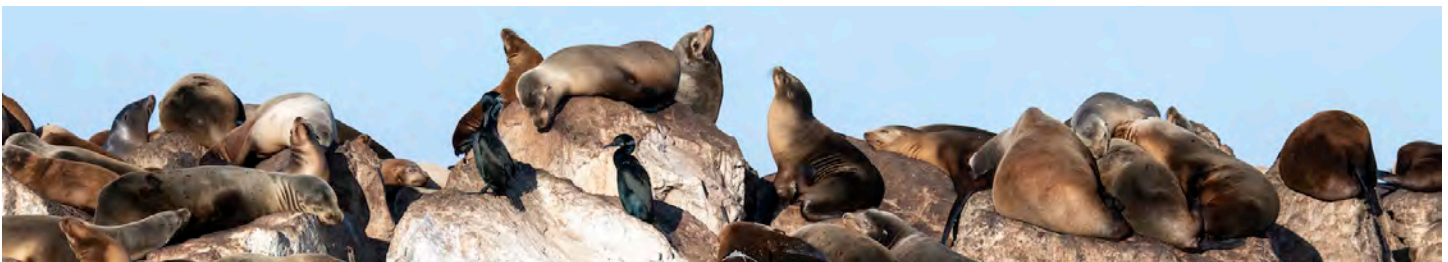
Participants enjoying recreational fishing in the sanctuary.  
Photo: Lisa Uttal/NOAA

## Get Into Your Sanctuary Event

Annual Get Into Your Sanctuary activities featured a collaboration with Shared Adventures for the Day on the Beach held in July. The community-based event hosted 300 individuals with diverse developmental, physical, and cognitive disabilities, engaging in ocean recreation activities such as kayaking, outrigger canoeing, scuba diving, and beach wheelchair floats. Sanctuary staff hosted 40 participants with recreational fishing opportunities from the Santa Cruz Wharf alongside partners from the Sanctuary Advisory Council, Santa Cruz Boat Rentals, and CDFW to discuss fishing regulations and fish identification with the public.

## Integrating Science and Management

Current information on the status and trends of ocean change is needed to support effective and responsive management, particularly for the deep ocean. Staff contributed to the paper "[\*Building on a human-centered, iterative, and agile co-design strategy to facilitate the availability of deep ocean data.\*](#)" describing an approach to co-designing data streams for deep-sea indicators. Presented as a four-phase project road map initially focused on Monterey Bay National Marine Sanctuary, the approach then generalized to other areas such as the U.S. West Coast and offshore wind energy development areas.



Sea lions and cormorants are common marine life seen in the sanctuary. Photo: Robert Schwemmer/NOAA