NATIONAL MARINE SANCTUARIES COORDINATION REPORT

Introduction:
The 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 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 continue with providing an 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 2017 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.
  Outcome: As of January 2017, NOAA has received 15 nominations. Of these, two nominations are under review, five have been declined or withdrawn, and eight have been admitted to the inventory.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. On the west coast, 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, two nominations have been submitted along the west coast, for which the PFMC has oversight: Chumash Heritage off of the San Luis Obispo and Santa Barbara county coastline, and Southern California Offshore Banks representing Cortes, Tanner, Cherry and Northwest Banks, and Garret Ridge. 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 nominations 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. There is not an active evaluation within ONMS 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. The proposal was submitted with letters of support from local university scientists, aquaria, and sport fishing. The nomination's purpose is to protect and manage critical offshore resources, including endangered and protected species such as white abalone (*Haliotis sorenseni*) and promote collaborative research. The proposal does not recommend curtailment of fisheries (commercial or recreational) or military activities, but emphasizes the need to coordinate these offshore activities with national security concerns while prohibiting oil and gas extraction and other industrial uses. The proposal is currently under review. No final action has been taken on the nomination while ONMS headquarters conducts discussions with the US Navy to understand their concerns with the nomination.

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)). The sanctuary management plan review process has evolved over the years to include thorough public engagement opportunities, not just in reviewing a draft management plan but also in the very drafting of the strategies and activities that are the foundation of the plan. In addition, over the last decade ONMS has strived to complete a sanctuary condition report, which describes the conditions of the sanctuary ecosystem in advance of the 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. This new paradigm of pairing the condition report with the onset of sanctuary management plan review helps create a clear link between resource protection needs and management priorities. Here follow condition report development and 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 in 2017 a focus on drafting new action plans related to priority issues and updating still relevant 2008 action plans. New action plans include: Climate Change, Coastal Erosion and Sediment Management, Davidson Seamount, Elkhorn Slough, Marine Debris and Introduced Species. Programmatic plans for Education and Outreach, Research and Monitoring and Resource Protection, Maritime Heritage and Marine Spatial Planning have also been added. The MBNMS Advisory Council has been considering and discussing issues and providing input to staff on revisions and updates to the action plans. Environmental documents are in development and minimal regulatory changes are under consideration; primarily changes to definitions are being considered.
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 late 2018. A final draft of these documents is expected by the end of 2019. MBNMS will consult with 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 the National Marine Fisheries Service (NMFS).

- **Condition Report Update – CINMS**
  (http://sanctuaries.noaa.gov/science/condition/)
  Purpose: The 2018 CINMS condition report is under final review as mandated by NOAA's Office of Management and Budget. 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.
  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 (IEA) 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 ecosystem services to be published separately. The bulk of the work in 2017 focused on writing up the results from workshops held, incorporating datasets and analyses, and addressing reviewer comments. The revised CINMS condition report will be made available online.
  Timeline: Full report completion and distribution is estimated to occur by spring of 2018.
  Partners: The CINMS Advisory Council's Research Activities Panel (RAP) was instrumental in vetting the report's assessment approach, identifying indicators to track over time, and participating in workshops to establish status and trends ratings. The RAP consists of local researchers within the University of California and California State

University systems, state agencies such as CDFW, federal agencies such as NMFS, the Bureau of Ocean Energy Management (BOEM) and the National Park Service (NPS), as well as local NGOs such as the Santa Barbara ChannelKeeper. Processed data and analyses were contributed by the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), Channel Islands NPS, Southern California Coastal Watershed Research Project, Santa Barbara Channel Long-term Ecological Research, Santa Barbara Channel Marine Biodiversity Observing Network, UC Santa Barbara Plumes and Blooms Project, CalCOFI, Multi-Agency Rocky Intertidal Network (MARINe), and Marine Applied Research and Exploration (MARE).

- **Management Plan Review – CINMS**
  Purpose: In 2018 CINMS will begin a process to update the site's 2009 management plan. Much of the current plan is still relevant, so the update process is expected to be much more streamlined than the process used to develop the 2009 plan, which had replaced the original CINMS management plan from 1982.
  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. Following release of the condition report, a public scoping period is expected to take place later in 2018, to be followed by public process steps such as input from the CINMS Advisory Council, possible formation of issue-specific working groups, interagency compliance steps, drafting of action plans, public release and agency reviews of a draft management plan and appropriate National Environmental Policy Act (NEPA) documentation, and incorporation of comments received. 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.

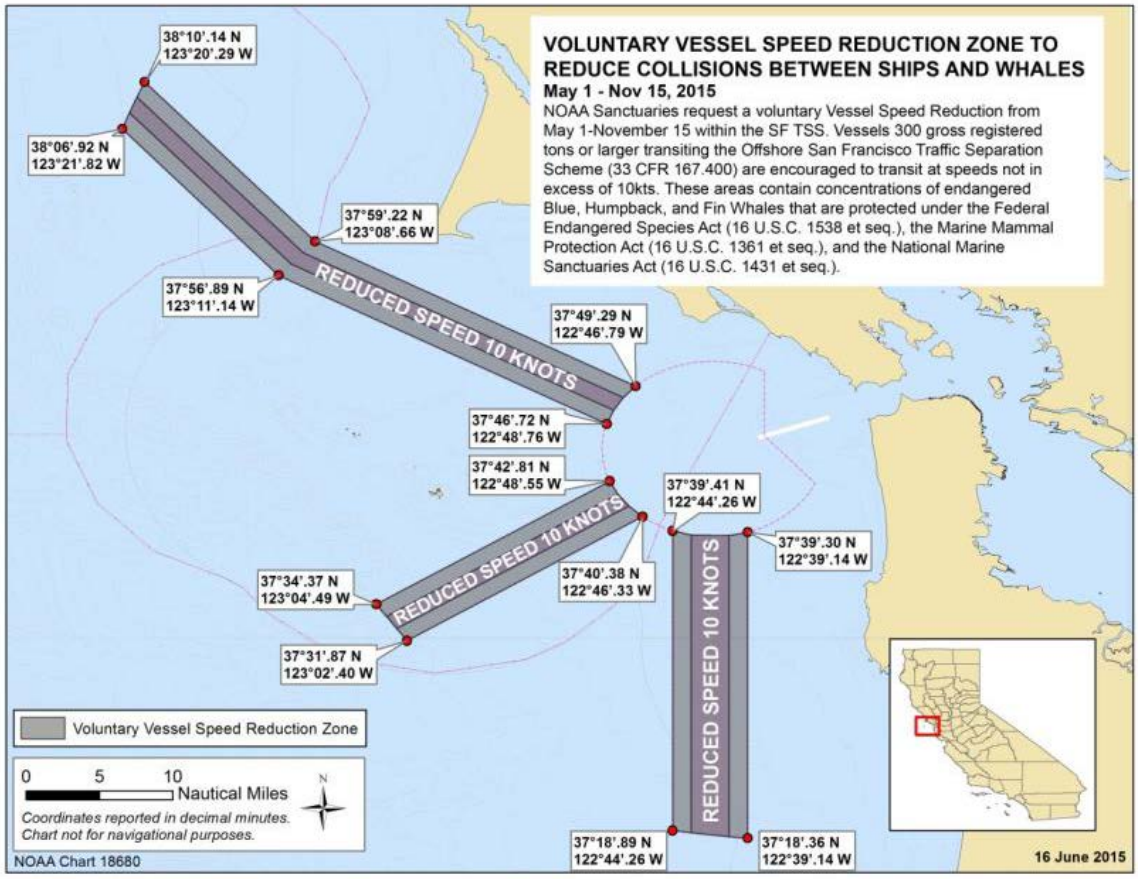
  Condition Report Preparation – OCNMS
  Purpose: OCNMS staff have begun planning for the OCNMS condition report, which is scheduled to kick off in FY19. Initial steps include having ONMS headquarters experts provide an overview for the tribes and other key participants, laying out the timeline and overall process. This will be followed by a discussion of how to build on recent innovations from CINMS and MBNMS in condition report development and address the new section on ecosystem services. This project also aims to increase the convergence of science-based reporting efforts in the region, integrating existing data streams and indicator information. For example, OCNMS comprises 42% of the area addressed by the Washington State's Marine Spatial Plan (MSP), offering an opportunity for OCNMS to build on and integrate with the state's MSP data and process. In addition, NOAA's California Current IEA will also be leveraged in support of developing the OCNMS condition report.
  Outcome: This project is in the early stages of planning and will kick off next fiscal year; in FY18 the focus is on engaging key partners early in the process, clearly describing and

socializing the condition reporting process, and identifying critical data streams and indicator information that may be available to support the process.
Timeline: In FY18, most of the focus will be on preparation and socialization of the process. In FY19, the OCNMS condition report process will commence and drafting will continue through at least 2020, prior to agency review and clearance, and publication.
Partners: NMFS, Northwest Fisheries Science Center (NWFSC), NOAA's Pacific Marine Environmental Laboratory (PMEL), NOAA's Ocean Acidification Program, tribes, state, NGOs, and academia.

ANCILLARY MANAGEMENT ACTIVITIES

- **Reducing Ship Strikes on Endangered Whales – CINMS, GFNMS and CBNMS**
  Purposes: CINMS and the central coast national marine sanctuaries (GFNMS and CBNMS) reduce the risk of ship strikes on endangered blue, humpback and fin whales by implementing voluntary vessel speed reduction (VSR) programs. One program requests all vessels 300 gross tons or larger reduce speeds to 10 knots. In addition to reducing the risk of lethal ship strike to whales, slowing ships to 10 knots or less improves air quality. GFNMS and CBNMS request a voluntary VSR for the traffic separation scheme at the entrance to San Francisco Bay from May 1 – November 15. CINMS and NMFS request a voluntary VSR at the Santa Barbara Channel (SBC; part of the traffic separation scheme for the approach to Los Angeles/Long Beach harbors) from June until the large whales leave the area, typically in the fall. Whale sightings are collected via aerial surveys, by the whale watch industry and volunteers, and by whale researchers tracking high concentrations of whales within the SBC. 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. CBNMS and GFNMS also send letters to select shipping companies indicating the level of cooperation by their ships, which is monitored via AIS. Furthermore, 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 starting in 2014. This program provides cash incentives to shipping companies to slow down to 12 knots or less when passing through the SBC. The incentive-based VSR expanded in 2017 to include ship traffic at the entrance to San Francisco Bay.
  Outcome: Cooperation by ships with the voluntary VSR (10 knots) at San Francisco Bay has been steadily improving from 20% in 2015, 27% in 2016, and 36% in 2017, while cooperation for the voluntary VSR (10 knots) at the SBC for the past 10 years has been less than 10%. For the incentive-based VSR, 125+ ship transits were slowed to 12 knots or less in the SBC and San Francisco Bay Area regions in 2017, reducing nitrogen oxides, greenhouse gases, and other pollutants, and reducing the threat of lethal ship strikes to whales. A short film was produced with Earth Media Lab, LLC, "Protecting Blue Whales and Blue Skies" to communicate to the shipping industry and potential funders the benefits of slower vessel speeds to air quality, whale conservation, and ocean noise, while promoting sustainable ocean commerce.
  Timeline: Ongoing. National marine sanctuaries off of California plan to continue to refine scientific support, outreach, and partnerships for the voluntary and incentive-based

VSR to reduce whale ship strikes. The film "Protecting Blue Whales and Blue Skies was completed in March 2017.
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, 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.

- **Reducing Loss of Lobster Traps / Marine Debris – CINMS**
  Purpose: The project focuses on preventing loss of lobster gear and the removal of any lost gear. CINMS communicates via video, print, and web outreach the extent and effects of lost lobster gear; best fishery management practices to prevent the loss of lobster gear; and proposed approaches for preventing a lobster trap loss. The intended audiences are novice lobster fishermen, and secondarily fishery and ocean managers, and the general public. For removal of lost gear, CINMS collaborates with local lobster fishermen to conduct island cleanups and remove lost lobster traps within CINMS.
  Outcomes: Using funding from NOAA's Marine Debris Program and through a partnership among CINMS, local commercial lobster fishermen, and others over two tons of debris have been removed, including more than 60 lobster traps, numerous buoys, and hundreds of feet of fishing rope and line, from the shores of CINMS and the Channel

Islands NPS in 2017. Removal of this gear has reduced the future by-catch of lobsters and other marine species, wildlife entanglements, and habitat damage. In addition CINMS produced, with Earth Media Lab, LLC, the short film, "Leave No Traps Behind," featuring veteran lobster fishermen's best practices for preventing lobster trap loss. Overall, working with the lobster fishermen to make the film and conduct island cleanups has strengthened the relationship between the sanctuary and lobster fishing community. Momentum and interest has been generated to promote lobster fishermen's use of these best practices, and support future island shoreline cleanup events.
Timeline: Island Cleanup Events held in 2017: April 7, April 10, August 11 (Get into Your Sanctuary Day), and September 16 (International Coastal Cleanup Day). Ongoing: Outreach for the film and cleanups has thus far included web features and partner press releases, social media posts, and presentations to the CINMS Advisory Council.
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 NPS, Santa Rosa Island Research Station and California State University Monterey Bay, Dr. Julia Coates, CDFW, Santa Barbara Adventure Co. Island Packers, and CINMS Advisory Council and volunteers.

Opening graphic to the film "Leave no Traps Behind" by Earth Media Lab, LLC.

- **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. 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, and rescued whales.
Timeline: Ongoing; MBNMS is offering in-kind support to the Working Group efforts. The Working Group is funded through January 2019 by a grant from OPC, and additional funding from The Nature Conservancy. Funds are also being considered in the Governor of California's 2018-19 state budget for CDFW to support this effort long-term.
Partners: The Working Group is a collaboration of commercial and recreational fishermen, Environmental NGOs, disentanglement experts, researchers, gear manufacturers, and state and federal agencies. ONMS also partners with the Marine Mammal Disentanglement Network.

- **Reducing Damage from Vessel Groundings - OCNMS**
(https://nmsolympiccoast.blob.core.windows.net/olympiccoast-prod/media/docs/20170922-viwg_recomltr_and_rpt.pdf)
Purpose: Since designation of OCNMS in 1994, there has been an ongoing effort to track incidents that result in vessels being lost in or near the sanctuary. This includes vessels that have sunk, grounded or capsized, regardless of whether the vessel was salvaged or remnants of the wreck remain in the marine environment. When a vessel is lost, there is often an associated oil spill, which is a violation of the law both within and outside of the sanctuary. Outside the sanctuary, once the pollution risk has been mitigated, USCG regulations do not require the removal or salvage of the vessel. In OCNMS, the abandoning of any material on the submerged lands of the sanctuary, including vessels that have sunk or grounded, is prohibited under sanctuary regulations. The sanctuary drafted a report documenting and analyzing 46 vessel incidents (23 of which were commercial fishing vessels) that occurred from 1994 through 2016. Data collected on those incidents was summarized and presented to the OCNMS Advisory Council on March 17, 2017. The Advisory Council discussed and supported the creation of a working group to review the findings of the report and to provide recommendations on actions to prevent or respond to vessel groundings to the sanctuary superintendent.
Outcome: A Vessel Incident Working Group (VIWG) reviewed the circumstances leading to vessels being lost in the sanctuary, considered options to mitigate against future incidents, and provide nine recommendations to the sanctuary superintendent. The recommendations ranged from education of the boating community on safe boating practices to engagement with the insurance industry on liability and responsibility for wreck removal.

Timeline: The nine recommendations were adopted by consensus resolution and forwarded to the sanctuary superintendent September 22, 2017. OCNMS is currently reviewing recommendations to determine which can be implemented in 2018.
Partners: OCNMS Advisory Council VIWG members included representatives from commercial fishing, marine transportation, insurance and salvage industries, private citizens, Washington Sea Grant, USCG, and Washington State Departments of Ecology and Fish and Wildlife.

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: GFNMS developed the following climate related products in 2017:
  - *Rapid Vulnerability Assessment Tool* (RVA; 2017). The RVA tool was piloted at two climate vulnerability assessment workshops for MPA managers in the Pacific Northwest and southern California to better understand climate impacts to resources and increase their capacity to respond with minimal financial burden.
  - *Rapid Vulnerability Assessment Workshops* (2017). GFNMS conducted RVA workshops at five sanctuaries across the program including: Stellwagon Bank and Gray's Reef national marine sanctuaries, CINMS, MBNMS, and the National Marine Sanctuary of American Somoa. The workshops helped sites determine the most vulnerable species, habitats, and ecosystem services to climate change.
  - *Climate Adaptation Tool Kit* (2018). GFNMS is working 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 2019.
  - *Sonoma-Marin Coastal Regional Sediment Management Report* from the GFNMS Advisory Council (2018). The GFNMS *Climate Action Plan* science need strategy SN-2 "Determine the source of sediment for vulnerable beaches in order to improve sediment supply processes" was the first strategy acted upon by the Advisory Council. Over the course of 2017 the Advisory Council convened a coastal sediment management working group for Sonoma-Marin Counties. The resulting *Sonoma-Marin Coastal Regional Sediment Management Report* contains 17 regional recommendations as well as site specific recommendations. The report will be forwarded to the California Natural Resources Agency and the State Coastal Sediment Management Workgroup.
  - *Kelp Restoration Project.* At the January 2018 GFNMS Advisory Council meeting a Kelp Restoration Project Working Group was established. The Advisory Council has requested the working group partner with CDFW to bring experts together to develop a restoration plan for bull kelp in Sonoma and Mendocino Counties. The working

group plans to submit their recommendations for restoration to the Advisory Council by January 2019.

- **Proposed Desalination Plants in Monterey Bay – MBNMS**
  (http://montereybay.noaa.gov/resourcepro/resmanissues/desal-projects.html)
  Purpose: Because of federally- and state-ordered cutbacks from the Carmel River, CA, and drought conditions, several desalination projects are being 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 EIR/EIS is scheduled to be released in Spring 2018.
  - The Monterey Bay Regional Water Project (MBRWP)/Deepwater Desal proposes a 25 MGD desalination plant using a new open water intake with new screens, 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 until March, 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. The Moss Landing Harbor District (MLHD) and MBNMS are lead agencies.
    Timeline: The applicant has provided a new project description which is under environmental review.
    Outcome: Joint state and federal environmental reviews and documents, 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 Board.

- **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, the OCNMS Advisory Council's Climate Change Working Group identified a priority recommendation to "work with partners to propose to NOAA leadership that OCNMS be designated as a NOAA Sentinel Site for ocean acidification and/or sea level rise."

Outcome: In September 2016, OCNMS partnered with the NOAA Ocean Acidification Program to host an OA Sentinel Site workshop to explore this concept. The workshop brought together 45 resource managers, educators and leading experts from state, federal and tribal agencies and regional organizations to discuss habitat and species' vulnerability to ocean acidification; key functions, components and applications of a sentinel site; and an ocean acidification awareness campaign for specific audiences. 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.

As a direct result of the 2016 OA Sentinel Site Workshop, partners collaborated on two successful proposals funded by NOAA's Ocean Acidification Program: *The Olympic Coast as a Sentinel: An Integrated Social-Ecological Regional Vulnerability Assessment to Ocean Acidification*, and *Development of Ocean Acidification "pHyter" – Plankton Monitoring Tools & Curriculum*. Both of these proposals greatly enhance ocean acidification work along the Olympic coast and contribute to establishment of the OA Sentinel Site on the Olympic Coast. In addition, partners are collaborating to monitor chemical parameters of OA, assess biological responses to OA, research synergies between OA and other stressors, and expand education and outreach activities.

Timeline: Ongoing.

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

- **Southern California Seafloor Mapping Initiative – CINMS**

Purpose: Place-based fisheries and coastal zone managers depend on fine scale bathymetry and habitat maps for an array of critical decisions including: navigational safety, disaster response, endangered species and fisheries management, conservation, research, energy development, and marine planning. Yet, in southern California nearly 90% of U.S. waters remain unmapped at an appropriate resolution. As of 2014, the unmapped area within CINMS was just over 50%, with the majority being characterized by single beam and lead line data from the 1930s. To address this critical information gap, offices across the NOAA family, together with other state and federal partners, are uniting and filling the void.

Outcome: Over 8,000 km^2 of seafloor mapping has occurred since 2014, 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. The majority of areas surveyed prior to 2017 were in waters deeper

than 30 meters. In 2017, with the use of survey launches provided by NOAA's Office of Coast Survey and Office of Marine and Aviation Operations, waters as shallow as 2 meters were surveyed including all waters around Anacapa and San Miguel Islands along with a portion of Santa Rosa Island. In 2018, CINMS hopes to again have a similar level of effort to map remaining shallow waters surrounding Santa Rosa and Santa Barbara Islands.
Timeline: Ongoing.
Partners: Over 20 individuals representing 20 agencies, NGOs, and academic institutions have actively aided in the mapping effort to-date. Entities include the California OPC, BOEM, United States Geological Survey (USGS), multiple offices within NOAA, Southern California Coastal Ocean Observing System, The Nature Conservancy, Monterey Bay Aquarium Research Institute (MBARI), Channel Islands NPS, University of California, Santa Barbara, U.S. Navy, California State University Monterey Bay, CDFW, Ocean Exploration Trust, U.S. Army Corps of Engineers, and California Coastal Commission.

- **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 2017 was 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 km^2 of multibeam data in the deeper portions of GFNMS at Arena Canyon, Farallon Escarpment and Pioneer Canyon. Visual surveys were conducted and specimens were collected from the areas. In 2017, an additional 857 km^2 was also surveyed. Data are currently being prepared for inclusion in the NOAA National Center for Environmental Information. The two mapping efforts more than doubled the amount of GFNMS seafloor mapped with a modern multibeam echosounder. Several publications are anticipated in the next few months that review the taxonomy of two new species of sponges collected in 2016, and update the description and range expansion of another sponge species.
  Timeline: GFNMS has prioritized for 2018 - 2020 multibeam surveys of areas where habitat characterization is data-poor, including Point Arena Biogenic Area North, Point Arena Biogenic Area South, The Football, Point Reyes Region west of state waters, Fanny Shoal-Rittenberg Bank-Cochrane Bank, Farallon Escarpment, Pioneer Canyon, and areas near the shelf break.
  Partners: NOAA Deep Sea Coral Research and Technology Program (DSCRTP), NOAA's National Centers for Coastal Ocean Science (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 has been working with the state of Washington and other stakeholders to develop seafloor characterization products to help inform sanctuary management, marine spatial planning efforts and other ocean management issues. In 2017, OCNMS

mapped priority areas that were identified during a 2015 multi-agency prioritization workshop, which included the state of Washington and NOAA's NCCOS. Approximately 2,531 km^2 of new seafloor data was collected, mostly within offshore priority areas. A second workshop to identify the next 'tier' of offshore mapping priorities and to refine the nearshore priority areas is planned for March 6, 2018 in Tacoma, WA. OCNMS staff are also pursuing support to add new data to the Washington State Seafloor Atlas, (http://olympiccoast.noaa.gov/science/habitatmapping/habitatmapping.html), a collection of map products derived from the integration of 35 multibeam and sidescan sonar surveys conducted 2000 to 2013.
Outcome: Over the past two years, OCNMS has utilized a variety of mapping platforms, including the NOAA Ship *Rainier* and the E/V *Nautilus,* to collect high priority seafloor data in and adjacent to the sanctuary. Recent surveys gathered swath bathymetry, acoustic backscatter, and in some cases water column data, to help inform marine resource management. As resources become available, OCNMS will integrate the newly collected seafloor habitat data into the Washington State Seafloor Atlas.
Timeline: Ongoing. OCNMS continues to make incremental progress towards high-resolution mapping of the seafloor within the sanctuary and has joined forces with Washington State and other key entities to promote future advancements in regional seafloor mapping efforts.
Partners: Makah Tribe, Quileute Tribe, Hoh Tribe, Quinault Indian Nation, Washington Department of Ecology, WDNR, NOAA's NCCOS, NOAA's Integrated Ocean and Coastal Mapping, WDFW, NMFS, University of Washington, Oregon State University (OSU), NOAA's Coast Survey, Ocean Exploration Trust.

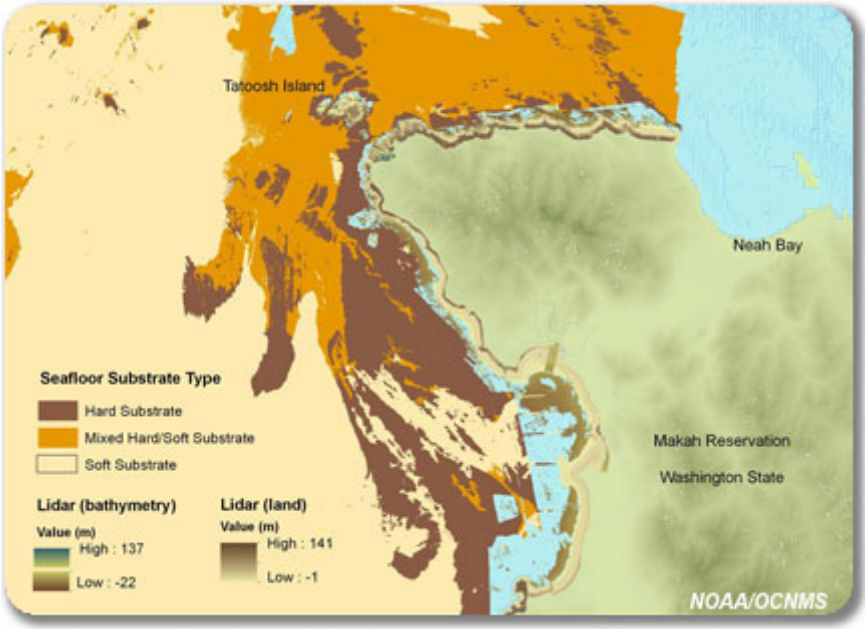
- **Eelgrass Habitat Characterization of Tomales Bay - GFNMS**
  Purpose: Eelgrass provides important habitat for numerous fish, birds, invertebrates and other organisms in Tomales Bay, and provides ecosystem services such as trapping of sediments and nutrients and preventing shoreline erosion by buffering 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. ArcGIS products of the extent of eelgrass bed are being developed in 2018. GFNMS staff are currently building partnerships with state and local agencies to jointly fund consistent bay-wide eelgrass habitat characterizations.
  Timeline GIS maps of eelgrass extent with an associated report are planned for release March 2018. Additional baseline surveys are planned for 2020, funding pending.

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

- **Benthic Monitoring - CBNMS**
  Purpose: The goals of the CBNMS benthic science program are to characterize habitats and monitor them over time to provide information to support management. This includes exploring areas that have never been surveyed, such as areas in Bodega Canyon and deep slope areas that were added to the sanctuary in 2015, and systematically surveying areas that have prior data so that trends can be determined over time. In 2017 CBNMS completed two significant benthic habitat surveys related to these goals and made progress towards implementation of a new long term benthic monitoring plan.
  Outcome: In 2017, CBNMS completed two benthic surveys. The first was on the E/V *Nautilus* August 6-13, 2017. CBNMS staff members, along with scientists from GFNMS, California Academy of Sciences, and UC Davis used the remotely operated vehicle (ROV) *Hercules* to survey the biological communities and environmental conditions at depths from 270 to 740 meters, deeper than any previous surveys in CBNMS and in areas of the expanded sanctuary that had never been surveyed. Scientists completed six dives and collected 76 hours of seafloor video. Over 230 samples were collected including biological specimens, sediment, and water. Significant observations were of at 16 new coral records for CBNMS, including the first records of black and bamboo corals in the sanctuary; new species observations of sponges, sea cucumbers, anemones, and fish; and information about habitat and environmental conditions. The cruise significantly expanded the information about deep habitat in CBNMS, and opens up new topics for future research and outreach. All the ROV dives were broadcast on Nautiluslive.org allowing people around the world to see the research in CBNMS in real-time. The second survey was August 20-28, 2017 on the sanctuary R/V *Fulmar* and used the sanctuary owned ROV to survey Cordell Bank at depths between 70-120 meters. The goal was to conduct quantitative surveys of benthic habitat and monitor change over time. The team completed 14 transects over 5 days of diving. A new high definition video camera on the ROV allowed scientists to see new details of the organisms and communities on the bank. The science team included personnel from CBNMS, University of North Carolina Wilmington, UC Davis, and Humboldt State University.
  Timeline: Image analysis is currently underway and a preliminary report for the Cordell Bank survey is expected in late 2018. A report of the E/V *Nautilus* cruise is expected in 2019. Specimen and physical sample analysis is underway.
  Partners: GFNMS, Ocean Exploration Trust, California Academy of Sciences, Bodega Marine Lab.

Photo credit: CBNMS / An invertebrate and fish community at Cordell Bank from the ROV survey in 2017.

- **A Joint Habitat Framework for Washington's Outer Coast - OCNMS**
  Purpose: In 2015, the Olympic Coast Intergovernmental Policy Council (IPC), composed of the Makah Tribe, Quileute Tribe, Hoh Tribe, Quinault Indian Nation, the State of Washington, and OCNMS, agreed to work together on an initiative to create a common spatial framework for seafloor habitats found off Washington's Pacific coast. Known as the 'Habitat Framework', the project was led by the Northwest Indian Fisheries Commission with substantial support from OCNMS and NatureServe. The work was undertaken to create a common base of information about the seafloor in a GIS-based format that would help enhance collaborations among IPC members and reduce potential conflicts during sensitive consultations, such as with the designation or modification of EFH or other spatial management techniques. The Habitat Framework, is the largest application to date for NOAA's Coastal Marine Ecological Classification System (CMECS) and addresses two of the four major components of the CMECS classification system. The four CMEC components are water column (oceanography), geoform (seafloor geomorphology), substrate, and biotic (benthic and pelagic assemblages).
  Outcomes In 2017, the team completed two components of CMECS classification system: seafloor geomorphology and substrate type. Coastal treaty tribes and the Northwest Indian Fisheries Commission are evaluating options for developing additional classifications for oceanography and biotic data. The Habitat Framework was made publicly available in late 2017, and a story map on the subject can be found at: https://nwifc.maps.arcgis.com/apps/Cascade/index.html?appid=8ee7967fbb5f43948a803438b07938b8.
  Timeline: Ongoing. Habitat Framework products for two of the four components of CMECS are presently available for use.
  Partners: Northwest Indian Fisheries Commission, Makah Tribe, Quileute Tribe, Hoh Tribe, Quinault Indian Nation, Washington Department of Fish and Wildlife, and NMFS.



Mapped seafloor sediments and geomorphology around Cape Flattery and Tatoosh Island, WA

- **Groundfish EFH and Rockfish Conservation Areas (RCAs) Modifications**
  Purpose: A central objective of national marine sanctuaries is resource protection, including protection of biodiversity and ecosystem health. As such, protecting groundfish EFH and RCAs from adverse impacts from fishing is aligned with sanctuary goals. The five west coast sanctuaries work diligently to characterize the status of benthic habitat in national marine sanctuaries (see recent findings in this report), including the status of EFH. Newly collected benthic habitat data, since the implementation of groundfish EFH in 2006, formed in part the basis of proposals submitted to the Council in 2013 to modify groundfish EFH. The collaborative sanctuary proposals submitted by MBNMS, GFNMS and OCNMS (subsequently withdrawn), sought to identify and protect sensitive biogenic habitat from trawl gear impacts and also to identify and re-open and return areas of soft bottom habitat that are valuable historical fishing grounds to the bottom trawl fleet. The west coast national marine sanctuaries and the WCRO have a strong interest in seeing the Council's process to update and modify groundfish EFH finalized and stand ready to assist NMFS and the Council where needed.

- **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) rotates their funding to regions around the country every 3-4 years. Funding returns to the west coast 2018-2020, with 2018 marked as a planning year. NWFSC and ONMS staff are coordinating to convene a workshop in 2018 to determine research priorities for the anticipated $2M that may be made available for deep sea coral and sponge research over the following two fiscal years. Through this work, ONMS and partners hope to develop a better understanding of the abundance and distribution of deep sea coral and sponge communities, which are important zones of life that have persisted for hundreds or even thousands of years. The results of the west coast research on deep sea corals are expected to inform marine resource management at tribal, state, and federal levels.

Outcome: Planning for this effort in FY18 brings together NOAA staff from multiple line offices in support of deep sea coral research along the west coast. The process will strengthen professional relationships while making progress towards a more complete collective understanding of the distribution of critical deep sea habitats and the long-lived organisms that inhabit them. This in turn supports better ecosystem-based management of living marine resources found within sanctuaries.
Timeline: During the first year (FY18), funding for the DSCRTP campaign is focused on planning and coordination, in advance of more significant funding for actual research activities in FY19 and FY20. Likewise, FY21 is expected to be a year of ramping down of activities and wrap-up of projects.
Partners: NOAA's DSCRTP, NMFS, ONMS, NCCOS, and NGOs

RESEARCH AND MONITORING

- **Restoration of Black Abalone – MBNMS**
(https://www.fisheries.noaa.gov/species/black-abalone)
Purpose: Black abalone (*H. cracherodii*) used to be the most abundant large marine mollusk on the west coast of the North America. Sadly, the population has decreased significantly due to overfishing and the subsequent outbreak of a devastating disease (withering syndrome) and is now locally extinct in most locations south of Point Conception, California. They are listed as endangered under ESA. NMFS and partners are developing a recovery plan as mandated by the ESA. The plan includes on-going monitoring of extant populations, disease and genetic research, and responses to threats such as oil spills and landslides.
The Mud Creek landslide, which occurred on May 20, 2017, re-shaped the California coastline with new slide material extending 600 feet out into the ocean, creating 15 acres of new land. This section of Highway 1 now lies under rock and dirt, spanning 1,700 feet of highway. In total, about 75 acres of land were displaced, including the 15 acres out to sea; that's 2.4 million yards of slide debris weighing approximately 4.2 million tons. The slide is currently still active and access is restricted. Sediment from the slide continues to erode into the ocean, and there is a tremendous amount of sediment in the subtidal. This sediment is moving both up and down the coast line, converting black abalone critical habitat into brand new, dark sand beaches, devoid of any of the pre-existing marine life. Black abalone have been and continue to be buried as the sand continues it spread from the landslide.
Outcome: A strong partnership between NMFS and ONMS in the rescue and translocation of black abalone from the Mud Creek slide to a state MPA at Piedras Blancas, 16 miles south.
Timeline: Ongoing. Field surveys occurring at least monthly, weather permitting.
Partners: Lead partners include the NMFS West Coast Region and Protected Resources Division, SWFSC, CDFW, USGS, UC Santa Cruz, CalTrans, Piedras Blancas Light Station, Cayucos Abalone Farm, and Tenera Environmental.

Photo credit: Steve Lonhart/MBNMS / Black abalone relocation.

- **Restoration of White Abalone – CINMS**
  (http://www.fisheries.noaa.gov/pr/species/Species%20in%20the%20Spotlight/white_abalone_spotlight_species_5-year_action_plan_final.pdf)
  Purpose: CINMS staff are working with NMFS and others to help locate living white abalone (*H. 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 $1/m^2$ of suitable habitat, recent surveys show that densities average 1/hectare (10,000 m^2) 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 to survey for white abalone.
  Outcome: 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. Based on CINMS plans for 2018, specific outcomes expected include: more engaged and involved recreational dive communities helping to spot white abalone around the Channel Islands; continued collection of additional high-resolution seafloor mapping data that can be provided to partners to help identify potentially suitable white abalone habitat; and potential use of the sanctuary's research vessel in support of additional survey efforts with a particular focus on areas near Santa Barbara Island.
  Timeline: Ongoing. 2018 field season vessel operations and diving to be scheduled soon. Diver community outreach and seafloor mapping activities is scheduled throughout 2018.
  Partners: Lead partners are NMFS WCR and Southwest Fisheries Science Center (SWFSC), U.S. Navy, and CDFW. CINMS is a supporting partner, providing on-water support and working in coordination with ONMS WCR. As outreach programs develop,

divers expected to be approached will be from dive clubs, dive operation vessels, and possibly commercial dive fisheries.

- **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 not been frequently 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. MBNMS will be conducting a 10-day research cruise aboard the FSV *Shimada* in July 2018 to conduct marine mammal and seabird surveys, and correlate observations with simultaneous echosounder surveys for krill and mid-water fishes. MBNMS will be working with NMFS scientists to establish effective protocols. Additional research during the cruise will include microplastic trawl surveys and conductivity-temperature-depth (CTD) profiles.
  Timeline: Project instructions are currently under development with final instructions available in May. The FSV *Shimada* will leave port from San Francisco on July 15 and return July 24.
  Partners: NMFS, Save the Earth, Point Blue, Moss Landing Marine Laboratories, California State University Monterey Bay, UC Santa Cruz.

- **Applied California Current Ecosystem Studies (ACCESS) – CBNMS, GFNMS, and MBNMS (**accessoceans.org)
  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; 2018 will be the 15th year of surveys. Annual summaries are available at accessoceans.org.
  Partners: CBNMS, GFNMS, and 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. In 2017 a salinity sensor was added and an overwinter deployment is currently in place. 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: September 2017 marked the recovery of Noise Reference Station #03 (NRS03) from its second 2-year deployment near OCNMS, and scientists are looking forward to the availability of up to 3.5 years of baseline acoustic data from this site, which sits just outside the sanctuary's western boundary. NRS03 is part of a network of 12 listening stations managed collaboratively by NOAA's PMEL and partners over the past decade in an effort to collect baseline data on the nation's underwater sound environment. Four listening stations are currently within national marine sanctuaries: Olympic Coast, Cordell Bank, Channel Islands and Stellwagen Bank. Data collected from the sanctuary Noise Reference Stations is the subject of doctoral research by Samara Haver, a NOAA Nancy Foster Scholar at OSU. The doctoral research supports acoustic research in OCNMS and CBNMS, including a new multi-year study with the US Navy that will be getting underway in 2018. The new project involves placement of up to four listening stations in OCNMS and deployment of specialized gliders to complement data from the stationary receivers. Thanks to a recently-completed inventory of acoustically-active animals found in OCNMS, the project will address a variety of ecologically- and economically-important sonic species, including fish and invertebrates in addition to marine mammals.
  Outcome: Understanding the sanctuary's acoustic environment helps OCNMS manage potential impacts to affected species and builds capacity for further investigation related to this emerging topic.
  Timeline: Data collected by NRS03 are expected shortly and will likely be used to support FY18 planning and deployment of listening equipment at up to 4 locations within OCNMS.
  Partners: US Navy, OSU, NOAA's PMEL and coastal tribes.

- **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. Additionally, CBNMS hosted Marin County School District on board the vessel for a field experience as part of their workshop to learn about sound in the ocean. Video on initial deployment: https://sanctuaries.noaa.gov/science/sentinel-site-program/cordell-bank/accoustic-buoy-final.html
  Timeline: Preliminary data analysis from 2015-2017 deployment are expected by the end of 2018. A published article on goals and methods is pending (Haver *et al*.).
  Partners: PMEL and OSU.

- **At-Sea Surveys of Seabirds and Marine Mammals - OCNMS**
  Purpose: Between 1995 and 2008, OCNMS conducted ten cruises to survey seabird and marine mammal communities along 14 transects along the Washington and British Columbia (Canada) coast. After a lapse of 10 years, a decade marked by substantial environmental variability, OCNMS was provided shiptime on the FSV *Shimada* to resurvey these important communities. OCNMS staff are coordinating with many partners to plan and staff the mission. In addition to the at-sea visual observation surveys, OCNMS plans to investigate oceanic environmental conditions and prey field composition using CTD casts and plankton nets. To the degree possible, research results will be incorporated into the upcoming OCNMS condition report.
  Outcome: OCNMS is undertaking this work to gauge how a decade of environmental variability has influenced the abundance and distribution of seabird and marine mammal communities, and to compare quantitative information collected in 2018 to data collected during ten previous survey efforts. Planned activities cultivate deeper partnerships within the region's research community.
  Timeline: Planning for the cruise is underway now. The FSV *Shimada* will depart from and return to Newport, Oregon on June 14-23, 2018.
  Partners: Makah Tribe, NMFS, Cascadia Research, Oceans Initiative, and expert volunteers.