RESOLUTION of the
Greater Farallones National Marine Sanctuary Advisory Council

To support staff recommendations within the Deep-Sea Habitat Topic Briefing

At its meeting on February 24, 2023, the Greater Farallones National Marine Sanctuary Advisory Council suggested edits to the staff recommendations within the Deep-Sea Habitat Topic Briefing. The council passed a resolution to support the staff recommendations with the suggested edits.

Attachments: Deep-Sea Habitat Topic Briefing

This resolution was passed with majority vote by a quorum of primary members (or alternate members serving in place of primary members) at a public meeting on February 24, 2023 held in Point Reyes Station, CA and via Google Meet. Council discussion regarding this resolution can be found in Meeting Highlights documentation at https://farallones.noaa.gov/manage/sac_meetings.html.

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Briefing on Deep Sea Habitat in GFNMS and CBNMS[1]

State of the Resource

- Condition Report Data
  - CBNMS (in publication) -In general, conditions appear to be good. Major declines in benthic species have not been observed. However, 1) only a small portion of the sanctuary has been visually surveyed, 2) although we do have some monitoring sites, the time series is not yet long enough to evaluate trends, and the sample size is small, and 3) this habitat is vulnerable to impacts from fishing and climate change. CBNMS-led science activities in benthic habitat were critical for the CR assessment and should continue. However, information on known impacts to habitat was lacking. Data presented was based on the level of human activity, but not actual impacts. This is an area to explore further.
  - GFNMS (in preparation) - Less than 1% of deep-sea habitat has been visually surveyed. Of the areas visually surveyed, most appear to have diverse geological and biological composition. Marine debris, primarily fishing gear, has been observed at all locations. One location within the National Marine Fisheries Service's Point Arena South Biogenic no-trawl Essential Fish Habitat Conservation Area showed an abundance of large and dead glass sponges. As in CBNMS, the habitat is vulnerable to impacts from fishing and climate change. Since the previous condition report, more areas of the sanctuary are open to bottom contact fishing gear. More data is needed to fully establish a baseline characterization of the habitat and species present in the offshore environment of GFNMS, especially in the northern area of the sanctuary, which was added in 2015.
- Other science information: Recent exploration of deep-sea habitat has led to discoveries of new species and new observations for the sanctuaries. Many areas of the sanctuaries remain to be explored, particularly in the deeper offshore areas.
- Climate Vulnerability Assessment Findings. Vulnerability is calculated from exposure to climate and non-climate stressors, sensitivity to those same stressors, and the resource's ability to adapt to the impacts. Ratings presented are from the original 2015 report and from 2023 revisions of some indicators.

[1] Deep Sea Habitat is defined by NOAA as habitat deeper than 50 meters below sea level.

    - Offshore rocky reefs (e.g. Rittenburg Bank in GFNMS, Cordell Bank) have a **moderate vulnerability** score based on low-moderate exposure to climate change stressors, namely altered currents/mixing and water temperature, low-moderate sensitivity to stressors such as water temperature and fishing impacts, and moderate adaptive capacity. The vulnerability of offshore reefs increased since the original assessment, due to documented and projected increases in bottom water temp.
    - Representative corals and sponges (CA hydrocoral and white lobed sponge) for these offshore reefs have a **moderate vulnerability** based on moderate exposure to stressors such as Ocean Acidification and increased water temperatures, moderate sensitivity to changing ocean conditions, and moderate adaptive capacity.
- The sanctuaries, in partnership with NOAA's Office of Coastal Management and Greater Farallones Association, are working on calculating carbon content of sanctuary open ocean sediments to identify carbon hotspots and the value of sanctuary benthic habitats to carbon sequestration.
- Pressures on deep sea habitat include:
    - Climate change
    - Fishing activities
    - Marine debris

Summary of Relevant Regulations

See full text, definition, and exemptions on the regulations page of the GFNMS and CBNMS websites.

The following GFNMS and CBNMS prohibitions can prevent impacts to deep sea habitat from listed prohibited activities:

1. Exploring for, developing, or producing oil, gas or minerals.
2. Constructing, placing or abandoning any structure, drilling into, dredging, or otherwise altering the submerged lands of the Sanctuary (*Note: lawful fishing is exempt from GFNMS and CBNMS regulations and the regulation of fishing and therefore protecting habitat from fishing, is not authorized by both sanctuaries' terms of designation).*

The following CBNMS regulation can prevent additional impacts to deep sea habitat:

1. On or within the line representing the 50-fathom isobath surrounding Cordell Bank, removing, taking, or injuring or attempting to remove, take, or injure benthic invertebrates or algae located on Cordell Bank. This prohibition does not apply to use of bottom contact gear used during fishing activities, which is prohibited pursuant to 50 CFR part 660.

Summary of Relevant Sanctuary Projects

Conservation Science:

- The Sanctuaries conduct exploration, characterization, and monitoring through mapping, visual surveys, and analysis. This work is used to understand the status of sanctuary resources, gain basic science information about these little known areas, and to evaluate and inform management efforts such as implementation of fishery management areas.
- The science team works with the resource protection team to identify issues and areas to study and restore and with the education team to share findings.

Resource Protection:

- The sanctuaries review project proposals, including proposed actions from other agencies that could potentially violate sanctuary regulations or are likely to destroy, cause the loss of, or injure deep sea habitat.
- Through permitting actions the sanctuaries manage, reduce, or eliminate injury to benthic habitat from activities other than lawful fishing.
- The sanctuaries work with NOAA's Office of Law Enforcement and the U.S. Coast Guard to document and enforce sanctuary regulations that protect the seabed and work with NOAA's General Council to issue fines and to work with responsible parties to restore deep sea habitat.
- GFNMS and CBNMS current terms of designation do not provide these sanctuaries the authority to regulate fishing impacts to deep sea habitat. GFNMS and CBNMS provide data about important, unique, and sensitive deep-sea habitats and make recommendations on how to best protect these habitats to fisheries managers when there are potential fishery management actions that can impact deep sea sanctuary resources.
- To the extent feasible, under the mandates of the National Marine Sanctuaries Act (NMSA), GFNMS and CBNMS work to restore deep sea benthic habitat. The success of deep-sea benthic habitat restoration activities, such as the proposed coral restoration project in GFNMS described in the draft YFD-70 Dry Dock Restoration Plan, are contingent in part on NOAA taking action to protect deep sea habitat from fishing impacts.

Education and Outreach:

- The sanctuaries educate kindergarten through university students, sanctuary volunteers, and community members about sanctuary deep-sea habitats through virtual classroom programs and curricula, summer camp programs, public lectures, teacher workshops, web stories, and print and social media that incorporate content on deep sea habitats. The education and outreach projects are designed to increase awareness of deep-sea habitats in the sanctuaries.

- Through high resolution video, virtual reality experiences, and exhibits the sanctuaries strive to increase appreciation and awe of deep-sea habitats and highlight the value of sanctuaries.

Infrastructure and Vessels:
Sanctuary infrastructure that supports research on, protection of, and education about deep sea habitat include office infrastructure, at sea assets, and specialized tools.

- Research, GIS, Resource Protection, and Education and Outreach staff collaborate on benthic habitat projects and meet with project partners at the sanctuary offices.
- The Crissy Field Visitor Center delivers deep sea habitat education programs utilizing the pier classroom to 2nd grade - high school students and GFNMS and CBNMS partner with the Oakland Museum of California and Point Reyes National Seashore on deep sea habitat exhibits.
- GFNMS and CBNMS conduct single and multi-day missions on the regional research vessel *Fulmar* and longer missions on larger NOAA "White Ships" and the exploration vessel *Nautilus*.
- GFNMS and CBNMS use remotely operated vessels (ROVs), multibeam, and side scan sonar to map and characterize deep sea benthic habitats. ROVs suitable for deep sea conditions are used to survey and monitor deep sea benthic habitats.

Summary

Information about deep sea habitat in GFNMS and CBNMS indicates conditions are fairly good where assessed, but very little of the habitat has been surveyed, and there are known threats to this habitat. Protecting and restoring deep sea benthic habitat is contingent on working with the Pacific Fishery Management Council and NOAA's National Marine Fisheries Service. The sanctuaries' education and outreach team deliver education programs to kindergarten - university students, sanctuary volunteers, and community members about deep sea benthic habitats as well as the vulnerability of these habitats to ocean acidification. The sanctuaries' work is supported by office infrastructure, vessels, multibeam, side scan sonar, and ROV technology.

GFNMS and CBNMS Advisory Council Recommendations

These recommendations were provided during a joint GFNMS and CBNMS Advisory Council meeting on February 24, 2023. To view council discussion on this topic, please visit https://farallones.noaa.gov/manage/sac_meetings.html and view the meeting's highlights.

Conservation Science: Expand efforts to explore and characterize as well as continue and add additional areas to monitor deep sea benthic habitat to understand 1) the

sanctuaries' natural resources, 2) status and trends of those resources, and 3) the amount of carbon storage to inform management and protection efforts.

Resource Protection: Increase protection of representative deep sea habitat types as reference sites with a focus on areas at highest risk of damage, that are sensitive and unique, and that do not easily recover from damage. Restore, where feasible, deep sea benthic habitat (e.g. deep-sea coral).

Education and Outreach: Increase student, stakeholder, and community awareness about the importance of deep-sea habitat to the sanctuaries', the ocean's, and our communities' health and how students, stakeholders, and communities can become involved in its protection.

Infrastructure: Maintain facility infrastructure as a collaborative meeting space, increase visitor center education programming space to reach more students, and update exhibits as needed to support protecting and restoring deep sea habitat. Secure, at a minimum, vessel time and technical support to survey a statistically significant sample size to assess the health of the sanctuaries' deep sea benthic habitat.