OFFICE OF NATIONAL MARINE SANCTUARIES
COORDINATION REPORT

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 appreciates the invitation to provide this coordination report (the fourth issue) to the Pacific Fishery Management Council (PFMC or Council). Since the first invitation in 2017, our relationship has continued to improve through knowledge and recognition of our individual mandates and shared responsibilities. This report contains an update of activities and programs of mutual interest implemented in 2019 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 and Clarification – 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 (79 FR 33851). 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. The preamble to the final rule establishing the sanctuary nomination process (SNP) states "if NOAA takes no action on the nomination in the inventory, the nomination will expire after five years from time it is accepted to the inventory." NOAA subsequently clarified the process NOAA intends to use for assessing the continuing viability of nominations that are nearing the five-year expiration mark (84 FR 61546; November 2019). The process aims to determine if the nomination after five years is still responsive to the SNP criteria and considerations described in the 2014 final rule. 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: ONMS's goal is to maintain a vibrant list of relevant nominations on the inventory. 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. The 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, on the west coast, NOAA has received two other nominations that were not accepted into the inventory of areas that could one day be designated as a new national marine sanctuary: 1) the Aleutian Islands National Marine Sanctuary, covering most of Western Alaska, the Bering Sea, and the Aleutian Islands; and 2) the Southern California Offshore Banks proposal, representing Cortes, Tanner, Cherry and Northwest Banks, and Garret Ridge. This nomination was declined by ONMS on March 12, 2018.

Outcome/Timeline: As of February 2019, NOAA has received 15 nominations. Of these, one nomination is under review, six have been declined or withdrawn, and five have been admitted to the inventory. Three nominations on the inventory have been selected for designation: Lake Michigan in Wisconsin and Lake Ontario in New York continue to work their way through the designation process, while Mallows Bay – Potomac River in Maryland was designated on September 3, 2019. It is the first national marine sanctuary designated since 2000 and protects the remnants of 118 World War I-era wooden steamships and vessels as well as other significant maritime heritage resources.

The new Mallows Bay-Potomac River National Marine Sanctuary will protect shipwrecks and other artifacts representing multiple eras of our nation's history (photo credit Don Schomett).

- **Chumash Heritage National Marine Sanctuary Nomination - WCRO**
  Purpose/Outcome: The purpose of the CHNMS nomination is to protect, study and interpret the region's abundant natural resources and maritime heritage, including the Chumash cultural heritage. The nomination stretches from Cambria along the coast to Gaviota, to offshore to the Channel Islands. It 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 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. The nomination was added to the inventory of candidate sites for future designation with community support from the public, elected officials, businesses, scientists, and environmental groups. There is not an active evaluation within NOAA at this time to consider moving this site forward for designation.

  The CHNMS nomination will have been in the inventory for five years by October 5, 2020. If NOAA has not initiated a designation process for CHNMS by April 2020, it will initiate a process to determine if the nomination is still relevant to the 11 SNP criteria NOAA has established. Accordingly, the WCRO will provide the nominating party, agencies and stakeholders the opportunity to provide relevant updates to the nomination, such as changes in management framework or threats to resources originally proposed for protection.

  Timeline: The WCRO will begin information gathering, via public workshops adjacent to the nominated CHNMS (e.g. in Santa Barbara and San Luis Obispo counties) to update the CHNMS nomination in the spring of 2020. Following the information gathering and evaluation against the SNP criteria, a recommendation will be provided to the ONMS director to maintain the nomination in the inventory, or remove it in October 2020.

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. The MBNMS Advisory Council held a number of meetings to discuss potential issues and action plan solutions to inform on how best to revise the management plan. MBNMS has been revising its 2008 management plan, with a focus on updating still relevant 2008 action plans and drafting new action plans that address new priority issues and group strategies into program-based themes. New action plans are Climate Change, Coastal Erosion and Sediment Management, Davidson Seamount, Elkhorn Slough, Marine Debris and Introduced Species. Programmatic plans are Education and Outreach, Research and Monitoring, Resource Protection, Maritime Heritage, and Marine Spatial Planning. The draft management plan and associated environmental documents will be released for public review in early spring of 2020.

  NOAA is not proposing any actions or regulations that directly or indirectly affect fisheries or is proposing any fisheries management actions or regulations related to fish or fisheries. Regulatory changes proposed are responsive to community needs as discussed in working groups and advisory council meetings. Current proposed changes in review include: 1) expanding the use of motorized personal watercraft (MPWC; e.g., jetski) at Mavericks by reducing the required condition to operate from high surf warning to a high surf advisory, and by moving the boundaries for year-found MPWC zones closer to shore; 2) clarifying the *beneficial use* of clean and suitable dredged material for habitat restoration purposes within MBNMS is fundamentally different from *disposal* of dredged material below the mean high water line. MBNMS anticipates that employment of additional habitat restoration sites using clean dredged material would be possible and appropriate, and that beneficial use projects may occur through MBNMS permits or authorizations; and 3) noticing the excepted Department of Defense activities at the Davidson Seamount Management Zone. The beneficial use of dredged material aims to address shoreline sediment placement near Surfers Beach in Half Moon Bay, California. Beneficial use 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 to 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, draft EA and proposed regulations for public comment in early spring 2020. Final versions of these documents are about nine months after the drafts rule is released. After public comments are received, reviewed and responded to MBNMS will consult with the National Marine Fisheries Service (NMFS) as required and approach the Council as appropriate.

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

- **Management Plan Review – CINMS**
  (https://channelislands.noaa.gov/manage/plan/revision.html)
  Purpose: In 2019 CINMS initiated 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. The process to review the management plan was preceded by an update to the CINMS Condition Report, which was released and distributed in in the spring of 2019 (https://sanctuaries.noaa.gov/science/condition/cinms/).

  Outcome: An updated sanctuary management plan containing programmatic strategies to guide sanctuary activities for 5-10 years, supported by an environmental analysis (likely an EA, or possibly an environmental impact statement (EIS)), and potentially a proposed and final rule should any regulatory adjustments be pursued.

  Timeline: On October 1, 2019 a Notice of Intent (NOI) was published in the Federal Register (84 FR 52053) to announce the start of the management plan revision process, beginning with a public scoping period that ran through November 15, 2019. The public, stakeholders and partners, including PFMC leadership and staff were notified of the publication of the NOI. In the NOI, NOAA did not specifically identify the need to revise regulations or adjust boundaries of the marine reserve and conservation area network within the sanctuary. However, NOAA remains open to these adjustments, based upon input received through the public scoping comment period, which could result in regulatory or boundary change proposals. All comments received are logged at docket NOAA-NOS-2019-0110 at the website "regulations.gov." Sanctuary staff have cataloged the comments and sorted them into issues/topics. In January 2020, a summary of comments received was provided to the sanctuary advisory council. Throughout the spring and summer of 2020, CINMS staff with input from the sanctuary advisory council intend to characterize, prioritize, and select issues to be addressed in new or revised action plans. During fall 2020, selected issues will guide development of action plans, which are the basis of the updated sanctuary management plan. CINMS staff plan to publish a draft management plan, associated environmental analysis and potentially a proposed rule in 2021. Throughout the process to revise the CINMS management plan, sanctuary staff will reach out to coordinate with the PFMC, as well as CDFW and NMFS, as appropriate, should an interest arise to address a fishing activity, either directly or indirectly.

  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 2022 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 began in spring 2019 with a one-day workshop to select ecosystem indicators. The workshop provided early guidance to project partners as they prepared and analyzed data and information in advance of an intensive 3-day expert workshop held in January 2020. This workshop, building upon the ecosystem indicators workshop, allowed dozens of invited subject matter experts to collectively identify status, trends and confidence ratings for selected habitat, living marine resources, water quality, maritime and cultural heritage resources, and ecosystem services in OCNMS. In addition, participants identified key data/information gaps and in some cases, identified additional data sets that might address those gaps.

Timeline: Began condition report assessment in 2019, expected completion with release of final condition report in late 2021 or early 2022.

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

Olympic Coast National Marine Sanctuary Condition Report Workshop – January 2020 (photo credit` Robert Schwemmer/ NOAA)

- **Kick-off of Condition Report Update – CBNMS**
  Purpose: CBNMS staff are planning in 2020 to begin the process of updating the CBNMS Condition Report, which was first drafted in 2009.

  Outcome: CBNMS plans to follow a similar process to update condition reports as the other national marine sanctuaries have followed. CBNMS staff educate the CBNMS Advisory

Council and partners on the process and offer options for involvement to ensure the process is informed with the best local and current information. Ecosystem indicators are reviewed and selected to best evaluate the status and trends of sanctuary resources. Experts are consulted to help identify data sources and gaps in data/information and assist in evaluating the status, trends, and confidence ratings for selected habitat, living marine resources, water quality, and ecosystem services in CBNMS, perhaps in a workshop setting, The condition report provides a basis for the next management plan revision, set to begin in 2022.

Timeline: An initial step was to brief the CBNMS Advisory Council in February 2020 and discuss options for involvement throughout the process. Other collaborators will be engaged as the process develops. In 2020, sanctuary staff will be preparing background materials, developing content, and identifying potential ecosystem indicators and relevant data sets. In 2021, the sanctuary will invite experts to help evaluate the status and trends of sanctuary resources. Expected completion with release of the final condition report is in 2022.

Anticipated Partners: CBNMS Advisory Council, Cordell Marine Sanctuary Foundation, National Centers for Coastal Ocean Science (NCCOS), California Current Integrated Ecosystem Assessment Program, NMFS NWFSC/SWFSC, UC Davis Bodega Marine Lab, Point Blue Conservation Science (PBSC), Farallon Institute, San Francisco State University, Point Reyes National Seashore, and GFNMS.

ANCILLARY MANAGEMENT ACTIVITIES

- **Safe Boating Film: "Know Before You Go" – CINMS**
  Purpose: For decades staff from CINMS, the US Coast Guard (USCG), Channel Islands National Park Service (CINPS) and partners have worked to reduce boats grounding and sinking in the sanctuary. Collectively, the partners have long wanted to be proactive instead of reactive to this threat and protect marine resources and the boating public. With generous financial support from the BoatUS Foundation, CINMS, USCG and Tow Boat US Ventura worked with Earth Media Lab to produce a safe boating film to educate boaters on safe boating practices to reduce accidents.

  We invite PFMC and partners to assist with distribution of the film to ensure the film gets incorporated into boater education courses and on-line boating resources - wherever boaters may be able to see the short 9 minute film. The film, entitled "Know Before You Go" is available on the YouTube channel of the BoatUS Foundation: (https://www.youtube.com/watch?v=Wsut5rDVFdU&feature=youtu.be.

  Outcome: Real success will be fewer boats grounding and sinking, safer boating, and protected resources in the ocean, particularly those in national marine sanctuaries.

  Timeline: The safe boating film was completed in June 2019 and is currently available for distribution.

  Partners: USCG, BoatUS Foundation, Tow Boat US Ventura, Earth Media Lab.

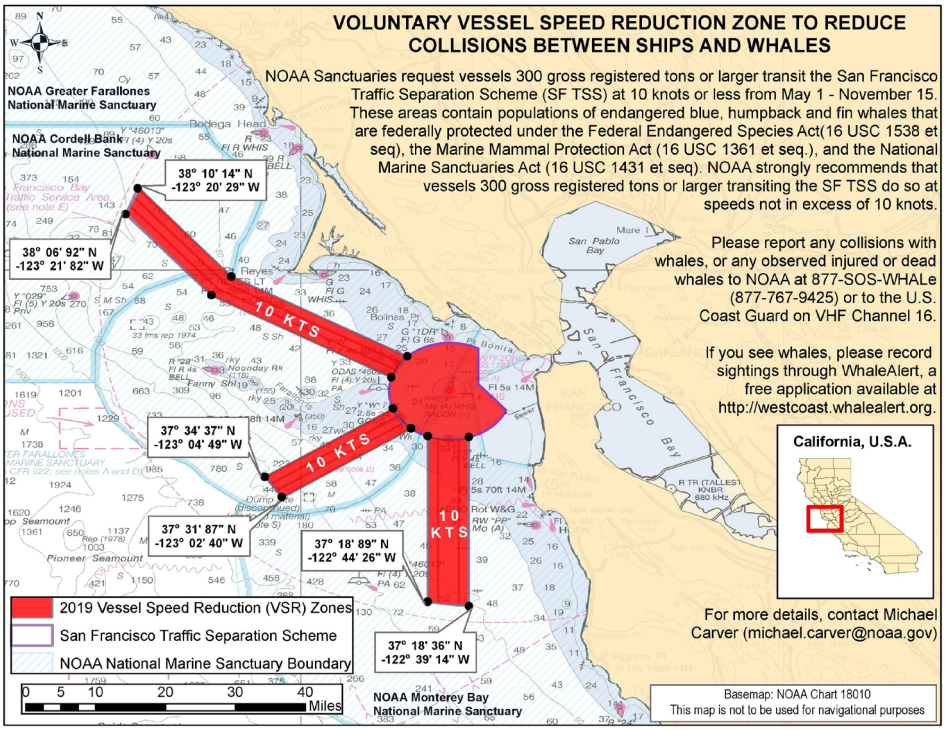
The nine-minute educational video, 'Know Before You Go', is available online at https://www.youtube.com/watch?v=Wsut5rDVFdU&feature=youtu.be.

- **Whale Conservation – All West Coast Sanctuaries**
  Purpose: Numerous endangered whale species (humpback, blue, and fin) migrate to the extraordinary productivity of national marine sanctuaries, where they feed on dense aggregations of krill, northern anchovy, and Pacific sardine. Vessel collisions and entanglement of whales have been identified as significant threats to endangered whale species.
  Outcome: Efforts to reduce these threats and their impacts by national marine sanctuary staff in coordination and collaboration with NMFS staff and affected stakeholders have been quite extensive and include the following:
  - *Vessel Speed Reduction (VSR)*: CBNMS, GFNMS, and MBNMS in collaboration with San Francisco's USCG vessel traffic service have issued dynamic and seasonal vessel speed reduction requests for the San Francisco Bay traffic separation scheme (TSS). Similarly, CINMS in collaboration with NMFS and the Marine Exchange of Southern California has issued dynamic and seasonal vessel speed reduction requests for the Santa Barbara Channel TSS. These requests for vessels to slow down support a reduction in potential lethal ship strikes.
  - *Incentive-based VSR*: ONMS has implemented in the past five years an incentive-based VSR program in and around the shipping lanes. The incentive-based program has resulted in 1,595 ship transits slowing to 10 knots or less, thereby reducing the risk of fatal vessel collisions. For more information please visit: https://www.ourair.org/air-pollution-marine-shipping/
  - *ACCESS*: Since 2004, CBNMS and GFNMS have been conducting the Applied California Current Ecosystem Studies (ACCESS), fine-scale surveys of the greater marine area offshore of San Francisco Bay, in partnership with PBCS. Starting in 2019,

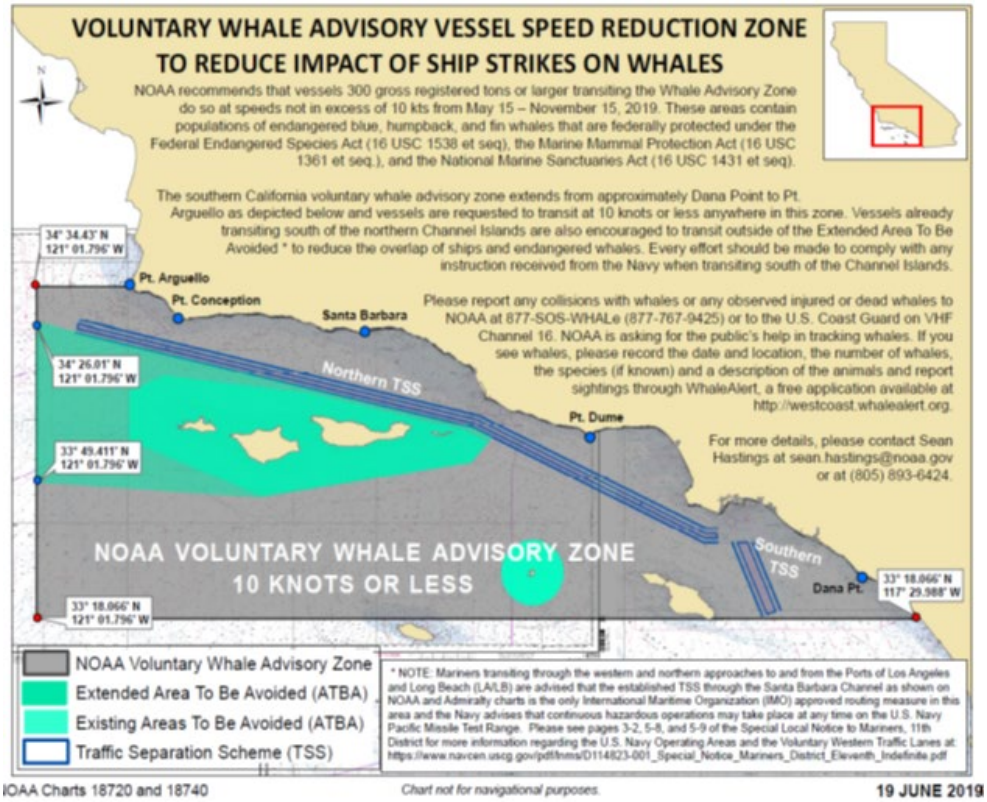
the surveys have been expanded to the northern portion of MBNMS. The ACCESS surveys monitor distribution, abundance and demography of all marine wildlife, including humpback whales in the context of underlying physical oceanographic processes. These data are essential to identifying physical and biologically important features to humpback whales and used in management and policy considerations of vessel strikes to whales and risk assessments for whale entanglements.

- *Whale Alert*: National marine sanctuaries on the west coast have helped with the development, distribution and use of Whale Alert (http://www.whalealert.org/) and Spotter Pro, mobile applications for smartphones and tablets to allow users to report whale sightings in real-time. The crowd-sourced data managed by PBCS are incorporated into ongoing risk assessments to help reduce whale entanglements.
- *Volunteers*: Naturalist Corps Volunteers (CINMS and CINPS) are trained to collect opportunistic whale sightings while aboard commercial whale watching vessels. The public on board whale watching vessels or on shore can share whale sightings via the Whale Alert app.
- *Removal of lost fishing gear*: The California national marine sanctuaries in collaboration with University of California (UC) Davis SeaDoc society and NOAA's marine debris program continue to remove lost fishing gear, thereby reducing the risk of entanglement of marine life, particularly endangered whale species.
- *Advisor to Working Group*: MBNMS represents west coast sanctuaries on the California Dungeness Crab Fishing Gear Working Group as an advisor, and to assist with the sharing of whale abundance data and other data sets collected by national marine sanctuaries and partners (e.g., via ACCESS, aerial overflights). The data are integral and key to the risk assessment and mitigation program of this working group aimed at reducing whale entanglements.
- *Entanglements off Washington*: Based on recent increases in whale entanglements, OCNMS is considering to have staff receive training in response to whale entanglement, as well as include in the revisions to their condition report an evaluation of whale entanglements, and abandoned, lost, and derelict crab pots as indicators of human activity.

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



Vessel Speed Reduction requests at entrance to San Francisco Bay in 2014 - 2019.



Vessel Speed Reduction requests at Santa Barbara Channel 2019

- **Proposed Desalination and Water-related Projects 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, a number of desalination and water-related projects have been proposed on the coastline adjacent to MBNMS. MBNMS is serving as the lead for the NEPA review for two desalination plants and one recycled water project. Staff are developing reasonable and appropriate permit decisions as necessary. 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 in concert with state guidelines to evaluate and advise the following projects:

  - *California American Water Company (CalAm)/The Monterey Peninsula Water Supply Project (MPWSP)*: CalAm proposes to construct and operate a seawater reverse osmosis (SWRO) facility using subsurface slant wells located in Marina's dune and sandy beach area to draw seawater from beneath the ocean floor of MBNMS that will produce 6.4 million gallons per day (MGD) of potable water. To fulfill the amounts of water proposed for the MPWSP, CalAm would rely on an additional 3.12 MGD of water to be produced by Monterey One Water via the Pure Water Monterey project. In 2014, MBNMS issued a permit to CalAm to test the feasibility of the slant well system. The California State Public Utilities Commission (CPUC) and MBNMS are the lead agencies for environmental review of CalAm's project.

    Timeline: March 2018, MBNMS published a final environmental impact report (EIR)/EIS for the MPWSP; the CPUC certified the document. The California Coastal Commission is currently evaluating the permit requests for the MPWSP.

  - *Monterey One Water (M1W)/Pure Water Monterey (PWM) project:* M1W proposes to construct a water recycling facility to further treat water that has already been treated by existing primary and secondary treatment plants using ozone, membrane filtration, reverse osmosis, and advanced oxidation with ultra violet light and hydrogen peroxide. The purpose of the PWM project is to replenish the Seaside Groundwater Basin, provide additional recycled water for agricultural irrigation, and help to prevent seawater intrusion in the Salinas Valley Groundwater Basin. MBNMS is the lead agency for the federal environmental review of the project, and published an EA for the PWM project in March of 2019.

    Timeline: In March 2019, MBNMS published the EA for the PWM project to authorize the Central Coast Regional Water Quality Control Board's reissuance of a National Pollutant Discharge Elimination System permit allowing discharge of a waste stream generated by the project into MBNMS. In December 2019, M1W issued a draft supplemental EIR for an expanded capacity PWM project (5.0 MGD to 7.6 MGD) as a backup water source for CalAm's MPWSP.

- *Deepwater Desal/The Monterey Bay Regional Water Project (MBRWP):* Deepwater Desal proposed a 25 MGD desalination plant in 2015 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 have served as lead agencies for review of the project.

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

Outcome: The goal is to coordinate with state and federal agencies on environmental reviews and permit letters for the proposed desalination and recycled water projects: MPWSP, MBRWP, and PWM.

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

CLIMATE CHANGE

- **Ocean Climate Program – GFNMS** (https://farallones.noaa.gov/manage/climate/)
  Purpose: The Ocean Climate Program, spearheaded by GFNMS and GFA addresses climate change impacts in the North-central California coast and ocean region through fostering awareness, advocating solutions, and promoting action among government agencies, public and private organizations, and individuals to build ecosystem resilience and sustainability.

  As part of the Ocean Climate Program, the Climate-Smart Conservation Program (https://farallones.noaa.gov/manage/climate/climatesmart.html) integrates climate change science, monitoring, adaptation, mitigation, and communication into sanctuary management to achieve a healthy, resilient ocean for future generations. 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

  The GFNMS Ocean Climate Program serves as leader in climate adaptation and resilience for local, regional and national conservation programs.

  Outcomes/Partners: Climate related products and activities in 2019:
  - *Climate Adaptation Plan* (https://farallones.noaa.gov/manage/climate/adaptation.html) GFNMS produced this plan to respond to and manage for the impacts of climate change to sanctuary resources. The Climate Adaptation Plan will guide sanctuary management and partners to ensure long-term viability of the marine ecosystems within the productive and unique region of GFNMS.
  - *Coastal Resilience Sediment Plan (https://nmsfarallones.blob.core.windows.net/farallones-prod/media/docs/20191101-coastal-resilience-and-sediment-plan.pdf):* With one-third of the GFNMS Climate Adaptation Plan's strategies focusing on better understanding and managing sediment

along the coast as an effective tool for increasing climate resilience, GFNMS staff developed the Coastal Resilience Sediment Plan, a comprehensive and collaborative approach to climate-informed sediment management along the North-central California coast. GFNMS also established the new North-central California Coastal Sediment Committee to support coastal resilience through consensus-driven recommendations along the coastlines of Sonoma, Marin, San Francisco, and San Mateo counties. Support was provided by the GFA and California Natural Resources Agency.

- *Planning for Climate Change*: Through 2019, staff at GFNMS and the United States Fish and Wildlife Service (USFWS) coordinated to redesign a training course for climate adaptation offered at the USFWS National Conservation Training Center to focus on coastal and marine systems and to incorporate scenario planning. In July 2019, GFNMS staff provided the first offering of this course to NOAA staff in Long Beach, CA. This foundational training is critical to integrating climate considerations into marine and coastal resource management, including scenario planning and climate vulnerability assessments.
- *Climate Adaptation Toolkit for Marine Resource Managers (*https://www.cakex.org/MPAToolkit): This web-based toolkit was released in October 2019 and features a complement of tools that support climate vulnerability assessment, adaptation planning and implementation. The toolkit was developed for the Commission for Environmental Cooperation by GFNMS in consultation with other national marine sanctuaries in the WCR.

- **Olympic Coast as an Ocean Acidification Sentinel Site - OCNMS**
  Purpose: Changing water chemistry and ocean acidification have profound implications for Washington's marine resources, threatening coastal economies, communities and quality of life. In 2016, the OCNMS Advisory Council formed the Ocean Acidification Sentinel Site (OASesS) Working Group to address the threat of ocean acidification on Washington's outer coast and assist OCNMS in becoming a sentinel site for ocean acidification.

  Outcome:.In summer 2019 the OASes working group completed a final report, including vision, goals and objectives for the Olympic Coast Ocean Acidification Sentinel Site, and submitted it to the OCNMS Advisory Council. The report included the following three recommendations: 1) OCNMS should be formally designated as an ONMS Sentinel Site for Ocean Acidification as part of the greater Olympic Coast Ocean Acidification Sentinel Site with the goals and objectives adopted by the working group; 2) OCNMS should convene a steering committee to further refine the deliverables of the Olympic Coast Ocean Acidification Sentinel site; and 3) OCNMS should serve as the coordinating entity and provide staff support to the Olympic Coast Ocean Acidification Sentinel Site. In November, 2019, the ONMS Director formally designated OCNMS as an Ocean Acidification Sentinel Site.

  Timeline: OCNMS staff will work with the Olympic Coast Intergovernmental Policy Council to establish a Sentinel Site Steering Committee. This body will then collaborate to deliver upon the goals and objectives of the Ocean Acidification Sentinel Site

Partners: NOAA's Ocean Acidification Program; NOAA's Pacific Marine Environmental Lab, 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), NMFS/NWFSC, Northwest Indian Fisheries Commission, and Olympic National Park.

HABITAT

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

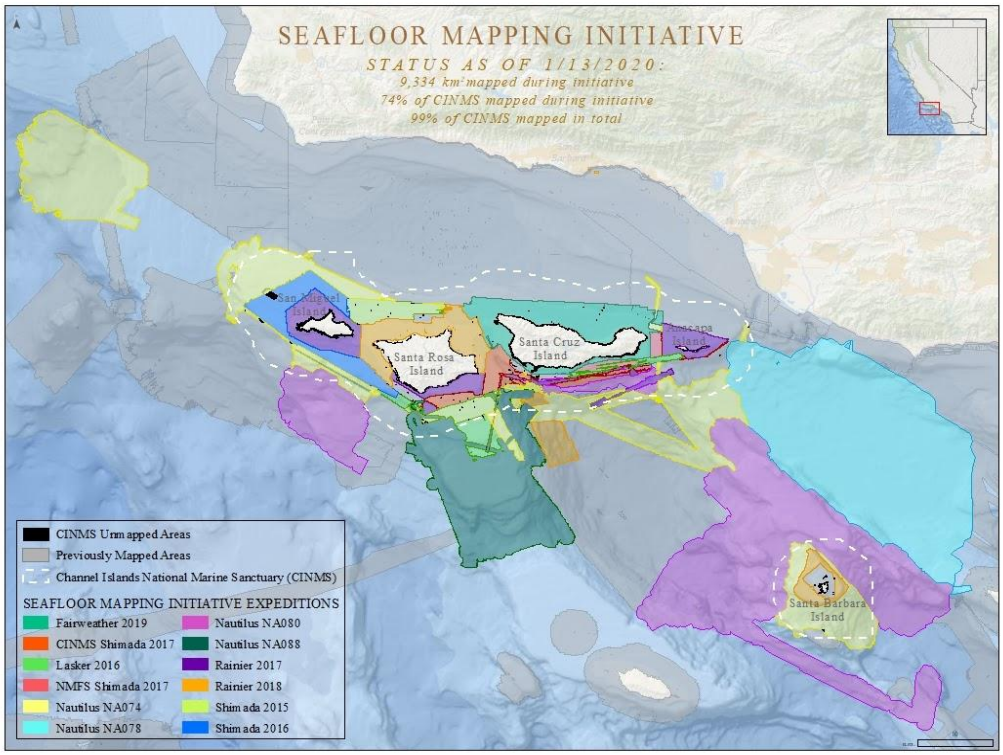
  Purpose: Place-based fisheries and coastal zone managers depend on fine scale bathymetry and visual data for an array of critical decisions, including navigational safety, disaster response, endangered species and fisheries management, conservation, research, energy development and marine planning. Despite their importance, these data types are limited both spatially and temporally for the offshore areas of Washington, Oregon, and California. NOAA, Bureau of Ocean Energy Management (BOEM), and the United States Geological Survey (USGS) initiated in 2018 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 (FY20-21) will leverage investments made by NOAA's West Coast Deep Sea Coral Initiative (WCDSCI).

  Outcome: Over 10,000 sq. km of seafloor mapping and over a hundred dives using remotely operated vehicles (ROV) and autonomous underwater vehicles (AUV) 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 97% of the sanctuary as of December 2019 has coverage of high-resolution multibeam bathymetry and backscatter. Multiple EXPRESS missions occurred in FY19, including missions to map seafloor areas around Santa Cruz Island within CINMS, areas in GFNMS and CBNMS, and at a proposed wind farm location off Morro Bay in central California. Moving forward, EXPRESS will use the Integrated Ocean and Coastal Mapping Program and Seasketch, a GIS tool, to plan for upcoming acquisition missions in FY20, and to coordinate priorities among participating agencies.

  Timeline: This work is ongoing and acquisition planning is currently underway with partners. We assume the Ocean Exploration Trusts'(OET) Exploration Vessel (EV) *Nautilus* will map additional offshore seafloor areas in or near national marine sanctuaries of the west coast in calendar year 2020.

  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 OET, California Ocean Protection Council (OPC), Southern California Coastal

Ocean Observing System, The Nature Conservancy (TNC), Monterey Bay Aquarium Research Institute (MBARI), CINPS, UC Santa Barbara, US Navy, California State University Monterey Bay, CDFW, US Army Corps of Engineers, and the California Coastal Commission.



Seafloor mapping in CINMS from EXPRESS and SCSMI efforts through 2019. All recent mapping coverage from these two efforts are in the colored footprints.

- **Research Findings from the West Coast Deep-Sea Coral Initiative**
  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 supports a four 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 CINMS and NWFSC leads formed a NOAA-led steering committee with representatives from NCCOS, Office of Exploration (OER), NMFS, ONMS and DSCRTP. The steering committee convened a workshop of regional experts in April 2018 to scope research priorities and identify the most pressing DSCS research and management needs on the west coast. The workshop outcomes have guided the formation of the science plan for the WCDSCI. Planned research 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. ONMS and partners aim to address three major research objectives identified during the workshop:
  1. Gather baseline information prior to the implementation of Amendment 28 of the Pacific Coast Groundfish Fishery Management Plan. The amendment includes a new

configuration of areas closed to bottom trawling to protect essential fish habitat (EFH). The EFH areas frequently protect DSCS communities and habitats.

2. Improve our understanding of known DSCS bycatch "hot spots".
3. Explore and assess DSCS resources within NOAA's national marine sanctuaries with emphasis on areas of resource protection and other management concerns.

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. The timing of the workshop coincided with PFMC approving Amendment 28 to modify configurations of areas to protect EFH: either closing new areas or re-opening previously closed areas to bottom fishing. Multiple agencies and many stakeholders overwhelmingly selected the first research objective as a priority for the WCDSCI. The goal is to gather basic information on the condition of the communities and habitats of DSCS in those areas for future comparisons once the changes in EFH configurations take effect in 2020.

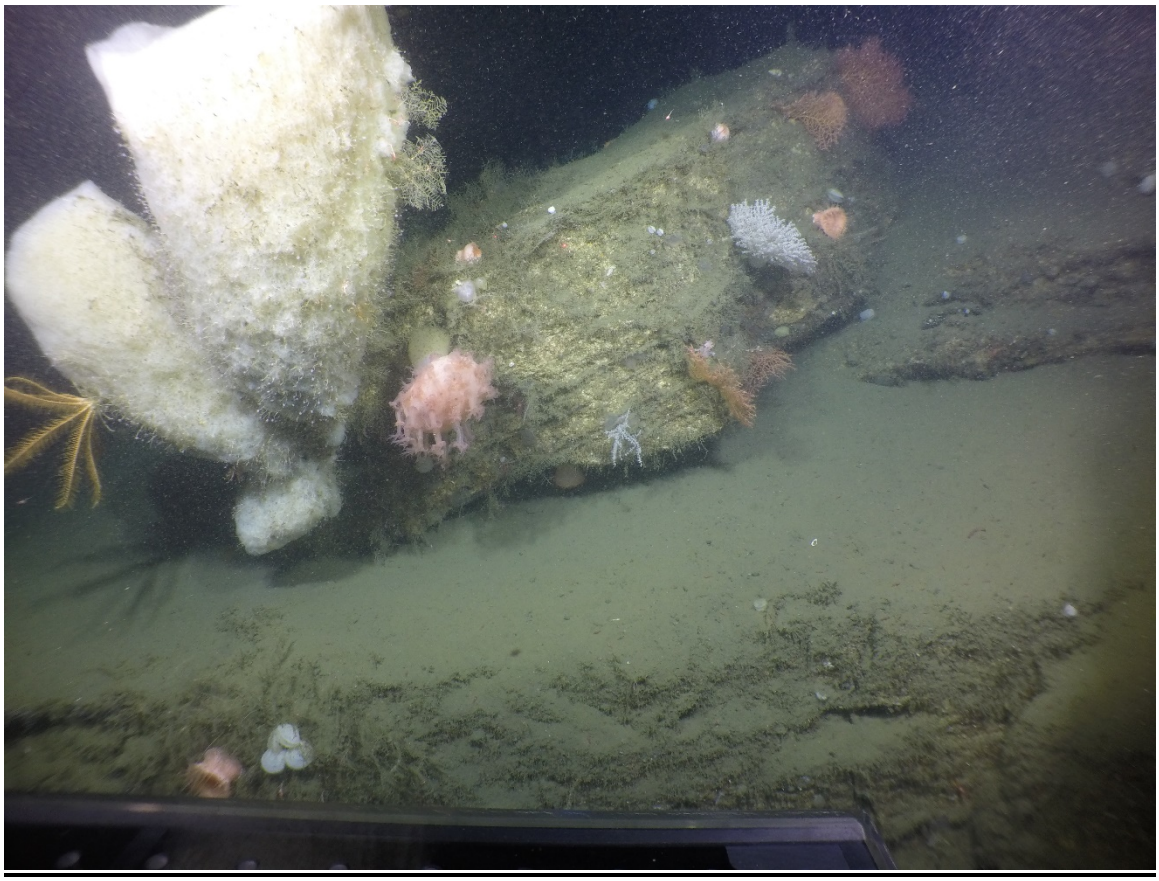
Outcome: Two years of intensive field research were initiated in FY19 with a collaborative 30-day EXPRESS cruise. Spanning the Oregon and California coasts, the cruise conducted visual surveys and sample collection in areas scheduled to change as a result of Amendment 28; areas of historically high coral and sponge bycatch; and in national marine sanctuaries. Researchers completed 37 ROV dives, 24 AUV dives, collected 95 coral and sponge samples and hundreds of water samples for oceanographic and environmental DNA (eDNA) analyses. Two additional DSCS cruises within national marine sanctuaries occurred in FY19. A 7-day cruise to OCNMS included visual surveys and sample collections (5 ROV dives) within the Olympic 2 EFH Conservation Area, as well as long-term oceanographic and acoustic measurements. A 9-day mission to CINMS prioritized visual surveys (17 ROV dives) to explore and ground-truth newly mapped areas of the sanctuary, deploy temperature sensors for long-term monitoring, and collect deep-sea coral and sponge samples for husbandry studies. The WCDSCI supports analyses (video analysis, species identification, etc.) of information collected during the WCDSCI cruises, and also partially supports data analyses for other DSCS cruises in the WCR, such as those conducted on the EV *Nautilus*.

A second 30-day EXPRESS mission took place in early FY20, continuing to address overlapping WCDSCI and EXPRESS priorities in locations offshore of California, Oregon, and Washington. The FY20 mission conducted visual surveys with an AUV, as well as with a deep water capable ROV, owned and operated by the Global Foundation for Ocean Exploration (GFOE). The GFOE system was accompanied by portable satellite communications that allowed the public virtual access to the ROV dives. The communications system effectively expanded the number of scientists beyond those on board that could participate in the mission's research and collectively engage with, and educate the public about the mission's goals in real-time. In total, researchers conducted 19 ROV dives, 19 AUV dives and collected over 140 deep-sea coral, sponge, and rock samples, as well as over 400 seawater, invertebrate, and sediment samples to better understand DSCS distributions, their environmental drivers, as well as the connectivity between DSCS ecosystems along the west coast.

Data analysis of the video imagery collected is in progress. Scientists are identifying corals, sponges, and fish in videos and/or still imagery to the lowest possible taxonomic resolution and will submit the observation records to the DSCRTP National Database (https://deepseacoraldata.noaa.gov/) - an open access resource for managers, researchers, and the public. Site characterization reports will also be submitted to the DSCRTP and will be available to help inform various management and conservation decisions regarding DSCS habitat off the West Coast.

Timeline: In FY2018 the WCDSCI focused a relatively small portion of DSCRTP funding ($2.5 million over three years) on planning and coordination. The largest portions of funds (~ 1 mil/year) are allocated to FY19 and FY20 to conduct field missions and small projects. The initiative will focus in FY21, the final year, a small portion of the remaining funds on wrap-up activities, such as outstanding data analysis and coordinating final reports.

Partners: NOAA DSCRTP, NMFS, ONMS, NCCOS, OET, National Oceanographic Parternship Program, BOEM, USGS, MBARI, Monterey Bay Aquarium, and other NGOs.



A large glass sponge growing off the side of a layered terrace with nearby orange (Swiftia), white (Parastenella), and mushroom (Heteropolypus) deep-sea corals in CBNMS (photo credit: Ocean Exploration Trust/NOAA).

RESEARCH AND MONITORING

- **Octopus Garden at Davidson Seamount - MBNMS**
  Purpose: The area surrounding the Davidson Seamount was afforded special conservation status by the PFMC in 2006 and added to MBNMS in 2008. It is a unique and special place within US 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." 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.

  As previously reported to the Council, in October 2018, MBNMS visually surveyed with ROVs aboard the EV *Nautilus*, 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.

  Return visits, in March 2019 with the human occupied vehicle (HOV, i.e. submersible) *Alvin,* and August 2019 with MBARI's ROV *Doc Ricketts*, confirmed suspicions that the shimmer observed during previous dives is caused by thermal mixing of warmer venting seawater (up to 10.4° C) with ambient seawater. This venting seawater is most likely part of a low-temperature ridge-flank hydrothermal system originating at Davidson Seamount, which is a significant geologic discovery. MBNMS returned to the octopus garden with the EV *Nautilus* in October 2019 to leave long-term data loggers to record seep temperature and dissolved oxygen variability for the next year. MBNMS also discovered a second distinct octopus garden six miles from the original. This is an exciting development, perhaps supporting the idea that seamounts indirectly support these nurseries.

  MBNMS also came across a whale fall and collected and confirmed a new species of the bone-eating worm, *Osedax*. Finding a whale fall is rare; it is even more rare to find one estimated to be only several months old. Future expeditions will be able to monitor the ecological succession and diversity of the deep-sea faunal community of a whale fall.

  Timeline: A research cruise to conduct marine mammal, seabird and trawl surveys at Davidson Seamount aboard the FSV *Bell M. Shimada* is scheduled for July, 2020. The EV *Nautilus* is scheduled to dive with the ROVs *Hercules* and *Argus* at Davidson Seamount in September 2020 to retrieve long-term data loggers, explore the second octopus garden, and explore targets for additional octopus nurseries.

  Partners: NMFS, Save the Earth, PBCS, Moss Landing Marine Laboratories, California State University Monterey Bay, UC Santa Cruz, Woods Hole Oceanographic Institute, OET.

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

- **Applied California Current Ecosystem Studies – CBNMS, GFNMS, and MBNMS**
  Purpose: 2019 marks the 16th field sampling season of the Applied California Current Ecosystem Studies (ACCESS; www.accessoceans.org). ACCESS is a collaborative effort of CBNMS, GFNMS, and PBCS for ongoing data collection to understand status and trends of sanctuary resources, ecosystem health, and response to climate change. Scientists collect seabird and marine mammal data, oceanographic measurements, marine debris, and sample for prey availability along predetermined transect lines. The sanctuary research vessel *Fulmar* serves as a platform to conduct observation transects along predetermined lines and conduct water and prey sampling at set stations.

  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.

  Spring upwelling conditions in 2019 made for rough seas but good ocean productivity, indicated by abundant zooplankton (predominantly krill) and whales foraging along the shelf break and over the continental shelf. Scientists also collected data on the locations of Dungeness crab pot buoys, a commercial fishery that closed early in 2019 due to increased risk of whale entanglements. ACCESS data are provided to the Dungeness Crab Fishing Gear Working Group to inform the Risk Assessment and Mitigation Program to look at risk to humpback whales and locations of out-of-season commercial gear.

  During the July cruise, during peak upwelling, scientists observed high levels of phytoplankton, zooplankton and krill in the prey samples. Humpback whales were observed

throughout the region and across the shipping lanes. No blue whales were observed during this cruise, which is somewhat uncommon. Lower than average numbers of common murres with chicks were seen.

Typical oceanographic conditions and productivity prevailed during the fall cruise, with scattered bait balls of krill and fish, copepods and gelatinous invertebrates. Humpback and blue whales were distributed mostly along the 200-meter isobath, and some humpbacks were feeding on small schooling fish across the shelf. Surprisingly high numbers of Arctic terns, Sabine's gulls, south polar skua, and various jaegers throughout the sanctuaries were observed. Overall, 2019 saw a continued trend of more productive ocean conditions compared to the anomalous conditions in 2014-2016.

Timeline: Cruises to collect data for ACCESS typically occur three times a year from spring through fall to capture the oceanographic seasons and have been conducted since 2004; 2020 will be the 17th year of surveys. Annual summaries are available at accessoceans.org.

Partners: PBCS, Bodega Marine Lab, San Francisco State University, California Department of Public Health.

ACCESS survey activities (clockwise top left): surveying for seabirds and marine mammals; launching of connectivity-temperature-depth (CTD) cast; washing down the plankton net; observing prey (krill) using sonar; center picture: krill (*Euphausia pacifica*) (photo credit Jaime Jahncke/PBCS).

- **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/m^2 of suitable habitat, recent surveys show that densities average 1/hectare (10,000 m^2) in the Channel Islands off southern California.

Outcome: The marine habitat surrounding the Channel Islands may support endangered white abalone and could serve as suitable habitat for restoration efforts. SCUBA surveys in 2018 conducted by ONMS, NMFS, and NPS around Santa Barbara Island in search of living abalone, including white abalone (*H. sorenseni*) observed only one living pink abalone (*Haliotis corrugata*). Divers also saw evidence of the historic abundance of white abalone off Arch Point. 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.

Timeline: Ongoing. 2020 vessel operations and diving will continue to survey high priority white abalone habitat areas within CINMS. A mapping workshop for the diver/citizen-science community will be held February 4, 2020 at the Santa Barbara Sea Center to better integrate and coordinate efforts to locate and restore white abalone with the dive community.

Partners: Lead partners are NMFS WCR and SWFSC, US Navy, CDFW and NPS. CINMS is a supporting partner, providing on-water support and working in coordination with ONMS WCR. The diver/citizen-science workshop will target commercial urchin divers, recreational dive clubs, dive shops, and dive boat operators in Santa Barbara and Ventura counties.

- **Kelp Forest Restoration and Recovery in Northern California – GFNMS, OCNMS, MBNMS and CINMS**

  Purpose: The Kelp Recovery Project is an initiative under the GFNMS Ocean Climate Program to investigate opportunities to restore and protect kelp forests on the Northern California coastline. Over the last six years, over 90% of kelp forests in Northern California were degraded and lost due to climate and ecological stressors. These stressors include a large-scale persistent marine heatwave, a lack of vital nutrients from upwelling, the massive die-off of sea stars due to a wasting syndrome, and a population boom in purple sea urchins. The loss of bull kelp forests has led to the collapse of the commercial red urchin fishery in the region and the complete closure of the recreational red abalone fishery. In order to understand and proactively respond to the drastic loss of bull kelp, the GFNMS Advisory Council convened the Kelp Recovery Working Group, chaired by the GFA and CDFW to develop recommendations to comprehensively address kelp loss in Sonoma and Mendocino counties and facilitate management and recovery of bull kelp populations. The resulting Bull Kelp Recovery Plan (Recovery Plan; https://farallones.org/wp-content/uploads/2019/06/Bull-Kelp-Recovery-Plan-2019.pdf), published in April 2019, is a comprehensive blueprint for restoring kelp along the Northern California coast. The Kelp Recovery Project seeks to implement strategies of the Recovery Plan for active kelp recovery, restoration site selection, monitoring, research, and community engagement.

Outcome: The Recovery Plan has been adopted by CDFW and will be incorporated into a state-wide kelp restoration plan. GFNMS, GFA and CDFW are coordinating to implement strategies of the Recovery Plan, including: 1) active recovery and monitoring at key recovery sites identified within the Recovery Plan; 2) mapping kelp canopy at over 30 kelp recovery sites using unmanned aerial vehicles (UAVs); and 3) establishing two new citizen science intertidal monitoring sites adjacent to kelp recovery sites, in partnership with the LiMPETS program (Long-term Monitoring Program and Experiential Training for Students; https://limpets.org/) to assess densities of abalone, sea urchins and sea stars. Pending funding, GFNMS will take the lead on assessing and developing standard methods and protocols for kelp canopy mapping in national marine sanctuaries on the west coast. The ONMS WCR recently formed a Kelp Strategy Team comprised of GFNMS, OCNMS, MBNMS and CINMS.

Timeline: The project to assess standard kelp canopy mapping methods has a timeline of one year (2020). A three to five year project for restoration of key kelp recovery sites and monitoring for effectiveness has been developed, and pending funding will be implemented starting in FY2020.

Partners: GFA, CDFW, California OPC, TNC, UC Los Angeles, UC Santa Cruz, Reef Check, Noyo Center for Marine Science, Waterman's Alliance, and other NGOs.

UAV kelp canopy surveys being conducted at Fort Ross, Sonoma County, by pilot Waz Hewerdin (photo credit Abby Nickels/GFA).