



## Monterey Bay National Marine Sanctuary

# Sanctuary Office Report

Volume 16, Number 6



A REPORT FOR THE SANCTUARY ADVISORY COUNCIL MEMBERS

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### ABOUT THE SANCTUARY

Designated in 1992, Monterey Bay National Marine Sanctuary (MBNMS or Sanctuary) is a federally protected marine area offshore of California's central coast. Stretching from Marin to Cambria, MBNMS encompasses a shoreline of 276 miles and 6,094 square statute miles of ocean.

Supporting one of the world's most diverse marine ecosystems, it is home to numerous mammals, seabirds, fishes, invertebrates and plants in a remarkably productive coastal environment. MBNMS was established for the purpose of resource protection, research, education and public use of this national treasure.

### NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) AND OFFICE OF NATIONAL MARINE SANCTUARIES (ONMS) NEWS

#### West Coast Fisheries “Comeback of the Century”

With help from rebounding West Coast rockfish, Giuseppe “Joe” Pennisi has put the fisherman back in San Francisco's famed Fisherman's Wharf. Pennisi is the first fisherman to sell freshly caught fish off his boat at Fisherman's Wharf in many years. He has reintroduced locals to the flaky white fish that was once a mainstay of West Coast seafood. Most weekends when the fishing is good, crowds form early at the dock next to his boat, the Pioneer, and continue all day. Some wait for hours to buy chilipepper rockfish, rose fish, boccacio and other deep-water species Pennisi brings up in his nets. “You can't help but be excited when you get to the dock and all these people are waiting for their fish,” he said. The reemerging demand for rockfish reflects what may be the West Coast fisheries comeback of the century. Rapidly rebuilding stocks are reviving opportunities for determined fishermen such as Pennisi

and customers of his Pioneer Seafoods. From Washington to California, a fishing fleet that sacrificed heavily while groundfish stocks rebuilt are now beginning to harvest the results. For more information:

<https://www.fisheries.noaa.gov/feature-story/west-coast-fisheries-comeback-century>

#### Explore ocean and coastal acidification with NOAA Data in the Classroom

NOAA's Data in the Classroom uses story maps to help students explore today's most pressing environmental issues through interactive narratives. Now, teachers and students can learn about ocean and coastal acidification through a new module. Can ocean conditions support the growth and survival of marine life, both now and into the future? With this new NOAA Data in the Classroom module, students can dig into this question and the relationships between carbon dioxide, ocean pH and aragonite saturation state. This educational resource introduces students to ocean and coastal acidification through a series of interactive web maps, apps, and videos, allowing students to explore authentic research questions and scaled data interactions that use near real-time data from NOAA. For more information: <https://www.noaa.gov/education/news/explore-ocean-and-coastal-acidification-with-noaa-data-in-classroom>

#### The 2019 ozone hole is the smallest ever recorded

Abnormally warm temperatures in the stratosphere over Antarctica dramatically limited ozone loss in September and October, resulting in the smallest ozone hole observed since 1982, NOAA and NASA scientists reported today offsite link. The annual ozone hole reached its peak extent of 6.3 million square miles (16.4 million square kilometers) on September 8 and then shrank to less than 3.9 million square miles (10 million square kilometers) during the remainder of September and October. During years with normal weather conditions, the ozone hole typically grows to a maximum of about 8 million square miles. For more information:

<https://www.noaa.gov/news/2019-ozone-hole-is-smallest-ever-recorded>

## NATIONAL MARINE SANCTUARY NEWS

### **Cleanup Operations Wrapping Up for Dive Vessel *Conception* in Channel Islands National Marine Sanctuary; Staff and Advisory Council Reflect and Give/Receive Support**

Salvage work has been completed and cleanup operations are nearly done for the dive vessel *Conception*, which caught fire and sank on September 2, tragically taking 34 lives in Channel Islands National Marine Sanctuary. Since the vessel was lifted out of the water on September 12 and taken to a secure port location on the mainland coast, sanctuary staff have been assisting response agencies such as the FBI with their dive operations to collect debris, using the CINMS research vessel *Shearwater* as a dive platform, and overseeing continued cleanup operations being conducted by the hired salvage company. On September 23, divers from the sanctuary and Channel Islands National Park conducted joint surveys of the site to assess the amount of debris that had been cleaned up by the hired salvage company. Involved agencies will next sign-off on the salvage and cleanup phase. In addition, at their public meeting on September 20, the Sanctuary Advisory Council held an emotionally supportive period of reflection about the tragic incident, and received a briefing about the multi-agency response actions taken, presented by the U.S. Coast Guard and Santa Barbara Sheriffs Department (slides available upon request). Sanctuary staff also reflected on the incident at their staff meeting on September 24. Several staff members will participate in a critical incident stress counseling session being provided by the Santa Barbara County Fire Department on September 24. On that same day, drills and safety reviews will be conducted for CINMS vessel operations.

### **Over sixteen-hundred shark fans engaged, enthralled at Farallones for Sharktoberfest**

The Farallones sanctuary's iconic white sharks were the stars of Sharktoberfest 2019, as a record-breaking 1,600+ people descended on sanctuary headquarters and Visitor Center in the San Francisco Presidio Saturday, September 28 for Sharktoberfest 2019. This annual celebration of the white sharks's return to their fall feeding grounds, co-sponsored with the Greater Farallones Association, and Shark Stewards, featured shark experts, a Science Station, shark virtual reality films, and live sharks. Hands-on activities like Sharkitecture 101 ("Build a Shark") demonstrated physiology and adaptations and engaged and enthralled participants. "Tag the Shark" facilitated discussion of telemetric tracking to better conserve this unique white shark breeding population. Exhibitors included NOAA Fisheries, California Academy of Sciences, California State University's Pacific Shark Research Center, and others who brought their special focuses to the event. All ages found opportunities to learn about and enjoy our shark and ray families. SharktoberFest provides the community with an educational and entertaining way to learn about an ecologically important ocean predator. It responsibly presents information and provides opportunities for involvement in shark conservation.

### **The Deep Ocean Battlefield Revealed: Japanese Aircraft Carriers Discovered in Papahānumokuākea Marine National Monument**

Superintendent Athline Clark was aboard the R/V *Petrel* acting in the capacity of resource monitor and accompanying a media team during the discovery of the Japanese aircraft carrier *Kaga* that was announced on Friday, October 18, 2019. The discovery of a second Japanese aircraft carrier was announced on Sunday October 20, 2019. Autonomous Underwater Vehicle (AUV) sonar images corresponded to the Japanese flagship aircraft carrier *Akagi*. Submerged shipwrecks reflect many different times and events across the Pacific Islands region, but none capture a turning point in modern history more so than the wrecks of the Battle of Midway, June 4-7, 1942. The R/V *Petrel* is a 250-foot research and exploration vessel purchased by the late Microsoft co-founder and philanthropist Paul G. Allen. *Petrel's* advanced underwater equipment and technology makes it one of the few ships on the planet capable of exploring to 6,000 meters deep (more than 3.5 miles). Operated by Vulcan Inc., *Petrel* operators mapped over 500 nautical miles of benthic habitat to document this historic battleground. As historic properties of great significance located within the expansion area of the Papahānumokuākea Marine National Monument, these historic aircraft carriers are protected by the Monument to the extent authorized under U.S. law. The discovery of the second aircraft carrier was one of the top three news stories globally on Sunday according to the Associated Press reporter who was on board during the discoveries.



## MONTEREY BAY NATIONAL MARINE SANCTUARY NEWS AND PROGRAM UPDATES



### MANAGEMENT

#### **MBNMS Volunteer Monitoring Coordinator Selected as 2019 NOS Team Member of the Year**

For more than 17 years of dedicated service, Lisa Emanuelson was selected as the 2019 Team member of the Year on behalf of Monterey Bay National Marine Sanctuary. This prestigious award recognizes Lisa's outstanding contributions to NOS programs and her demonstrated exceptional and sustained effort toward accomplishment of the NOS mission. Lisa's leadership and creativity has contributed outstanding achievements in education and resource protection, including her current position as Volunteer Monitoring Coordinator for the Water Quality Protection Program. Beyond an inherent passion for ocean protection and stewardship, Lisa understands the needs of our most important workforce, citizen volunteers. She strives to cultivate a team of hundreds of volunteers who feel valued and know their efforts make a difference. Lisa has been invited to receive this award at the NOS Recognition Ceremony on Dec 3, in Silver Spring, MD. The NOS Team Member of the Year Award is presented to members of the workforce who are recognized for their contributions towards the stewardship of ocean and coastal resources and promoting safe charting and maritime navigation as recognized by their NOS peers.

#### **Monterey Bay National Marine Sanctuary Holds Advisory Council Meeting**

On October 18, MBNMS' Advisory Council met and received a series of presentations and updates on the online CeNCOOS (Central and Northern California Ocean Observing System) Data Portal to view BeachCOMBERS (Coastal Ocean Mammal/Bird Education and Research Surveys) data, the ONMS Ocean Guardian School program and 2020 ONMS West Coast Regional priorities. The Advisory Council reviewed the 2020 meeting calendar and suggested potential agenda item topics for the 2020 meetings. They also received a presentation on the issue of balloon marine debris in MBNMS and reviewed a draft resolution addressing the issue. The next meeting will be held on December 13 in Monterey at the Monterey Conference Center. Sanctuary Advisory Councils are community-based advisory bodies consisting of representatives from various user groups, government agencies and the public at large. The role of the council is to provide advice to the sanctuary superintendent on the designation and/or operation of a national marine sanctuary.

### RESEARCH AND MONITORING

#### **Ed Ricketts Memorial Award and Lecture held at Sanctuary Exploration Center**

The 2019 Ed Ricketts Memorial Award was presented to Dr. James Harvey, Director of Moss Landing Marine Laboratories, on the evening of September 17, 2019 at Monterey Bay National Marine Sanctuary's Exploration Center in Santa Cruz. Dr. Harvey provided a lecture entitled "Research, Teaching, and Mentoring: Musings of a Generalist Optimist" that highlighted the foraging ecology of harbor seals, humpback whales, and leatherback turtles. He also discussed the changing academic landscape. The event was well attended with more than 70 guests. The event was made available via Facebook Live; and the video, viewed by more than 110, is available at MBNMS Facebook page (<https://www.facebook.com/MBNMS>). The Ed Ricketts Memorial Award was created to honor scientists who have exhibited exemplary work throughout their career and advanced the status of knowledge in the field of marine science. Award information available at:

<https://montereybay.noaa.gov/new/2019/190813ricketts.html>. The Ed Ricketts Memorial Lecture was created to honor scientists who have exhibited exemplary work throughout their career and advanced the status of knowledge in the field of marine science. The first award was presented in 1986. Recipients are selected by the Monterey Bay National Marine Sanctuary Research Activity Panel. Award history can be viewed at: <https://montereybay.noaa.gov/research/ricketts.html>.

### **Sanctuary deep-sea coral restoration methods published in *Frontiers in Marine Science***

Monterey Bay National Marine Sanctuary (MBNMS) and Monterey Bay Aquarium Research Institute scientists recently compared different methods to restore deep-sea coral by transplanting live coral fragments and measuring their survival rates. The experiment was conducted in MBNMS on Sur Ridge, 60 kilometers (37 miles) offshore and 800 to 1,300 meters (2,624 to 4,265 feet) below the ocean's surface. This is the first time researchers have attempted to develop and test restoration methods for multiple deep-sea coral species in the Pacific Ocean. Because previous studies have focused primarily on propagating single species, this research helps fill in the knowledge gap for multiple coral species restoration methods in the deep sea. It is also the longest deep-sea coral study ever completed. The results are published in the August issue of *Frontiers in Marine Science*. Additional information can be viewed at: <https://www.mbari.org/coral-translocation/>. As outlined in the MBNMS Management Plan, staff shall conduct deep-water coral age determination and restoration studies in concert with Sur Ridge research activities; and publish sanctuary science.

### **Entangled seabird and marine mammal data from citizen science surveys published**

Data collected from citizen scientists of the BeachCOMBERS (Coastal Ocean Mammal and Bird Education and Research Surveys) program within Monterey Bay National Marine Sanctuary have been analyzed and published in the journal *Marine Pollution Bulletin*. From 1997-2017, surveyors reported 357 cases of entanglements among 65,604 carcasses. Twenty-six seabird species (97%), three marine mammal species (3%), and three non-marine birds were affected. Seabirds were primarily entangled in monofilament fishing line. The article is available at: <https://doi.org/10.1016/j.marpolbul.2019.110557>. Since 1997, trained volunteers have surveyed beached marine birds and mammals monthly at selected sections of beaches throughout the Monterey Bay area, with the specific goal of using deposition of beach cast carcasses as an index of the health of the sanctuary. On average, BeachCOMBERS detect 2.5 events per year, where baseline numbers of dead organisms are significantly surpassed. These could be natural events (e.g., a low productivity year for food) or human caused (e.g., an oil spill). BeachCOMBERS accomplishments and information can be found on the web site <https://www.mlml.calstate.edu/beachcombers/>.

### **Cooperative microplastics sampling complete**

Monterey Bay National Marine Sanctuary (MBNMS) research staff completed their initial collection of 27 discrete surface water microplastics samples from four distinct locations (two inshore, two offshore) between July 2017 and July 2019. Through a cooperative agreement with California State University Monterey Bay's Undergraduate Research Opportunities Center and Stanford's Hopkins Marine Station, all samples are close to completing analyses. Analyses include the isolation and extraction of synthetic material from our samples, followed by epifluorescence microscopy and ImageJ software to quantify the number of microplastics per cubic liter of seawater. To link the polymer type of our subset of our samples to their plastic source, we used Fourier-transform infrared spectroscopy (FT-IR). Microplastics, small pieces of plastic (<5mm), are the most common type of marine debris. Many marine species ingest microplastics, and the effects on the food web and ecosystem is of increasing concern. This has implications for MBNMS because of the sanctuary's mandate to understand and protect this area of national significance. The vertical distribution (5-1000m) of microplastics within the bay has been recently reported, finding the highest concentrations (15 particles m<sup>-3</sup>) at 200m depth, with higher concentrations of microplastics in offshore samples as compared to nearshore samples. To contribute to the limited research concerning microplastics in the MBNMS, we seek to understand the concentrations of microplastics surface seawater samples. Our results will provide vital baseline information on the extent of microplastic pollution in the surface waters of the MBNMS at nearshore and offshore locations. This project is summarized on the website <https://sanctuarysimon.org/dbtools/project-database/index.php?ID=100507>.

## **MBNMS Scientists Discover Whale Fall and a Second “Octopus Garden” with the E/V Nautilus**

MBNMS staff led and participated in a research and exploratory mission to the Davidson Seamount aboard the exploration vessel *Nautilus* from October 12-18, 2019. In 2018, they discovered a population of over 1,000 brooding mother octopuses associated with low-temperature seeps. The first ROV dive of this expedition revisited the octopus garden to establish a minimum population count by running transects across the entire rocky knoll they were found on, take oxygen and temperature measurements, and deployed long-term oxygen and temperature loggers and two Osmo Samplers, all of which will be collected sometime in 2020. The second dive’s mission was to characterize the corals and sponges found along the southeast apron of Davidson Seamount at a depth of 3200 meters. They discovered massive 50-foot sedimentary cliffs, a dumbo octopus, predatory tunicates and more. The highlights of the dive came near the end when they ran across a whale fall. It is estimated that the whale is 5 meters long and had only been there for several months. It was covered in scavengers, including cusk eels, grenadiers, octopus and crustaceans. The bones were covered in thousands of bone-eating worms (*Osedax sp.*). After coordinating with scientists ashore, they collected various samples of bone worms, sediment and water, all of which were picked up at the end of the cruise. Within the last hour of the dive, they discovered another low-temperature seep at the top of a small volcanic cone, which is the second one at Davidson and only the fourth discovered in the world. Shortly thereafter, they came across hundreds of octopus aligned within cracks and crevices of venting water, a second “octopus garden.” All of these discoveries were broadcast live to the public at [www.nautiluslive.org](http://www.nautiluslive.org). Sixty-five hours of deep-sea video is now available for analysis, greatly expanding our knowledge of the deep-sea within MBNMS. The whale fall is in the middle stages of ecological succession and will be revisited by scientists to study its evolution. Valuable and rare samples of *Osedax*, water, eDNA, sediment and bone will provide a boon of information to a relatively poorly studied phenomena. The public followed along as they made these remarkable discoveries, and the social media and media impact has been extraordinary. One Twitter video of the whale fall has more than 4 million views. Interviews were published by the Washington Post, Business (Science) Insider, KSBW-8, Monterey Herald, San Jose Mercury News, KAZU radio and more. Video of the whale fall made the front page of CNN.com.

Video of whale fall: <https://www.youtube.com/watch?v=CZzQhiNQXxU&t=>

Video of shrimp/baby octopus battle: <https://www.youtube.com/watch?v=kfvo9LAsTig>

## **MBNMS Research Activity Panel Meets at Moss Landing Marine Labs**

On November 1, Monterey Bay National Marine Sanctuary (MBNMS) Research Activity Panel (RAP) met at Moss Landing Marine Laboratories (MLML), in Moss Landing, CA. Agenda items included: MLML Research Update; Summary of October MBNMS Advisory Council meeting; Davidson Seamount Research Cruise Aboard E/V *Nautilus*; 2019 and 2020 Ricketts Award; Quick Update on Drone Usage in MBNMS; and RAP Member Recruitment. The MBNMS Research Activity Panel (RAP) is a working group of the MBNMS Advisory Council (AC). The RAP meets five times per year; and advises AC and sanctuary staff on basic and conservation science issues.

<http://montereybay.noaa.gov/sac/rap/rapma.html>

## **NOAA Ship *Reuben Lasker* surveys deep habitats in Monterey Bay National Marine Sanctuary**

During October 27 - 29, NOAA Ship *Reuben Lasker* surveyed deep-sea habitats within Monterey Bay National Marine Sanctuary (MBNMS), including three EFH Conservation Areas that will soon be opened to fishing: Cabrillo Canyon; West of Carmel Canyon; and Sur Canyon Slot Canyons. The objective of this work was to assess the habitats off the West Coast using an Autonomous Underwater Vehicle (AUV), Remotely Operated Vehicle (ROV), and CTD. This work is part of the West Coast Initiative on Deep Sea Coral and Sponges. The research focus was on Essential Fish Habitat conservation areas proposed for modification under the Pacific Fishery Management Council’s draft Amendment 28, surveying of sites that are potential areas for offshore wind energy, and exploring of areas that have been not been previously surveyed. This survey was part of a larger 29-day expedition along the California, Oregon, and Washington coasts, including sites within four National Marine

Sanctuaries from October 7 to November 7, 2019. This larger research cruise is a result of multi-institution planning as part of EXPRESS (Expanding Pacific Research and Exploration of Submerged Systems) and Deep-sea Coral Research and Technology Program's West Coast Deep-Sea Coral Initiative efforts. Participating Institutions include: NOAA NMFS (Southwest Fisheries Science Center and Northwest Fisheries Science Center); NOAA NOS (Channel Islands, Cordell Bank, Monterey Bay and Greater Farallones National Marine Sanctuaries); US Geological Survey (Pacific Coastal & Marine Science Center, Wetland and Aquatic Research Center); and Bureau of Ocean Energy Management (Pacific Region). This cruise had telepresence capabilities thanks to Global Foundation for Ocean Exploration's (GFOE) portable VSAT system and was live-streamed on the world wide web. Data collection will provide a better understanding of MBNMS seafloor habitats (including deep-sea corals and sponges) in anticipation of fisheries management changes and re-opening of these areas to bottom fishing.

<https://www.fisheries.noaa.gov/feature-story/research-cruise-survey-deep-sea-corals-sponges-and-fish-habitat-along-west-coast>

### **MBNMS staff presents at 100th meeting of Western Society of Naturalists**

The 100th annual meeting of the Western Society of Naturalists (WSN) convened adjacent to the Autonomous University of Baja California (UABC) Ensenada Campus from Oct 31 to Nov 3, 2019. WSN is a scientific society with a strong focus on ecology, evolution, natural history, and marine biology, with over 1000 members concentrated along the west coast of North America. Dr. Steve Lonhart presented a talk entitled "Marine heatwaves in central and southern California from 2013 to 2018" as part of a contributed papers session on community ecology. This year there were over 200 talks, 125 posters, and 2 symposia. Dr. Brian Tissot (Humboldt State), the outgoing President of WSN, along with past-President Dr. Ginny Eckert (U of Alaska) and President-elect Dr. Danielle Zacherl (CSU Fullerton), were the selection committee for the next President-elect, and on Saturday informed Lonhart that they had selected him to be the new president-elect, serving in 2021. The meeting in 2020 will be in Monterey, which has the highest attendance of all WSN locations, and the 2021 meeting location has yet to be determined. The annual meeting of WSN is generally regarded as the preeminent gathering of marine ecologists along the western US. Featuring faculty and graduate students from dozens of academic institutions from Canada to Mexico, as well as from federal and state agencies (e.g., NOAA, California Department of Fish and Wildlife) and NGOs alike, WSN serves as nexus for information exchange and connecting with field biologists from multiple disciplines.

To learn more about WSN, visit: <https://www.wsn-online.org/>

## **RESOURCE PROTECTION**

### **Pre-Season Risk Assessment conducted for upcoming CA Dungeness crab season opener in mid-November**

Since September 2015, the California Dungeness Crab Fishing Gear Working Group (Working Group) has been taking steps to actively identify and be responsive to elevated risk of whale entanglements. West Coast Sanctuaries serve as an advisor on the Working Group, which met on October 15, 2019, in Santa Rosa to provide input to the California Department of Fish and Wildlife (CDFW) regarding the Risk Assessment and Mitigation Program (RAMP) pre-season risk assessment. The group assessed the following levels for each of the four risk factors:

- number of whale entanglements – not applicable
- marine life concentrations – moderate and decreasing, based on aerial survey and other whale density data
- ocean/forage – moderate/low and decreasing, based on lowest krill abundance since 1998, highest YOY anchovy surge, plus presence of a marine heat wave which is similar to the 2016 blob based on area covered and persistence
- fishing dynamics – low, based on available domoic acid testing

Taking results for all four factors into consideration, the group concluded that there is no need for “mandatory” management measures at this time, and the Central and Northern Management Area should open as scheduled (Nov 15 and Dec 1, respectively). The WG will revisit the recommendation in late October to assess if/as new information becomes available, and consider if any updates to the recommendations are needed. CDFW will request that fishermen prioritize voluntary best practices during the season including the slackline initiative, using neutral buoyancy line (surface gear set-up and all elements of the best fishing practices guide). Whale entanglements are identified by the West Coast Regional Resource Protection Coordinators as a priority over the next 5 years as the issue represents one of the major threats to large whales, including humpback and blue whales.

### **Outreach to Agricultural Community on Carbon Sequestration**

A workshop on agricultural practices that sequester carbon from the air into soils was held in Moss Landing and a tour of Monkeyflower Ranch was attended by 30 ranchers and agriculture professionals in late September. A second tour open to the community and advertised as part of Open Farms Day was hosted at Monkeyflower Ranch on 10/12/19. The value of conservation practices to soil health, ranching productivity and atmospheric carbon removal was discussed and the potential positive impacts of wider adoption to ocean health was highlighted. All attendees expressed an interest in including healthy soils practices on their ranches. If 10% of ranchlands in California adopt three healthy soils practices, this can offset the greenhouse gas emissions of all households in California. This can slow the rate of ocean warming and acidification.

### **Resource Protection staff get update on Pure Water Soquel Project**

On October 24, Resource Protection staff met with a representative of Soquel Creek Water District to learn more about the Pure Water Soquel Project which will perform advanced water treatment on wastewater and then inject it into the ground for ultimate use as potable water and to reduce sea water intrusion. This project is scheduled to break ground in late 2020 to provide an additional 1,500-acre feet per year of potable water to Santa Cruz County residents. The reject water from the advanced water treatment process will be sent back to the Santa Cruz Wastewater Treatment Plant and co-mingled with the current discharge which may require an amendment to their existing NPDES permit and an authorization by MBNMS. By coordinating early in the planning process of large scale water projects, we ensure that the responsible agency knows sanctuary regulations and includes us in the planning process and environmental review which will ultimately result in the protection of sanctuary resources. <https://www.soquelcreekwater.org/pws>

### **MBNMS and USCG conduct joint inspection of M/V ROYAL PRINCESS at Monterey**

As part of its cruise ship regulatory compliance program, MBNMS staff coordinated a joint inspection with NOAA OLE and the Coast Guard of the 1,083-ft M/V ROYAL PRINCESS during the cruise ship’s port call to Monterey on October 22. This is one of several special random inspections conducted each year to verify compliance with strict sanctuary regulations governing discharges from cruise ships operating within MBNMS. The ship’s command staff were well aware of sanctuary jurisdictional boundaries and regulations. The inspection team reviewed ship’s logs and orders to ensure that no prohibited discharges occurred during transit through the sanctuary. These random, short-notice inspections are an important accountability measure and reminder to cruise ship operators that special discharge rules apply when they are transiting through MBNMS and other west coast national marine sanctuaries.

### **2019 Team OCEAN’s 20th Season is in the Books!**

The twentieth Team OCEAN season is over and equipment is dried and packed away for the winter. This year Team OCEAN staff and volunteers contacted 4,244 people in Elkhorn Slough, Moss Landing and 1,585 people along Cannery Row in Monterey. These seasonal totals bring the program totals to over 113,000 people contacted since the programs started in 2000. Team OCEAN staff and volunteers observed 99 disturbances

ranging from head raises to all out flushes into the water by sea otters, harbor seals, sea lions and local birds. After twenty years on the water, Team OCEAN continues to be a critical and unique program that is vital for the protection of federally protected, sensitive wildlife such as the iconic sea otter and secretive harbor seal. Team OCEAN is a unique program where on the water interactions with ocean users such as kayakers, paddleboarders and boaters directly influences whether users disturb sensitive marine wildlife such as sea otters or harbor seals.

### **First Flush 2019 Training and Dry Run**

In preparation for the first major rainstorm, two First Flush volunteer training sessions as well as two hands-on practice sessions have been conducted. For the first time both training sessions have been conducted via webinar with embedded polls and videos inserted to provide volunteers with more opportunities to incorporate procedures and protocols. The hands-on sessions gave volunteers a chance to check out their assigned sites, meet other team members and collect water if any was flowing from the outfall. The online training sessions occurred on September 18 and October 31 with the hands on sessions were on September 22 and November 2. First Flush monitoring is valuable to sanctuary and local stormwater managers both to understand and better manage the water quality running off of urban areas as well as engaging the local residents in environmental protection and stewardship. With 2019 as the 20<sup>th</sup> consecutive year of this event, stormwater programs are able to use the robust dataset to prioritize efforts to improve water quality.

### **Salinas Urban Watch 2019 Season Finale**

The City of Salinas' Urban Watch program completed its second year on October 1. In August and September 2019, Urban Watch volunteers monitored outfalls for common urban pollutants such as detergents, ammonia, phosphate and chlorine from three Salinas watersheds (Santa Rita, Gabilan and Natividad) as well as the Reclamation Canal and the Blanco Drain. Lab samples were also collected for the analysis of *E. coli*, enterococcus and human-specific bacteroides at each monitoring site. Volunteers donated over 40 hours to collect samples at designated sites within each watershed over the two-month program. The most unusual object seen while sampling? A dishwasher that had been dragged to the banks of Natividad Creek. Water quality results were reported to City of Salinas Public Works representative, Heidi Niggemeyer. Water quality monitoring programs like Urban Watch provide cities with critical information regarding water quality and illegal dumping within city limits. In its second year, Urban Watch monitoring has been able to determine water quality hotspots within the city as well as areas that have healthy watersheds.

### **Pacific Grove Urban Watch 2019 Season is Complete**

The City of Pacific Grove's Urban Watch program completed its 2019 season on October 15. Urban Watch volunteers monitored nine outfalls for common urban pollutants such as detergents, ammonia, phosphate and chlorine from June to October 2019. Lab samples were also collected for the analysis of *E. coli* and enterococcus at each monitoring site. Monthly trash assessments are done at each site, volunteers analyzed trash data as well. Volunteers donated over 160 hours to collect samples and conduct trash assessments at designated sites over the four-month season. Water quality results were reported to City of Pacific Grove Public Works representative, Milas Smith. Water quality monitoring programs like Urban Watch provide cities with critical information regarding water quality within city limits.

## **EDUCATION, VOLUNTEER AND OUTREACH PROGRAMS**

### **Sanctuary Exploration Center hosts annual Volunteer "End of Summer" appreciation event**

The Monterey Bay National Marine Sanctuary Exploration Center hosted its annual volunteer appreciation party on September 22. Over 60 volunteers attended the celebration to honor the commitment and dedication of the Center's 73 active volunteers that have logged 6,126 total hours of service this year. With a Roaring 20's theme, volunteers outdid themselves with attire and costume contest. Two dedicated volunteers: Richard Johnson and

Bruce Mitchell received the Center's first 1,500 hour appreciation awards, both of whom have been volunteers since the Center's grand opening in 2012. In FY 2019, the volunteers have educated over 60,560 visitors about the sanctuary through events, field trips, private tours, and during normal operating hours. Volunteers play a key role as educators to Exploration Center visitors regarding the protection and the greatness of the Monterey Bay Sanctuary. Without volunteers, the Center would not be able to open its doors and reach a large and broad audience. It is important to recognize the efforts of our volunteers to show our appreciation that their commitment is accomplishing a key Sanctuary goal of education and outreach.

### **MBNMS Staff present to Santa Cruz City Council on Sanctuary Exploration Center**

On September 10 Sanctuary Exploration Center Manager, Chelsea Prindle gave an update to the Santa Cruz City Council on current Center operations and programming. The council was curious how the Center was connecting with local schools and partnering with local tourism attractions such as hotels and the Santa Cruz Beach Boardwalk. The Sanctuary Exploration Center was built in a partnership with the City of Santa Cruz on City owned land. The goal was for the Center educate visitors to the Santa Cruz Beach area on MBNMS and ecosystem protection while also acting as an educational resource for local schools and community groups. It is a pleasure to update the Council on our successes!

### **Sanctuary Exploration Center Kicks off "Experience Monterey Bay Sanctuary" Education Program**

During the week of September 18, 140 4th grade students from Macquiddy Elementary visited the Sanctuary Exploration Center as part of the new Experience Monterey Bay Sanctuary education program. This program was funded through the National Marine Sanctuary Foundation in Winter 2019 and will serve 20 local underserved classes. As part of this program, MBNMS educators conduct a pre-field trip visit where students learn about local watersheds and potential impacts to the Sanctuary. Students then participate in a three-hour field trip to the Sanctuary Exploration Center where they explore the visitor center and participate in the Wharf Oceanography program on the Santa Cruz Wharf. Following the field trip, MBNMS educators visit students in class again to analyze the data they collected on the field trip and view the plankton they collected. The Sanctuary Exploration Center's goals are: to educate visitors about the sanctuary's unique and fascinating coastal and marine environment, to foster a more personal connection with the sanctuary and the ocean's relevance in people's daily lives and to encourage stewardship of the sanctuary and a better understanding of how to responsibly enjoy and protect the ocean.

### **Monterey Bay National Marine Sanctuary Staff take the sanctuary to the Sierras**

On Saturday, October 6, MBNMS staff headed inland and participated in the annual US Forest Service Fall Fishfest celebration at the Taylor Visitor Center in Lake Tahoe, CA. Thousands of people gathered to view the release of the invasive Kokanee salmon into their creek and to learn about salmon, bears and other wildlife. MBNMS is collaborating with the USFS to create a fourth panel for a Salmonscape Exhibit. Panel 1-3 are complete and at the Sanctuary Exploration Center in Santa Cruz. Once all four panels are complete, the exhibit will potentially travel to one of the US Forest Service visitor centers. A healthy California "salmonscape" requires conservation collaborations from the tops of the mountains to the bottom of the ocean. California rivers connect National Marine Sanctuaries and Forest Service land.

### **Listening in on Monterey Bay National Marine Sanctuary (MBNMS)**

Last Friday, the Sounds in the Sanctuary exhibit public opening took place at the Sanctuary Exploration Center in Santa Cruz, CA. Over 160 public members came through the doors after hours to enjoy interacting with the new 'Sounds in the Sanctuary' exhibit, which was funded and designed by MBNMS and then developed and fabricated in collaboration with Monterey Bay Aquarium Research Institute (MBARI). Activities and festivities for the evening included MBARI's Dr. John Ryan who gave a presentation on acoustics, a 'sound bath' combining natural sounds with instruments in a musical experience by Josh Miller (Embodied Sounds) and

'sounds of plankton' pop-up. There were many conversations between MBNMS staff, scientists, educators and the public who showed a lot of interest in ocean acoustics. The visitor experience allowed the public to hear, feel and see sounds in the sanctuary. It was a great way to celebrate this new and engaging exhibit which uses listening as the primary learning modality to engage the public in ocean acoustics and the science around it. It is important for MBNMS to interpret and share sanctuary science with the public. The Office of the National Marine Sanctuary's sound team and partners like MBARI are collaborating in acoustics research in the greater Monterey region to characterize the sound in the sanctuary.

For more detail about how the exhibit came to be:

<https://www.mbari.org/sanctuary-soundscape-exhibit/>

To listen in on the sanctuary 24/7, please see the following web link:

<https://www.mbari.org/soundscape-listening-room/>

### **Elementary Students Dive Further Into Ocean Exploration with E/V *Nautilus***

In support of Ocean Exploration Trust E/V *Nautilus* expedition to Davidson Seamount in Monterey Bay National Marine Sanctuary from October 11-18, members of the sanctuary's education team visited participating classes to host presentations and activities with students before the expedition began. Sixty 4th grade students from Bayview Elementary in Santa Cruz were treated to an overview presentation about deep sea ocean exploration aboard the E/V *Nautilus* and participated in demonstrations to illustrate the effects of water pressure at depth on objects using full size and shrunken Styrofoam cups. Students were able to decorate their own cups, which were taken aboard the ship, attached to the ROV to shrink at depth, and returned to students in the classroom. From October 16-18th, students from Bayview Elementary took a school field trip program to the Sanctuary Exploration Center and engaged in the ONMS Deep Sea Coral Curriculum, ROV building activities, and experienced live ship-to-shore interactions in the Center's Fly Through Theater. Additionally, 30 after-school students from Mar Vista Elementary in Aptos came to the Exploration Center to learn about the Deep Sea and engage in live ship-to-shore interaction. Engaging with students inside the classroom and through sanctuary visitor centers excites them to learn about the deep sea, engage with scientists, and experience ocean exploration which can inspire students to seek careers in science, technology, engineering, and mathematics and to become the next generation of explorers.

### **Sanctuary Exploration Center Salmonscape Enrichment**

On Wednesday, October 23, the Sanctuary Exploration Center hosted a salmonscape volunteer enrichment to educate docents about the new salmonscape exhibit that was installed in May. Guest speaker Tommy Williams, research fisheries biologist at the Southwest Fisheries Science Center, gave an excellent lecture on the salmon life cycle, salmon in California and anthropogenic impacts. Twenty docents were in attendance for his lecture followed by a great Q&A period. The public have been very engaged with the salmonscape exhibit thus far, and we are excited to provide our docents additional background to enhance their interactions with visitors at this exhibit. Docent enrichments, like "Salmonscape Night," are an important aspect of the Sanctuary Exploration Center volunteer program and allows the SEC to continue educating volunteers about MBNMS and marine topics covered by the SEC exhibits to improve exhibit interpretation.

### **MBNMS Staff Serves on a Career Panel for Future Marine Biologists**

Forty students heard from a panel of six professionals in marine science, education and conservation this week as a part of an Introduction to Marine Sciences class at California Polytechnic State University. Led by Dr. Nikki Adams, the goal of the class was to expose students to various fields in marine science and to encourage students to ask panelists for advice on the tools and background needed to obtain a job. The six panellists represented county, state and federal jobs in marine science. Cal Poly partners closely with MBNMS and provides interns for the Coastal Discovery Center. Career panelist activities such as these can influence the career paths of students while introducing them to agencies they may not know about, like the Office of National Marine Sanctuaries.

### **Sanctuary Exploration Center launches Virtual Reality (VR) Sundays**

On Sundays from October 1-December 31 2019, [Oceans360](#) will host pop-up VR experiences at the Sanctuary Exploration Center. Visitors are able to take an underwater virtual reality dive at amazing locations around the world. Get up close to Elephant Seals in Ano Nuevo, dive with Sea Turtles and Iguanas in the Galapagos, and dive with Manta Rays in Hawaii. Special activities such as VR Sundays diversity the visitor experience at the Sanctuary Exploration Center, allowing people to learn and be inspired in new and creative ways, ultimately reaching a broader audience of future ocean stewards. Additionally, adding weekly programs gives locals a reason to comb back to the center again and again!

### **Sanctuary Exploration Center Report for September 14-November 8**

Between September 14 and November 8, the Sanctuary Exploration Center had 4,312 visitors. The Center had a busy few weeks of programming after hosting the 2019 Ed Ricketts Memorial Award, hosting five Toddler story time programs with twenty children, two guided tours with 74 children and two self-guided tours with 30 visitors. The Fall Field Trip season launched the week of September 14 and the Fall Field Trip Volunteer training program started shortly thereafter. One hundred forty students visited the Exploration Center over two days to learn about the sanctuary in the Visitor Center, and participate in a hands-on field program on the Santa Cruz Wharf. Students collected oceanographic information, identified local wildlife, and collected plankton, which we viewed as a group back in our classroom. The center also hosted two Nautilus Deep Sea Exploration field trips with 60 students, one Nautilus Live Interaction with 30 students and two Wharf Oceanography field trips with 30 students each. The National Marine Sanctuary Foundation conducted five facility rentals, which generated revenue for Exploration Center exhibits and programming.

### **Coastal Discovery Center Report for September 20-November 3**

Between September 20 and November 3, 844 visitors visited the Coastal Discovery Center. September 21 was statewide Coastal Cleanup Day run by CA Coastal Commission and EcoSlo Environmental Center of San Luis Obispo. Twenty-six volunteers showed up at the Coastal Discovery Center site to collect 33 lbs of trash from San Simon Beach, San Simeon Point, Hearst Memorial State Park, and nearby highway pull-outs. Trash analysis from this site showed the most common trash to be cigarette butts, followed by food wrappers and bottle caps. For results of the analysis of 12,411 pounds of trash collected throughout SLO County go to [ecoslo.com coastal cleanup 2019](#). At the end of September, MBNMS staff were joined by 14 students and their science teachers from Paso Robles High School to conduct a citizen science program, Long-term Monitoring Program and Experiential Training for Students (LiMPETS), as part of a newly formed class, the Paso Robles High School Field Studies Collaborative. The course includes field trips to various biomes in CA, and requires students to work with experts to collect and analyze data from terrestrial, desert and marine ecosystems. During the first week of October, a special field trip was created for a group of 34 adults from Arroyo Grande, the AG Explorers, a trailer park community of retirees seeking to better understand the natural history of the Central Coast. Volunteers Marj Sewell and Leslie McGarry led the group on a tour of the Center, an overview of MBNMS and a lesson in the history of San Simeon Bay and shore whaling. Mrs Sewell, 87 yrs old, grew up in San Simeon and her parents worked for William Randolph Hearst. Both volunteers are past volunteer of the year nominees. MBNMS volunteers attended a field trip to the Cal Poly Pier to learn about research in marine science. Led by MBNMS program assistant and Cal Poly graduate, Ali Wolman, topics included an overview of live invertebrates used in research and background on the Central and Northern CA Ocean Observing System (CENCOOS).

## NEWS COVERAGE

### [Bechtel Family Center for Ocean Education and Leadership: Cultural/Worship](https://www.enr.com/articles/47648-bechtel-family-center-for-ocean-education-and-leadership-culturalworship)

<https://www.enr.com/articles/47648-bechtel-family-center-for-ocean-education-and-leadership-culturalworship>  
ENR California – October 1, 2019

### [New exhibit showcases the soundscape of Monterey Bay National Marine Sanctuary](https://www.mbari.org/sanctuary-soundscape-exhibit/)

<https://www.mbari.org/sanctuary-soundscape-exhibit/>  
MBARI – October 8, 2019

### [Discovering a passion for nature through scientific field studies at Paso Robles High School](https://www.kcbx.org/post/discovering-passion-nature-through-scientific-field-studies-paso-robles-high-school#stream/0)

<https://www.kcbx.org/post/discovering-passion-nature-through-scientific-field-studies-paso-robles-high-school#stream/0>  
KCBX – October 4, 2019

### [New exhibit allows people to hear sounds from marine sanctuary](https://www.sfgate.com/news/bayarea/article/New-Exhibit-Allows-People-To-Hear-Sounds-From-14513983.php)

<https://www.sfgate.com/news/bayarea/article/New-Exhibit-Allows-People-To-Hear-Sounds-From-14513983.php>  
SFGate.com – October 11, 2019

### [Monterey Bay National Marine Sanctuary subject of streaming deep sea research](https://www.montereyherald.com/2019/10/11/monterey-bay-national-marine-sanctuary-subject-of-streaming-deep-sea-research/)

<https://www.montereyherald.com/2019/10/11/monterey-bay-national-marine-sanctuary-subject-of-streaming-deep-sea-research/>  
Monterey Herald – October 11, 2019

### [Sanctuary board honors Sea Star award winners](https://www.santacruzsentinel.com/2019/10/13/sanctuary-board-honors-sea-star-award-winners-name-dropping/)

<https://www.santacruzsentinel.com/2019/10/13/sanctuary-board-honors-sea-star-award-winners-name-dropping/>  
Santa Cruz Sentinel – October 13, 2019

### [Scientists piece together microplastics problem in Monterey Bay](https://www.mercurynews.com/2019/10/13/scientists-piece-together-microplastics-problem-in-monterey-bay/)

<https://www.mercurynews.com/2019/10/13/scientists-piece-together-microplastics-problem-in-monterey-bay/>  
Mercury News – October 13, 2019

### [Watch marine life feast on a complete whale skeleton on the ocean floor](https://www.smithsonianmag.com/smart-news/watch-scientists-find-complete-baleen-whale-skeleton-accident-bottom-ocean-180973360/)

<https://www.smithsonianmag.com/smart-news/watch-scientists-find-complete-baleen-whale-skeleton-accident-bottom-ocean-180973360/>  
Smithsonian – October 17, 2019

### [Grisly underwater video shows a group of octopuses slowly gorging on remains of a giant whale off Monterey coast](https://www.dailymail.co.uk/news/article-7591753/Incredible-underwater-video-shows-huge-group-octopuses-feasting-remains-giant-whale.html)

<https://www.dailymail.co.uk/news/article-7591753/Incredible-underwater-video-shows-huge-group-octopuses-feasting-remains-giant-whale.html>  
DailyMail.com – October 19, 2019

### [Whales are being killed by shipping traffic at alarming rates. A new initiative aims to help.](https://www.montereycountyweekly.com/news/local_news/whales-are-being-killed-by-shipping-traffic-at-alarming-rates/article_acc4af28-fb75-11e9-b02b-b70f242384f3.html)

[https://www.montereycountyweekly.com/news/local\\_news/whales-are-being-killed-by-shipping-traffic-at-alarming-rates/article\\_acc4af28-fb75-11e9-b02b-b70f242384f3.html](https://www.montereycountyweekly.com/news/local_news/whales-are-being-killed-by-shipping-traffic-at-alarming-rates/article_acc4af28-fb75-11e9-b02b-b70f242384f3.html)  
Monterey County Weekly – October 13, 2019



**Web Site** (<https://montereybay.noaa.gov/>)

★★ **Check out these MBNMS Advisory Council webpage links!** ★★

**Advisory Council Meeting Agendas & Minutes**

<https://montereybay.noaa.gov/sac/sacma.html>

**Advisory Council Actions and Results**

<https://montereybay.noaa.gov/sac/sacact.html>

**Advisory Council User Group Newsletters (seats and working groups/sub-committees)**

<https://montereybay.noaa.gov/sac/advisory-nwsltr.html>

*Please take a few moments to peruse the site. Your feedback is greatly appreciated.*

*Comments and suggestions can be sent to [andrew.white@noaa.gov](mailto:andrew.white@noaa.gov).*

**Follow MBNMS on [Facebook](https://www.facebook.com/MBNMS)** (<https://www.facebook.com/MBNMS>) and **[Twitter](https://twitter.com/mbnms)** (<https://twitter.com/mbnms>)

## **FUN, OCEAN RELATED WEB SITES**

**NOS Ocean Facts: Ocean Life**

<https://oceanservice.noaa.gov/factspage.php?siteName=oceanfacts&cat=Ocean%20Life>

**Caitlin Seaview Survey**

<http://www.caitlinseaviewsurvey.com>

**SIMON**

<https://www.sanctuariesimon.org>

**Seasons in the Sea**

<http://www.seasonsintthesea.com>

**Thank You Ocean**

<http://www.thankyouocean.org/>

**Oceans Live**

<http://oceanslive.gso.uri.edu/>

**NOAA Ocean Explorer**

<http://oceanexplorer.noaa.gov/>

**Encyclopedia of the Sanctuaries**

<http://www.ocean.com/Library/Encyclopedia/>

## **MBNMS STAFF**

**Paul Michel** – Superintendent  
**Dawn Hayes** – Deputy Superintendent

### Research

**Andrew DeVogelaere** – Research Coordinator  
**Jennifer Brown** – SIMoN Ecosystem Scientist  
**Erica Burton** – Research Specialist  
**Chad King** – SIMoN Data Analyst  
**Steve Lonhart** – SIMoN Senior Scientist

### Education

**Amity Wood** – Education and Outreach Coordinator  
**Acy Wood** – Program Assistant (SEC)  
**Nick Ingram** – Exhibits/Facility Specialist (SEC)  
**Bri Madrigal** – Volunteer Coordinator (SEC)  
**Emily Pierce** – Program Assistant (SEC)  
**Chelsea Prindle** – SEC Manager  
**Carolyn Skinder** – Southern Region Program Coordinator  
**Lisa Uttal** – Education Specialist

### Resource Protection

**Karen Grimmer** – Resource Protection Coordinator  
**Sophie De Beukelaer** – GIS Analyst & Research Permit Coordinator  
**Lisa Emanuelson** – Citizen Watershed Monitoring Network Coordinator  
**Bridget Hoover** – Water Quality Protection Program Director  
**Scott Kathey** – Regulatory/Emergency Response Coordinator (on detail to GRNMS)  
**Pamela Krone** – Agriculture Water Quality Coordinator

### Program Operations

**Raymond Chisolm** – Program Specialist  
**Nichole Rodriguez** – Advisory Council Coordinator  
**Andrew White** – Network Manager and Webmaster



## **Learn More About Your Sanctuary**

The Sanctuary Office Report is produced bi-monthly by Monterey Bay National Marine Sanctuary staff in conjunction with Sanctuary Advisory Council meetings. To learn more about the Sanctuary please visit our web site at: <https://www.montereybay.noaa.gov>.

To learn more about the Sanctuary Advisory Council please visit:  
<https://montereybay.noaa.gov/sac/advisory.html>

## **The Office of National Marine Sanctuaries**

Monterey Bay National Marine Sanctuary is one of 14 marine protected areas in the National Marine Sanctuary System encompassing more than 150,000 square miles of marine and Great Lakes waters from Washington State to the Florida Keys, and from Lake Huron to American Samoa. The system includes 13 national marine sanctuaries and the Papahānaumokuākea Marine National Monument. Visit the ONMS web site at:  
<https://www.sanctuaries.nos.noaa.gov/>

## **Get involved and stay informed!**

To learn how to get involved in the Sanctuary visit:  
<https://montereybay.noaa.gov/getinvolved/welcome.html>

Sign up for the MBNMS listserv to receive email notices about upcoming Sanctuary events, and public meetings of the Sanctuary Advisory Council and Working Groups:  
<https://montereybay.noaa.gov/intro/elists.html>

## **- Contact Information -**

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