

2019 Sanctuary Science Accomplishments

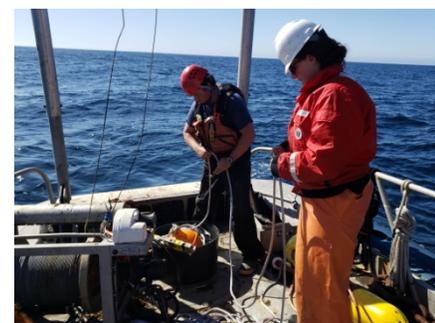
The Conservation Science program at Cordell Bank National Marine Sanctuary (CBNMS) works to understand the ecosystem of the sanctuary and monitor the conditions of the habitat and organisms to inform management decisions that can better protect the resources. In 2019, we focused on our commitment to long term monitoring, increasing our capacity, and producing data products and reports.

Projects:

- **Sixteen Years of ACCESS:** The Applied California Current Ecosystem Studies (ACCESS) Partnership completed three research cruises in CBNMS and Greater Farallones National Marine Sanctuary (GFNMS) in 2019, for the 16th year of monitoring the nearshore and open ocean sanctuary habitat. The cruises collect data to understand the status and trends of sanctuary resources, ecosystem health, and response to climate change. ACCESS data also address critical management issues, including distribution of whales in relation to human activities such as fishing and shipping, and local changes and responses to ocean acidification. ACCESS is a collaborative partnership of CBNMS, GFNMS, and Point Blue Conservation Science (accessoceans.org).
- **Six Years of Hypoxia Monitoring:** In partnership with scientists from UC Davis Bodega Marine Laboratory (BML), CBNMS deployed a mooring outfitted with oceanographic instruments at Cordell Bank to monitor dissolved oxygen for the sixth consecutive year. The team is now monitoring conditions year round to learn more about seasonal conditions. Low oxygen conditions can be stressful to organisms and extreme conditions can lead to death. Results from previous years show variability within and between years, with hypoxic events occasionally present for short durations. CBNMS and BML will continue to monitor conditions for changes and any impacts on marine life on the bank.
- **Benthic Science:** CBNMS staff completed analysis of remotely-operated vehicle (ROV) video and 593 still images collected during a 2017 cruise aboard the R/V *Fulmar* and published their findings in a [report](#). Fourteen dives over 5 days were completed on Cordell Bank at depths between 70-120 meters, to conduct quantitative surveys of benthic habitat and monitor change over time. At least 45 taxa of fish, at least 15 taxa of sponges, at least 5 taxa of corals and at least 33 taxa of other invertebrates were identified and quantified. In combination with data collected in 2014 of the upper reefs, the analysis characterizes the zonation and distinct communities on the bank. Staff completed analysis of video surveys conducted in 2017 on E/V *Nautilus*. Analysis of data from five dive sites in the deepest canyon and slope regions of CBNMS (744-2737 meters) have greatly expanded our knowledge of deep sea coral and sponge diversity and distribution. A total of 11,776 corals and 5,423 sponges were identified and enumerated to the lowest taxonomic level, sized to the maximum height and width, assessed for condition, associations with other invertebrates or fish and georeferenced. At least 25 new coral observations were documented for the sanctuary and 39 total coral collections from 22 taxa identified by the California Academy of Sciences assisted with confirming species identification from video imagery. Analysis



A humpback whale with black footed albatross during the ACCESS cruise in May.
Photo: J. Jahncke/ACCESS/NOAA/Point Blue



CBNMS and BML researchers deploying the hypoxia mooring at Cordell Bank.
Photo: NOAA



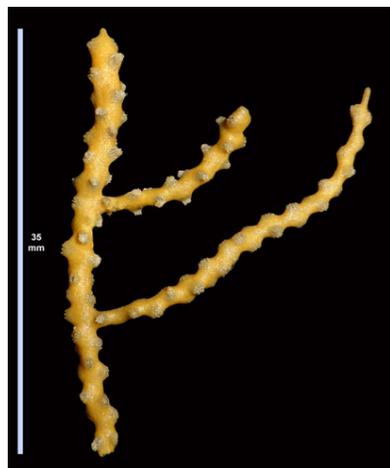
Researchers using a ROV from the E/V *Nautilus* to collect samples of a coral in CBNMS.
Photo: OET/NOAA

➤ **Benthic Science (cont'd):**

of specimens collected indicate that there is a new sponge species, and several significant range extensions for coral and sponge species. These data were used to select dive locations and species collection targets for the 2019 surveys. A report will be available in 2020.

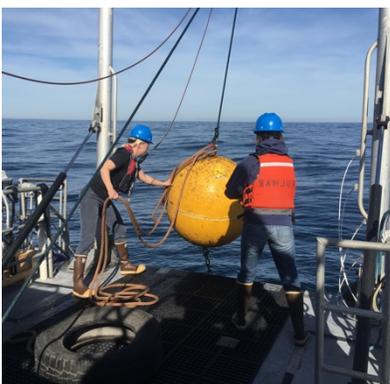
CBNMS staff, in partnership with GFNMS and Ocean Exploration Trust, collected seafloor imagery during a mapping and visual survey of seafloor habitat on the E/V *Nautilus* in October 2019. Researchers explored new areas in Box Canyon and Bodega Canyon in CBNMS, and collected 32 samples of corals, sponges, and other invertebrates, as well as water and sediment samples. Participants onboard included scientists and educators from CBNMS, GFNMS, California Academy of Science (CAS), and U.S. Geological Survey, and Scientists Ashore participated via live video feeds.

- **New Species:** In 2019, a new coral species collected from CBNMS was described by Dr. Gary Williams from the California Academy of Sciences and Dr. Odalisca Breedy from the Centro de Investigación en Estructuras Microscópicas and the Smithsonian Tropical Research Institute. The scientists named it *Chromoplexaura cordellbankensis* and published the findings in the *Proceedings of the California Academy of Sciences*. The coral was observed by CBNMS scientists using remotely operated vehicle on Cordell Bank in 2017 and collected in 2018. Subsequent reviews of imagery indicates the coral has been on the bank since at least 2004 but had never been collected or noted.



This yellow coral was collected in CBNMS and described as a new species by Drs. Gary Williams and Odalisca Breedy.
Photo: Gary Williams/California Academy of Sciences

- **Acoustic Monitoring:** CBNMS and NOAA's Pacific Marine Environmental Lab (PMEL) recovered, refurbished, and redeployed a Noise Reference Station (NRS) acoustic buoy in the sanctuary. A buoy has been recording sound in CBNMS and GFNMS since 2015 and the data will provide a characterization of the local soundscape, analysis of how ambient sound varies over time, and how it compares to other reference sites. The project is a partnership with PMEL, Oregon State University, and the ONMS noise team.



Researchers from CBNMS and PMEL recovered and redeployed an acoustic mooring in CBNMS.
Photo: NOAA

Publications from CBNMS and collaborators:

Graiff, K., D. Lipski, D. Howard and M. Carver. 2019. Benthic community characterization of the mid-water reefs of Cordell Bank. 32 pp.

Williams, G.C. and O. Breedy. 2019. A new species of Gorgonian Octocoral from the mesophotic zone off the central coast of California, Eastern Pacific with a key to related regional taxa (Anthozoa, Octocorallia, Alcyonacea). *Proceedings of the California Academy of Sciences*, Series 4, v.65, no.6, pp 143-158.

Partners:

Cordell Marine Sanctuary Foundation, Point Blue Conservation Science, Greater Farallones National Marine Sanctuary, Greater Farallones Association, UC Davis Bodega Marine Lab, California Academy of Science, United States Geological Survey, Oregon State University, Pacific Marine Environmental Lab, Ocean Exploration Trust.

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