UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Greater Farallones and Cordell Bank
National Marine Sanctuaries
991 Marine Drive, The Presidio San Francisco, CA 94129

November 4, 2024

Mr. Brad Pettinger, Chair
Pacific Fisheries Management Council
7700 Ambassador Place, Suite 101
Portland, OR 97220

RE: Agenda item I.5 - Cordell Bank Conservation Area Revisions

Dear Mr. Pettinger:

The purpose of this letter is to share with the Pacific Fishery Management Council (PFMC) a report from the NOAA Office of National Marine Sanctuaries (ONMS) Greater Farallones and Cordell Bank National Marine Sanctuaries (GFNMS/CBNMS) that summarizes sanctuary data from Cordell Bank, the focal feature of CBNMS, that was not provided during scoping in the summer of 2023 for the Cordell Bank Conservation Area (*Appendix A*). Some of this data has subsequently been shared with PFMC staff and was incorporated into the Preliminary Draft EA/RIR/MSA Analysis. Additional information about the sensitive habitats within the Groundfish Conservation Area (GCA) and habitat analysis is also included in the attached report. GFNMS/CBNMS requests the PFMC consider this information when evaluating the current alternatives and use this information to propose an additional alternative(s) that meets the purpose and need of the proposed action to provide fishing access to previously closed areas surrounding Cordell Bank while protecting sensitive habitats. GFNMS/CBNMS considers a large portion of this area to be sensitive habitat because of the substrate, corals, sponges, fish, and previous fishing impacts, and has provided information in support of this purpose and need.

GFNMS/CBNMS are one management unit under ONMS. The GFNMS/CBNMS management unit has two Sanctuary Advisory Councils, one for each sanctuary. On October 31, 2024, both Advisory Councils called a special meeting to discuss the PFMC Cordell Bank Conservation Area Revisions as the proposed action pertains to the purpose of CBNMS "to protect and preserve the extraordinary ecosystem, including invertebrates, marine birds, mammals, and other natural resources, of Cordell Bank and its surrounding waters" (80 FR 13078). At that meeting, both Advisory Councils passed a resolution requesting me to submit a letter and additional data to the PFMC for consideration of an additional alternative(s).

GFNMS/CBNMS and the Sanctuary Advisory Councils believe that we can have sustainable fishing within the sanctuary while also protecting the sensitive, nationally and internationally designated habitat of ecological significance, Cordell Bank.

Sincerely,

Maria Brown

Maria Brown
Superintendent

APPENDIX A

Report from Greater Farallones and Cordell Bank National Marine Sanctuaries

A.1 Purpose

This report shares information from benthic research in Cordell Bank National Marine Sanctuary (CBNMS), provides additional information that should be considered during the Pacific Fishery Management Council deliberations over adopting a purpose and need and a range of alternatives under Agenda Item I.5, Cordell Bank Conservation Area Revisions, identifies an area of sensitive habitat, and provides supporting rationale regarding the significance of the area.

This report includes additional information to augment the Cordell Bank Fishery Regulation Changes Preliminary Draft EA/RIR/MSA Analysis:

- CBNMS Long Term Benthic Science Plan, which identifies habitat strata for study, including the transition area around the bank as an area distinct from the bank with sensitive habitat and species;
- Visual survey locations, which illustrate the effort that has been made to survey the area;
- Yelloweye observations and size classes;
- Lost fishing gear locations from fishing activity prior to the establishment of the Groundfish Conservation Area (GCA); and
- Delineated area of sensitive habitat based on habitat, coral, sponge, fish, and lost fishing gear observations.

This report includes information that supplements data in the Preliminary Draft EA/RIR/MSA Analysis and provides some clarification on:

- The predicted substrate data that was provided by Greater Farallones and Cordell Bank National Marine Sanctuaries (GFNMS/CBNMS); and
- New information about the Coral Habitat Suitability Model ("BOEM model," Poti et al., 2020).

A.2 Background

Cordell Bank National Marine Sanctuary (CBNMS) was designated as a national marine sanctuary in 1989, because of the national significance of the Bank. In 1988 it was recognized internationally as a significant underwater habitat as part of the United Nation's Golden Gate Biosphere Reserve. In 2015, the sanctuary was expanded to include the continental slope and Bodega Canyon, which support the productive ocean dynamics in the sanctuary including the Bank. Sanctuary staff and partners continue to explore and conduct research on and around the bank through a variety of methods including submersibles, divers, remotely-operated vehicles

(ROVs), camera sleds, and autonomous underwater vehicles (AUVs). These studies include multiple objectives such as exploring new areas and understanding the natural conditions of this unique benthic community, the status and trends of conditions over time, and changes in response to stressors or management actions.

Benthic Science Plan

Sanctuary staff conduct systematic research guided by a Long Term Benthic Science Plan developed in 2015 (ONMS, 2017). The goal is to characterize and monitor the benthic communities in the sanctuary so that changes can be detected and information is available to make recommendations to support management of a healthy marine ecosystem. The Long Term Benthic Science Plan delineates Cordell Bank seafloor habitat into two strata: 1) Cordell Bank, and 2) transition area around Cordell Bank. Other seafloor research strata in CBNMS include: 3) continental shelf, and 4) continental slope (including Bodega Canyon) (Figure 1).

The areas of research in the science plan that overlap with the current proposed action in Agenda Item I.5 are:

1. Cordell Bank, which includes all seafloor from the shallowest rock reefs on the Bank to the 120 m isobath to the north and the 100 m isobath to the south.
2. Cordell Bank Transition, which extends from the outer edge of the Cordell Bank polygon to the 160 m isobath to the north and west of the Bank and is boxed off with a right angle at the southeast corner where there were no contour lines to follow. The purpose of this area is to define the transitional habitats of the continental shelf and slope up to the consolidated rock ridges of Cordell Bank. These transition areas include the deep boulder, soft sediment, and steep slope areas to the west of Cordell Bank; the fine or coarse-grain unconsolidated sediment (such as ripple scour depressions) to the east and south of the Bank; and rock and soft sediment areas to the north of the Bank.

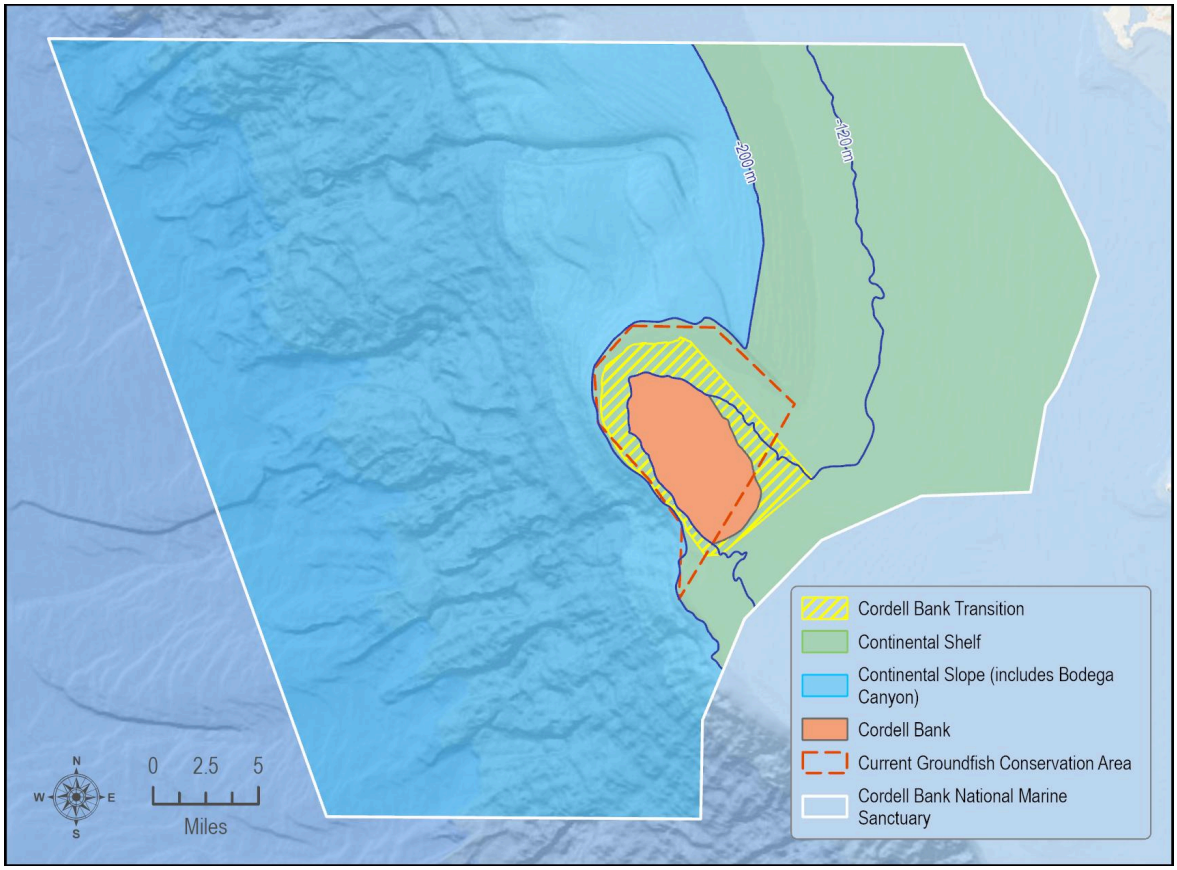

Figure 1. Benthic habitat strata zones of the CBNMS with the current Cordell Bank Groundfish Conservation Area (GCA). Strata zones were drawn as polygons in ArcGIS using bathymetry and hillshade data as guides.

A.3 Current Research

GFNMS/CBNMS is providing new information about the location of visual surveys on and around Cordell Bank which demonstrates the significant effort that has been made to characterize the Bank (Figure 2). The missions conducted at Cordell Bank since the Groundfish Conservation Area (GCA) was implemented in 2004 included quantitative visual surveys listed below conducted by divers, remotely-operated vehicles (ROVs), camera sled, and submersible.

- 2004 and 2005 *Delta* submersible benthic characterization: nineteen quantitative survey dives were conducted to describe the distribution and abundances of fishes, macroinvertebrates, and habitat types on Cordell Bank.
- 2004 and 2007 camera sled benthic characterization: visual transects were conducted on the soft sediment to the east of Cordell Bank to characterize substrate, fish, and invertebrates.
- 2006 and 2008 marine debris removal: derelict fishing gear that had been observed during previous submersible surveys (2002-2005) on Cordell Bank was relocated and marked using a ROV in 2006 and removed from the bank in 2008.

- 2010 technical dives: NOAA dive teams conducted technical dives at five sites on the upper Cordell Bank reef (123-193 feet) to obtain video footage, still images, and biological specimens.
- 2010 ROV benthic characterization: quantitative transects were conducted on the slope to the west of Cordell Bank (167-497 meters) to characterize benthic habitat, fish, and deep-sea corals and sponges.
- 2014 ROV benthic characterization: thirteen quantitative dives were conducted on Cordell Bank above 70 meters to characterize the invertebrate cover on the shallow parts of the reef.
- 2017 ROV benthic characterization: fourteen quantitative dives were conducted on Cordell Bank at depths between 70-120 meters in areas where there had been previous explorations to survey benthic habitat, fish, and macroinvertebrates and monitor change over time.
- 2018 ROV benthic characterization: this expedition surveyed multiple habitats and locations within CBNMS and one quantitative dive was conducted on Cordell Bank at a long-term monitoring site to survey benthic habitat, fish, and macroinvertebrates.
- 2021 ROV benthic characterization: this expedition surveyed multiple habitats and locations within CBNMS and one quantitative dive was conducted on Cordell Bank at a long-term monitoring site to survey benthic habitat, fish, and macroinvertebrates.

To date these surveys have resulted in the classification of seafloor substratum, species lists, and abundance and distribution data of fishes and macroinvertebrates, including deep-sea corals and sponges (Graiff et al., 2011, 2019; Graiff & Lipski, 2016, 2020, 2023). The benthic datasets collected in and around Cordell Bank have allowed scientists to monitor patterns or changes in the benthic communities over time and have contributed to assessing the status and trends of conditions in CBNMS (ONMS, 2023). Additionally, these datasets serve as the basis for management recommendations by the CBNMS Advisory Council. Data collected from the 2010 ROV survey were used during Amendment 28 to the Groundfish FMP to extend the existing Bottom Trawl Essential Fish Habitat Conservation Area (EFHCA) to include rock substrate and coral habitat on the continental slope to the west of Cordell Bank (the area known as Cordell Bank EFHCA Modification 2 in the Collaborative proposal). Many of the surveys collected specimens that were identified and curated at the California Academy of Sciences. High-definition video and still imagery have been captured and used nationwide for various purposes.

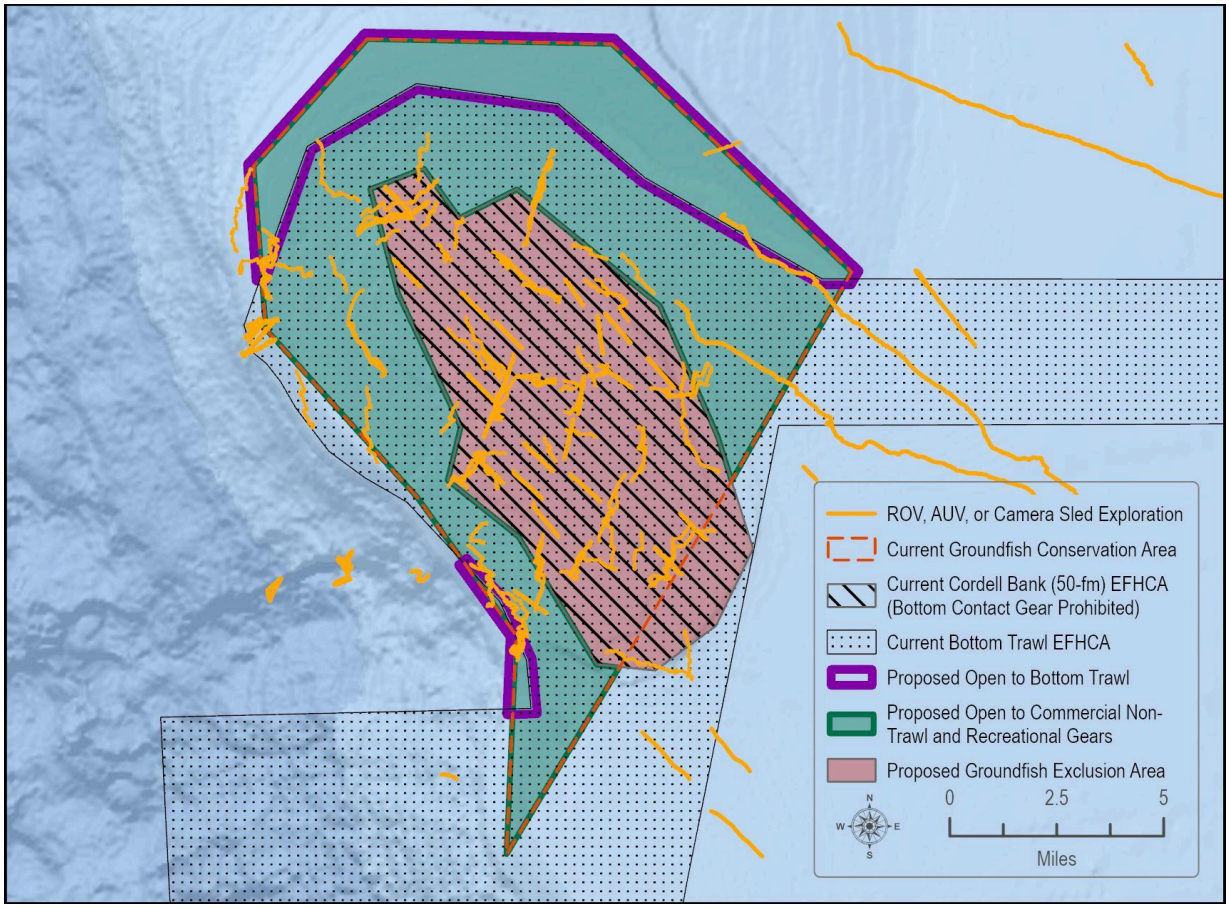

Figure 2. Locations of benthic surveys that have occurred on and around Cordell Bank from 2002-present using a submersible, remotely-operated vehicles, autonomous underwater vehicle, and towed camera sled in relation to current conservation areas (dashed, stippled, hatched areas) and proposed conservation areas (colored areas).

A.4 Information Relevant to the Proposed Action

Seafloor substratum:

The substrate map depicting rocky reef on Cordell Bank in Figure 6 of the Cordell Bank Fishery Regulation Changes Preliminary Draft EA/RIR/MSA Analysis is based on an analysis of multibeam sonar data from a single survey conducted in 2005 (R/V *VenTresca,* Seafloor Mapping Lab at California State University, Monterey Bay) that incorporates rugosity (roughness) and ground truthing (visual observations) to produce a "supervised" and thus, high confidence classification of rocky reef on the top of the bank and within the western Cordell Bank Transition area.

The predicted substrate map presented in Figure 3 of this report is the product of three multibeam data sources: 1) on top of the bank from the R/V *VenTresca* in 2005, 2) north-south of the bank from the NOAA Ship *Okeanos Explorer* in 2009, and 3) to the west of the bank from the E/V *Nautilus* in 2017. The analyses of these datasets were based on numerical classification of depth,

slope and reflective backscatter, but lack rugosity, and ground-truthed observation data were not used. Therefore, these classifications produced "unsupervised" predictive substrate interpretations. The interpretation of the predicted substrate on top of and surrounding Cordell Bank was completed in two analyses that used the same methodology (described in Cochrane, 2008). Analysis of predicted substrate on top of Cordell Bank was performed by Dr. Mary Young as a graduate student at California State University Monterey Bay, and the analysis of predicted substrate to the west and north of Cordell Bank was performed by Dr. Guy Cochrane of the U.S. Geological Survey. The predicted substrate classes are hard-sloped, mixed, and soft-flat; hard-sloped represents rock and soft-flat represents mud and sand. The mixed class is coarse sediment and low-relief rock.

Hard-sloping rock and mixed substrates make up approximately 81% (34 mi^2) of the predicted substrate within the Cordell Bank 50-fathom isobath (Figure 3). There is also ~18 mi^2 (73% of the available predicted substrate data) of hard-sloped and mixed substrates within the current GCA that is proposed to be opened to commercial and non-trawl and recreational fishing gear.

Approximately 90% of CBNMS has been mapped (ONMS, 2023). However, there is a data gap to the north and east of Cordell Bank that is 6.4 mi^2 or approximately 65% of the area proposed to be opened to bottom trawl. There is no multibeam sonar data in this area, and there are no visual datasets to confirm the presence of soft sediment or low relief mixed substrate in the northern portion. Visual surveys are limited to one submersible dive and two camera sled transects in the eastern portion of this area which indicate soft sediment is present.

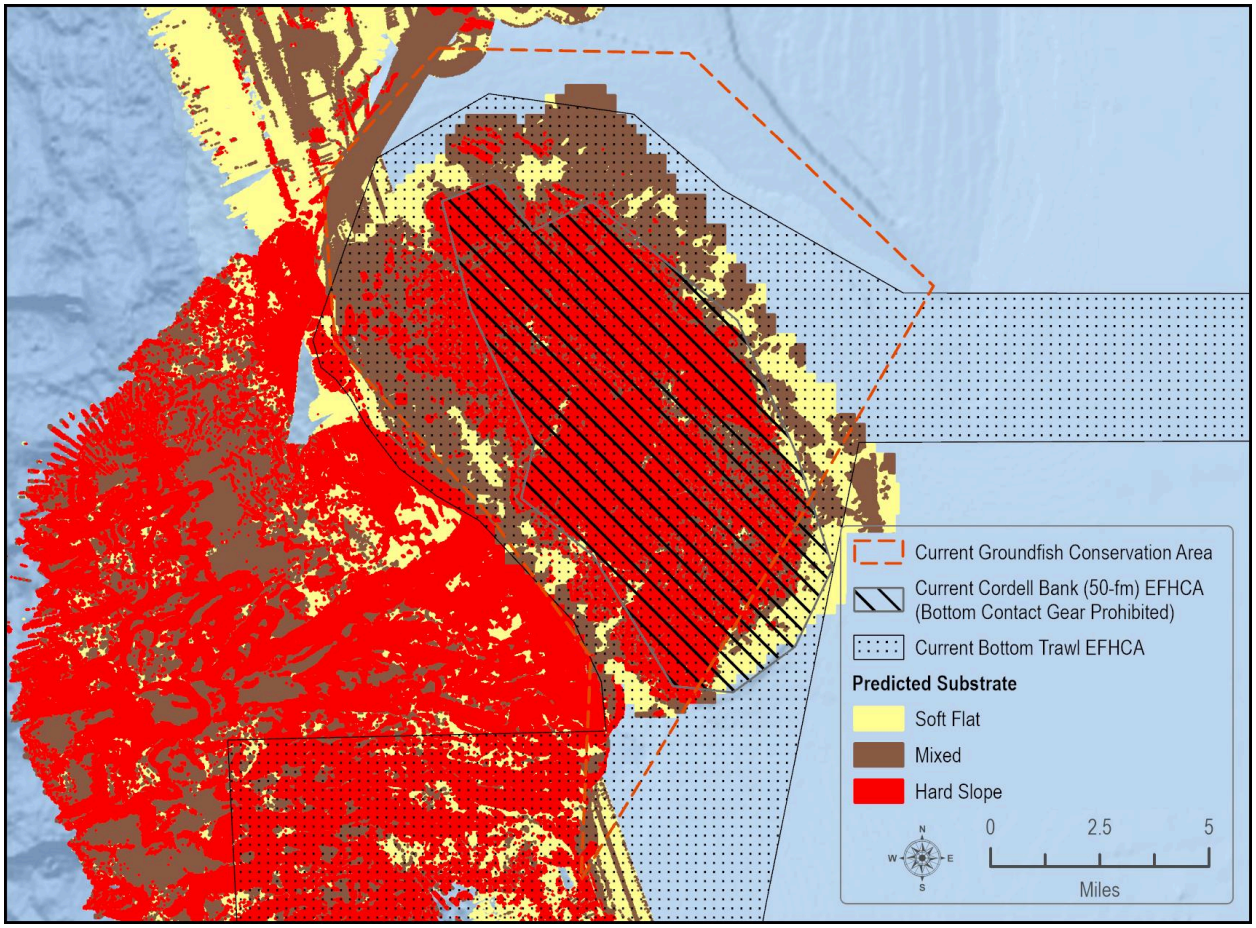

Figure 3. Predicted substrate classifications from three multibeam sonar datasets summarized as hard-sloping, mixed, and soft-flat substrates in the current Cordell Bank conservation areas.

Living Habitat - Deep-sea corals and sponges:

Cordell Bank and the surrounding rocky substrate in the region off the western extent of the bank to the continental slope supports an abundant and diverse ecosystem of deep-sea corals and sponges (DSCS). Research has revealed that DSCS are often extremely long-lived and slow growing (Andrews et al., 2009; Roark et al., 2009; Clarke et al., 2017); characteristics that make them slow to recover from physical disturbance from bottom-contact fishing gear (Rooper et al., 2017). The complex and three-dimensional structure of many DSCS species provides structure for protection and enhanced feeding for associated fishes and other invertebrates (Baillon et al., 2012; Buhl-Mortensen et al., 2010).

Structure-forming coral taxa found on and in the region of Cordell Bank include the hydrocoral *Stylaster californicus*, and gorgonians *Chromoplexaura marki* and *C. cordellbankensis. Chromoplexaura cordellbankensis* was recently described as a new species from an ROV collection made on Cordell Bank in 2018 (Williams & Breedy, 2019).

Predictive habitat suitability models of *Stylaster* spp. and *Chromoplexaura* spp. (referred to at the time of analysis as *Swiftia* spp.) were developed from visual observations (presence-absence data) collected from 2002-2005 by the *Delta* submersible and associated environmental data (Etherington et al., 2011; Figure 4). The generalized linear models indicate that rugosity had a strong influence on the presence of *Stylaster* spp., which were associated with shallow, high-relief rocky habitats. *Chromoplexaura* spp. were predicted to be broadly distributed in deeper water, low sloping environments, and over a diversity of substratum types. Since the development of the Etherington et al. (2011) model, GFNMS/CBNMS have collected additional visual datasets (Section A.3) of georeferenced *Stylaster californicus*, *Chromoplexaura marki,* and *C. cordellbankensis* observations from Cordell Bank and the surrounding region (Figure 5).

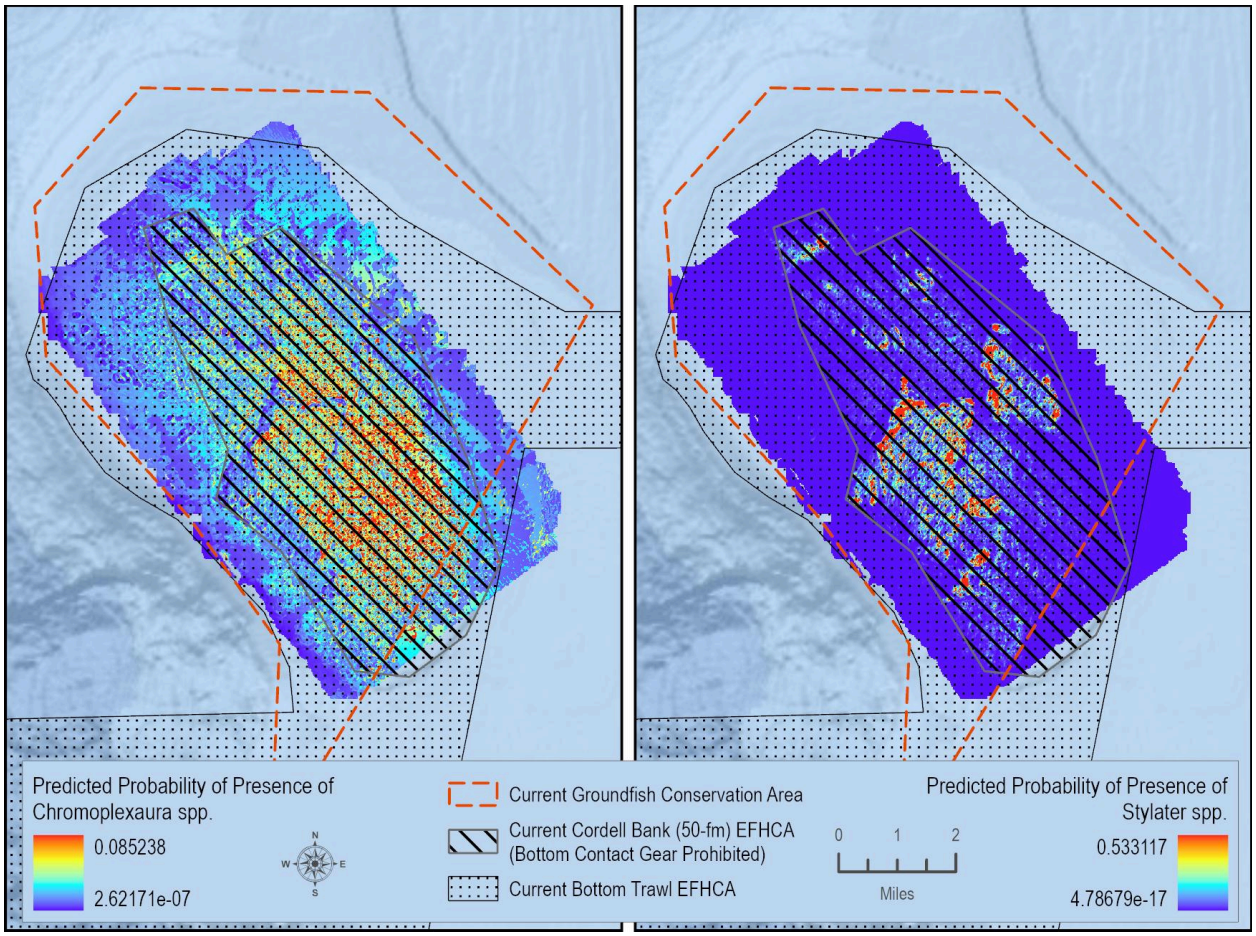

Figure 4. Predicted probability of the presence of the gorgonian *Chromoplexaura* spp. (left) and hydrocoral *Stylaster* spp. (right) across Cordell Bank using best fit logistic regression model applied to habitat raster data using ArcRStats (Etherington et al., 2011) and the current Cordell Bank conservation areas.

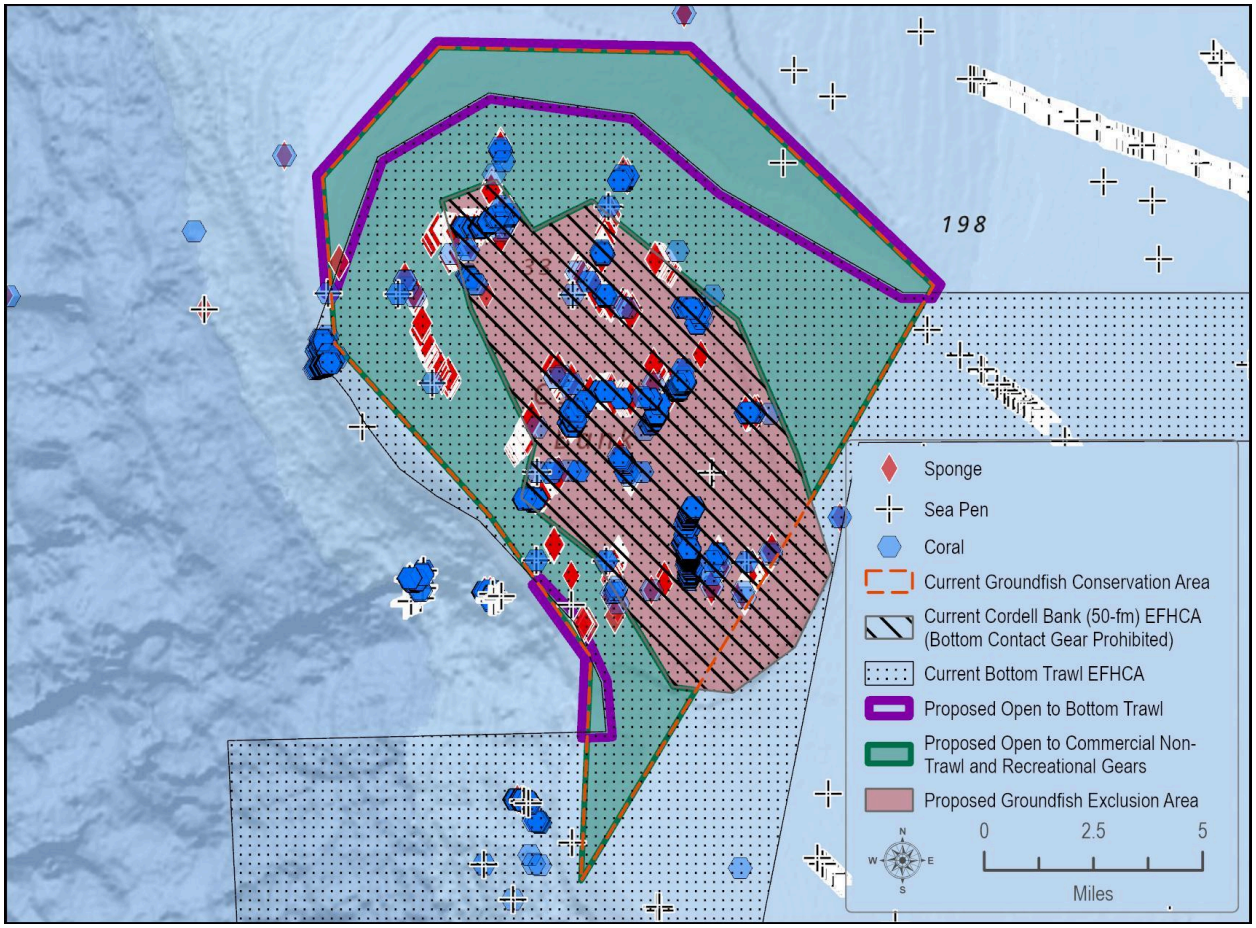

Figure 5. Observations of corals, sea pens, and sponges from visual surveys conducted using using a submersible, remotely-operated vehicles, autonomous underwater vehicle, and towed camera sled in relation to current Cordell Bank conservation areas (dashed, stippled, hatched areas) and proposed conservation areas (colored areas).

Given the well documented DSC observations on Cordell Bank and to the west of Cordell Bank, the results of the habitat suitability model for corals (Poti et al., 2020) presented in Figures 7 and 8 of the Preliminary Draft EA/RIR/MSA Analysis do not accurately represent the coral habitat on and around Cordell Bank. The model predicts there is no robust high or highly suitable predicted coral habitat on and nearby Cordell Bank. The modeling results presented are aggregated layers of 22 DSC taxa known to be associated with hard substrate for the entire study area offshore the continental U.S. West Coast. However, records of *Stylaster* spp. and *Swiftia* spp. were not included in the model, because the analysis only included records identified to species. If the model had included *Stylaster* spp. and *Swiftia* spp. (now known to be *Chromoplexaura marki*), the model would have likely predicted areas on Cordell Bank with high habitat suitability for these taxa (Matthew Poti, pers. comm.). **We recommend the Poti et al., 2020 model not be used as a representation of habitat suitability of corals on Cordell Bank.**

Sponges are also an important component to the benthic community on Cordell Bank and in the surrounding rocky substrate to the west of the bank. Often sponges occur in larger sizes than deep sea corals, and while species identification of sponges is lacking compared to corals, they serve an important ecological function providing additional habitat for fishes and other invertebrates with their three-dimensional structure and diverse morphotypes (e.g., vase, shelf, foliose) (Clarke et al., 2017). There are no habitat suitability models presented for sponges in the CBNMS region, yet there are numerous occurrences to the west of Cordell Bank within the current GCA that would not be within the proposed GEA (Figure 5).

Groundfish species of interest:

The Cordell Bank GCA has been in place for 20 years to facilitate the rebuilding of overfished groundfish stocks. Cordell Bank and the region to the west of the bank provide habitat for large, sexually mature rockfish including bocaccio, canary, cowcod, widow, and yelloweye (Graiff et al., 2011, 2019; Graiff & Lipski 2023). Visual imagery collected by submersible and ROV quantitative transects in CBNMS are analyzed for all species of fish. Each fish observation is identified to the lowest taxonomic level, enumerated and sized (fork length to the nearest 5 cm) using the set of paired parallel lasers mounted 10 or 20 cm apart (vehicle specific) and positioned in the center of the video frame for sizing objects viewed in images. These frequency and size data contribute to density estimates and distribution information of the fish communities in CBNMS. Yelloweye rockfish are of particular interest to GFNMS/CBNMS to enumerate from visual survey data because the fish stock is still considered to be rebuilding (Wallace, 2023) and juveniles and adults are easily identified and sized from underwater video due to their color morphologies and physical characteristics. Georeferenced observation data of yelloweye indicate that the upper reefs of Cordell Bank and the area to the west of the bank in the transition area serve as important habitat for all sizes and life stages (Figure 6).

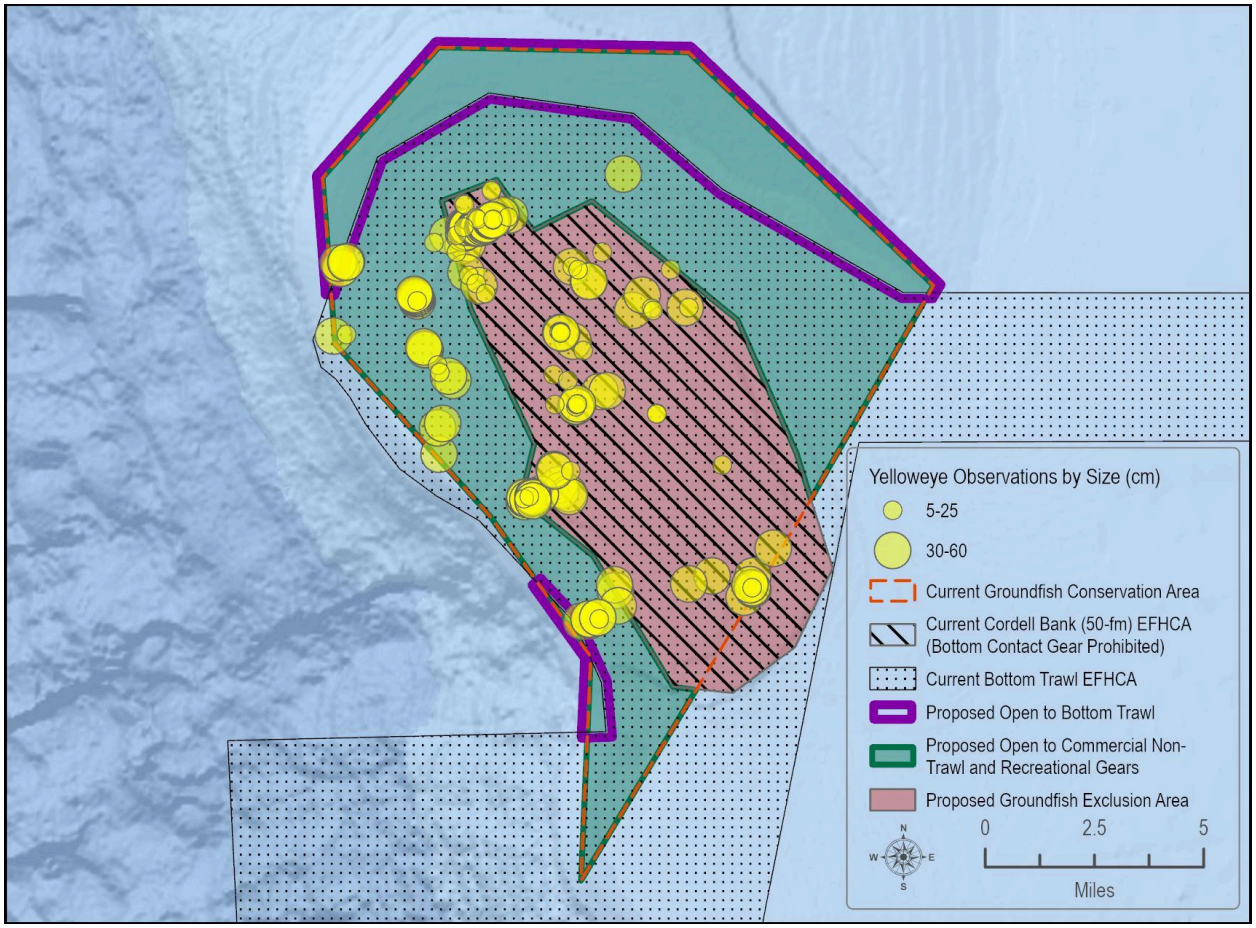

Figure 6. Size classes (5-25 cm and 30-60 cm) of yelloweye rockfish observations from visual surveys conducted using a submersible and remotely-operated vehicles in relation to current Cordell Bank conservation areas (dashed, stippled, hatched areas) and proposed conservation areas (colored areas).

Within the 50 fathom Cordell Bank EFHCA 39% of the total yelloweye observations are 5-25 cm in length and 61% are 30-60 cm in length. To the west of Cordell Bank in the GCA, 18% of the yelloweye are 5-25 cm in length and 82% are 30-60 cm in length. Yelloweye are a slow-growing species and mature relatively late in life with 50% mature at 40 cm and 7 years in central and northern California (Love et al., 2002).

Lost fishing gear:

GFNMS/CBNMS scientists have documented significant amounts of lost fishing gear on and around Cordell Bank when conducting visual benthic surveys (Figure 7). In 2002, lost fishing gear was observed on 90% of the research transects conducted across the rocky habitats on Cordell Bank with an average density of one piece of gear observed every 670 linear meters (ONMS, 2008). Gear was more likely to be found on rocky reefs compared to mud or sand bottom habitats. This gear includes long lines, gill nets, and crab and trawling gear, which are entangled on Cordell Bank and some extending into the water column.

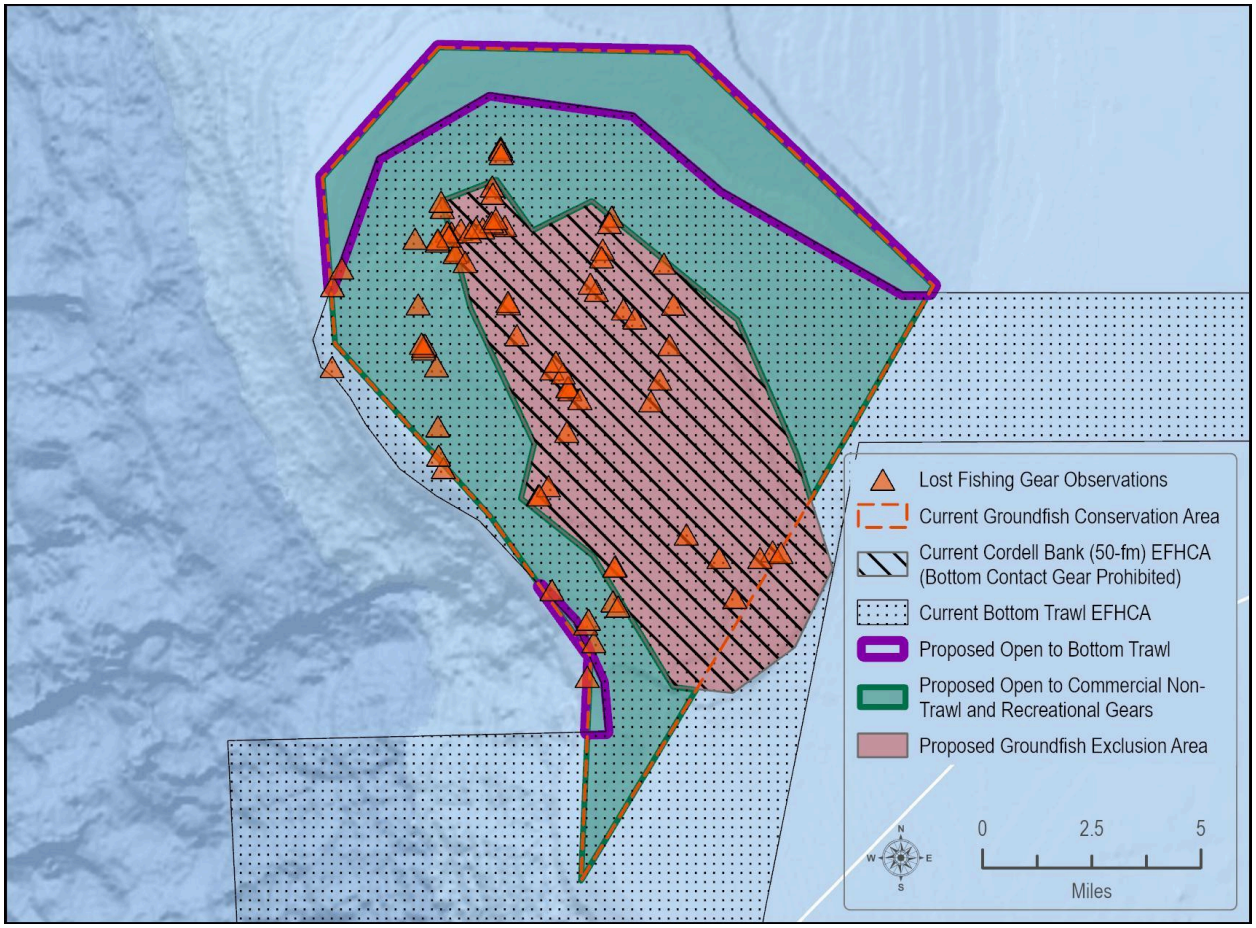

Figure 7. Lost fishing gear observations from visual surveys conducted using submersible and remotely operated vehicles in relation to current Cordell Bank conservation areas (dashed, stippled, hatched areas) and proposed conservation areas (colored areas).

Lost fishing gear negatively impacts benthic communities and habitats by scouring or breaking fragile, slow-growing deep-sea corals and sponges. In some locations, lines rest on top of boulders and sand flats for hundreds of yards, while in other locations, lines and nets have formed snarled masses of line that are entangled on the rocky features. The densities of lost fishing gear that have been observed in surveys conducted over just a small portion of the Cordell Bank region suggest that the overall load of fishing gear in the area is large from historic fishing effort that occurred before the implementation of the GCA and EFH. The proposed changes to the current GCA could result in additional entanglement of lost fishing gear and habitat impacts as fishing effort (similar to pre-closure effort) moves into the GCA.

A.5 Area of Sensitive Habitat

To inform the PFMC's consideration of a purpose and need, identification of a range of alternatives, and potential selection of a preliminary preferred alternative, GFNMS/CBNMS have provided additional data to that provided in the Preliminary Draft EA/RIR/MSA Analysis, and also provided more details about data that was presented in that analysis. Additional data and

details were not included during scoping over the summer of 2023, because CBNMS/GFNMS and the Sanctuaries' Advisory Councils were not included in the preliminary scoping with stakeholders.

Cordell Bank and the transition area around it contain sensitive habitat. GFNMS/CBNMS are concerned that the alternative proposed will negatively impact this sensitive habitat. To meet the stated purpose and need to protect sensitive habitat while also providing fishing access to previously closed areas surrounding Cordell Bank, CBNMS/GFNMS have identified an area of sensitive habitat (Figure 8). This report accompanies a letter from CBNMS/GFNMS to the PFMC that recommends expansion of the range of alternatives in order to reduce regulatory complexity while protecting benthic habitat.

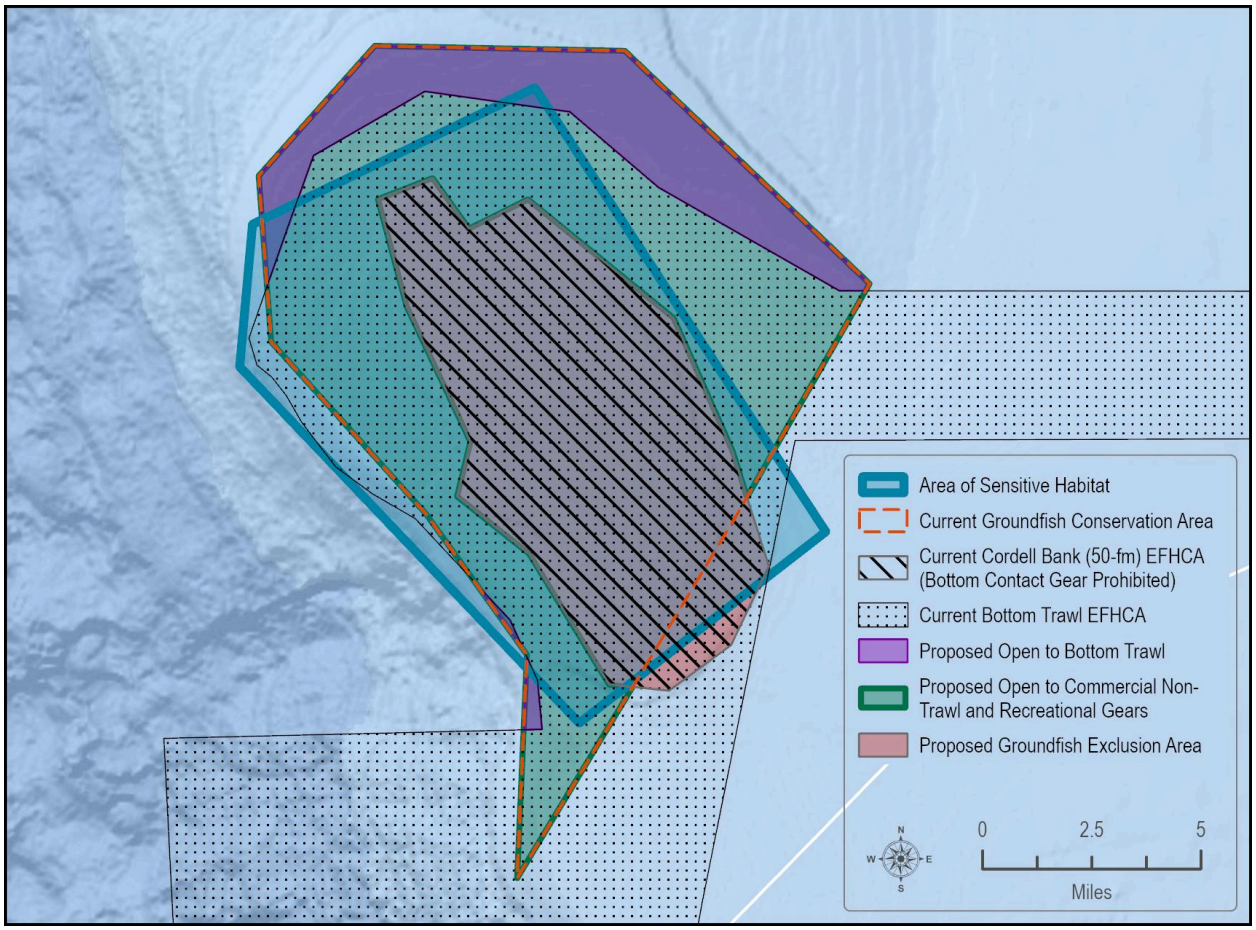

Figure 8. Area of sensitive habitat in blue in relation to current Cordell Bank conservation areas (dashed, stippled, hatched areas) and proposed conservation areas (green, purple, and pink colored areas).

<u>Rationale:</u>

CBNMS/GFNMS staff identified an area of sensitive habitat based on the data described above, coupled with the Preliminary Draft EA/RIR/MSA Analysis (Figure 9). Based on documented benthic habitat, biological resources, and historical lost fishing gear, CBNMS/GFNMS recommends sensitive habitat within this area be considered for protection and management in the development of additional alternatives, but this is not a proposed boundary for fishing closures. This area includes the upper reefs of Cordell Bank to the deeper shelf and slope transition area surrounding the bank. The area of sensitive habitat is 48.97 mi^2.

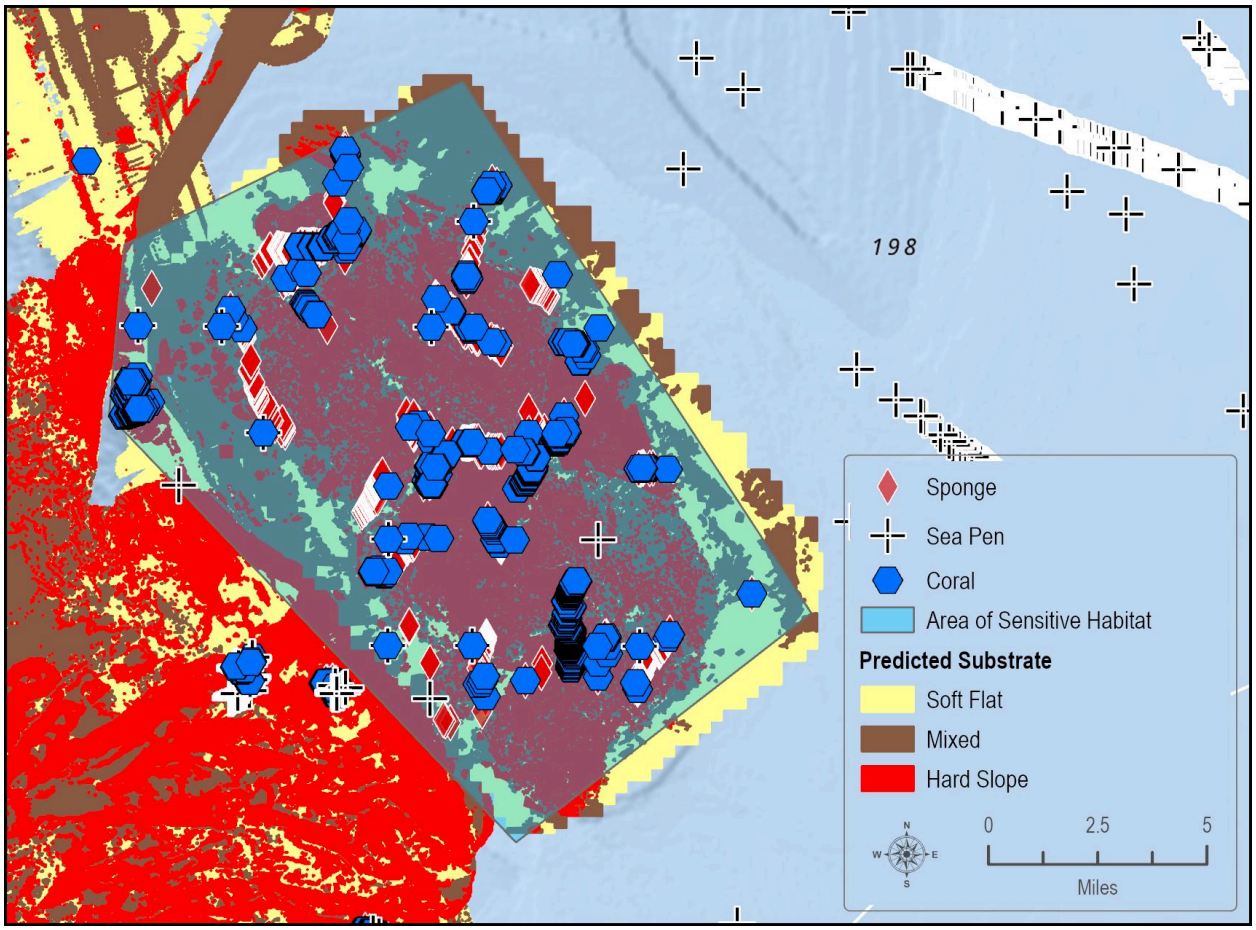

Figure 9. Area of sensitive habitat with predicted substrate classifications and observations of corals, sea pens and sponges from visual surveys.

As stated in section A.4, there is considerable hard substrate to the west of Cordell Bank within the area of sensitive habitat. **Rock substrate is a non-renewable resource and once damaged it cannot be restored; therefore, CBNMS/GFNMS recommends the PFMC consider restricting activities that can irreparably damage the substrate and habitat.**

The hard substrate provides ideal habitat for an abundance of corals, sponges, and other invertebrates. Corals and sponges provide habitat for fish and other invertebrates. Both are slow growing and long-lived and once damaged may take decades to recover. **Bottom contact fishing in this area could result in damage to slow growing corals and sponges.**

Lost gear documented from visual surveys was more likely to be found in rocky substrate (ONMS, 2023). **Allowing fishing gear in the area of sensitive habitat may increase the potential for accidental gear entanglement with hard substrate and associated biological communities.**

There are very few deep, offshore, rocky features like Cordell Bank in northern-central California. As part of an archipelago of seafloor features ranging from the Farallon Islands, to Rittenberg Bank, and Cordell Bank, with smaller banks and rocky features in between, Cordell Bank is an underwater island supporting biologically diverse habitats and associated species. The purpose of CBNMS is "to protect and preserve the extraordinary ecosystem, including invertebrates, marine birds, mammals, and other natural resources, of Cordell Bank and its surrounding waters" (80 FR 13078) and does not regulate the activity of fishing. Since this unique, sensitive, seafloor feature was the driver for the designation of the sanctuary, per the National Marine Sanctuaries Act, CBNMS requests the Pacific Fishery Management Council consider the ecological value and sensitive habitat that has been well documented over the past nearly 50 years and develop additional alternative(s) to protect the national significance of Cordell Bank from fishing gear entanglement and damage to the rocky features, corals, and sponges. **The current proposed alternative does not include the entirety of Cordell Bank--the main feature of the sanctuary--and would open areas of hard substrate, and deep sea coral and sponge habitat to fishing activity.**

The areas to the north and east of Cordell Bank have not been included in the area of sensitive habitat, because there is a notable lack of data in that region. There is no mapping data in the area to the north and east of the bank. Visual surveys include one submersible and two camera sled surveys to the east of the bank. Soft substrate (mud and/or sand) was the primary habitat type observed on these surveys. The substrate type in the area to the north of the bank is unknown. Some mixed or hard substrate may be present, based on extrapolating known substrate types to the south (Cordell Bank) and north (Gobbler's Knob) of the unmapped area. The current proposed alternative includes potential changes in a data poor area which has not been prioritized for surveys.

As a result of the data presented in this report, and on the recommendation of the Cordell Bank and Greater Farallones National Marine Sanctuary Advisory Councils, GFNMS/CBNMS recommends that the PFMC analyze additional alternatives that reduce regulatory complexity while protecting nationally significant sensitive habitats of Cordell Bank.

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