

NATIONAL MARINE SANCTUARIES COORDINATION REPORT (March 2019)

Introduction

The NOAA Office of National Marine Sanctuaries (ONMS) serves as trustee for the nation's system of marine protected areas (MPAs). Through active research, management and public engagement, national marine sanctuaries sustain healthy environments that are the foundation for thriving communities and stable ocean-dependent economies. The primary objective of the National Marine Sanctuaries Act (NMSA) is resource protection of marine areas (Great Lakes included) of special national significance, while promoting sustainable uses. Five national marine sanctuaries are located on the west coast: Olympic Coast, Greater Farallones, Cordell Bank, Monterey Bay, and Channel Islands (OCNMS, GFNMS, CBNMS, MBNMS and CINMS respectively).

Purpose of the Annual Coordination Report

The West Coast Regional Office (WCRO) within ONMS provided the first coordination report to the Pacific Fishery Management Council (PFMC or Council) in 2017 and appreciates the invitation to provide this third annual report to inform the Council of relevant national marine sanctuary actions and programs. This report contains an update of activities and programs of mutual interest implemented in 2018 by west coast national marine sanctuaries with a preview of upcoming activities. Sanctuary activities are grouped according to the following topics: nominations, management plan review, ancillary management activities, climate change, habitat, and research and monitoring.

NOMINATIONS

- **Sanctuary nomination process – WCRO** (www.nominate.noaa.gov)
Purpose: In response to widespread interest from the public, in June 2014 NOAA launched a process to accept new national marine sanctuary nominations. ONMS reviews sanctuary nominations against eleven criteria that are derived in large part from the NMSA. Nominations that successfully pass this review are added to an inventory of areas NOAA may consider for potential designation as a national marine sanctuary. A sanctuary nomination is not the same as a sanctuary designation. Designation is a separate process that by law is highly public and participatory, and often takes several years to complete.

On the west coast, the second submission for a proposed Chumash Heritage National Marine Sanctuary, located off Point Conception in California, was added to the inventory in October 2015. St. George Unangan Heritage National Marine Sanctuary nomination, surrounding St. George Island in the Bering Sea, was accepted and added to the inventory in January 2017. In addition, a third nomination submitted along the west coast is Southern California Offshore Banks representing Cortes, Tanner, Cherry and Northwest Banks, and Garret Ridge. This nomination was declined by ONMS on March 12, 2018. Below are a few more details of the two nominations on the west coast in the area overlapping with the PFMC:

- **Chumash Heritage National Marine Sanctuary Nomination**
The nomination was added to the inventory of candidate sites for future designation on October 5, 2015, with community support from the public, elected officials, businesses, scientists, and environmental groups. The purpose of the nomination is to protect, study and interpret the region's abundant natural resources and maritime heritage, including the Chumash cultural heritage. The region contains an internationally significant ecological transition zone, supporting high biological diversity and densities of numerous important species. The nomination states that the proposed sanctuary should not have an impact on treaty fishing rights, nor impose future regulations upon commercial or recreational fishing. The nomination identified considerable threats to resources including existing and potentially future oil and gas development, offshore wind farms, fiber optic cables, potential marine transport of spent nuclear waste, and others for which a sanctuary could be ideal to address. The nomination recognized national marine sanctuaries can provide a single forum for comprehensive planning of multiple uses. There is not an active evaluation within NOAA at this time to consider moving this site forward for designation.
- **Southern California Offshore Banks National Marine Sanctuary Nomination**
The nomination was submitted January 9, 2017 by the Southern California Marine Institute and Vantuna Research Group with letters of support from local university scientists, aquariums, and sport fishing. The nomination focused on protecting and managing critical offshore resources, including endangered and protected species, and promoted collaborative research at Cortes, Tanner, Cherry and Northwest Banks, and Garrett Ridge. Although the nomination demonstrated the ecological significance of these offshore banks and their research potential, ONMS determined on March 12, 2018 that the nomination did not adequately meet other NOAA-established criteria to warrant addition to the inventory of sites. In particular, the nomination did not adequately demonstrate support for the national marine sanctuary concept from a breadth of community interests.

Outcome: As of February 2019, NOAA has received 15 nominations. Of these, one nomination is under review, six have been declined or withdrawn, and six have been admitted to the inventory. Two nominations on the inventory have been selected for designation: Mallows Bay – Potomac River in Maryland and Lake Michigan in Wisconsin; these continue to work their way through the designation process.

MANAGEMENT PLAN REVIEW

The NMSA requires NOAA to “evaluate the substantive progress toward implementing the management plan and goals for the sanctuary” and “revise the management plan and regulations as necessary to fulfill the purposes and policies of this chapter” at intervals not exceeding five years (NMSA 304(e)). Over the last decade, ONMS has strived to complete a sanctuary condition report, which describes the conditions of the sanctuary ecosystem in advance of a comprehensive management plan review. The condition report sets the stage for evaluating previous management efforts as well as the relevance of existing goals and objectives of the sanctuary. When a sanctuary pairs the condition report with the onset of sanctuary management plan review it helps create a clear link between resource protection needs and management

priorities. Here follow condition report development and significant management plan processes for the west coast national marine sanctuaries.

- **Management Plan Review – MBNMS**

(<http://montereybay.noaa.gov/intro/mp/2015review/welcome.html>)

Purpose: MBNMS completed its condition report and kicked off management plan review in 2015. Since then MBNMS has been revising and updating the 2008 management plan, with a focus on drafting new action plans related to priority issues and updating still relevant 2008 action plans. Action plans in the draft management plan are Climate Change, Coastal Erosion and Sediment Management, Davidson Seamount, Elkhorn Slough, Marine Debris and Introduced Species. Programmatic plans include Education and Outreach, Research and Monitoring, Resource Protection, Maritime Heritage, and Marine Spatial Planning. The draft management plan and associated environmental documents should be released for public review in summer 2019. An Environmental Assessment is currently underway and findings are likely to result in a determination that no proposed major federal actions would significantly affect the quality of the human environment.

NOAA is not expecting to propose fisheries management actions or regulations related to fish or fisheries. Regulatory changes proposed are primarily definition changes aimed to clarify details in specific existing regulations. Although currently still under development, examples of potential regulatory changes include: 1) changing definitions to clarify legal intent and enhance public understanding; 2) modifying the definition of cruise ships to include “condominium” ships; 3) reducing required High Surf Warning condition for Motorized Personal Watercraft operations at Mavericks to a High Surf Advisory condition; and 4) clarifying that the beneficial reuse of clean and suitable dredged material for restoration purposes within MBNMS below the Mean High Water line is allowed. The last example is aimed to address shoreline sediment placement near Surfers Beach in Half Moon Bay, California. Beneficial reuse of sediment would still have to meet the rigorous testing and screening criteria established by other federal, state and local beach nourishment regulatory and reviewing agencies, and an applicant would have to apply for a sanctuary permit in addition to all other required permits. The clarification is not intended allow any new dredging sites or ocean disposal sites.

Outcome: Draft and final management plan, draft and final environmental analyses, and proposed and final regulations.

Timeline: MBNMS aims to issue a draft management plan, environmental analysis and proposed regulations for public comment by summer 2019. A final draft of these documents is expected in early 2020. MBNMS will consult with the National Marine Fisheries Service (NMFS) as required and approach the Council as appropriate.

Partners: The MBNMS Advisory Council and other experts from local, state and federal partner agencies, such as the California Department of Fish and Wildlife (CDFW) and NMFS.

- **Condition Report Update – CINMS**

(<http://sanctuaries.noaa.gov/science/condition/>)

Purpose: A sanctuary condition report provides a summary of resource conditions, specifically water quality, habitat, living resources and maritime archaeological resources in the sanctuary; describes pressures on those resources and the current condition and trends of sanctuary resources; and summarizes management responses to pressures that threaten the integrity of the sanctuary’s marine environment. Timing of the condition report’s development allows it to serve as a precursor to inform a subsequent CINMS management plan review process. The CINMS condition report update process has proceeded in two parts and is nearly completed. The first part of the process undertook an update through 2016 of the site history, drivers, pressures and state of water quality, habitat, living resources and maritime archaeological resources sections and was released as in an interim report titled, “[Channel Islands National Marine Sanctuary 2016 Condition Report, Volume I.](#)” The second part of the process, which includes an assessment of ecosystem services and an update to management responses in the sanctuary, is under final review as mandated by NOAA’s Office of Management and Budget.

Outcome: Since release of the first CINMS condition report in 2009, the format and some of the questions have changed. The introduction of indicators, following NOAA’s California Current Integrated Ecosystem Assessment framework, greatly improved the ability to establish quantitative status and trends, and the use of confidence scores improves the certainty of the status and trend ratings. CINMS will be the first national marine sanctuary to write a report using the new national guidelines, which includes a section on ecosystems services. The bulk of the work in 2018 focused on writing the new ecosystem services section and addressing reviewer comments. The ecosystem services section is supplemented by an independently-prepared contribution from Chumash community authors that describes Chumash history connected to the northern Channel Islands and surrounding sanctuary waters, indigenous community values linked to the ecosystem, related traditional knowledge and practices. The full, completed CINMS condition report will be made available online.

Timeline: Full report completion and distribution is estimated to occur in spring of 2019.

Partners: The CINMS Advisory Council’s Research Activities Panel was instrumental in providing input on the report’s assessment approach, indicator selection, and status and trends findings. The new ecosystem services section benefited from review by local partners and from an independently-prepared contribution from Chumash community authors. Partner institutions in this effort are numerous and include, to mention a few, the University of California and California State University systems, CDFW, NMFS, the Bureau of Ocean Energy Management (BOEM) and the National Park Service (NPS), and Santa Barbara ChannelKeeper.

- **Management Plan Review – CINMS**

Purpose: In 2019 CINMS will initiate a public process to update the site’s 2009 management plan. Much of the current plan is still relevant, so the update to the

management plan is expected to be much more streamlined than the process used to develop the 2009 plan.

Outcome: A draft and final management plan, draft and final environmental analyses, and potentially proposed and final regulatory adjustments.

Timeline: An internal assessment of progress made implementing the 2009 CINMS management plan was conducted in fall 2017 and completed in January 2018. The updated CINMS Condition Report will inform the management plan update process. We plan to initiate a public process in summer 2019 that includes input from the CINMS advisory council, possible formation of issue-specific working groups, and public release for comment of draft documents as mandated by the National Environmental Policy Act (NEPA), including interagency consultations. CINMS will consult with NMFS as required and approach the Council as appropriate.

Partners: The CINMS Advisory Council and other experts from local, state and federal partner agencies.

- **Condition Report Update – OCNMS**

Purpose: In anticipation of kicking off an extensive and public management plan review process in 2021 at OCNMS, sanctuary staff briefed key partners in late 2018 on the condition report process and discussed options for involvement throughout the process. The condition report will help inform future updates of the OCNMS management plan. A sanctuary condition report provides a summary of resource conditions.

Outcome: With sanctuary staff and key partners now familiar with the condition report process and goals, the first phase of the OCNMS condition report process will begin in spring 2019 with a one-day workshop to select ecosystem indicators. The workshop will provide early guidance to project partners as they prepare and analyze data and information in advance of an intensive 3-day expert workshop in late 2019.

Timeline: Begin condition report assessment in 2019, expected completion with release of final condition report in late 2020.

Partners: Olympic Coast Intergovernmental Policy Council, Makah Tribe, Quileute Tribe, Hoh Tribe, Quinault Indian Nation OCNMS Sanctuary Advisory Council, NMFS/Northwest Fisheries Science Center, Washington State Department of Ecology, Washington Sea Grant, NOAA's Pacific Marine Environmental Laboratory, Olympic National Park, and academic partners.

ANCILLARY MANAGEMENT ACTIVITIES

- **Reducing Ship Strikes on Endangered Whales – CINMS, GFNMS and CBNMS**

Purposes: CINMS, MBNMS, GFNMS, and CBNMS reduce the risk of ship strikes on endangered blue, humpback and fin whales by implementing voluntary and incentive-based vessel speed reduction (VSR) programs. CBNMS, GFNMS, and MBNMS request all vessels 300 gross tons or larger reduce speeds to 10 knots in the shipping lanes approaching and

leaving San Francisco Bay from May 1 – November 15. CINMS and NMFS request a voluntary VSR at the Santa Barbara Channel (part of the traffic separation scheme for the approach to Los Angeles/Long Beach harbors) from May or June until the large whales leave the area, typically in the fall. Whale sightings are collected via monthly aerial surveys conducted by CINMS staff, as well as on the water through sanctuary monitoring cruises by CINMS, GFNMS and CBNMS, the whale watch industry, volunteers, and researchers tracking high concentrations of whales within the Santa Barbara Channel. National marine sanctuaries conduct extensive outreach for the voluntary VSR programs via USCG Local Notices to Mariners broadcasts and publications, NOAA marine band weather radio, automatic identification system (AIS) messaging and direct communications with ship captains. The sanctuaries also send letters to select shipping companies indicating the level of cooperation by their ships, which is monitored via AIS.

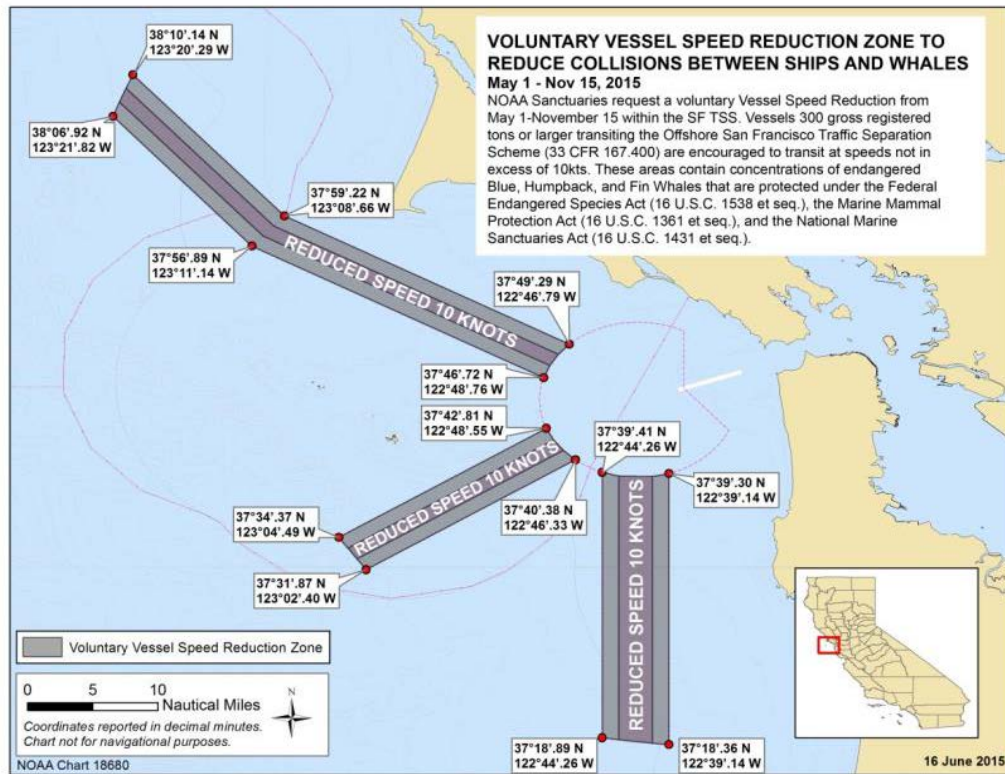
Starting in 2014, CINMS engaged in a unique partnership with the Santa Barbara and Ventura Counties Air Pollution Control Districts to implement an innovative incentive-based VSR program. In addition to reducing the risk of lethal ship strike to whales, slowing ships improves air quality. The Air Pollution Control District provides cash incentives and positive press and recognition to shipping companies to slow down to 10 knots or less. The incentive-based VSR expanded in 2017 and 2018 to include ship traffic at the entrance to San Francisco Bay.

Outcome: Cooperation by ships with the voluntary VSR within the San Francisco Bay Area traffic lanes and Santa Barbara Channel have been slowly improving over the past three years, but are still below 50% in both regions. In 2018, the San Francisco Bay Area traffic lanes saw 45% compliance in terms of distance traveled at less than 10 knots; whereas the Santa Barbara Channel has been consistently lower and saw 24% compliance in 2018 (percent distance travel less than 10 knots).

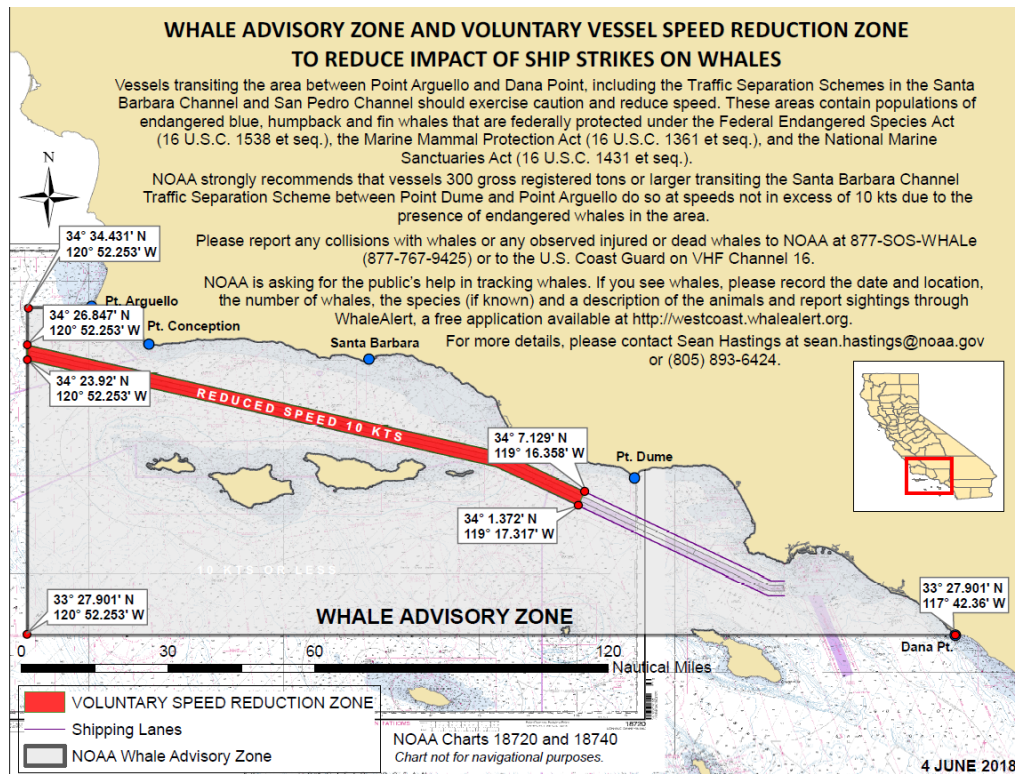
For the incentive-based VSR program, we have seen an increase in participation and decrease in speed over a much larger areas. Seven companies in 2014 participated and traveled less than 12 knots for a total distance of 2,700 nm combined. In 2018, 12 companies participated traveling less than 10 knots for a total distance of 46,026 nm. Combined, these efforts have resulted in reducing nitrogen oxides, greenhouse gases, and other pollutants, and reducing the threat of lethal ship strikes to whales, while promoting sustainable ocean commerce.

Timeline: Ongoing. The California national marine sanctuaries will continue to refine scientific support, outreach, and partnerships for the voluntary VSR to reduce whale ship strikes. The incentive-based VSR will continue in 2019 for both regions.

Partners: USCG, NMFS, Marine Exchange of Southern California, Pacific Merchant Shipping Association, Cascadia Research/John Calambokidis, Santa Barbara Air Pollution Control District, Ventura County Air Pollution Control District, Bay Area Air Quality Management District, National Marine Sanctuary Foundation, Greater Farallones Association, Starcrest LLC, and Benioff Ocean Initiative partners, including UC Santa Barbara, Woods Hole, Scripps Institute of Oceanography, UC Santa Cruz, and others.



Voluntary Vessel Speed Reduction Zone at entrance to San Francisco Bay in 2015.



Voluntary Vessel Speed Reduction Zone Santa Barbara Channel 2018.

- **Reducing Loss of Lobster Traps / Marine Debris – CINMS**

Purpose: This collaborative project focuses on using the expertise and experience of veteran fishermen to educate novice fishermen on best practices for reducing the loss of lobster gear, as well as the involvement of fishermen to help remove lost gear and other marine debris along CINMS shorelines.

Outcomes: In 2018 local fishermen Sam Shrout and Chris Voss joined with CINMS staff and other partners to conduct three debris cleanup events along the sanctuary shoreline that resulted in the removal of hundreds of pounds of plastic and metal debris, including substantial numbers of lost lobster traps. This followed similar events conducted in 2017 that removed two tons of debris, including more than 60 lobster traps, numerous buoys, and hundreds of feet of fishing rope and line. These efforts have brought together fishermen and agency staff to work together on reducing the future by-catch of lobsters and other marine species, wildlife entanglements, and habitat damage. Also in 2018, CINMS staff continued to help promote the distribution and use of the short film, "[Leave No Traps Behind](#)," created through this project in 2017. The film features veteran lobster fishermen explaining best practices for preventing lobster trap loss, and was created in collaboration with CINMS staff and produced by Earth Media Lab, LLC.

Timeline: Fishermen will continue to conduct shoreline cleanups in 2019; two specific cleanup events are scheduled to coincide with the annual Get Into Your Sanctuary weekend (August 2) and the International Coastal Cleanup Day (Sept. 21). CINMS staff are seeking additional NOAA grant funding to continue this project into 2020.

Partners: Local lobster fishermen: Sam Shrout, Jim Colomy, Chris Voss, Stanley Davis and Roger Healy; Sherry Lippiat, NOAA Marine Debris Program; National Marine Sanctuary Foundation; Channel Islands National Park; Santa Rosa Island Research Station; California State University Channel Islands; Dr. Julia Coates, CDFW; Santa Barbara Adventure Company; Island Packers; and the CINMS Advisory Council and volunteers.



Local lobster fishermen and sanctuary staff work together in 2018 to remove lost traps and other debris from the sanctuary's shoreline at Santa Cruz Island.

- **Whale disentanglement – MBNMS and WCRO**

Purpose: National marine sanctuaries on the west coast are deeply concerned with the increase in reported entanglements of whales in fishing gear in recent years and have been actively involved with preventing entanglements and disentanglement response. For preventing entanglements, national marine sanctuaries have been coordinating with the state and federal fishery managers and fishermen. CDFW in partnership with NMFS and the California Ocean Protection Council (OPC) convened the California Dungeness Crab Fishing Gear Working Group (Working Group) in the fall of 2015 to address this complex issue (<http://www.opc.ca.gov/whale-entanglement-working-group/>). The Working Group has identified collecting data on whale behavior and fishing gear dynamics as a high priority to assess circumstances of elevated entanglement risk and design appropriately tailored fishery management responses to reduce risk of entanglements. Acting in an advisory capacity, MBNMS staff is assisting the Working Group by providing whale observation and density data collected from vessel surveys (e.g. Applied California Current Ecosystem Studies (ACCESS), see the section on research and monitoring). Additionally, national marine sanctuaries off of California have conducted outreach to local whale watch operators to encourage the use of mobile applications for the collection of real-time whale observations (density and location), which the Working Group may incorporate into risk assessments to evaluate pre-season pilot efforts and in-season mitigation strategies.

For disentanglement of whales, sanctuary staff and vessels actively participate in response actions by coordinating with NMFS and the disentanglement networks.

Outcome: Data to inform risk assessments of whale entanglement, informed recommendations to avoid/minimize whale entanglements.

Timeline: Ongoing

Partners: The Working Group is a collaboration of commercial and recreational fishermen, Environmental NGOs, disentanglement experts, researchers, gear manufacturers, and state and federal agencies. MBNMS is offering in-kind support to the Working Group efforts. ONMS also partners with the Marine Mammal Disentanglement Network.

- **Proposed Desalination Plants in Monterey Bay – MBNMS**

(<http://montereybay.noaa.gov/resourcepro/resmanissues/desal-projects.html>)

Purpose: Because of federally- and state-ordered cutbacks to water withdrawals from the Carmel River, CA, and drought conditions, several desalination projects have been proposed on the coastline adjacent to MBNMS. Staff of MBNMS are serving as the lead for the NEPA review of three proposed desalination projects and developing reasonable and appropriate permit decisions as necessary. It is unlikely all three plants will be permitted and built, given that together they far exceed the water cutback required as a result of the dam removal on the Carmel River. The MBNMS management plan of 2008 produced guidelines in coordination with NMFS and the California Coastal Commission to ensure that future desalination plants adjacent to the sanctuary are properly sited, designed, and operated to avoid damaging impacts to the marine environment, including fish and their habitat. MBNMS staff are using these guidelines to evaluate and advise the following projects:

- The Monterey Peninsula Water Supply Project (MPWSP)/California American Water Company proposes to develop water supplies for Monterey District up to 9.6 million gallons per day (MGD) using slant wells in Marina, CA. The MPWSP will significantly reduce draw down in the Carmel river basin, thereby protecting habitat for steelhead. The California Public Utilities Commission (CPUC) and MBNMS are lead agencies for the state and federal environmental reviews. The preferred alternative is a smaller desalination plant using a subsurface seawater intake system (the slant wells) combined with the Pure Water Monterey project, a groundwater replenishment project.

Timeline: A final Environmental Impact Report/Environmental Impact Statement was released by NOAA on March 30, 2018. The preferred alternative (6.4 MGD desal facility in combination with the Pure Water Monterey project) is currently moving through the permitting process.

- The Monterey Bay Regional Water Project (MBRWP)/Deepwater Desal proposes a 25 MGD desalination plant using a new open water intake adjacent to Monterey Canyon with screens to limit entrainment, and a new outfall at Moss Landing, CA.

The California State Lands Commission (CSLC) and MBNMS are lead agencies for review of the project.

Timeline: The state and federal draft environmental review process is on hold indefinitely, pending further project design and descriptions from the applicant.

- The People's Moss Landing Desalination project proposes a 12 MGD desalination plant using a new screened open water intake and the extension of an existing outfall near Moss Landing. The Moss Landing Harbor District (MLHD) and MBNMS are lead agencies.

Timeline: The applicant provided a new project description, which initiated CEQA environmental review. NEPA has not been initiated due to uncertainties in project design and lack of communications with the project applicant.

Outcome: The goal is to coordinate with state and federal agencies on environmental reviews and permit letters for up to three proposed desalination projects: MPWSP, MBRWP, and People's Moss Landing.

Partners: CPUC, CSLC, MLHD, California Coastal Commission, California Regional Water Quality Control Board, and California State Water Resources Control Board.

CLIMATE CHANGE

- **Climate-Smart Conservation Program – GFNMS**

(<http://farallones.noaa.gov/manage/climate/>)

Purpose: The GFNMS “Climate-Smart Conservation” program is an initiative that integrates climate change science, monitoring, adaptation, mitigation, and communication into sanctuary management. Thereby promoting nature-based solutions to:

- Reduce greenhouse gas emissions and enhance carbon sinks
- Reduce climate change impacts on wildlife and people and enhance resilience
- Sustain vibrant, diverse ecosystems

Outcomes/Partners: Climate related products and activities in 2018:

- *Climate Adaptation Tool Kit.* Starting in 2018, GFNMS has worked with the Commission on Environmental Cooperation to create an adaptation tool kit with strategies that marine protected areas may take to address the impacts of climate change. The tool kit is scheduled to be completed by spring 2019.
- *Sonoma-Marin Coastal Regional Sediment Management Report* from the GFNMS Advisory Council (2018). The GFNMS *Climate Action Plan* implementing living shorelines strategy, protect and restore habitat strategy, science need strategy were the first strategies acted upon by the Advisory Council. The resulting *Sonoma-Marin Coastal Regional Sediment Management Report* contains 17 regional recommendations as well as site specific recommendations. The report was forwarded to the California Natural Resources Agency and the State Coastal Sediment Management Workgroup. GFNMS is using the recommendations from the report to develop the *North-Central California Coast Coastal Resiliency Sediment Action Plan*.

- As part of the development of the Action Plan, GFNMS is spearheading the establishment of a North-central California Sediment Management Committee composed of government agencies in the region. Three case studies will be developed in the plan including restoring Surfer's Beach with sand from Pillar Point Harbor in San Mateo County, CA. The plan will be completed summer 2019.
- *Kelp Recovery Plan* (2019). The next *Climate Action Plan* strategy addressed by the Sanctuary Advisory Council in partnership with the CDFW was to develop recommendations to restore kelp forests. In November 2018 the GFNMS Advisory Council forwarded recommendations to restore bull kelp in Sonoma and Mendocino Counties. GFNMS is using the recommendations to develop a *Bull Kelp Recovery Plan for Sonoma and Mendocino Counties*. The plan will be completed spring 2019.
 - *Native Oyster Restoration Plan* (2019). At the August 2018 GFNMS Advisory Council meeting, the Sanctuary Advisory Council began implementation of the Climate Action Plan strategies for living shorelines and habitat restoration by establishing a native oyster restoration working group. The working group is a partnership between GFNMS Advisory Council and Marin County and will develop recommendations on techniques and locations to restore native oysters in Tomales Bay. The recommendations will be brought to the Sanctuary Advisory Council at the August 2019 meeting. GFNMS will then work with Marin County to develop a report that identifies next steps.
 - *Sharing Scenario Planning Lessons Learned with the PFMC*. On December 18, 2018, the PFMC Ecosystem Work Group held an informational webinar with briefings for listeners on scenario planning. GFNMS staff presented on the results and lessons learned from climate change scenario planning for North-central California coastal habitats.
- **Olympic Coast as an Ocean Acidification Sentinel Site - OCNMS**
Purpose: Changing water chemistry and ocean acidification (OA) has profound implications for Washington's marine resources, threatening coastal economies, communities and the quality of life. In 2016, OCNMS Advisory Council's Climate Change Working Group identified a priority recommendation to "work with partners to propose to NOAA leadership OCNMS be designated as a NOAA Sentinel Site for ocean acidification and/or sea level rise." Focusing on a coordinated strategy for science, education, awareness, public engagement, and resource management, a sentinel site will develop early warning capabilities regarding ocean acidification and help forecast impacts on marine resources of the Olympic Coast and inland waters.
- Outcome:** In September 2016, OCNMS and NOAA's Ocean Acidification Program co-hosted a workshop to explore a sentinel site concept, producing a workshop report outlining the recommendations from the assembled experts. In 2018, Olympic Coast National Marine Sanctuary Advisory Council created an OA Sentinel Site Working Group to further outline the specific components, potential organizational structure and participating entities.

Timeline: The working group is expected to complete their deliberations and make recommendations to OCNMS Advisory Council and OCNMS by the end of 2019.

Partners: NOAA's Ocean Acidification Program; NOAA's PMEL, Makah Tribe, Quileute Tribe, Hoh Tribe, Quinault Indian Nation; University of Washington's Ocean Acidification Center, OCNMS Advisory Council, Washington Department of Ecology, Washington Department of Natural Resources (WDNR), Washington Department of Fish and Wildlife (WDFW).

HABITAT

- **NOAA's Deep Sea Coral Research and Technology Program Funding Returns to the West Coast**

Purpose: NOAA's Deep Sea Coral Research and Technology Program (DSCRTP) works with partners to support regionally-led research programs to inform deep-sea coral and sponge (DSCS) ecosystem management and conservation. Approximately \$2.5M of funding will support a 4 year research initiative in our region, known as the West Coast Deep-Sea Coral Initiative (WCDSCI). 2018 served as a planning and preparation year during which west coast leads Chris Caldwell (CINMS) and Elizabeth (Liz) Clarke (NWFSC) formed a NOAA-led steering committee with representatives from NOAA's National Centers for Coastal Ocean Science (NCCOS), Office of Exploration (OER), NMFS, ONMS and the DSCRTP. The steering committee, CINMS, and NMFS organized and hosted a research priority scoping workshop in April of 2018 to capture the most pressing DSCS research and management needs on the west coast, according to experts from the region. These workshop results have since guided the formation of the science plan, a document that outlines the planned activities supported by the WCDSCI. Planned activities include fieldwork on NOAA ships and sanctuary vessels, data rescue and analysis, as well as the development of outreach products to educate managers, stakeholders and the general public. Through these funded projects, ONMS and partners hope to address three major place-based research themes that emerged during the workshop:

1. To gather baseline information from areas subject to changes to fishing regulation before implementation of Amendment 28 to the Pacific Coast Groundfish Fishery Management Plan;
2. Improve our understanding of DSCS bycatch "hot spots" and the potential impacts of fishing gear on biogenic habitat on the west coast;
3. Continue to explore and assess DSCS resources throughout NOAA's National Marine Sanctuaries.

The results of the WCDSCI are expected to inform marine resource management at tribal, state, and federal levels, as well as educate the public about these unique and valuable deep-sea ecosystems.

Outcome: Planning for this effort in FY18 brought together NOAA staff from multiple line offices, as well as many partners external to NOAA, in support of DSCS research. The timing coincides with a major decision recently made by the PFMC to change the designation status of several areas off the west coast as either Essential Fish Habitat Conservation Areas or Rockfish Conservation Areas. Before these changes in protection

take effect, multiple management agencies are interested in collecting baseline information on community distribution and condition of DSCS, particularly in areas planned for reopening to bottom trawling. The partnerships leverage staff time, capability, and investments such as vessel days at sea while also engaging leadership at several federal agencies. Furthermore, the partnerships integrate shared priorities across NOAA program offices, in collaboration with BOEM, the U.S. Geological Survey (USGS) and other participants of the multi-agency campaign focused on Expanding Pacific Research and Exploration of Submerged Systems (EXPRESS). We hope to continue to collaborate through EXPRESS as well as with other partners such as the Ocean Exploration Trust (OET), to expand WCDSCI research and outreach accomplishments. This process will strengthen professional relationships while making progress towards a more complete understanding of the distribution of critical deep sea habitats and the ecosystem services they provide. This in turn supports better ecosystem-based management of living marine resources found within sanctuaries and beyond.

Timeline: The first year, FY2018, focused a relatively small portion of DSCRTP funding on planning and coordination. The following two field-intensive years, 2019-2020, will use the largest allocations of DSCRTP funding to support the research and outreach activities. The final year, FY2021, will again focus a smaller portion of funds on wrap-up of projects and winding-down activities.

Partners: NOAA's DSCRTP, NMFS, ONMS, NCCOS, OER, and NGOs.

- **Seafloor Mapping Initiative - Expanding Pacific Research and Exploration of Submerged Systems (EXPRESS)**

Purpose: Place-based fisheries and coastal zone managers depend on fine scale bathymetry and visual data for an array of critical decisions including navigational safety, disaster response, endangered species and fisheries management, conservation, research, energy development and marine planning. Despite their importance, these data types are limited both spatially and temporally for the offshore areas of Washington, Oregon, and California. Recently, NOAA, BOEM, and USGS, initiated a new campaign: Expanding Pacific Research and Exploration of Submerged Systems (EXPRESS). By working together in a coordinated fashion cross-agency resources can be leveraged to target these information gaps. EXPRESS arose from the successes of the CINMS-led Southern California Seafloor Mapping Initiative (SCSMI) and over the next two years will leverage investments made by NOAA's WCDSCI, which will bring \$2 million dollars for the west coast deep sea mission over the next two years.

Outcome: Over 8,000 sq. km of seafloor mapping and over a hundred ROV/AUV dives have occurred since 2014 by SCSMI and EXPRESS, producing high resolution seafloor bathymetry and backscatter data as well as derived products such as habitat maps, rugosity, and other measures of seafloor complexity. Within CINMS alone, over 80% of the sanctuary now has high-resolution multibeam bathymetry and backscatter coverage. Multiple EXPRESS missions have already launched including a mission to map the waters around Santa Rosa and Santa Barbara Islands in Southern California, a proposed wind farm location off Morro Bay in central California, and parts of OCNMS. Moving

forward, EXPRESS will use the Integrated Ocean and Coastal Mapping Program and the Seasketch tool to plan for upcoming acquisition missions and coordinate priorities between agencies.

Timeline: Ongoing.

Partners: This effort is led by a joint partnership between USGS, BOEM and NOAA, including NMFS, NCCOS and ONMS. Over 20 individuals representing 20 agencies, NGOs, and academic institutions have actively aided in the mapping effort to-date.

Entities include the Ocean Exploration Trust, California OPC, Southern California Coastal Ocean Observing System, The Nature Conservancy, Monterey Bay Aquarium Research Institute (MBARI), Channel Islands NP, University of California, Santa Barbara, U.S. Navy, California State University Monterey Bay, CDFW, U.S. Army Corps of Engineers, and California Coastal Commission.

- **Groundfish Essential Fish Habitat (EFH) and Rockfish Conservation Areas (RCAs) Modifications**

Purpose: The West Coast Region's national marine sanctuaries have been engaged in the Council's process to modify EFH for Pacific Coast Groundfish because of the close alignment between protection of groundfish EFH from adverse impacts from fishing and the ONMS's goals of protecting benthic habitat and associated ecological communities while also facilitating appropriate multiple uses. The West Coast Region appreciates the collaborative relationship with the Council, its staff and committees regarding marine habitat conservation. We have valued participating on the EFH Review Committee and the Habitat Committee and contributing data and community feedback to the final EFH Conservation Area designs. Our views and recommendations have also benefitted greatly by collaborations with many diverse fishermen and their representatives, and we commend them and the collaborative process the Council facilitated. Furthermore, we share the goal of developing conservation practices for benthic habitat in close concert with potentially-affected fishermen. We also are committed to continued research of seafloor communities and associated habitats within sanctuaries.

Timeline: The WCRO reviewed and commented on the 2018 Draft Environmental Impact Statement for Changes to Groundfish Essential Fish Habitat Conservation Areas and Boundaries of the Trawl Gear Rockfish Conservation Areas and Pacific Coast Groundfish Fishery Management Plan Amendment 28 and will continue to track the implementation of the Fishery Management Plan Amendment and associated rulemaking in 2019. We are also planning seafloor mapping and other benthic habitat research in 2019 as detailed elsewhere in this update report.

- **Seafloor Mapping - GFNMS**
(<https://farallones.noaa.gov/science/seafloor.html>)

Purpose: Very little of the seafloor habitat off of northern California has been explored and even less is characterized using visual survey techniques, especially deep-water habitats. The goal of benthic characterization for 2018 and 2019 is to increase mapping (bathymetry and substrate) data collection within GFNMS.

Outcome: In 2016, ONMS, the Ocean Exploration Trust, and NOAA's Office of Exploration and Research, using the E/V *Nautilus* collected 1,600 sq. km of multibeam data in the deeper portions of GFNMS at Arena Canyon, Farallon Escarpment and Pioneer Canyon. In 2017 and 2018, an additional 857 sq km area was surveyed in adjacent areas. A publication from the 2016 cruise was released in 2018 and reviews the taxonomy of two new species of sponges collected in 2016, and updates the description and range expansion of another sponge species. In 2018, GFNMS and partners completed mapping at Rittenburg Bank, Deep Reef, and Pescadero Reef, and separately, characterization surveys at Cochrane Bank, Deep Reef, Pescadero Reef and Pigeon Point Reef.

Timeline: Projects in 2019 include completion of mapping in Point Arena Biogenic Area South (PABAS) and The Football and surrounding area. An ROV cruise is planned for PABAS in October 2019. Funding is currently being sought to analyze and publish data collected from 2016 and 2018 cruises. GFNMS has prioritized for 2019 - 2021 multibeam surveys in areas where habitat characterization is data-poor, including PABAS, The Football and the surrounding proposed EFH Conservation Area, Point Reyes Region west of state waters. GFNMS aims to also complete mapping between Fanny Shoal and Cochrane Bank.

Partners: EXPRESS, NMFS, DSCRTP, MARE, NOAA's NCCOS, USGS, CBNMS, California Academy of Sciences, NOAA's Office of Exploration and Research, and Ocean Exploration Trust.

- **Seafloor Mapping and Habitat Characterization - OCNMS**

Purpose: OCNMS continues to work with the State of Washington, NOAA's National Centers for Coastal Ocean Science and other stakeholders to identify and communicate seafloor mapping priority areas for Washington State. Thanks to a spatial prioritization process conducted in May 2015 and a subsequent workshop in March 2018, OCNMS staff has been able to contribute substantial input to a similar seafloor mapping prioritization effort for the entire U.S. west coast funded by BOEM. OCNMS also continues to coordinate with partners and promote the collection of new high-resolution seafloor mapping data by ships of opportunity working in or transiting through OCNMS.

Outcome: In 2019, OCNMS anticipates the release of an app. 2,600 sq. km of new high-resolution seafloor mapping data collected in the sanctuary by NOAA Ship *Rainier* and E/V *Nautilus* in 2017, which is undergoing final review at NOAA's Pacific Hydrographic Branch. These data will be used for a variety of purposes including resource protection, research, living resource management, and coastal hazard planning.

Timeline: Ongoing. OCNMS staff continues to make incremental progress towards development of a high-resolution map of the seafloor within OCNMS and coordinates with others to contribute to regional seafloor mapping efforts when possible.

Partners: NOAA/NCCOS, Washington Department of Ecology, WDNR, WDFW, NOAA/Integrated Ocean and Coastal Mapping, NOAA's Office of Coast Survey, Olympic Coastal Treaty Tribes, NMFS, University of Washington, Oregon State University (OSU), Ocean Exploration Trust.

- **Eelgrass Habitat Characterization of Tomales Bay - GFNMS**

Purpose: Eelgrass provides important habitat for numerous fish, birds, invertebrates and other organisms in Tomales Bay, and provides ecosystem services such as trapping of sediments and nutrients and preventing shoreline erosion by buffering the impacts of wave energy and storms. A comprehensive sidescan sonar survey of eelgrass was conducted in Tomales Bay in 2017. Previous eelgrass surveys were sporadic and only conducted via overflight, which limits knowledge of the extent of eelgrass beds, especially in deeper waters with high turbidity. The new surveys serve to inform impacts from coastal and shoreline activities to eelgrass (e.g. moorings) and a number of research projects underway related to eelgrass/aquaculture interactions. Eelgrass is also Essential Fish Habitat (EFH) for groundfish and has various other federal, state and local protections and designations. The need for spatial planning by the nine agencies that manage Tomales Bay is critical, and eelgrass habitat is a main driver during decision-making. Requests for information on the extent of the beds is consistent and ongoing.

Outcome: In the Fall of 2017 the extent of eelgrass beds was mapped and ArcGIS products showing the extent of eelgrass bed were produced in Spring 2018. GFNMS staff are currently building partnerships with state and local agencies to seek funding for consistent bay-wide eelgrass habitat mapping.

Timeline: We completed this project in 2018. Additional baseline surveys are planned for 2020, pending funding.

Partners: The Tomales Bay Interagency Committee oversees implementation of projects in Tomales Bay led by GFNMS, and is currently comprised of nine federal, state and local agencies including CDFW, State Parks and the County of Marin.

RESEARCH AND MONITORING

- **Restoration of White Abalone – CINMS**

Purpose: CINMS staff are working with NMFS and other federal and state agencies to help locate living white abalone (*Haliotis sorenseni*) in and around CINMS. Surveys previously conducted in southern California show that at least a 99% reduction in white abalone density has occurred since the 1970s. Once occurring in numbers as high as 1/m² of suitable habitat, recent surveys show that densities average 1/hectare (10,000 sq. m) in the Channel Islands off southern California. The marine habitat surrounding the Channel Islands may support endangered white abalone and could serve as suitable habitat for restoration efforts. CINMS staff have been supporting field-operations aboard the sanctuary vessel R/V *Shearwater* to conduct dive trips into the sanctuary to survey for white abalone.

Outcome: To continue to support the development of a strong partnership between NMFS and ONMS, and ultimately the discovery of living white abalone in the wild, within areas that could serve as suitable habitat for restoration of this species. In 2018, CINMS hosted and joined research divers from the NOAA Restoration Office, NOAA Southwest Fisheries Science Center, National Park Service, and MBNMS aboard the R/V *Shearwater* to conduct SCUBA surveys around Santa Barbara Island in search of living abalone, including white abalone (*H. sorenseni*). Three teams of divers used a baseline - transect survey method (David Witting, NOAA Restoration Center) to survey close to four acres (15,500 square meters) of habitat at locations where white abalone were once commonly found. Additionally, the dive teams collected data on abalone shells, and any abalone found alive. From this large underwater survey effort, only one living pink abalone (*Haliotis corrugata*) was observed at site SBI 2 (see figure below). Divers also saw evidence of the historic abundance of white abalone off Arch Point at the SBI 2 and SBI 5 dive sites. Over 15 shells ranging in size from 98 – 175 mm were collected from those locations. None of the white abalone shells collected were “fresh”, meaning that none had died recently.



Santa Barbara Island Map showing the (5) dive sites surveyed and characterized. Divers observed a single living pink abalone at SBI 2. Divers collected white abalone shells at the SBI 5 site and rated the habitat as *excellent* for white abalone and other abalone species.

Timeline: Ongoing. 2019 field season vessel operations and diving will continue to survey high priority white abalone habitat areas within CINMS. A diver community outreach and seafloor mapping workshop will be coordinated in 2019 to better integrate and coordinate efforts to locate and restore white abalone.

Partners: Lead partners are NMFS WCRO and Southwest Fisheries Science Center (SWFSC), U.S. Navy, CDFW and NPS. CINMS is a supporting partner, providing on-

water support and working in coordination with ONMS WCRO. The outreach and mapping workshop will target commercial urchin divers and dive boat operators in Santa Barbara and Ventura counties.

- **Characterization of Davidson Seamount - MBNMS**

Purpose: The area surrounding the Davidson Seamount was added to MBNMS in 2009. It is a unique and special place within U.S. west coast waters. The seamount has been infrequently surveyed for marine mammals and seabirds, and it is critical to regularly survey these waters to better understand the use patterns by marine mammals and seabirds in this biological "hot spot." Understanding prey availability (krill and fishes) in temporal association with marine mammal and seabird presence is the next step in correlating seamount affects with prey and predator presence. It is also important to assess new areas within the Davidson Seamount Management Zone for coral and sponge populations on the seafloor adjacent to the seamount proper, where all previous benthic surveys have taken place.

MBNMS conducted a 10-day research cruise aboard the NOAA fisheries survey vessel *Shimada* in July 2018. Marine mammal and seabird surveys, echosounder surveys for krill and mid-water fishes, oceanographic measurements, surface microplastics tows, and midwater krill and fish tows were conducted 24 hours a day. MBNMS also surveyed, with ROVs, a new area approximately 3,000 to 3,300 meters deep southeast of Davidson Seamount, but still within MBNMS waters. Not only new populations of corals and sponges were discovered, but also aggregations of over 1,000 brooding female octopuses (*Muusoctopus robustus*). This population is referred to as the "octopus garden," the largest of only two known deep sea brooding aggregations. The octopuses were associated with fluid seeps, another discovery not previously known in the area. The total geographic extent of this population was not assessed, but may be in March 2019 when MBNMS participates in a research expedition back to this area aboard the R/V *Atlantis* and the HOV *Alvin*. Another future ROV expedition to the area will once again take place aboard the E/V *Nautilus* in October 2019.

Timeline: The R/V *Atlantis* will leave port from San Francisco on March 26, dive with the HOV *Alvin* at Davidson Seamount on March 27 and the area which occupied the "octopus garden" on March 28. The E/V *Nautilus* will leave port from San Francisco on October 12 and dive with the ROVs *Hercules* and *Argus* at Davidson Seamount and the "octopus garden" from October 12-16, disembarking on October 18 in San Pedro.

Partners: NMFS, Save the Earth, Point Blue, Moss Landing Marine Laboratories, California State University Monterey Bay, UC Santa Cruz, Woods Hole Oceanographic Institute, BBC, Ocean Exploration Trust.



Female octopuses (*Muusoctopus robustus*) in their unique brooding posture within a fluid seep at 3,100 meters depth near Davidson Seamount. Photo credit: Ocean Exploration Trust/NOAA.

- **Applied California Current Ecosystem Studies (ACCESS) – CBNMS, GFNMS, and MBNMS**

Purpose: ACCESS is a long term research and monitoring project that examines coastal and pelagic ecosystem health and processes in north-central California national marine sanctuaries. Scientists collect data on oceanographic conditions, prey availability, and distribution and abundance of predators. The project aims to understand changes in the ecosystem from stressors like climate change and includes components to understand ocean acidification conditions and impacts to biological resources from climate change induced physical changes.

Outcome: This project contributes to a regional characterization and monitoring of the physical and biological components of the pelagic ecosystems of northern MBNMS, CBNMS and GFNMS. Data is used to relate the spatial patterns of bird and marine mammal distribution with oceanographic and prey patterns and to understand seasonal and interannual changes in the pelagic ecosystem. The information is used in management decisions by NOAA and other regulatory agencies to protect resources in the sanctuaries.

Timeline: Cruises to collect data for the project typically occur three or four times a year from spring through fall to capture the oceanographic seasons and have been conducted since 2004; 2019 will be the 16th year of surveys. Annual summaries are available at accessoceans.org.

Partners: Point Blue Conservation Science. Collaborators: Bodega Marine Lab, San Francisco State University, California Department of Public Health.

- **Hypoxia Monitoring – CBNMS**

(https://nmscordellbank.blob.core.windows.net/cordellbank-prod/media/archive/science/hypoxia_052417.pdf)

Purpose: CBNMS is partnering with scientists from UC Davis Bodega Marine Lab to monitor oxygen conditions in the sanctuary. Oxygen conditions have been changing along the west coast and hypoxic conditions have the potential to have significant impacts to the CBNMS ecosystem. Scientists and managers need to assess the presence of hypoxic conditions in CBNMS, understand the drivers, and evaluate how this may impact the ecosystem.

Outcome: Since 2014 two moorings monitoring temperature and dissolved oxygen have been deployed at Cordell Bank. Data show variability in oxygen conditions correlated with upwelling and relaxation events. A UC Davis graduate student plans to produce a manuscript using the CBNMS mooring data.

Timeline: Manuscript completion date: possibly 2020.

Partners: UC Davis Bodega Marine Lab.

- **Acoustic Research - OCNMS**

Purpose: A new multi-year study with partners from NOAA, United States Navy and Naval Postgraduate School in Monterey aims to provide OCNMS with a better understanding of the acoustic characteristics of the sanctuary. Six-month deployments of four acoustic receivers called ‘soundtraps’ will begin in spring of 2019, and is expected to continue on a 6-month cycle for the next several years. The four listening stations in OCNMS were selected to capture data from locations representing a range of acoustic environments in the sanctuary, and to investigate whether severe hypoxic events that occur frequently in southern OCNMS near the Quinault Indian Nation can be detected acoustically related to changes in the distribution and abundance of sound-producing organisms. Northern locations were selected in cooperation with Makah Tribal fishermen and tribal staff to avoid negative impacts to tribal fisheries while still capturing sound signatures originating from international shipping lanes in the Strait of Juan de Fuca and from small-boat traffic nearshore, which likely intensifies during recreational and commercial fishing activity. Thanks to an existing inventory of acoustically-active animals in OCNMS, project results will help characterize the sound environment experienced by ecologically- and economically-important species believed to be impacted by sonic disturbance.

Outcome: Understanding the sanctuary’s acoustic environment helps OCNMS consider and manage potential impacts to affected species, and builds capacity for further acoustic research.

Timeline: Soundtraps will be deployed in OCNMS in spring 2019 and serviced on ~6-month intervals for the next several years.

Partners: US Navy, Naval Postgraduate School, Channel Islands National Marine Sanctuary, Office of National Marine Sanctuaries.

- **Acoustic Research - CBNMS**

Purpose: CBNMS has partnered with NOAA's PMEL and OSU to monitor ocean sound in the sanctuary using NOAA Noise Reference Station # 11 (NRS11). The goal is to develop a soundscape of the sanctuary as a first step towards understanding the impact that sound has on sanctuary resources. The data will provide a characterization of the local soundscape in the sanctuary, an analysis of how ambient sound varies over time, and a comparison to other reference stations. Additional questions about sound from whales and ships will be addressed.

Outcome: Understanding the sanctuary's acoustic environment helps CBNMS manage potential impacts to affected species, such as endangered whale species. After a two year deployment, scientists from CBNMS and PMEL recovered the acoustic mooring on October 4, 2017 and redeployed new instruments for another two years. The data are being analyzed by PMEL and OSU scientists. Video on initial deployment:

<https://sanctuaries.noaa.gov/science/sentinel-site-program/cordell-bank/acoustic-buoy-final.html>

Timeline: Data analysis from 2015-2017 deployment is underway. A published article on goals and methods "Monitoring long-term soundscape trends in U.S. Waters: The NOAA/NPS Ocean Noise Reference Station Network" was published in Marine Policy in April 2018 ([Haver et al.](#)).

Partners: PMEL and OSU.

- **Supplementing 2018's Juvenile Salmon and Ocean Ecosystem Survey – OCNMS**

Purpose: In June 2018, OCNMS teamed up with NOAA's Northwest Fisheries Science Center to augment and enhance a planned survey of juvenile salmon in Washington State. The surveys are part of a long-term monitoring program conducted by NWFSC each summer from the F/V *Frosti*, a chartered fishing vessel that surveys along established cross-shelf transects in Oregon and Washington to assess the abundance and distribution of young salmon entering the ocean. F/V *Frosti* was accompanied by NOAA fisheries survey vessel *Shimada*, which sampled alongside the F/V *Frosti* on three transects within OCNMS to help scientists understand how different research platforms influence data results. In addition to doubling the number of research trawls for juvenile salmon in OCNMS, the science party also conducted multiple nighttime plankton tows in waters surrounding OCNMS oceanographic moorings, and Quileute Tribe Natural Resource staff analyzed numerous surface plankton samples to monitor for the presence of harmful algal blooms. *Seattle Times* reporter, Lynda Mapes, and photographer, Steve Ringman,

also participated in the cruise to help document the effort and share their experience with a wide audience of readers in our region.

Outcome: OCNMS continues to build on productive partnerships with an array of collaborators throughout the Pacific Northwest in an effort to promote and share ecological research conducted in the sanctuary.

Timeline: The research cruise was conducted June 18-23, 2018.

Partners: NOAA Northwest Fisheries Science Center, University of Washington, Quileute Natural Resources, *Seattle Times*.