

**Cordell
Bank
National
Marine
Sanctuary**

**Final Environmental
Impact Statement/
Management
Plan**

Volume One

Designated May 19, 1989

U.S. Department of Commerce

National Oceanic and
Atmospheric Administration

Marine and Estuarine
Management Division



UNITED STATES DEPARTMENT OF COMMERCE
FINAL ENVIRONMENTAL IMPACT STATEMENT
AND MANAGEMENT PLAN FOR THE PROPOSED
CORDELL BANK NATIONAL MARINE SANCTUARY

April 1989

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Designation: Final Environmental Impact Statement/Management Plan

Title: Final Environmental Impact Statement and Management Plan for the Proposed Cordell Bank National Marine Sanctuary

Abstract: The National Oceanic and Atmospheric Administration proposes to designate Cordell Bank on the edge of the Pacific continental shelf, 20 miles west of Point Reyes, California as a National Marine Sanctuary.

The proposed Sanctuary includes all waters within a line extending southwest from Bodega Head to the 1,000 fathom depth contour west of Cordell Bank, then south along this contour until it joins the boundary of the Point Reyes-Farallon Islands National Marine Sanctuary. The proposed Sanctuary includes 397.05 square nautical miles.

The designation of Cordell Bank as a National Marine Sanctuary would provide an integrated program of resource protection, research and interpretation to assist in the long-term management and protection of its resources. Resource protection will involve cooperation with other agencies in formulating resource protection policies and procedures including the enforcement of regulations for visitor use.

Two Sanctuary regulations are proposed. One of those regulations will prohibit the discharge into the Sanctuary of oil and other materials that may be harmful to Sanctuary resources, except as specifically permitted for research, educational, salvage or Sanctuary management purposes. The other regulation will prohibit removing, taking, or injuring or attempting to take, remove or injure benthic organisms, except as specifically permitted for research, educational, salvage, or Sanctuary management purposes. Three other activities are potentially subject to regulations; hydrocarbon activities, anchoring on Cordell Bank, or within the 50 fathom contour surrounding the Bank and taking, removing, or injuring or attempting to take, remove or injure cultural or historical resources. Alternatives to the proposed action include the status quo, larger and smaller boundary options and a non-regulatory option.

Research will include baseline studies, monitoring, and analysis and prediction projects to provide information needed in resolving management issues. Interpretation programs will be directed to improving public awareness of the Sanctuary's resources and the need to use them wisely to ensure their viability.

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FINAL ENVIRONMENTAL IMPACT STATEMENT AND MANAGEMENT PLAN
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Note to Reader:

A. National Environmental Policy Act (NEPA):

This document is both a final environmental impact statement and management plan for the proposed Cordell Bank National Marine Sanctuary. Some of the section headings, and their order, are different from those frequently found in other environmental impact statements. To assist NEPA reviewers, the following table has been developed. Under the heading "NEPA Requirements" are listed those topics normally discussed in an EIS. the corresponding section of this document and the page numbers are provided in the other two columns.

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B. Endangered Species Act (ESA):

Pursuant to § 7 of the ESA, the U.S. Fish and Wildlife Service of the Department of the Interior, and the National Marine Fisheries Service, of the Department of Commerce, were consulted in the performance of the biological assessment of possible impacts on threatened or endangered species that might result from the designation of a National Marine Sanctuary at Cordell Bank. The consultation confirmed that some twelve endangered and two threatened species are known to occur in the area and that Sanctuary designation was not likely to adversely affect these species. The species identified are:

1. California brown pelican....	<u>Pelicanus occidentalis calif.</u>	Endangered
2. Short-tailed albatross.....	<u>Diomedea albatrus</u>	Endangered
3. Gray whale.....	<u>Eschrichtius robustus</u>	Endangered
4. Right whale.....	<u>Eubalaena glacialis</u>	Endangered
5. Blue whale.....	<u>Balaenoptera musculus</u>	Endangered
6. Fin whale.....	<u>B. physalus</u>	Endangered
7. Sei whale.....	<u>B. borealis</u>	Endangered
8. Humpback whale.....	<u>Megaptera novaeangliae</u>	Endangered
9. Sperm whale.....	<u>Physeter catodon</u>	Endangered
10. Guadalupe fur seal.....	<u>Arctocephalus townsendi</u>	Threatened
11. Green sea turtle.....	<u>Chelonia mydas</u>	Endangered
12. Leatherback sea turtle.....	<u>Dermochelys coriacea</u>	Endangered
13. Pacific Ridley sea turtle.....	<u>Lepidochelys olivacea</u>	Endangered
14. Loggerhead sea turtle.....	<u>Caretta</u>	Threatened

All correspondence related to these consultations is contained in Volume II of the FEIS/MP.

C. Resource Assessment:

The Marine Protection, Research and Sanctuaries Act, as amended, requires a resource assessment report documenting present and potential uses of the proposed Sanctuary area, including uses subject to the primary jurisdiction of the Department of the Interior. This requirement has been met in consultation with the Department of the Interior and the assessment report is contained in Part II, Section II.

D. Federal Consistency Determination

Section 307 of the Coastal Zone Management Act of 1972, as amended, requires that each Federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs. This requirement has been met through a Federal Consistency Determination made by NOAA to the California Coastal Commission dated, December 31, 1988, that the designation of Cordell Bank as a National Marine Sanctuary is consistent, to the maximum extent practicable with California's Coastal Management Plan.

EXECUTIVE SUMMARY

Cordell Bank is located at the edge of the Pacific continental shelf, 20 miles due west of Point Reyes, California. In accordance with Title III of the Marine Protection, Research and Sanctuaries Act, as amended, 16 U.S.C. 1431 et seq., this final Environmental Impact Statement and Management Plan proposes the establishment of a National Marine Sanctuary centered on Cordell Bank to facilitate the long-term management and protection of its resources. Part I of this report reviews the authority for Sanctuary designation, the goals of the National Marine Sanctuary Program, the development of this proposal, and the purpose of designating a national marine Sanctuary at Cordell Bank.

Part II, Section I, outlines Sanctuary management goals and objectives in resource protection, research, interpretation and visitor use. The area recommended for the proposed Sanctuary, about 397.05 square nautical miles, provides the habitat for a distinctive assortment of living marine resources. The surfaces of Cordell Bank are populated by an unusual combination of benthic organisms, including nearshore varieties as well as those normally found on offshore seamounts. Bank waters are inhabited by large numbers of rockfish and are used as a feeding ground by marine mammals and seabirds. The abundance of rockfish at Cordell Bank also supports a significant commercial and recreational fishery. The Cordell Bank environment, its living resources, and human activities in the area are described in Part II, Section II.

The plan for managing the proposed Sanctuary is provided in Part II, Section III. This plan contains guidelines to ensure that all management actions undertaken in the first five years after designation are directed to resolving important issues as a means of meeting Sanctuary objectives. Management actions are considered in three program categories: resource protection, research, and interpretation. Resource protection will involve cooperation with other agencies in formulating policies and procedures including the enforcement of regulations for visitor use. Research will include baseline studies, monitoring, and predictive studies to provide information needed in resolving management issues. Interpretation programs will be directed to improving public awareness of the Sanctuary's resources and the need to use them wisely to ensure their viability.

Existing regulatory authorities in the proposed Sanctuary (Appendix II) will be unaffected by Sanctuary designation. In addition to regulation by these authorities, however, the management plan calls for the promulgation of two new regulations when the Sanctuary is designated. One of these regulations will prohibit the discharge into the Sanctuary of oil and other materials that may be harmful to Sanctuary resources, except as specifically permitted for research, educational, salvage or Sanctuary management purposes. The other regulation will prohibit removing, taking, or injuring or attempting to take, remove or injure benthic organisms, except as specifically permitted for research, educational, salvage, or Sanctuary management purposes. Three other activities are potentially subject to regulations; hydrocarbon activities,

anchoring on Cordell Bank, or within the 50 fathom contour surrounding the Bank and taking, removing, or injuring or attempting to take, remove or injure cultural or historical resources.

The administrative framework for managing the proposed Sanctuary (Part II, Section IV) recognizes the need for cooperation and coordination among all participants in Sanctuary management and delineates the roles of the National Oceanic and Atmospheric Administration's Marine and Estuarine Management Division, the National Park Service, the U.S. Coast Guard, and the Sanctuary Manager and staff in resource protection, research, interpretation, and general administration.

Alternatives in developing the proposal to designate a national marine Sanctuary at Cordell Bank were considered in terms of achieving optimum protection for the ecosystem, improving scientific knowledge of the area, and promoting public understanding of the value of Bank resources (Part III). Based on these criteria, Sanctuary designation was preferred to the alternative of no action, and preferred boundary, management, and regulatory alternatives were selected. The environmental consequences of each of these alternatives are described in Part IV.

The emergence of new issues and other unforeseeable factors may affect specific aspects of Sanctuary management as described in this plan. However, the overall goals, management objectives and general guidelines will continue to be relevant. Throughout the first five years after designation, the aim is to carefully adjust the plan to changing circumstances in light of the experience gained in actual management.

PART I: INTRODUCTION

A. Authority for Designation

Title III of the Marine Protection, Research and Sanctuaries Act of 1972, 16 U.S.C. 1431 et seq., as amended (MPRSA), authorizes the Secretary of Commerce to designate discrete marine areas of special national significance as National Marine Sanctuaries to promote comprehensive management of their conservation, recreational, ecological, historical, research, educational, or esthetic values. National Marine Sanctuaries may be designated in those areas of coastal and ocean waters, the Great Lakes and their connecting waters, and submerged lands over which the United States exercises jurisdiction, consistent with international law. National Marine Sanctuaries are built around the existence of distinctive natural and cultural resources whose protection and beneficial use requires comprehensive planning and management. The National Oceanic and Atmospheric Administration (NOAA) manages the program through the Marine and Estuarine Management Division (MEMD) in the Office of Ocean and Coastal Resource Management.

B. Goals of the National Marine Sanctuary Program

Consistent with the mission of developing a system of National Marine Sanctuaries for the purpose of serving the long-term benefit and enjoyment of the public, the following goals were established for the Program:

1. Enhance resource protection, through comprehensive and coordinated conservation and management tailored to the specific resources, that complements existing regulatory authorities;
2. Support, promote and coordinate scientific research on, and monitoring of, the site-specific marine resources to improve management decision-making in National Marine Sanctuaries;
3. Enhance public awareness, understanding, and wise use of the marine environment through public interpretive and recreational programs; and

4. Facilitate, to the extent compatible with the primary goal of resource protection, multiple use of these marine areas.

C. Terms of the Designation

Section 304(a)(4), 16 U.S.C. 1434(a)(4), of the MPRSA provides that as a condition for establishing a National Marine Sanctuary, the Secretary of Commerce must set forth the terms of the designation. The terms must include: (a) the geographic area included within the Sanctuary; (b) the characteristics of the area that give it conservation, recreational, ecological, historical, research, educational or esthetic value; and (c) the types of activities that will be subject to regulation in order to protect those characteristics. The terms of the designation may be modified only by the same procedures through which the original designation was made.

D. Status of the National Marine Sanctuary Program

Seven National Marine Sanctuaries have been established since the Program's inception in 1972 (Figure 1):

- ° The Monitor National Marine Sanctuary serves to protect the wreck of the Civil War ironclad, U.S.S. MONITOR. It was designated in January 1975 and is an area one mile in diameter, 16 miles southeast of Cape Hatteras, North Carolina.
- ° The Key Largo National Marine Sanctuary, designated in December 1975, provides protection and management of a 100 square mile coral reef area south of Miami, Florida.
- ° The Channel Islands National Marine Sanctuary, designated in September 1980, consists of an area of approximately 1,252 square nautical miles off the coast of California adjacent to the northern Channel Islands and Santa Barbara Island. The sanctuary ensures that valuable habitats for marine mammals, including extensive pinniped assemblages and seabirds, are protected.
- ° The Looe Key National Marine Sanctuary, designated in January 1981, consists of a submerged section of the Florida reef southwest of Big Pine Key. The site, five square nautical miles in size, includes a beautiful "spur and groove" coral formation supporting a diverse marine community and a wide variety of human uses.

Figure 1

National Marine Sanctuary Program



- ° The Gray's Reef National Marine Sanctuary, designated in January 1981, is a submerged live bottom area located on the South Atlantic continental shelf due east of Sapelo Island, Georgia. The sanctuary, which encompasses about 17 square nautical miles protects a highly productive and unusual habitat for a wide variety of species including corals, tropical fish, and sea turtles.
- ° The Point Reyes-Farallon Islands National Marine Sanctuary, designated in January 1981, is a 948 square nautical mile area off the California coast north of San Francisco. It provides a habitat for a diverse array of marine mammals and birds as well as pelagic fish, plants, and benthic biota.
- ° The Fagatele Bay National Marine Sanctuary in American Samoa was designated in August 1986. The 163-acre bay contains deepwater coral terrace formations that are unique to the high islands of the tropical Pacific. It serves as habitat for a diverse array of marine flora and fauna included the endangered hawksbill turtle and the threatened green sea turtle.

E. History of the Proposal

In July 1981, NOAA received a recommendation to establish Cordell Bank as a National Marine Sanctuary from Cordell Bank Expeditions, a non-profit association dedicated to the exploration and description of the Bank. NOAA evaluated the recommendation in accordance with the requirements of the National Marine Sanctuary Program regulations (15 CFR 922). Cordell Bank was found eligible for inclusion on the List of Recommended Areas (LRA), and NOAA announced its placement on the LRA on August 31, 1981 (46 FR 43731).

More complete information on the site was collected by NOAA and incorporated into a resource summary and site description. The summary was distributed in July 1982. At that time, additional information and public comment relating to the site and its potential for designation as a sanctuary were requested. The request was sent to state and local government agencies, academic institutions, industry representatives, conservation groups and other interested parties. Meanwhile, NOAA conducted preliminary consultations with other Federal agencies to assess their views about the proposal. In general,

the comments received in response to these actions were favorable to proceeding with the evaluation of the site as an active candidate for sanctuary designation.

Concurrently with the evaluation of Cordell Bank for active candidate selection, NOAA was revising its procedures for selecting and designating Sanctuary candidates. Revised regulations (48 FR 24297 (1983)) replaced the LRA with the Site Evaluation List (SEL) and established new criteria for placement on the SEL. Cordell Bank was evaluated in terms of both the old and the new criteria for Sanctuary candidacy and was named an active candidate in the Federal Register on June 30, 1983 (48 FR 30178).

On April 25, 1984, NOAA sponsored a public scoping meeting at the California Academy of Sciences in San Francisco to solicit public comment on the scope and significance of issues involved in designating a Cordell Bank Sanctuary. Those attending the meeting were asked to comment on readily identifiable issues, to suggest additional issues for examination, and to provide information useful in evaluating the site's potential as a Sanctuary. Again the response was generally favorable to proceeding with the evaluation.

The Amendments to the National Marine Sanctuaries Program (P.L. 100-627), which became law on November 7, 1988, require the Secretary of Commerce to issue a Notice of Designation with respect to Cordell Bank National Marine Sanctuary by December 31, 1988. In view of a delay in issuing the Notice of Designation, and in adherence with the intent of Section 202 of P.L. 100-627, a notice was published on December 30, 1988 in the Federal Register (53 FR 53049) that issued findings regarding why the Secretary of Commerce was unable to issue the notice of Designation for Cordell Bank National Marine Sanctuary on or before December 31, 1988. The notice stated that a Notice of

Designation for the Cordell Bank National Marine Sanctuary will be issued by March 31, 1989.

Congress pursuant to Section 304(b) of the Act then has the opportunity to review the designation and regulations before they take effect. The designation and regulations shall take effect and become final after the close of a review period of forty-five days of continuous session of Congress beginning on the day on which the Sanctuary Designation Document is published unless the designation or any of its terms is disapproved by Congress through enactment of a joint resolution.

Because of the complexity of the issues in the DEIS/MP, a large number of comments were received which supported diverse views on what should and should not be regulated. More time was required to respond to all of the comments and to determine an appropriate balance with regard to regulations than was anticipated. Further, when the Congressionally mandated deadline of December 31, 1988 for issuing a Designation Document became law on November 7, 1988, there was not sufficient time available to meet the mandatory procedural provisions of both the National Environmental Policy Act and the Marine Protection, Research and Sanctuaries Act by that date.

F. Purpose and Need for Designation

Because of its position and the unusual characteristics of its marine environment, Cordell Bank supports an extraordinarily diverse and abundant community of marine life. The assortment of benthic organisms is exceptional due to its combination of nearshore and oceanic species, the distribution of organisms by depth-zone, and the presence of several previously undescribed species as well as species previously unknown in these waters or at these

depths. One of these is a species of hydrocoral, Allopora californica, which is abundant on the Bank.

Circulating in the water around and above Cordell Bank are large numbers of rockfish which attract marine mammals and seabirds. Fourteen species of marine mammals have been identified in nearby waters and seabirds of at least forty-seven species forage above the Bank. Four of these endangered species have been regularly sighted in the Sanctuary study area: (1) the humpback whale has been observed in fairly sizeable numbers while feeding in Bank waters; (2) the blue whale was sighted on nine separate, out of sixteen total, "whale-watching" trips to Cordell Bank, and on at least one occasion feeding behavior was observed; (3) the Brown pelican has frequently been seen feeding in the area; and (4) the short-tailed albatross has recently been sighted over the Bank. One of this albatross species was identified and photographed on two separate occasions during early November, 1985. It was located 22 miles south of Point Reyes directly over Cordell Bank (Point Reyes Bird Observatory, 1985). In addition, the Bank and its surrounding waters may contain cultural and historical resources of national significance.

Human activity in the Cordell Bank region consists largely of recreational and commercial fishing. Most fishing operations pose no threat to the Bank ecosystem, but commercial gill-net fishing, which became increasingly intensive in recent years, might have eventually posed a threat to the Cordell Bank rockfish stocks if it had continued. Presently, however, the use of gill-nets at Cordell Bank is prohibited by a California law that applies to fishing vessels operating beyond the territorial sea which either use California ports or are licensed in California. Because the gill-net fishing at Cordell Bank was largely from California-registered vessels based

in California ports, the law in effect prohibits gill-net operations in Bank waters.

Another possible threat to the ecosystem are discharges of oil or materials primarily from ships transiting the area. Other activities that might have an impact, although less serious, are (1) increased boat traffic for such purposes as viewing marine mammals and seabirds which could disturb these populations, and (2) unrestricted diving which might adversely affect the benthic community.

A number of Federal agencies now have regulatory responsibilities in the Cordell Bank area, but each of these agencies is concerned only with specific activities, rather than with the Bank environment as a whole. Designation of Cordell Bank as a National Marine Sanctuary can provide the long-term comprehensive planning and management needed to protect its habitats and ecosystem. Because many of the marine mammals and seabirds that visit Cordell Bank to feed in its waters are also dependent on habitats in the Point Reyes-Farallon Islands National Marine Sanctuary, designation would provide the means for better overall management and protection of these resources. Designation also would provide support for management-related research focused on the Bank's environment and for interpretive programs to inform the public of the area's importance and the need to use its resources wisely.

G. The Plan for Managing the Sanctuary

The remainder of this report consists of a final management plan and final environmental impact statement for the proposed Cordell Bank National Marine Sanctuary. The plan provides information on the resources and uses of the proposed Sanctuary, as well as Sanctuary goals and objectives. Programs (Resource Protection, Research, and Interpretation) for implementing the goals

and objectives are described. The plan proposes actions for resolving immediate management concerns and formulates guidelines for continuing long-term management.

PART II: SANCTUARY MANAGEMENT PLAN

Section I: A Management Plan for the Proposed Cordell Bank National Marine Sanctuary

A. Introduction

National Marine Sanctuaries are designated in marine environments selected for their conservation, recreational, ecological, historical, research, educational, or esthetic values. The Marine Protection, Research and Sanctuaries Act of 1972, as amended and its implementing regulations (15 CFR 922) require that a management plan be prepared for each proposed Sanctuary. Once the Sanctuary is designated, the plan will be implemented. In general, management plans focus on Sanctuary goals and objectives, management responsibilities, research and interpretation programs, and policies to guide plan implementation.

The plan establishes an administrative framework in recognition of the need for cooperation and coordination to ensure effective management. The Marine and Estuarine Management Division (MEMD), National Oceanic and Atmospheric Administration (NOAA), is responsible for management of the site.

Variable funding for staff and program development over the next five years may affect specific aspects of Sanctuary management described in this plan. Modifications to the scope and scale of the programs may have to be made because of such unforeseeable changes in the level of funding. The goals and objectives of the plan will, however, remain unchanged.

B. Sanctuary Goals and Objectives

Sanctuary goals and objectives provide the framework for developing the management strategies. The goals and objectives direct Sanctuary activities towards the dual purposes of public use and resource conservation and are

consistent with the intent of the national program.

The management strategies planned for the proposed Cordell Bank National Marine Sanctuary (CBNMS) are directed to the goals and objectives outlined below. It should be noted that, although the Sanctuary goals are listed discreetly, they are actually overlapping. For instance, the research and interpretive efforts both contribute to resource protection and to enhancing public use of the Sanctuary.

1. Resource Protection

The goal assigned the highest priority for management is to protect the marine environment and resources of the CBNMS. The specific objectives of resource protection efforts are to:

- ° Establish cooperative agreements and other mechanisms for coordination among all the agencies participating in Sanctuary management;
- ° Develop an effective and coordinated program for the enforcement of Sanctuary regulations;
- ° Promote public awareness of and voluntary user compliance with regulations through an interpretive program stressing resource sensitivity and wise use; and
- ° Reduce threats to Sanctuary resources raised by major emergencies through contingency and emergency-response planning.

2. Research

The goal of Sanctuary research activities is to improve understanding of the Cordell Bank environment and resources and to resolve specific management problems, some of which may involve resources common to both Cordell Bank and the nearby Point Reyes-Farallon Islands National Marine Sanctuary (PRNMS).

(The current name of the Point Reyes-Farallon Islands National Marine Sanctuary is the Gulf of the Farallones National Marine Sanctuary. However, at the time of writing of the DEIS/MP for Cordell Bank National Marine Sanctuary the old name was still in use. To be consistent, during the

designation process for Cordell Bank, the old name of Point Reyes-Farallon Islands National Marine Sanctuary will be used). Research results will be used in interpretive programs for visitors and others interested in the Sanctuary, as well as for resource protection. Specific objectives of the research program are to:

- ° Establish a framework and procedures for administering research to ensure that research projects are responsive to management concerns and that results contribute to improved management of the Sanctuary;
- ° Gather baseline data on the physical, chemical and biological oceanography of the Sanctuary;
- ° Initiate a monitoring program to assess environmental changes as they occur;
- ° Identify the range of effects on the environment that would result from predicted changes in human activity;
- ° Incorporate research results into the interpretive program in a format useful for the general public; and
- ° Encourage information exchange among all the organizations and agencies undertaking management-related research in the Sanctuary to promote more informed management.

3. Interpretation

Interpretive programs should be directed to improving public awareness and understanding of the significance of the Sanctuary and the need to protect its resources. The management objectives designed to meet this goal are to:

- ° Provide the public with information on the Sanctuary, its goals and objectives, with an emphasis on the need to use these resources wisely to ensure their long-term viability;
- ° Broaden support for the Sanctuary and Sanctuary management by offering programs suited to visitors with a range of diverse interests;
- ° Provide for public involvement by encouraging feedback on the effectiveness of interpretive programs;
- ° Collaborate with other organizations to provide interpretive services, including extension and outreach programs and other volunteer projects, complementary to the Sanctuary program.

4. Visitor Use

The Sanctuary goal for visitor management is to encourage commercial and recreational use of the Sanctuary compatible with the primary goal of resource protection. Specific management objectives are to:

- ° Provide relevant information about Sanctuary regulations and use policies;
- ° Collaborate with public and private organizations in promoting compatible use of the Sanctuary by exchanging information concerning the commercial and recreational potential of the Sanctuary; and
- ° Monitor and assess the levels of use to identify and control potential degradation of resources and minimize potential user conflicts.

Section II: The Sanctuary Setting

The most important factors to be considered in developing a management plan for the proposed CENMS are its location; its physical characteristics, environmental conditions, and biological resources; its uses; and the roles of the agencies with management responsibilities in the area. These factors will be summarized below to provide the background needed for understanding the plan.

A. The Regional Context

1. Sanctuary Location

Cordell Bank is located on the edge of the continental shelf, 20 miles due west of Point Reyes, California, or about 50 miles northwest of San Francisco (Figure 2). The center of the Bank is near 38°01' north latitude, 123°25' west longitude. The Bank itself is roughly elliptical, and within the 50 fathom (91 meter (m)) depth contour, it is 9.5 miles long and 4.5 miles wide and rests on a sea floor area of 18.14 square nautical miles. The preferred boundaries for the proposed Sanctuary would encompass the Bank and a large buffer zone in a protected area of 397.05 square nautical miles (See Figure 2).

Cordell Bank is the northernmost seamount on the California continental shelf. The continental shelf between the Bank and the headland at Point Reyes has an average depth of 60 fathoms (110 m). To the west the bottom falls quickly down the continental slope to the abyssal plain a few miles away. To the north there is no offshore area with physical features similar to Cordell Bank. Southeast of the Bank lie Fanny Shoal, Noonday Rock and the Farallon Islands, all of which are within the boundary of the PRNMS.

Regional Context

--- Proposed Boundary #1
Cordell Bank National
Marine Sanctuary

— Point Reyes-Farallon
Islands National
Marine Sanctuary

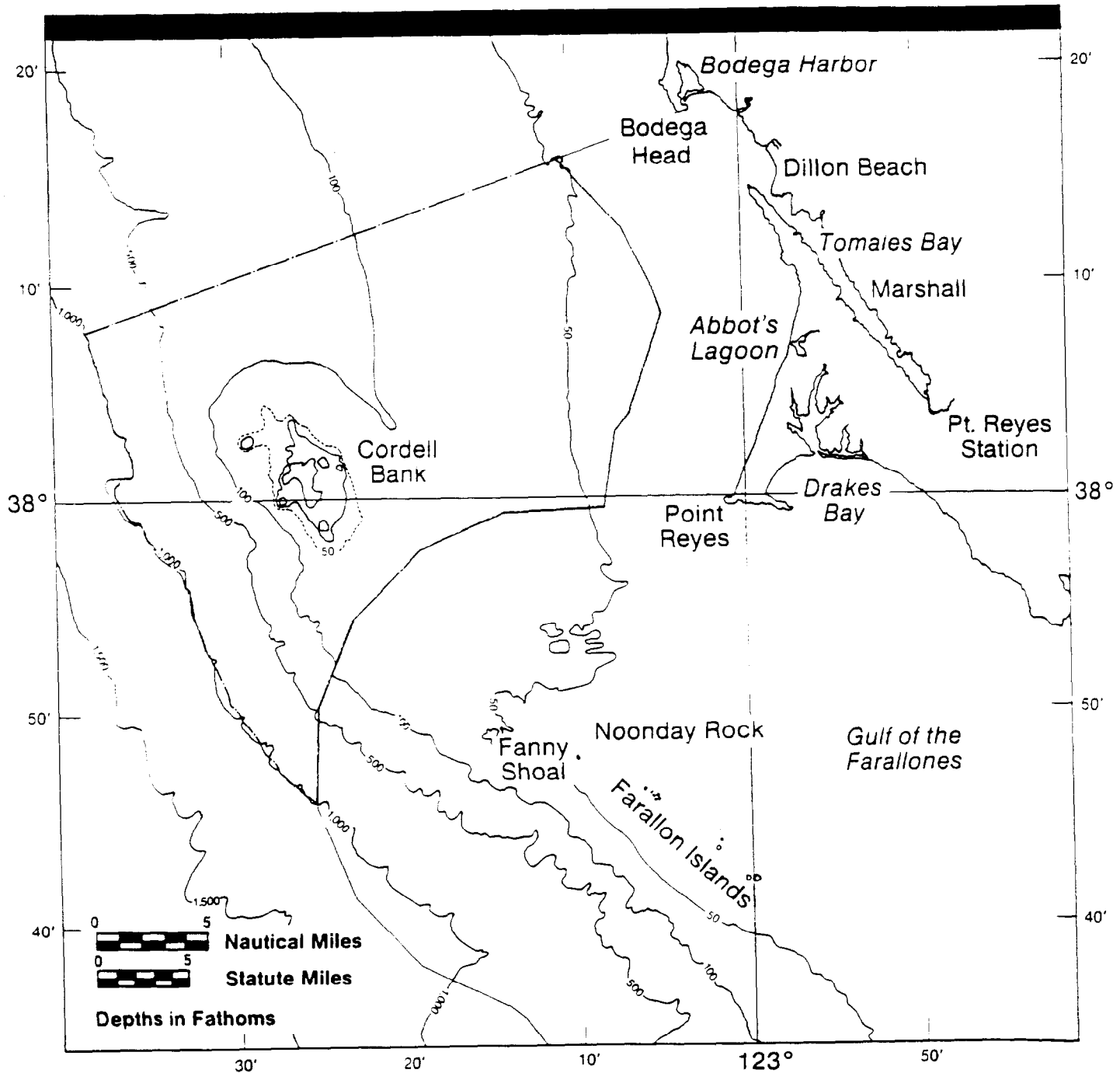


Figure 2

Source: National Ocean Service Nautical Chart 18640.

2. Regional Access

The proposed CBNMS is separated from the coast of Marin County by the northern arm of the PRNMS. Just to the north, in Sonoma County, is the Bodega Bay area. To the southeast is the major San Francisco-Oakland metropolitan area with a population of some five million people. San Francisco City and County function as the administrative center of the Bay area, providing headquarters for many financial, transportation, manufacturing, and government establishments. San Francisco also acts as the region's focal point for many trade and service activities and has extensive port facilities.

The largest coastal settlement in the area of the proposed CBNMS is Bodega Harbor. There are several smaller communities in the vicinity, including Dillon Beach, Marshall, Inverness, and the village of Point Reyes Station. Bodega Bay provides the base for most of the commercial and recreational fishing on this part of the coast, but commercial fishermen also operate out of Tomales Bay and from more northerly coastal points. Drakes Bay at Point Reyes, 20 miles east of the Bank, is the closest harbor.

B. Sanctuary Resources

Cordell Bank is characterized by a combination of oceanic conditions and undersea topography that provides for a highly productive environment in a discrete, well-defined area (Schmieder, 1982a). The highest elevation on the Bank is 115 feet (35 m) below the sea surface, yet only a few miles away there are water depths of 6,000 feet (1830 m). The prevailing California Current flows southward along the coast while the upwelling of nutrient-rich, deep-ocean waters stimulate the growth of planktonic organisms. These nutrients, combined with high light penetration in Bank waters and the wide

depth ranges in the vicinity, have led to a unique association of subtidal and oceanic species. The food web includes various algae and numerous types of invertebrates, fish, marine mammals and seabirds.

1. Environmental Conditions

(a) Geology

Over the last 60 million years, a single monolith, called the Salinian Block, was detached from the mainland and carried several hundred kilometers to the northwest by the Pacific Plate. The San Andreas Fault is the eastern boundary of this block. Along its western edge, the block outcrops near Salinas, at the Farallones and at several other places. Cordell Bank is its northernmost offshore outcrop. The Salinian block is still moving north at a rate of a few centimeters per year, carrying the Bank with it (Schneider, 1982a).

In recent geologic times the Cordell Bank formation projected well above sea level. During several periods of glaciation over the past million years, enough water was locked up in glaciers to lower the sea level sufficiently for the Bank to have been exposed as an island. The record of these transitions may be found in the fossils of intertidal organisms. The most recent period of sea level reduction was the late Wisconsin, with the lowest sea level, more than 55 fathoms (100 m) below the present level, occurring about 15,000 years ago (Schneider, 1982a).

The few rock samples collected thus far at Cordell Bank are granodiorite (Schneider, 1985c). These samples show very close affinities with other granitic rocks of the northern Salinian sub-block. The overall topography is roughly flat or gently sloping at depths of 175 to 210 feet (54 to 64 m), however, the jagged ridges and pinnacles rising abruptly from this plain reach

up to between 140 and 115 feet (42 to 35 m) below the sea surface. In many places the sides of the ridges and pinnacles are extremely steep, often with slopes greater than 80° (Schmieder, 1984a).

The ocean bottom around the Bank and within the Sanctuary contains few distinguishing features and is chiefly comprised of mud and sand deposits (NOAA, 1987). In a plume to the south, and a fan to the east, of Cordell Bank there extends deposits of undifferentiated mud and sand. To the north and western boundary, along the Farallon escarpment, the continental shelf is entirely made up of fine sand deposits. The complexity of the underwater topography and sediment distribution increases near the coast within the Point Reyes-Farallon Islands National Marine Sanctuary.

(b) Meteorology

Meteorological conditions at Cordell Bank are broadly predictable in accordance with annual weather cycles, although there are sudden local changes that are difficult to forecast. The calmest period is between late September and mid-December. At that time, wind-speed is normally below ten knots, usually rising in the afternoon and becoming calm again after sunset. Local fog banks may form within 15 minutes, reducing visibility to almost zero, and clear as rapidly as they form. Small rain storms can be seen as they approach. They normally pass within an hour, sometimes leaving very clear, calm conditions.

The storm season begins in December and lasts until late spring or early summer. During this season, dense fogs are common and storms appear out of the north every few days. However storms can also come from the west and winds from the south can reach speeds of 30 to 40 knots. The late summer months are characterized by generally calm weather, interrupted at times by

sudden, unpredictable storms (Schneider, 1982a).

(c) Waves and Currents

The sea state at Cordell Bank, driven by the predominant northwest winds, follows much the same cycle as the weather. From December until late spring the sea state is seldom calm. There are, however, numerous calm periods during the summer. In October and November, the sea surface may be a glassy calm. During this period the sea state is usually three or below on the Beaufort scale and has an exceedingly long wavelength, as much as several hundred feet, thus presenting excellent conditions for surface vessel operations (Schneider, 1982a).

In the spring and summer, the wind-driven California current flows southward off the California coast at speeds of one to three knots. The westward deflection of this current off northern and central California carries surface waters to the upper levels of Cordell Bank. As the surface water is driven southward by the winds and westward by the Coriolis effect, it is replaced by deep, nutrient-rich offshore waters moving shoreward and to the surface. Upwelling usually occurs year round but is most persistent during the Spring and Summer in central California.

In the fall, as the winds die down, the surface current is reduced and a deep north-flowing subsurface current, called the Davidson Current, rises to the surface, temporarily reversing the direction of the flow. The net result is that very confused currents can be expected during this period. The Davidson current phase normally lasts until mid-February, after which the California current returns and upwelling resumes.

The oceanic water borne by the California current is clean, cold, and exceptionally clear. Water temperatures at the surface are 52° to 56°F.

(11.1°C to 13.3°C) and about 5° (2.8°C) colder near the bottom. The clarity of the water is the result of low particulate loading which permits sunlight to penetrate to much greater depths than would be normal along the nearby California coast. Visibility on the upper reaches of the Bank is almost always greater than 65 feet (19.8 m) during the fall (Point Reyes Bird Observatory, personal communication, 1987). At times it can be greater than 100 feet (30.5 m) (Schmieder, 1978; 1985c). The light penetration, combined with the availability of nutrients transported by upwelling, provides the conditions essential to the existence of the richly diverse Cordell Bank ecosystem (Schmieder, 1985).

2. Natural Resources

(a) Bottom Organisms

Many species of benthic organisms and plankton exist on Cordell Bank (Table 1). The high light penetration in Cordell Bank waters provides an environment suitable for photosynthesis in algae. The bulk of the algal biomass consists of red algae which can be found in the dim light at the lower levels of the Bank, as well as on the higher elevations where other types of algae are also present.

The abundant food supply available in Cordell Bank waters together with a diverse and heterogeneous substrate supports a community of filter feeders and predators that, for its depth and isolation, is surprisingly rich and varied. Several varieties of plant and animal life that were previously unknown have been discovered at Cordell Bank. Others are rare forms or species never before observed at such depths or in waters so far north or south (Schmieder, 1985a).

**Table 1: List of Selected Algae, Sponges and Invertebrates
Identified on Cordell Bank**

Red Algae:

New Genus and species, Family: Delesseriaceae
 New Genus and species, Family: Corallinaceae^a
Fosliella sps^a
Erythrocladia membranaceum
Porphyra sps
Rhodochorton conrescens
Leptofauchea pacifica
Maripelta rotata

Green Algae

Derbesia marina
Entocladia viridis

Brown Algae

New Genus and species, Family: Ectocarpales^a
Pilayella tenella

Diatom

Entopyla cf. entopyla incurvata

Sponges

Acarnus erithacus.....Red Volcano Sponge
Leucandra heathi.....Heath's Sponge
Polymastia pachymastia.....Aggregated vase Sponge
Sphaciospongia confoederata.....Grey Moon Sponge
Toxadocia spp.....White-finger Sponge

Other Invertebrates

Allopora californica.....California hydrocoral
Epizoanthus scotinus.....Yellow anemone
Metridium senile.....White-tipped anemone
Telia piscivora.....Rose anemone
Balanophyllia elegans.....Orange cup coral
Eudistylia polymorpha.....Feather-duster worm
Lepidonotus squamatus.....Twelve-scaled worm
Serpula vermicularis.....Red tube or plume worm
Balanus rubilus.....Giant acorn barnacle
Megabalanus californicus.....Red-striped acorn barnacle
Pandalus danae.....Coon-striped shrimp
Loxorhynchus crispatus.....Decorator crab
Hemigrapsus nudus.....Purple shore crab
Megatebennus binaculatus.....two-spotted keyhole limpet
Crepidatella lingulata.....Half-slipper
Lamellaria diegoensis.....San Diego ear shell
Ocenebra atropurpurea.....Clathrate dwarf triton
Nassarius insculptus.....Smooth dog whelk
Mytilus californianus.....California mussel
Chlamys hastata.....Spear scallop
Chlamys sps. nov.....
Kellia laperousii.....Smooth Kelly clam
Tonicella lineata.....Lined chiton
Terebratulina unguicula.....Snake's-head lamp shell
Ophiothrix spiculata.....Spiny brittle star
Parastichopus californicus.....California Sea cucumber
Strongylocentrotus franciscanus.....Red sea urchin
Ascidia paratropa.....Glassy tunicate

Source: R.W. Schmeider, 1985a.

^aSilva, 1981, as cited in Schmieder, 1985.

One of the organisms inhabiting Cordell Bank surfaces is the purple hydrocoral, Allopora californica, found in large numbers, probably because of the high water quality and low collection pressure. Allopora thrives only in exceptionally clear, clean water. Residing among the tree-like branching colonies of Allopora are several species that are entirely dependent on it and can be found nowhere else. Among them are the pink snail, Pedicularia californica, the small barnacle, Armatobalanus nefrens, and the polychaete worm, Polydora alloporis. The snail resides on the hydrocoral branches. The barnacle and the worm are encased in the hydrocoral, although they maintain small openings through which they feed.

Allopora colonies also provide a favorable environment for algae, among them an undetermined genus of the brown algae, Ectocarpales, an undetermined genus of the red algae, Corallinaceae, and a newly discovered species of the red algae, Fosliella (Silva, 1981, as cited in Schmieder, 1985). Fosliella is normally found on plants or directly on the substrate. It has never before been observed living on an animal.

Other rare species on Cordell Bank surfaces include several previously undescribed sponge varieties and a scallop, Chlamys cf. C. hastata, with two patterns of microsculpture on its valves which may actually be two different subspecies (Roth, 1978, as cited by Schmieder, 1985). The shells of at least two previously undescribed snails were found in Bank sediments (McLean, 1985, as cited in Schmieder, 1985).

Some species at Cordell Bank are deep-water forms, but most are known from nearshore waters and some are even found in the intertidal zone. The occurrence of intertidal species in the deep water of Cordell Bank is surprising. Most of the flora and fauna live in densely packed masses near

the tops of the ridges and pinnacles. However, because the species living on the Bank do not have the same environmental requirements or tolerances, there is a marked variation from one depth to another in the distribution of organisms.

Bottom observations by divers of Cordell Bank Expeditions have provided considerable information on the distribution of biota at various depths. The following synopsis, drawn from Schmieder (1985), provides a generalized picture of habitat stratification, although specific sites may vary significantly.

At depths greater than 230 feet (70 m), most of the bottom is covered with coarse gravel sediment. This sediment is almost entirely calcareous. It is the sifted, ground-up remains of gastropod shells, bivalve valves, urchin tests, sponge spicules, foraminifera tests, coral skeletons, and miscellaneous pieces of arthropods, fish scales, otoliths, and worm tubes. Within this sediment lives a variety of animals, mostly very small arthropods, worms, and protozoa. Wandering around the sediment are brittle stars and a few scavengers such as crabs and urchins.

At 210-foot (64 m) depths, the rocks protruding from the sediment tend to be quite bare. The biota at these depths consist for the most part of red algae, solitary anemones, a few small sponges, and small, scattered colonies of Allopora hydrocoral. Between the 200-foot and the 165-foot levels (60 to 50 m), the size of the Allopora colonies increases and isolated anemones, sea cucumbers, sea stars, and sea urchins can be found.

Between 165 and 150-foot (45 to 50 m) depths, all horizontal surfaces are covered by a blanket of organisms four to six inches thick, consisting largely of sponges, a few urchins and great numbers of decorator crabs. Above

150 feet (45 m), high light levels and current-borne nutrients create an ideal habitat for a wide variety of benthic organisms. In this zone, competition for space may become a major population limiting factor. Ridge surfaces are thickly covered with an abundance of sponges, anemones, hydrocorals, hydroids, and tunicates, and scattered crabs, holothurians, and gastropods. In places the cover is a foot thick and very brightly colored, mainly in white, pink, yellows, and reds. The brilliant reds produced by the florescent strawberry anemones are especially striking. The highest elevation on the Bank is encrusted from 115 to 125 feet (38 to 35 m) by a dense cap of barnacles and red algae.

Although a few of the organisms found on Cordell Bank are rare, most of them are commonly found elsewhere. The particular combination of plants and animals on the Bank and their variation with depth is, however, found in few other places. It is the specific environment of rocky ridges and pinnacles, strong current, and exceptionally clear water that makes this special community possible (Schmieder, 1985).

(b) Fishes

Thirty eight varieties of fish have been identified in Cordell Bank waters by R.W. Schmieder as well as additional species (M. Eldredge, personal communication, 1987) (Table 2). By far the most abundant, however, are the rockfish. The fourteen varieties of rockfish, Sebastes, at Cordell Bank range in size from the small, brilliantly-colored, rosy rockfish, S. rosaceus, that reach a maximum length of fourteen inches, to the bocaccio, S. paucispinis, and the yellow-eye, S. ruberrimus, which may attain a length of three feet (Fitch, 1969).

Table 2: Partial List of Fishes Identified in Cordell Bank Waters

<u>Anoplopoma fimbria</u>	Sablefish
<u>Artedius corallinus</u>	Coralline sculpin
<u>A. meayvi</u>	Puget sound sculpin
<u>Caulolatilus princeps</u>	Ocean whitefish
<u>Chirolopsis nugator</u>	Mosshead warbonnet
<u>Citharichthys sordidus</u>	Pacific sand dab
<u>Cololabis saira</u>	Pacific saury
<u>Engraulis mordax</u>	Northern anchovy
<u>Eopsetta jordani</u>	Petrale sole
<u>Hemilepidotus spinosus</u>	Brown Irish lord
<u>Hexagrammos decagrammus</u>	Kelp greenling
<u>Hydrolagus colliei</u>	Ratfish
<u>Isurus oxyrinchus</u>	Mako shark
<u>Lepidopsetta bilineata</u>	Rock sole ^b
<u>Mola mola</u>	Common Mola, ocean sunfish
<u>Onchorhynchus tshawytscha</u>	King salmon
<u>Ophiodon elongatus</u>	Lingcod
<u>Oxylebius pictus</u>	Painted greenling
<u>Paralabrax clathratus</u>	Kelp bass ^a
<u>Prionace glauca</u>	Blue shark
<u>Psettichthys melanostictus</u>	sand sole
<u>Scomber japonicus</u>	Pacific mackerel
<u>Sebastes constellatus</u>	Starry rockfish
<u>S. entomelas</u>	Widow rockfish
<u>S. flavidus</u>	Yellowtail rockfish
<u>S. levis</u>	Cowcod rockfish
<u>S. maliger</u>	Quillback rockfish
<u>S. melanops</u>	Black rockfish
<u>S. miniatus</u>	Vermilion rockfish
<u>S. mystinus</u>	Blue rockfish
<u>S. ovalis</u>	Speckled rockfish
<u>S. paucispinis</u>	Bocaccio
<u>S. pinniger</u>	Canary rockfish
<u>S. rosaceus</u>	Rosy rockfish
<u>S. ruberrimus</u>	Yelloweye rockfish
<u>S. serranoides</u>	Olive rockfish
<u>S. rosenblatti</u>	Greenspot rockfish ^b
<u>S. chlorostictus</u>	Greenstripe rockfish ^b
<u>S. goodei</u>	Chilipepper rockfish ^b
<u>Squalus acanthias</u>	Spiny dogfish ^b
<u>Thunnus alalunga</u>	Albacore tuna
<u>Torpedo californica</u>	Pacific electric ray
<u>Trachurus symmetricus</u>	Jack mackerel
<u>Xeneretmus triacanthus</u>	Bluespotted poacher

Source: R.W. Schneider, 1985a.

^aB. Tasto, 1988. Personal communication, CDFG, Menlo Park.

^bM. Eldridge, 1987. Personal communication, NMFS, Tiburon.

Rockfish of diverse colors and sizes are found at all depths around the Bank. Yellowtail rockfish, S. flavidus, congregate in large aggregations above the pinnacles and may be seen at lower depths intermixed with other varieties. At these lower levels the blue rockfish and several red varieties are especially colorful as they swim around the ridges and slopes. A few, however, are less readily visible. The yelloweye and rosy rockfishes, the starry rockfish, S. constellatus, and the quillback, S. maliger, spend much of their time concealed in Bank caves and crevices.

(c) Marine Mammals

Fourteen species of marine mammals are known to frequent the waters of Cordell Bank. Gray whales pass through the region east of the Bank on their annual migrations to and from their breeding grounds in the Gulf of California. Other mammals frequent the Bank either as transients or as year-around residents of central California offshore waters.

In September and October, 1981, and again during the same two months in 1982, observers from the California Marine Mammal Center and San Francisco State University recorded marine mammal sightings on 16 boat trips to Cordell Bank (Webber and Cooper, 1983). Four of these trips were made in 1981 and twelve in 1982. Thirteen species of marine mammals, all but the gray whale, were identified in 267 sightings made in the two years. Eight of the thirteen species were cetacean and five were pinniped (Table 3). Ten of these thirteen species were observed in waters directly over the Bank.

Table 3: Marine Mammals Observed on Cordell Bank

Cetacean Observations in Cordell Bank Vicinity

<u>Species</u>	<u>No. of Sightings</u>	<u>No. of Individuals</u>
Dall's Porpoise	69	450 (est.)
Humpback Whale	68	145
Blue Whale	9	14
Harbor Porpoise	8	83
Risso's Dolphin	3	100 (est.)
Pacific White-sided Dolphin	1	150-200 (est.)
Northern Right Whale Dolphin	1	7
Killer Whale	1	5

Pinniped Observation in Cordell Bank Vicinity

<u>Species</u>	<u>No. of Sightings</u>	<u>No. of Individuals</u>
California Sea Lion	47	400 (est.)*
Northern Fur Seal	24	25**
Steller Sea Lion	23	37
Northern Elephant Seal	7	7
Harbor Seal	6	6

Source: Webber and Cooper, 1983.

*It should be noted that a disproportionate number of these animals were sighted during the twelve 1982 cruises. Only 15 were sighted during the four 1981 cruises.

**As with the California sea lion, a disproportionate number of northern fur seals were sighted in 1982. Only two were observed during the 1981 cruises.

Among the cetaceans, Dall's porpoise was the most numerous and the most frequently sighted. The second most frequently seen cetacean was the humpback whale, an endangered species. Another endangered species, the blue whale, was sighted in substantial numbers. Both humpback and blue whales were observed directly over the Bank as well as in nearby waters. Individuals of both species exhibited feeding behavior (Webber and Cooper, 1983). Studies conducted by the University of California at Santa Cruz (Dohl, et al., 1982) suggest that a significant portion of the eastern Pacific humpback whale population may feed during the summer months along the central and northern California coast north of the Farallon Islands and west of Point Reyes (i.e., the Cordell Bank area).

The harbor porpoise, a species that is widely distributed in coastal waters, but rarely seen in California waters seaward of the 300 foot (90 m) isobath, was observed eight times during the Webber and Cooper surveys; four of these sightings were beyond the 300 foot isobath. Two of the sightings were of groups of some 30 animals; harbor porpoises are seldom seen in groups of more than ten. Three of the harbor porpoise sightings, including the two large groups, were directly over the Bank. Other cetaceans observed over the Bank were Risso's dolphins and killer whales. Pacific white-sided dolphins and northern right whale dolphins were sighted to the northwest of the bank.

The California sea lion, the most abundant of the pinnipeds in California coastal waters, was, as might be expected, observed more frequently and in greater numbers than other pinnipeds during the survey. They were usually sighted singly or in pairs, but the largest group observed consisted of 40 or 50 individuals travelling in association with Pacific white-sided dolphins (Webber and Cooper, 1983).

In late fall and winter, the northern fur seal is the most abundant pinniped in outer continental shelf waters off northern and central California. Most of these animals use summer breeding grounds in the Bering Sea and migrate to California waters in the fall, returning north in the spring. However, a small breeding group on San Miguel Island in the Channel Islands probably spends the entire year in California waters. The northern fur seals observed in the vicinity of Cordell Bank in September and October of 1981 and 1982 were probably all from the San Miguel Island breeding group as it was too early in the season for the Bering Sea population to have arrived (Webber and Cooper, 1983).

Steller sea lion populations in the Farallon Islands and Channel Islands have decreased drastically in recent years for reasons that are not well understood. A decline in prey availability may be one of several factors contributing to the decrease of these animals. Apparently, however, Cordell Bank remains an attractive feeding ground for them, possibly because of the abundance of rockfish found there. Slightly over sixty percent of the Steller sea lions sighted in the 1981-1982 marine mammal survey were directly over the Bank (Webber and Cooper, 1983).

The other two pinnipeds sighted in the vicinity of Cordell Bank were the northern elephant seal and the harbor seal. Although northern elephant seals are rarely encountered at sea, five adult males and two sub-adults were sighted. All of the adult males were seen directly over the Bank and all five were resting or sleeping. As these animals are believed to feed at night, they might be expected to sleep during daylight hours. Their presence over the Bank might be explained by the fact that rockfish is a part of their diet. Harbor seals, a coastal species, were only observed shoreward of the 300 foot

(90 m) isobath during the 1981-1982 survey (Webber and Cooper, 1983). In another study, however, a harbor seal was sighted just north of the Bank (Dohl et al., 1982).

(d) Seabirds

The waters of Cordell Bank provide a rich feeding ground for a diverse multitude of seabirds. During the winter, spring, and summer, seabird density over Cordell bank is among the highest for central California waters (Dohl, et al., 1982). Density declines somewhat in autumn, but remains relatively high.

Regular trips to observe seabirds at Cordell Bank have been made for many years by personnel from the Point Reyes Bird Observatory and by other individuals (Parmeter, 1985). Forty-seven seabird varieties (Table 4) have been identified foraging near Cordell Bank. Some of these species, however, are represented by only a few individuals, often transients. Most of the birds belong to species that breed along the central California coast or on the nearby Farallon Islands (Table 4, note). These birds commonly forage in continental shelf waters between Bodega Bay and Point Ano Nuevo.

The predominant species in these waters are common murre, Cassin's auklets, pigeon guillemots, western gulls, and cormorants (Briggs, et al., 1985). Great numbers of shearwaters forage in these waters during the summer and fall and red phalaropes appear abundantly in the fall along the continental slope and in areas of upwelling. Brown pelicans also frequent the area in summer and fall. Webber and Cooper reported sighting brown pelicans on eight of twelve expeditions to Cordell Bank in September and October, 1981 to 1982 (Webber and Cooper, 1983).

For most of these birds, Cordell Bank's attraction as a feeding ground is the result of its plentiful population of rockfish. In studies of seabirds in

Table 4: Seabirds Observed on Cordell Bank

<u>Brachyramphus marmoratus</u>	Marbled murrelet
<u>Branta bernicla</u>	Brandt
<u>Catharacta skua</u>	South polar skua
<u>Cerorhinca monocerata</u>	Rhinoceros auklet
<u>Cephus columba</u>	Pigeon gilliebot*
<u>Diomedea nigripes</u>	Black-footed albatross
<u>Endomychura hypoleuca</u>	Xantus' murrelet
<u>Fulmarus glacialis</u>	Northern fulmar
<u>Gavia arctica</u>	Arctic loon
<u>G. immer</u>	Common loon
<u>G. stellata</u>	Red-throated loon
<u>Larus argentatus</u>	Herring gull
<u>L. californicus</u>	California gull
<u>L. canus</u>	Mew gull
<u>L. heermanni</u>	Heermann's gull
<u>L. hyperboreus</u>	Glaucus gull
<u>L. occidentalis</u>	Western gull*
<u>L. philadelphia</u>	Bonaparte's gull
<u>L. thayeri</u>	Thayer's gull
<u>Phalaropus lobatus</u>	Red Necked phalarope
<u>P. fulicaria</u>	Red phalarope
<u>Fratercula cirrhata</u>	Tufted puffin*
<u>Oceanodroma homochroa</u>	Ashey storm petrel*
<u>O. furcata</u>	Fork-tailed storm petrel
<u>O. leucorhoa</u>	Leach's storm petrel*
<u>O. melania</u>	Black storm petrel
<u>Pelecanus occidentalis</u>	Brown pelican
<u>Phalacrocorax auritus</u>	Double-crested cormorant*
<u>P. pelagicus</u>	Pelagic cormorant*
<u>P. penicillatus</u>	Brandt's cormorant*
<u>Ptychoramphus aleuticus</u>	Cassin's auklet*
<u>Puffinus carneipes</u>	Flesh-footed shearwater
<u>P. bulleri</u>	Buller's shearwater
<u>P. creatopus</u>	Pink-footed shearwater
<u>P. griseus</u>	Sooty shearwater
<u>P. puffinus</u>	Manx shearwater
<u>P. tenuirostris</u>	Short-tailed shearwater
<u>Rissa tridactyla</u>	Black-legged kittiwake
<u>Stercorarius parasitus</u>	Parasitic jaeger
<u>S. pomarinus</u>	Pomarine jaeger
<u>Sterna forsteri</u>	Forster's tern
<u>S. hirundo</u>	Common tern
<u>S. paradisaea</u>	Arctic tern
<u>Synthliboramphus antiquus</u>	Ancient murrelet
<u>Uria aalge</u>	Common murre*
<u>Xema sabini</u>	Sabine's gull

* Species that breed on the Farallon Islands

Source: R.W. Schneider, 1985a and PRBO, 1987, Personal communication.

the Gulf of Farallones, it was found that, unless unusually warm sea temperatures reduced their abundance, juvenile rockfish were clearly the major constituent in the diet of all species except Cassin's auklet (Briggs, et al., 1985, Appendix II). Further, in years when juvenile rockfish are exceptionally abundant during the summer months, seabird breeding success is also exceptional. Even Cassin's auklets, essentially plankton feeders, depend on rockfish populations in the area of the Farallon Islands. Rockfish larvae are the third most important item in the diet of Cassin's auklets found in the area (Briggs, et al., 1985).

Because of their feeding habits, Cassin's auklets are particularly drawn to areas of upwelling such as Cordell Bank, where foraging flocks of several hundred have been observed. Although Cassin's auklets do not participate significantly in feeding flocks consisting of mixed species, they have been recorded at Cordell Bank in apparent association with phalaropes and humpback whales, both plankton feeders (Briggs, et al., 1985; Webber and Cooper, 1983).

3. Historical and Cultural Resources

Cordell Bank may have been exposed as an island during the late Pleistocene epoch, but there is little likelihood of human habitation there at that time. The earliest evidence of human occupation in California coastal counties dates from about 5,000 years ago (MMS, 1982), at which time Cordell Bank had long ceased to be an island. However, even if humans did reach the Bank while it was exposed, erosion during its submergence would have destroyed any archeological evidence of their occupancy (Watt, 1984).

Despite the fact that many shipwrecks are found along the coast of California there is presently no evidence of any historical or cultural resources within the proposed Sanctuary.

C. Human Activities

1. Fishing

The most important human activity at Cordell Bank is commercial and recreational fishing. Fishing in Bank waters is regulated by the groundfish and salmon Fishery Management Plans (FMP's) prepared by the Pacific Fishery Management Council and approved by the National Marine Fisheries Service (NMFS), in accordance with the Magnuson Fishery Conservation and Management Act (See Appendix 2).

Commercial fishing-gear restrictions in present and past FMP's have included the prohibition of gill-net fishing above the 38th parallel, the northern part of the Bank. Below the 38th parallel, however, gill-net fishing was permitted until July 30, 1985, when a new California law banned it in that area as well.

Sport-fishing data collected by the California Department of Fish and Game (CF&G) (Table 5) indicate that after rockfish, the most important fish stocks at Cordell Bank are lingcod, jack mackerel, and king salmon. However, numbers of rockfish heavily dominate the size of the recreational catch, reflecting its great value to the local fishermen. Of the non-rockfish varieties lingcod was taken the most frequently. Yet, the catch of lingcod represented only 2.1% of the total from 1970 through 1981. Lingcod have been reported to weigh as much as 105 pounds but the maximum size normally caught is about four feet long and weighs fifty pounds. From late fall to early winter, the spawning period, the male guards the eggs in rocky crevices until they spawn, but otherwise lingcod are found at all depths in waters around Cordell Bank (Fitch, 1969).

Jack mackerel are pelagic, schooling fish, often found near the surface

in the vicinity of offshore reefs or banks, including Cordell Bank. Although their maximum size and weight have been reported to be 32 inches and five pounds, they are only 14 inches long at three years of age (Fitch, 1969). Jack mackerel, like the rockfish, are known to be eaten by seals and sea lions, several of the porpoises, and by some rockfish varieties.

Approximately one-eighth of one percent of the sport-fishing catch at Cordell Bank during the ten-year period consisted of king salmon. Various types of small fish, including rockfish, are part of the diet of mature king salmon; the salmon may possibly be drawn to Cordell Bank by its abundance of rockfish. Although king salmon have been recorded at weights of well above a hundred pounds, the average ocean-caught fish weighs between 10 and 15 pounds (Fitch, 1969).

Recreational fishing at Cordell Bank is done from fishing excursion boats, based largely in Bodega Bay or Sausalito. According to data collected from 1970 through 1981 by the CF&G, the most intensive sport fishing is in the four months of July through October (see Table 5). During this period, the average monthly sports fishing effort, as measured in boat-days, was almost twice the average for December and January, when the weather is at its worst and the least activity occurs. According to these data, 97.7 percent of the 1970-1981 total catch was rockfish. Only 2.1 percent of this catch was lingcod and the catch of other fish species was proportionately negligible. It can be assumed that the commercial catch is similarly dominated by rockfish (J. Underhill, 1988, personal communication).

Table: 5: Recreational Fishing Activity at Cordell Bank (1970-1981)

Month	Total Fish	Number Anglers	Boat Days	Angler Hours	Jack Mackerel	Lingcod	Rockfish	Salmon	Others
Jan	27145	2382	103	7807		818	26298	2	27
Feb	35855	3601	136	12448	43	1328	34390	74	63
Mar	40023	3850	144	12663		1281	38711	18	13
Apr	33747	3319	126	11349		867	32815	47	18
May	37722	3658	147	12322	25	592	37077	33	20
Jun	39403	3520	138	11108	33	454	38675	245	29
Jul	55807	5508	202	17771	187	586	55113	47	61
Aug	62783	5766	201	18261	239	743	61903	34	103
Sep	66113	6469	232	21069	185	1019	65016	21	57
Oct	55469	5726	212	19037	98	1398	53991	15	65
Nov	40538	4008	159	13245		1176	39227	104	31
Dec	26599	2458	111	8240		648	25923	2	26
Total	521204	50265	1911	165320	810	10910	509139	642	513

Source: California Department of Fish and Game data, analyzed by Cordell Bank Expeditions (Schmieder, Personal communication, May 4, 1984).

2. Oil and Gas Activities

There is no current oil and gas activity in the vicinity of Cordell Bank although such development has been planned in the past. The Bureau of Land Management (BLM), in the Department of the Interior, selected tracts for Outer Continental Shelf (OCS) Lease Sale #53 in October, 1978. A number of nominations to include Cordell Bank in the sale were received during the preselection process. Although the final selection of tracts did not include any in the immediate vicinity of Cordell Bank, eight tracts, amounting to 34,560 acres, were selected in the Bodega Basin, northwest of Cordell Bank (BLM, 1980). In April, 1981, the Secretary of the Interior issued a Final notice of sale in which the eight Bodega Basin tracts were deleted from Lease Sale #53.

In 1982, a Congressionally-imposed moratorium closed most offshore areas of central and northern California, including the area around Cordell Bank, to oil and gas leasing. This moratorium came to an end in November 1985, when Congress did not continue it. In February 1986, the Minerals Management Service (MMS), which had replaced the BLM in implementing the Department of the Interior's responsibilities under the Outer Continental Shelf Lands Act, published its 5-year plan for the OCS leasing program. This plan, includes Lease Sale #119 for the Central Californian Coast and defers Cordell Bank, within the 91 meter (49.76 fathom) isobath from leasing during the 5-year program (MMS, 1986) (Figure 3).

3. Commercial Shipping

Cordell Bank is located near the northern sea lanes used by commercial ships bound to and from San Francisco Bay ports. In 1984, 3,947 self-

propelled commercial ships entered the Bay. Of this number, 995 were tankers and 2,952 carried dry cargo or passengers. Similar numbers of outward bound ships of both types left the Bay (U.S. Army Corps of Engineers, 1986). The shipping lanes used by these ships were established by the U.S. Coast Guard (USCG) vessel traffic separation scheme for Bay ports (Figure 4). Ships using the northern lanes pass to the east of Cordell Bank.

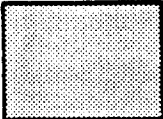
4. Military Activity

The Cordell Bank area is the site of regular U.S. Navy submarine, surface and air operations. Airspace Warning Area, W-260, overlaps the northern half of the Bank. Airspace Warning Area, W-513, and Submarine Diving Area, U-3, overlap the southern part of the Bank. Submarine activity in this area is comprised of trial diving exercises and equipment checkouts, usually following vessel overhaul or refitting. Exercises occur in Area U-3 on an average of about ten days per month. The Navy conducts aircraft and surface vessel exercises in the Warning Areas. These exercises are often coordinated with submarine operations (see Figure 4).

5. Research and Education

Cordell Bank was discovered by George Davidson of the U.S. Coast and Geodetic Survey on the night of October 20, 1853. No further exploration was carried out until June 1869, when Edward Cordell, at Davidson's suggestion, relocated the Bank and mapped its general contours. The Bank was again surveyed in 1873, 1911, and 1929, but its detailed structure remained unknown. In 1949-1950, G. Dallas Hanna of the California Academy of Sciences obtained samples of rock with a dredge. They were identified as granodiorite, thus establishing the connection to the Salinian Block. Since 1978, Cordell Bank

Potential Oil and Gas Development Near Cordell Bank

- Proposed Boundary #1 Cordell Bank National Marine Sanctuary
-  Areas Proposed for Offshore Oil Drilling under Lease Sale #119

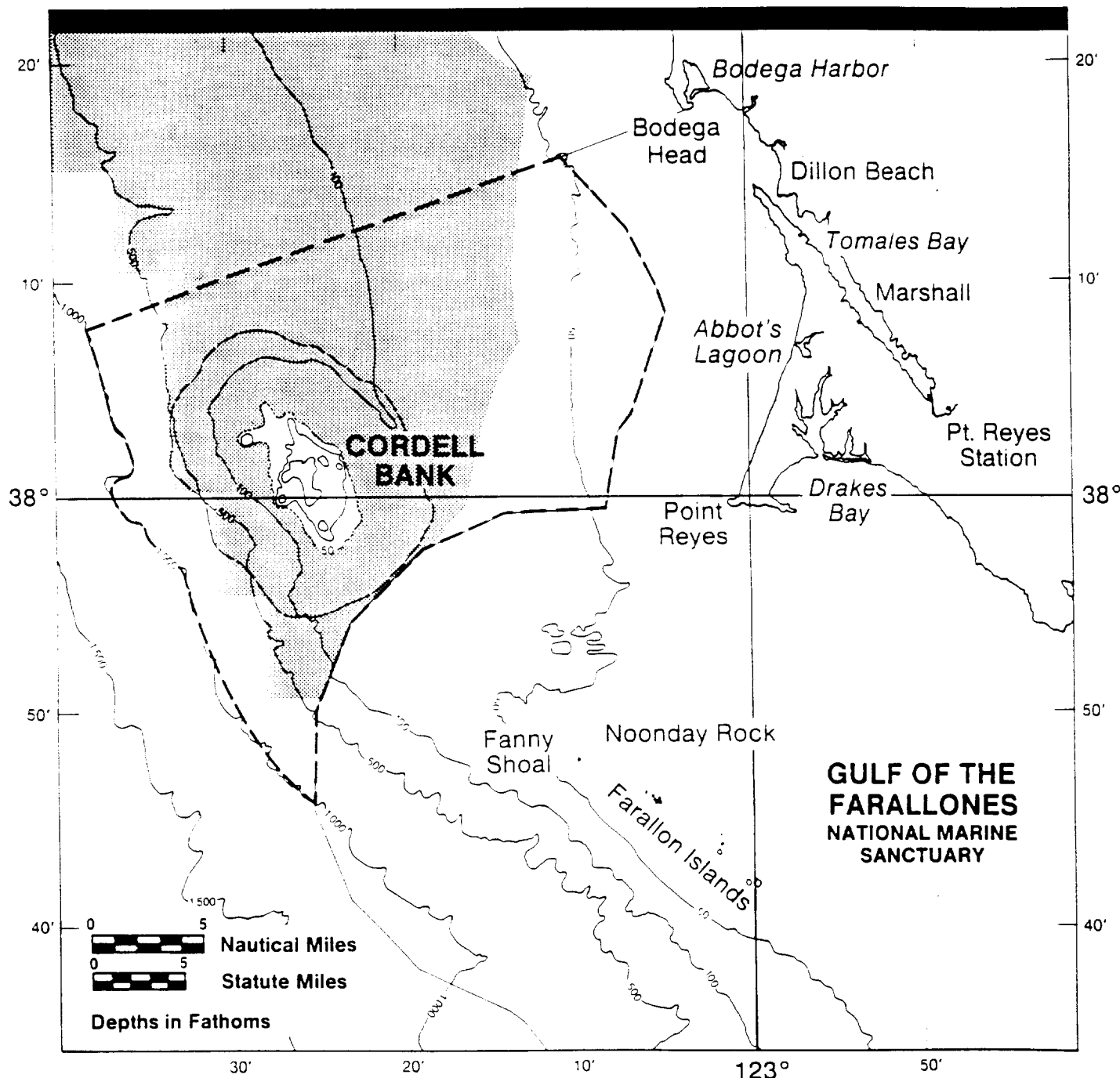


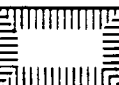


Figure 3

Sources: National Ocean Service Nautical Chart 18640;
Department of the Interior, OCS Oil and Gas
5 Year Plan, 1987.

Shipping and Military Activity

-  Existing Shipping Lanes
-  Point Reyes-Farallon Islands National Marine Sanctuary Boundary
-  Zone of Activity

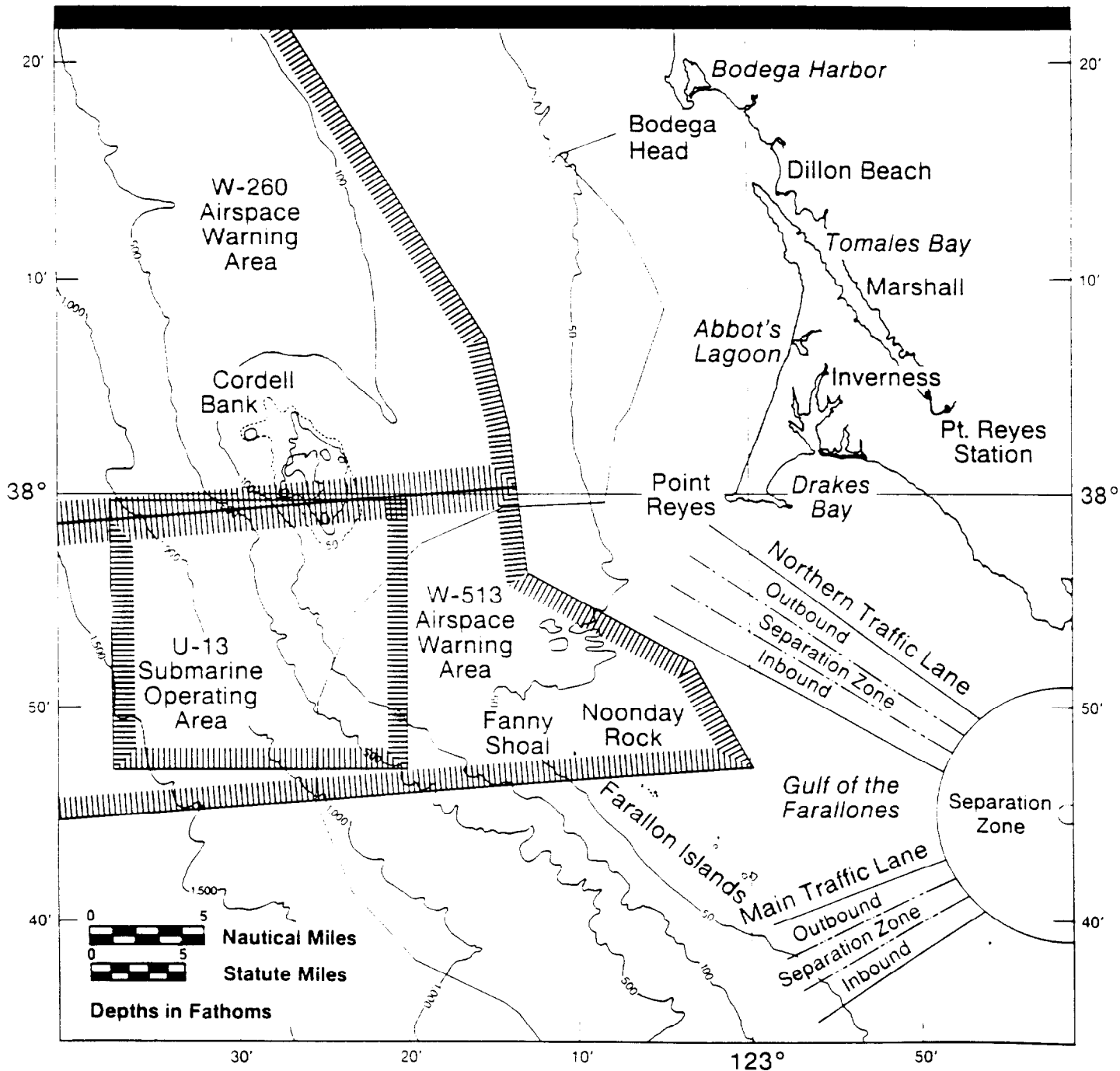


Figure 4

Sources: Defense Mapping Agency Chart 18005;
National Ocean Service Nautical Chart 18640.

Expeditions, a nonprofit organization dedicated to the exploration and description of this site, has carried out an annual series of high resolution depth surveys and scuba dives to obtain biological specimens and underwater photographs (Schmieder, 1978, 1979, 1981, 1984a, 1985b, 1985c, 1985d). Cordell Bank Expedition's depth surveys revealed errors in the existing charts of the Bank and provided information on a number of previously unsuspected topographic features. Other results of this research include a list of over 450 species found on the Bank, in surrounding waters and the air above. This list is based on direct observations made by Cordell Bank Expeditions and on information provided by the CF&G and other sources, including personnel of the California Marine Mammal Center who participated in several of the annual field investigations to record observations of cetaceans, pinnipeds, and seabirds.

The NOAA coastal survey ship, DAVIDSON, surveyed Cordell Bank in May, 1985, in conjunction with a larger hydrographic survey of waters off northern California. Data in the Cordell Bank area was collected with a bottom resolution of 20 by 20 feet and is being used by NOAA to produce a chart at a scale of 1:20,000. A chart at this scale would have a bottom resolution of 140 by 140 feet; it would thus be of little use as baseline information on the narrow ridges and peaks at the top of the Bank where most of the biological communities are concentrated. However, copies of the raw data collected on the DAVIDSON survey were provided to Cordell Bank Expeditions for use in producing detailed plots of Bank surfaces and the biological communities inhabiting them (Kruse and Schmieder, 1986).

Although there has been increasing research at Cordell Bank in recent years, there has been no similar organized effort to educate the public about

the Bank. Information developed by Cordell Bank Expeditions has occasionally been summarized in periodical literature. However, an organized educational program concerning Cordell Bank resources will be possible with Sanctuary designation.

Section III: Action Plan

A. Overall Management and Development Concept

The long-term protection of resources has the highest management priority in this plan. Ensuring the protection of Sanctuary resources depends on several factors affecting the feasibility of proposed programs and actions. Factors affecting management of the proposed Sanctuary include: its size; its depth and location; its proximity to the PRNMS; and the need to coordinate the responsibility for comprehensive management of the site with other authorities.

Visitor use of Cordell Bank waters is limited by weather conditions and by the Bank's remoteness from the California coast. The size and proximity of Cordell Bank to the PRNMS makes it feasible and cost-effective for the PRNMS manager and staff to provide the management needed for the proposed CBNMS. These constraints obviate the need for a Sanctuary management structure of the size required for other established sanctuaries. This concept of combined management is an important feature of the management plan.

Understanding the ecological relationships among the diverse species of benthic organisms, fish, mammals and seabirds that are dependent on the Cordell Bank environment is of prime importance in protecting these resources. The plan calls for a research effort to characterize and monitor environmental conditions and to detect significant changes in the status of populations. These studies will provide management with a basis for formulating contingency plans and for responding to unforeseen threats to the environment.

The general public and interested organizations in central and northern California will play important roles in attaining resource protection goals in

the Sanctuary. Interpretive programs fostering public understanding and, hence, support for management objectives, are inherent in the plan's concept. The establishment of a CENMS will provide an excellent opportunity to inform the public about the value of efforts to protect its fragile resources and the need for a long-term management framework. Effective communication will depend on publications, exhibits, and special events that convey the significance of the Sanctuary's resources to a varied public.

The management plan proposes actions tailored to specific issues affecting the Sanctuary. The plan recognizes the need for a balanced approach reflecting the existing protection priorities and the multiple use character of the area. Implementation of this plan will entail cooperation and coordination among several agencies including the USCG and the U.S. National Park Service (NPS). Information exchange, sharing facilities and staff, and the coordination of policies and procedures for resource protection will be features of all programs, including research and interpretation. The plan is designed to guide management of the proposed CENMS for the first five years after implementation. During this period, management initiatives will generally fall into three basic programs: Resource Protection, Research, and Interpretation. The remainder of this section describes guidelines and initiatives for each program.

B. Resource Protection

1. General Context for Management

The proposed designation of Cordell Bank as a National Marine Sanctuary focuses attention on the value of the area's resources. To ensure that these resources are protected, the Sanctuary resource protection program includes:

- (1) coordination of policies and procedures among the agencies sharing

responsibility for resource protection; (2) participation by other agencies in the development of new procedures to address specific management concerns (i.e., monitoring and emergency-response programs); and (3) the enforcement of Sanctuary regulations in addition to those already in place.

2. Designation Document and Sanctuary Regulations

A summary of the existing regulatory regime in the area of the proposed CBNMS is included in Part III—(Section 1) Status Quo Alternative. The regulations under this regime will not be affected by Sanctuary designation. The proposed Designation Document (Appendix 1) describes the relationship between Sanctuary designation and other regulatory programs. The proposed Designation Document also includes:

- ° a list of activities subject to regulation now or in the future;
- ° regulations for specified activities; and
- ° provisions for additional regulations, as necessary.

To ensure protection of Sanctuary resources and conservation of Cordell Bank's valuable habitat, NOAA proposes two additional regulations governing discharges and damaging benthic resources. If necessary to protect Sanctuary resources, hydrocarbon activities, anchoring on Cordell Bank or within the 50-fathom isobath surrounding the Bank, and removing, taking, or injuring or attempting to remove, take, or injure historical or cultural resources may be regulated in the future.

(a) Discharges

Discharges or deposits within the Sanctuary are prohibited. Discharges or deposits from beyond Sanctuary boundaries are also prohibited if the substance or material discharged enters the Sanctuary and injures a Sanctuary resource. Exceptions to these prohibitions include vessel cooling waters, fish wastes

and bait, marine sanitation device effluents, and discharges, such as deckwashings, authorized for routine operations.

(b) Removing, Taking or Injuring Benthic Resources

Removing, taking, or injuring or attempting to remove, take, or injure benthic invertebrates or algae located on Cordell Bank or within the fifty fathom isobath surrounding the Bank is prohibited, except as authorized by permit from NOAA for scientific research, educational, salvage, or Sanctuary management purposes.

(c) Oil and Gas Activities

If oil and gas activities are permitted in the future within the boundaries of the Sanctuary by the Department of the Interior OCS Leasing Program, Sanctuary regulations may be promulgated to restrict or prohibit such operations if it is determined that they may have adverse effects on the Sanctuary's resources. NOAA will actively consult with the Department of Interior concerning any proposed oil and gas activities in the area and NOAA will carefully monitor any exploration and development activities that may impact the Sanctuary's resources. Any regulation prohibiting hydrocarbon operations would apply throughout the Sanctuary.

(d) Cultural and Historical Resources

It is necessary to protect and manage any historical and cultural resources that may be in the Sanctuary. Therefore, any activity that leads to the discovery or finding of cultural or historical resources will be carefully monitored and regulations will be proposed if deemed necessary to protect such resources. Any regulation prohibiting removing, taking, or injuring or attempting to remove, take, or injure historical or cultural resources would apply throughout the Sanctuary.

(e) Anchoring

At present few vessels visit Cordell Bank and anchor on it. However, anchoring on the Bank can injure or destroy benthic organisms by physical impact and by dragging of the anchor chain. Anchoring could have a significant effect on the benthic flora and fauna and should be carefully monitored. Regulation of anchoring would be considered if anchoring activities increase and threaten the Bank's resources. This potential regulation would only apply to Cordell Bank and the area within the 50 fathom contour surrounding Cordell Bank. It is in this area where the benthic resources are most concentrated and potentially susceptible to anchor damage.

Note: Military Operations.

The regulation of activities within the CENMS shall not prohibit any activity conducted by the Department of Defense that is necessary for national defense. All activities being carried out by the Department of Defense within the Sanctuary on the effective date of designation that are necessary for the national defense are not subject to Sanctuary prohibitions. The exemption of additional activities shall be determined in consultation between NOAA and the Department of Defense.

3. Contingency Plans for Major Emergencies

The resources of the CENMS are susceptible to natural and human-related changes. Many of these changes are gradual and can be detected only through long-term monitoring of environmental and biological indicators. However, certain changes in conditions (due to an accidental oil spill, for example) could seriously impact resources and present severe health and safety hazards.

Under the National Contingency Plan for the removal of oil and hazardous

substances, remedial action to control or remove this type of material that could endanger the public health is the responsibility of U.S. Coast Guard directed Regional Response Teams acting through an On-Scene Coordinator and a Regional Response Center.

The Eleventh Coast Guard District will provide Regional Response Center facilities. The On-Scene Coordinator will receive scientific support from NOAA and assistance as necessary from the Regional Response Team and other appropriate Federal and state agencies. Assistance is also possible from private groups such as Clean Bay, an industry-supported oil spill clean-up cooperative operating in the San Francisco Bay area.

To provide further protection to Cordell Bank resources, the MEMD will monitor and assess the state of preparedness as it relates to the Sanctuary. This action will entail exchanging information with government and industry response teams and seeking their support in assessing detection and clean-up capabilities that can be used to protect Bank resources.

A MEMD-level contingency and emergency-response plan is now under preparation. After its completion, a Sanctuary-specific contingency and emergency-response plan will be prepared. This plan will:

- describe emergency-response procedures and coordination requirements for MEMD and Sanctuary staff; and
- provide a geographic information system depicting resources at risk; and
- outline procedures for emergency research; and
- provide damage assessment guidelines.

In conjunction with this plan, agreements may be formulated to improve spill detection programs and augment containment capabilities (i.e., with additional equipment, staff, and deployment plans). These efforts will be

closely coordinated with similar efforts to protect the PRNMS.

4. Encouraging Compatible Use of the Sanctuary

Encouraging the public to use the Sanctuary in ways that are compatible with the protection of significant resources is an important aspect of the resource program. The MEMD will encourage compatible visitor use by undertaking the following:

- ° Monitoring commercial and recreational activities in the Sanctuary and encouraging other agencies to do so to detect areas of particular management concern;
- ° Exchanging information on commercial and recreational activities in the Sanctuary;
- ° Consulting with other agencies on policies and proposals for the management of activities which may affect protection of Sanctuary resources; and
- ° Developing materials aimed at enhancing public awareness of the Sanctuary's resources and their need for protection.

Monitoring and information exchange programs are discussed under research (Subsection C). The development of materials is discussed under interpretation (Subsection D).

5. Surveillance and Enforcement

A primary feature of the resource protection program is the surveillance of Sanctuary waters and enforcement of applicable regulations. The USCG has broad responsibility for enforcing all Federal laws in navigable waters under U.S. jurisdiction. Where these laws regulate fishing harvests, the USCG works closely with the NMFS and the CF&G. The CF&G enforces Federal as well as California fishing regulations in the exclusive economic zone and acts as the primary agency for the enforcement of fishery regulations applying to Cordell Bank.

Sanctuary designation would have the effect of broadening USCG

enforcement responsibilities to include the enforcement of Sanctuary regulations. However, in the event that analyses of use patterns after Sanctuary designation indicate that additional surveillance is required, NOAA will provide for more intensive enforcement to protect Sanctuary resources. The effectiveness of Sanctuary enforcement operations will be evaluated two years after Sanctuary designation and annually thereafter.

(a) Public Education and Information

Because the most effective enforcement is prevention, the Sanctuary interpretive program will make every effort to inform users of the need to use the Sanctuary environment wisely. Much of this effort will involve the preparation of easily understood brochures and other written materials on regulations, and the reasons for them. These materials will be made available to all Sanctuary users.

(b) Planning and Coordination

Information obtained from the research program and from surveillance-enforcement activities on Sanctuary visitor use patterns, frequently occurring violations, and potentially sensitive resources, will be reviewed in periodic meetings between the Sanctuary Manager and enforcement agency personnel to determine the adequacy of surveillance levels.

C. Research

1. General Context for Management

Effective management of the CENMS will require the inauguration of a research program that addresses management issues. Knowing how a system works is essential in developing effective solutions to management problems. Research funded by the MEMD will be directed to improving knowledge of the Sanctuary's environment and resources and of how they may be affected by

various types of human activity. The general direction of the research program and the process for preparing an annual Sanctuary Research Plan is discussed below.

2. Framework for Research

The research program consists of three major project categories:

- ° Baseline studies to determine the features and processes of the natural environment; to determine the abundance, distribution, and interaction of the living resources; and to describe the pattern of human activity in the Sanctuary; and
- ° Monitoring to document changes in environmental quality, in ecology, and in human activity; and
- ° Predictive studies to assess the causes and effects of environmental and ecological changes.

Each of these categories is described in more detail below:

(a) Baseline Studies

Baseline studies will be designed to obtain a better understanding of the hydrology and ecology of the Sanctuary. Because Cordell Bank is located in an area subject to hydrocarbon spills, Sanctuary managers need sound information on water circulation. This information would be used to improve understanding of the dispersion pattern of possible oil spills as part of the Sanctuary's contingency planning efforts.

Comprehensive knowledge of the distribution of bottom organisms and their dependence on environmental factors is needed for interpretation as well as for resource protection. The environment at representative depths and locations should be characterized by the collection of additional baseline data on water temperature and salinity, light penetration, upwelling circulation and nutrient-load. This information should be correlated with data on the abundance and distribution, by depth zone and location of species populations living on Bank surfaces. Data of this type have been collected by

Cordell Bank Expeditions (Section II), but there are still many gaps in our knowledge of Bank ecology.

A fishery stock assessment should be instituted to determine the species composition and abundance of the rockfish population on Cordell Bank. The data collected in this study would serve to document the Bank's value as fishery habitat and provide the basis for estimating the effects, if any, of increased fishing intensity on the fishery.

(b) Monitoring

Effective management requires a data base more comprehensive than simply the number of plants, animals, and non-living elements within the Sanctuary. It requires an understanding of long-term changes to the status of the resources. Monitoring provides such understanding. Monitoring data indicative of the relative health of resources can be used to detect ecological changes and trends. This program should include pollution monitoring studies and studies to monitor the population dynamics of species inhabiting the upper reaches of Cordell Bank's ridges and pinnacles. Changes in the relative distribution of these species could indicate the existence of natural or man-caused threats to Bank resources.

Other studies should monitor the effects of anchoring on Bank surfaces; changes in rockfish abundance and in the proportions of adult to juvenile rockfish; fluctuations in the abundance of whale, seal and seabird species in the Sanctuary; and the intensity and relative importance of sport fishing, commercial fishing and nature observation activity.

(c) Predictive Studies

In addition to baseline research and monitoring, the Sanctuary research program will include studies, as needed, to analyze the causes and

consequences of changes in the ecosystem and to predict the effects on it of new or more intense human activity in the area. Studies could be made to determine the effects on marine mammals of possible increases in boating activity if heightened interest in whale watching and fishing excursions results from Sanctuary establishment. A knowledge of these effects would enable management to provide information to Sanctuary users to avoid disturbing these animals unnecessarily.

Other studies of whales, seals and seabirds in the Sanctuary could be initiated to determine their range, where they come from, and how dependent they are on the food resources of the Bank. These studies should be closely tied into similar studies conducted in the PRNMS research program. One such study, for example, might be an investigation to determine (1) whether the decrease in Steller sea lions in the Farallon and Channel Islands can be attributed to a decline in prey availability and (2) the importance of the Cordell Bank rockfish stocks in sustaining the remaining Steller sea lion population.

3. Selection and Management of Research Projects

To ensure that projects considered for funding by the MEMD are directed to the resolution of management issues and concerns, the Sanctuary Manager and the MEMD, will follow procedures developed by the MEMD to ensure that each Sanctuary's research program is consistent with overall Program policies and directions. These procedures include: (1) preparing an annual Sanctuary Research Plan (SRP) and (2) monitoring the progress of research in the Sanctuary. To a large degree, the research program for the CBNMS will be carried out in conjunction with the research program at the PRNMS.

(a) Preparing an Annual Plan

Each year a Sanctuary Research Plan (SRP) will be prepared for the CENMS. The SRP will then be incorporated into a national plan which includes annual plans for each Sanctuary. Steps involved in the annual planning process include:

- ° Identifying management concerns for the Sanctuary with supporting evidence or rationales.
- ° Based on the identification of management concerns, research priorities shall be established. Research priorities are established by the Sanctuary Manager in cooperation with the MEMD. The most important factors to be considered in establishing annual research priorities will be the following:
 - (1) Immediate or evolving management issues that may be resolved through directed research projects;
 - (2) The prospects of research already in progress; and
 - (3) The availability of funds, equipment and instruments for research support.
- ° After the management concerns are identified, a research announcement and request for detailed project ideas or concepts is prepared. The announcement discusses the management concerns, and summarizes past and ongoing research. Its purpose is to solicit suggestions for specific research that can help resolve management issues. Research workshops are held occasionally to facilitate the identification of research problems;
- ° Based on research suggestions generated by the announcement, workshops, or other means, a draft SRP is prepared. The SRP lists the proposed research projects with rationales. The list is priority-ranked by the Sanctuary Manager.
- ° The draft SRP is sent to the MEMD and is circulated for peer review.
- ° A final SRP is prepared. This SRP includes documentation of how each project meets the national selection criteria. The final SRP is sent to the MEMD where it is incorporated into a national Sanctuary Research Plan. The highest ranking research projects are selected from the national plan and a procurement schedule is prepared.

If research proposals include activities that are prohibited by Sanctuary regulations a permit may be issued by NOAA upon application by researchers or, it may be determined that all or part of the research should be conducted

outside of the Sanctuary. Research on protected or endangered species, such as the brown pelican and certain marine mammals, may require additional research permits from other agencies.

(a) Monitoring Progress

The Sanctuary Manager will monitor the performance of research projects and keep records of all research underway, equipment being used on site, frequency of researchers' visits, and progress to date. Progress reports and final reports to the MEMD and Sanctuary Manager will be required to assure conformance to schedules outlined under the terms of the contract. Final reports may be reviewed by recognized scientists and resource managers before approval by the MEMD. Outstanding project reports will be published by the MEMD in its Technical Report Series.

4. Information Exchange

To complement directly funded research, the MEMD will encourage research funded from other sources particularly where it supports Sanctuary management objectives. In this regard, the MEMD will make available to other agencies and private institutions current Sanctuary resource data obtained from past and ongoing research projects.

D. Interpretation

1. General Context for Management

Increased public understanding and appreciation of the natural value of Cordell Bank resources is essential for their protection. The interpretive program for the CBNMS will be focused on improving public awareness of the Sanctuary and providing information on Bank resources and Sanctuary regulations designed to protect them.

2. Interpretive Opportunities

Opportunities for interpreting the CBNMS fall into three broad categories: interpretation for visitors to the Sanctuary, for visitors to the PRNMS headquarters at Fort Mason in San Francisco, and for interested groups not visiting either location.

In the case of visitors to the Sanctuary, opportunities for interpretation are limited by the isolation of Cordell Bank, weather conditions, and the fact that many of its living resources are at least 115 feet (35.1 m) below the water surface. Recreational diving can be extremely dangerous at this depth.

With the exception of scientific research parties, visitors to Cordell Bank waters can generally be classified as fishermen and nature viewers. Most of the fishing on the Bank is commercial, but there is also considerable recreational fishing from excursion boats. Although recreational fishermen visit the Bank throughout the year, the greatest fishing activity occurs during a four month period, July through October. Activity is reduced during the remaining eight months because of weather constraints.

Whale watching and other nature viewing at Cordell Bank is generally incidental to sport fishing from excursion boats, but there is a potential for excursions solely for the purpose of nature viewing. Nature enthusiasts visiting Cordell Bank have the opportunity to enjoy watching sea lions, porpoises and great whales as well as the large flocks of seabirds that feed in Bank waters. Brochures and interpretive materials will be made available to fishermen and nature viewers to make them aware of Sanctuary regulations, particularly with regard to waste disposal, and to inform them about the seabirds and marine mammals that may be seen in the Sanctuary and the rich

ecological communities lying beneath its waters.

The establishment of the PRNMS headquarters at Fort Mason and the existence of other visitor and information centers along the coast provide an opportunity to inform visitors to these sites about Cordell Bank's environment. Most of these visitors would not normally visit Cordell Bank; yet, given the opportunity to see interpretive exhibits and brochures about the Sanctuary at these centers, their appreciation for the special qualities of the Bank environment should be enhanced.

Finally, the CBNMS interpretive program will try to reach groups in the coastal region of California and elsewhere who have an interest in Cordell Bank and related areas, but are not apt to visit it or the PRNMS. This project entails identifying these groups and making interpretive materials available to them.

3. Interpretive Programs

Interpretation for the CBNMS will consist of three distinct sub-programs:

- ° Site visitor programs for fishing and whale watching excursions and other recreational visitors to Sanctuary waters;
- ° Information center programs for those visiting the facilities at the PRNMS and other nearby information centers; and
- ° Outreach programs for interested groups not visiting either Sanctuary.

It should be noted again, however, that many of these programs will be carried out in coordination with programs sponsored by the PRNMS.

(a) Site Visitor Programs

On-site interpretation will consist largely of written material describing the Sanctuary and explaining its regulations. This information will be available to participants in fishing and nature viewing excursions. The program will rely heavily on the cooperation of excursion boat operators.

If there is sufficient public interest and if funding and staff resources are available for expanding this program, the Sanctuary Manager will consider co-sponsoring special excursions to Cordell Bank waters, organized by non-profit organizations, and providing on-board interpreters.

(b) Information Center Programs

CENMS exhibits will be established at the PRNMS facility at Fort Mason. The feasibility of establishing additional distribution points for brochures and information and space for posters and displays will be investigated. Possible distribution point locations include visitor and information centers at Audubon Canyon Ranch, Bolinas Lagoon Nature Preserve, Point Reyes Bird Observatory, the Point Reyes National Seashore, Tomales Bay State Park, Bodega Marine Laboratory, and the Farallon Islands National Wildlife Refuge visitor facility located in Newark, California.

(c) Outreach Programs

These programs will be carried out in conjunction with similar PRNMS programs to provide off-site interpretation. Where possible, they will involve close cooperation with environmental study groups, such as the Oceanic and Audubon Societies and the Whale Center; research and education organizations, such as the California Academy of Sciences and the University of California; local officials in Marin and Sonoma counties; and representatives of the tourism and recreational and commercial fishing industries. These groups will be provided with interpretive materials on the Sanctuary and will be encouraged to inform others of the availability of these materials. If interest is strong enough, a slide presentation or mobile exhibit may be developed for the use of schools and private groups.

Section IV. Administration

A. Administrative Framework

This section of the management plan describes the roles of the agencies that will be involved in Sanctuary management, proposes strategies to coordinate their activities, and provides for periodic evaluation of the effectiveness of the management plan. Sanctuary management consists of three functions: resource protection, research, and interpretation. Administration oversees all other functions and establishes who is responsible for implementing specific programs. The administrative framework ensures that all management activities are coordinated.

The MEMD is responsible for the overall management of the proposed CBNMS. The MEMD will coordinate its on-site activities through cooperative agreements with the NPS and the USCG. The general administrative role of each agency is as follows.

1. Marine and Estuarine Management Division

The National Marine Sanctuary Program is managed by the MEMD. A site-specific management plan is prepared for each Sanctuary to ensure that on-site activities in resource protection, research, and interpretation are coordinated and consistent with Sanctuary goals and objectives.

The MEMD develops a general budget setting out expenditures for program development, operating costs, and staffing. Funding priorities will be reviewed and adjusted annually to reflect evolving conditions in the proposed CBNMS and National Marine Sanctuary Program priorities and requirements. The MEMD also establishes policies and procedures in response to specific issues in each Sanctuary. Detailed MEMD responsibilities are listed under the resource protection, research, and interpretation sections which follow.

The Sanctuary Manager for the PRNMS reports directly to the MEMD and serves as Sanctuary Manager for the proposed CENMS. In this capacity, the Manager represents the MEMD and is the primary spokesperson for the CENMS. The manager's headquarters are located in Fort Mason at the Golden Gate National Recreation Area (GGNRA).

2. National Park Service

Through an interagency agreement, the NPS cooperates and assists in carrying out on-site management activities for the PRNMS. These activities are conducted by personnel at the GGNRA. These personnel will conduct similar management activities for the proposed CENMS.

3. U.S. Coast Guard

The USCG is responsible for enforcing Federal laws in waters under U.S. jurisdiction. This mission includes the enforcement of Sanctuary regulations promulgated for the CENMS. The USCG also manages operations for the control or removal of oil and hazardous substances resulting from offshore spills.

B. Resource Protection: Roles and Responsibilities

1. Marine and Estuarine Management Division

- (a) Approves priorities for funding for resource protection;
- (b) Monitors the effectiveness of interagency agreements for surveillance and enforcement and negotiates changes where required;
- (c) Develops contingency and emergency-response plans and, based on these plans, negotiates applicable interagency agreements;
- (d) Monitors the effectiveness of existing Sanctuary regulations and enacts changes where necessary; and
- (e) Coordinates efforts to protect and manage Sanctuary resources with other Federal agencies and with public and private organizations as well.

2. Sanctuary Manager

- (a) Recommends to the MEMD priorities for allocating funds annually to resource protection;
- (b) Assists in the coordination of surveillance and enforcement activities by providing liaison with the USCG and other agencies;
- (c) Reports regularly to the MEMD on surveillance and enforcement activities, violations, and emergencies;
- (d) Provides information for use in training Sanctuary enforcement officials;
- (e) Monitors and evaluates the adequacy of emergency-response plans and procedures in the Sanctuary;
- (f) Maintains a record of emergency events (e.g., oil spills) in and around the Sanctuary; and
- (g) Evaluates overall progress toward the resource protection objectives of the Sanctuary program and prepares semi-annual and bi-monthly progress reports highlighting activities for the MEMD.

3. U.S. Coast Guard

- (a) Holds broad responsibility for enforcing all Federal laws throughout the Sanctuary;
- (b) Ensures enforcement of Sanctuary regulations; and
- (c) Provides on-scene coordination and Regional Response Center facilities under the National Contingency Plan for the removal of oil and hazardous substances in the event of a spill that threatens the Sanctuary.

C. Research: Roles and Responsibilities

1. Marine and Estuarine Management Division

- (a) Prepares annual SRP's for each Sanctuary;
- (b) Prepares an annual National Research Plan (NRP) and budget, based on the SRP's of individual sanctuaries and in accordance with priorities determined at the national level;
- (c) Sets dates for procurement based on the NRP;
- (d) Administers interagency agreements and contracts for research;
- (e) Reviews all interim and final research reports submitted by the Sanctuary Manager; and

- (f) Issues permits for research activities, considering the recommendations of the Sanctuary Manager, to ensure consistency with Sanctuary regulations and provide additional technical review where necessary.

2. Sanctuary Manager

- (a) Recommends generic areas of research to resolve management issues;
- (b) Develops the Sanctuary research plan; and
- (c) Reviews research documents and progress reports submitted by contractors.
- (d) Prepares assessments of research needs and priorities based on management requirements and research continuity;
- (e) Prepares recommendations for SRP's;
- (f) Implements the SRP's;
- (g) Coordinates research and monitoring activities in the Sanctuary in cooperation with the MEMD and other interested parties; and
- (h) Coordinates an on-site process for reviewing and evaluating research proposals and permit requests, considering the views of the MEMD, concerned individuals and interest groups.

D. Interpretation: Roles and Responsibilities

1. Marine and Estuarine Management Division

- (a) Reviews and approves the list of annual priorities for interpretation and the annual interpretation budget prepared by the Sanctuary Manager;
- (b) Reviews and approves design proposals for all interpretive facilities; and
- (c) Evaluates progress toward accomplishing objectives for interpretation and adjusts long-term priorities accordingly.

2. Sanctuary Manager

- (a) Recommends annually to the MEMD a list of priorities and an annual budget for interpretation;
- (b) Prepares and circulates as required RFP's for interpretive projects;
- (c) Supervises the design and production of interpretive materials and facilities for the Sanctuary;

- (d) Provides training for NPS staff assigned to the Sanctuary;
- (e) Encourages local and regional organizations to participate in Sanctuary interpretation;
- (f) Disseminates information about the National Marine Sanctuary Program and the CENMS; and
- (g) Oversees the development of any facilities constructed for the proposed Sanctuary, reviews site analyses and design specifications, awards construction and maintenance contracts, and performs similar tasks.

3. National Park Service

- (a) Publicizes the Sanctuary as appropriate and develops a local constituency by means of brochures, presentations, structured events, articles for publication, and other activities consistent with the management plan; and
- (b) In cooperation with the Sanctuary Manager, establishes and operates combined PRNMS-CENMS information and interpretation facilities to increase public awareness and appreciation of the resources of the Sanctuary.

E. General Administration: Roles and Responsibilities

1. Marine and Estuarine Management Division

- (a) Ensures that the Sanctuary is operated in a manner consistent with established national program policies and with applicable national and international laws and provides guidance to the Sanctuary Manager;
- (b) Identifies, analyzes, and resolves Sanctuary management problems and issues;
- (c) Formulates comprehensive, long-term management plans for the Sanctuary and revises the management plan as necessary;
- (d) Directs and assists the Sanctuary Manager in the implementation of the management plan;
- (e) Coordinates Sanctuary management with other Federal and State agencies and private organizations;
- (f) Evaluates the effectiveness of Sanctuary management and regulatory measures;
- (g) Prepares a program budget for the Sanctuary; and
- (h) Provides funding for overall Sanctuary management and administration.

2. Sanctuary Manager

- (a) Coordinates on-site efforts of all parties involved in Sanctuary activities, including NPS, NOAA, USCG, PRNMS and the public;
- (b) Reviews the management plan periodically and recommends changes to the MEMD as needed;
- (c) Assists the MEMD in preparing the annual budget for the Sanctuary;
- (d) Oversees day-to-day operation of the Sanctuary, including administrative functions such as bookkeeping, purchasing and keeping records of visitor activities;
- (e) Supervises Sanctuary staff and other personnel, including interpretive employees, assigned to the Sanctuary; and
- (f) Represents the Sanctuary viewpoint on local issues and at public forums.

3. National Park Service

- (a) Assists in the preparation and implementation of a comprehensive, long-term management plan for the proposed Sanctuary;
- (b) Assists in the periodic review of the management plan; and
- (c) Provides support for day-to-day Sanctuary operation and general administration.

F. Staffing Levels

Management of the proposed Sanctuary will rely on the use of personnel at the PRNMS. Additional personnel may be hired, if necessary. The Sanctuary staff will work closely with the USCG and other agencies in providing enforcement and surveillance in the area of the proposed Sanctuary. The details of further staffing will be determined during the first year of operation.

G. Headquarters and Visitor Center Facilities

Because the management of the CENMS will be a collateral function of the manager and staff of the PRNMS, the headquarters for the two sanctuaries will be combined. The headquarters and administrative offices of the PRNMS are in

San Francisco, at Fort Mason, the NPS headquarters for the GGNRA. This site serves as the primary visitor information center for the PRNMS; it will serve the same function for the CENMS.

Alternatives, Including the Preferred Alternative

PART III: ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

In evaluating the proposal to designate a Cordell Bank National Marine Sanctuary (CENMS), the National Oceanic and Atmospheric Administration (NOAA) has analyzed institutional, boundary, management, and regulatory alternatives in terms of achieving optimum protection of the ecosystem, improving scientific knowledge of the area, and promoting public understanding of the value of Cordell Bank resources. This section describes the alternatives considered in the evaluation process. Part IV describes the environmental consequences of the alternatives described below.

The fundamental choice of alternatives is between the two institutional alternatives: (1) no action or continuing the status quo, and (2) the preferred alternative, Sanctuary designation as a complementary measure to existing programs. Boundary, management, and regulatory alternatives are considered in the context of the preferred institutional alternative.

Section I: Status Quo Alternative

The proposed CENMS is located entirely beyond three miles from the coast and is therefore under the jurisdiction of Federal statutes with the exception that the California Department of Fish and Game (CF&G) shares jurisdiction over fishing operations in Cordell Bank waters with the National Marine Fisheries Service (NMFS). The other Federal agencies with existing primary responsibilities in the area of Cordell Bank are the U.S. Fish and Wildlife Service (FWS) and the Minerals Management Service (MMS) of the Department of the Interior; and the U.S. Coast Guard (USCG) of the Department of Transportation. This section will review briefly the responsibilities of these agencies in the Cordell Bank area. Additional information is provided in Appendix 2.

The CF&G is responsible for enforcing California fishing laws in the 200-mile wide exclusive economic zone (see Appendix 2) as well as in State waters of the territorial sea. Among these laws is a statute prohibiting gill-net fishing in an area that includes Cordell Bank. The CF&G also assists in the enforcement of Federal fishery regulations.

The NMFS works with the CF&G, under the Magnuson Fishery Conservation and Management Act, with approving and enforcing fishery management plans (FMP's) prepared by regional fishery management councils. Through a cooperative enforcement agreement, the CF&G is also deputized to enforce FMP's beyond three miles from the coast. The Cordell Bank fish stocks affected by FMP regulations are lingcod, rockfish, and salmon.

The NMFS shares responsibility with the FWS for implementation of the Marine Mammal Protection Act and the Endangered Species Act. The protection of cetaceans and pinnipeds is the responsibility of the NMFS. The FWS is responsible for protecting endangered bird species. One of these species, the brown pelican, forages in the vicinity of Cordell Bank. Another, the short-tailed albatross, was recently sighted in the area (PRBO, 1985).

The USCG, in addition to its enforcement of fishing regulations, is responsible for enforcing regulations under the Clean Water Act (CWA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to prevent pollution caused by discharges from vessels of oil, hazardous substances, or other pollutants. The USCG is also responsible for regulating vessel traffic, maintaining boater safety, and coordinating search and rescue operations.

The Environmental Protection Agency (EPA) has regulatory responsibilities with regard to ocean dumping and sewage outfalls. Title I of

the Marine Protection, Research and Sanctuaries Act prohibits the transportation of any materials from the United States for the purpose of dumping them into the territorial sea, the contiguous zone, and the ocean beyond without a permit from EPA.

The MMS is responsible for managing offshore oil and gas exploration and development operations in accordance with the provisions of the Outer Continental Shelf Lands Act. This responsibility was formerly divided between the Bureau of Land Management and the U.S. Geological Survey.

Under the status quo alternative, existing activities and controls would continue as presently administered. No comprehensive management scheme for the Bank's resources would be implemented.

Section II: Designation as a National Marine Sanctuary

This institutional alternative, NOAA's preferred alternative, proposes to designate Cordell Bank as a National Marine Sanctuary, in accordance with the provisions of Title III of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, 16 U.S.C. 1431 et seq. This alternative is detailed in Part II of this document, the Sanctuary management plan. Through the management plan and the implementing regulations (Appendix 1), the preferred alternative ensures the protection of vital Sanctuary resources and Bank habitat, offers research opportunities, and provides an interpretive program to enhance public awareness about Cordell Bank. This comprehensive program is not possible under any of the existing institutional structures alone.

The preferred alternative will cost some \$130,000 per year or \$650,000 over five years. Approximately half of these funds will be allocated to research and resource protection and half to interpretation and administration. The preferred boundary was selected because it correlates

closely with the areal distribution of important Bank resources; the management alternatives were selected because they are more cost-effective than other alternatives and conform closely to the goals of the National Marine Sanctuary Program. The regulations were selected because they will improve protection of Cordell Bank resources from the adverse impacts of human activities.

A. Boundary Alternatives

A number of boundary options were identified in the evaluation process. These options were narrowed to three, which were then considered in terms of (1) the distribution of living resources requiring protection and (2) management logistics.

1. Boundary Alternative 1

This boundary alternative, the preferred alternative, establishes a Sanctuary area of 397.05 square nautical miles. It includes all waters within a line extending 180° from the northernmost boundary of the Point Reyes-Farallon Islands National Marine Sanctuary (PRNMS) to the 1,000 fathom depth contour northwest of Cordell Bank, then south along this contour until it joins the boundary of the PRNMS (see Figure 5). This alternative, or a variation of it, was the most frequently suggested in comments solicited by NOAA at the scoping meeting in April, 1984 and at the public hearings held on September 29 and 30, 1987 to receive comments on the proposal, and written comments on the DEIS/MP.

The rationale for establishing a Sanctuary of this size is that it would afford more protection to marine mammals and seabirds. While marine mammals are already protected under the provisions of the Marine Mammal Protection Act this statute does not protect their habitat. Since designation of the

Sanctuary is designed to protect the habitat and natural resource values of Cordell Bank's core area, the expanded buffer zone serves to protect an area not only where seabirds and marine mammals feed but also an area within which they are widely distributed during migration.

2. Boundary Alternative 2

This alternative establishes a Sanctuary area of 101.10 square nautical miles. It includes all waters within a line three nautical miles beyond the 50 fathom depth contour surrounding the Bank (see Figure 6). The alternative is designed to protect the distinctive resources dependent upon the immediate Bank environment. In addition to the presence of Allopora hydrocoral and other benthic organisms, this ecosystem includes marine mammals and seabirds drawn to Cordell Bank specifically because it is an important feeding ground.

This boundary encompasses the area most frequented by seabirds according to observations made in the 1981-1982 surveys by Cordell Bank Expeditions. Because marine mammals are attracted to Cordell Bank waters by the same food resources that attract seabirds, it can be assumed that this alternative encompasses the core area in which marine mammals feed. The marine mammal sightings made during the 1981-1982 Cordell Bank Expedition surveys were concentrated in waters over the Bank and in the area just beyond the fifty-fathom contour (Webber and Cooper, 1983).

3. Boundary Alternative 3

This boundary establishes a Sanctuary area of 18.14 square nautical miles. It includes all waters within the 50 fathom contour (see Figure 6) and would protect the benthic communities on Bank surfaces and the feeding ground above it, but not the nearby waters also used as a feeding ground by marine mammals and seabirds.

Boundary Alternative #1

--- Proposed Boundary #1
Cordell Bank National
Marine Sanctuary

— Point Reyes-Farallon
Islands National
Marine Sanctuary

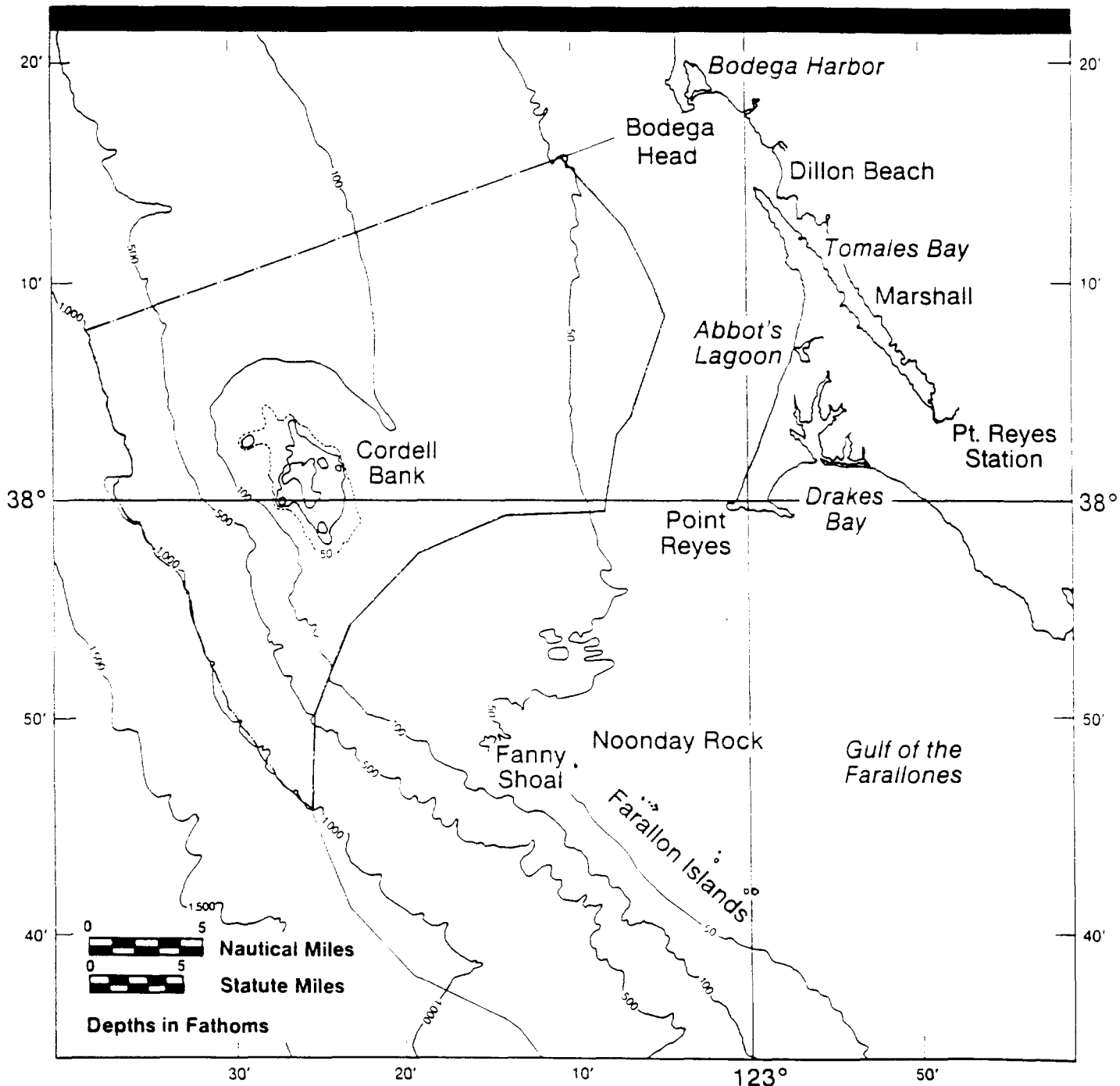


Figure 5

Source: National Ocean Service Nautical Chart 18640.

Boundary Alternatives #2 and #3

- Proposed Boundary #2
Cordell Bank National
Marine Sanctuary
- Proposed Boundary #3
Cordell Bank National
Marine Sanctuary
- Point Reyes-Farallon
Islands National
Marine Sanctuary

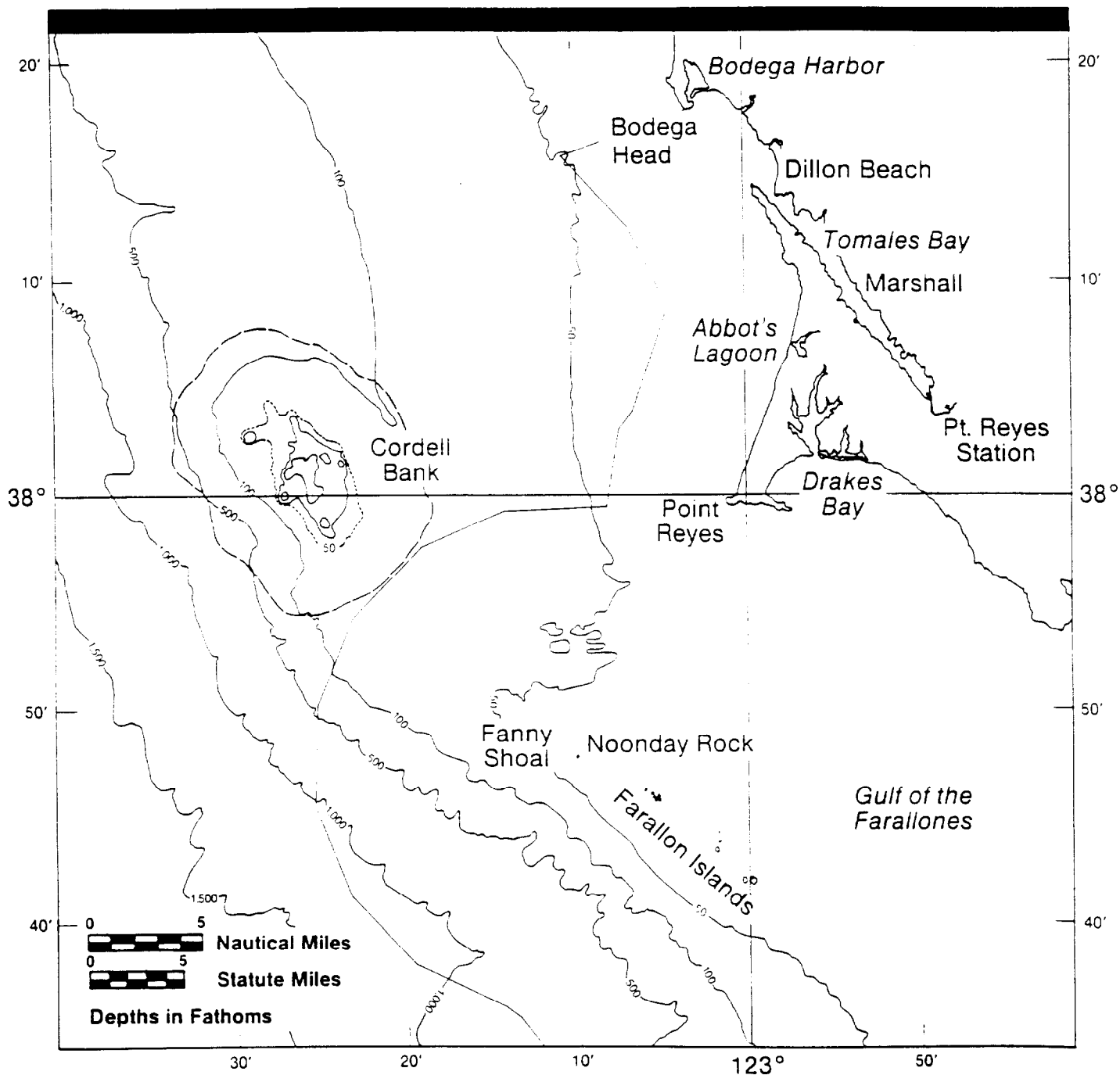


Figure 6

Source: National Ocean Service Nautical Chart 18640.

B. Management Alternatives

Two management alternatives were identified and considered in terms of (1) resource protection, research, and interpretation requirements and (2) cost-effectiveness.

1. Management Alternative 1

Under this alternative, NOAA would establish a management and administrative system for the CENMS that is entirely separate and distinct from that of the PRNMS. Using this approach, minimum staffing needs would entail the employment of a Cordell Bank Sanctuary Manager and supporting staff at a cost of some \$100,000. A separate headquarters and visitor center could be constructed at an estimated cost of \$500,000 in addition to land purchase and operating expenditures. Likely sites for the facility include the areas of Point Reyes and Bodega Bay, both of which are departure points for Cordell Bank, and the Marin Headlands.

There are three major disadvantages to this alternative, aside from its cost. First, a headquarters and visitor center situated away from San Francisco would have low visibility and visitor use and would limit interpretive opportunities involving other organizations, many of which are located in the San Francisco Bay area. Second, management programs for the proposed CENMS and the PRNMS are in many ways complementary and would best be done in a coordinated manner; and third, the protection and interpretation of Cordell Bank resources does not require the attention of a full-time Sanctuary Manager at this time.

2. Management Alternative 2

The preferred alternative is to combine the management and administrative

system of the CENMS with that of the PRNMS. Under this approach the management of Cordell Bank resource protection, research and interpretive programs would be a collateral function of the PRNMS Manager and staff. The headquarters for the two Sanctuaries would be the same. The headquarters and administrative offices of the PRNMS are at Fort Mason, San Francisco, in the National Park Service (NPS) headquarters for the Golden Gate National Recreation Area (GGNRA).

The preferred alternative would not significantly increase the PRNMS budget for administrative personnel and facilities, yet it would eliminate the need to include these items in the CENMS budget. The CENMS budget would thus include primarily the non-administrative costs of the resource protection, research and interpretation programs. Moreover, the CENMS would have the additional advantage of high visibility resulting from a location in the heavily visited GGNRA and its proximity to San Francisco. Finally, the implementation of the management plan could begin immediately upon designation as the Sanctuary Manager and staff would already be in place and prepared to begin work to implement the management plan.

C. Regulatory Alternatives

Regulatory alternatives governing five types of activity (discharges and deposits; removing, taking or injuring, or attempting to remove, take, or injure benthic resources; removing, taking or injuring, or attempting to remove, take, or injure historical or cultural resources; hydrocarbon activities; and anchoring) were evaluated in terms of need and effectiveness for resource protection. Activities not included in these five categories, such as fishing, would continue to be subject to existing regulations.

1. Discharges

(a) No Regulation

Under this alternative, the provisions of the Clean Water Act (CWA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Contingency Plan would provide some protection from potentially harmful discharges. Discharges of oil and chemical waste are regulated under provisions of the Act to Prevent Pollution from Ships of 1980, as amended in 1982 and 1987 (33 USC 1901 et seq.). On October 27, 1988 the United States Coast Guard announced a Notice of Proposed Rule Making that would implement the pollution prevention requirements of Annex V of the International Marine Pollution Convention, MARPOL 73/78 (53 FR 43622). These proposed regulations are expected to reduce the incidence of discharges of plastics and other ship-generated garbage into the marine environment.

(b) Prohibit Discharges

The preferred alternative is to prohibit discharges or deposits, with certain exceptions (See Part II, Section III. B. 2(a)) into Sanctuary waters, or from outside the Sanctuary boundaries if such discharge or deposit enters the Sanctuary and injures a Sanctuary resource. This regulation would apply to discharges or deposits of solid wastes as well as effluents. In addition NOAA will certify permits, such as the National Pollutant Discharge Elimination System (NPDES) permits, from other authorities for activities which are prohibited by Sanctuary regulations such as discharges. NOAA may deny certification or require additional conditions if necessary to protect Sanctuary resources.

2. Removing, Taking, or Injuring Benthic Resources

(a) No Regulation

Although the depth and isolation of Cordell Bank makes it unattractive as a site for recreational diving, such diving is possible, especially in the fall when the weather and sea-state are generally calm. Under the no-regulation alternative, divers could collect samples for their own use or for commercial purposes without legal constraint.

(b) Prohibit Damage to Benthos

The preferred alternative is to prohibit removing, taking or injuring, or attempting to remove, take, or injure benthic organisms except by permit for scientific research, educational, salvage, or Sanctuary management purposes.

3. Hydrocarbon Activities

(a) No Immediate Regulation

This is the preferred alternative. Cordell Bank is not at present subject to OCS leasing. The five-year plan for the OCS Leasing Program excludes the area of Cordell Bank within approximately the fifty-fathom contour (91 m or 49.76 fathoms). However, leasing could occur beyond the fifty-fathom contour, where it is possible that hydrocarbon operations could impact the Sanctuary's resources. If areas within the Sanctuary are leased for hydrocarbon activities in the future, NOAA has authority to certify and condition (or deny certification for), as necessary, permits or other authorizations granted to operators (lessees or contractors) by other authorities for activities within the Sanctuary. Such conditions may include, but are not limited to, the establishment of a monitoring program and scientific research studies to measure the effects of hydrocarbon activities on Sanctuary resources and the restriction of discharges. Any

conditions imposed by NOAA on other authorities' permits will be made in consultation with those agencies and the permittees.

In addition, NOAA has the ability to enact emergency regulations to prohibit hydrocarbon activities, or any other activities in the Sanctuary to prevent immediate, serious and irreversible damage to a Sanctuary resource. Such emergency regulations shall remain in effect for no more than 120 days, during which time permanent regulations may be proposed by NOAA.

(b) Immediate Regulation of Hydrocarbon Activities

Under this alternative, a regulation would be promulgated prohibiting oil and gas activities throughout the Sanctuary.

4. Anchoring

(a) No Regulation

This is the preferred alternative. At present few vessels visit Cordell Bank and anchor on it. However, anchoring on the Bank can injure or destroy benthic organisms by physical impact and by dragging of the anchor chain. Anchoring could have a significant effect on the benthic flora and fauna and should be carefully monitored.

(b) Prohibit Anchoring

Under this alternative, regulation of anchoring would apply to Cordell Bank and the area within the 50 fathom contour surrounding Cordell Bank. It is in this area where the benthic resources are most concentrated and potentially susceptible to anchor damage.

5. Historical and Cultural Resources

(a) No Regulation

This is the preferred alternative. At present, NOAA is unaware of any historical or cultural resources within the proposed Cordell Bank National

Marine Sanctuary. NOAA recognizes that the lack of information does not mean such resources are not present. It is necessary to protect and manage any historical and cultural resources that may be in the Sanctuary. Therefore, any activity that leads to the discovery or finding of cultural or historical resources will be carefully monitored.

(b) Prohibit Removing, Taking, or Injuring Historical or Cultural Resources

Under this alternative, a prohibition on removing, taking or injuring, or attempting to remove, take, or injure historical or cultural resources would apply throughout the Sanctuary.

PART IV: ENVIRONMENTAL CONSEQUENCES

In selecting the appropriate institutional, boundary, management, and regulatory alternatives for the proposed Cordell Bank National Marine Sanctuary, the National Oceanic and Atmospheric Administration evaluated the environmental consequences of their implementation. This section discusses these consequences including those resulting from the preferred alternative.

Section I: Environmental Consequences of Alternatives

A. Sanctuary Designation--The Preferred Alternative

The preferred alternative would permit the implementation of a coordinated and comprehensive management scheme resulting in the most cost-effective protection of Cordell Bank resources. This alternative would promote resource protection in three ways: (1) It would bolster the existing regulatory and resource protection regime. (2) It would establish a coordinated research program to expand knowledge of the Cordell Bank environment and resources and thus provide the basis for sound management. (3) It would include a broad-based interpretive program to improve public understanding of Cordell Bank's importance as the habitat for a unique community of marine organisms and of the need for a comprehensive management framework to protect this habitat.

1. Resource Protection Regime

The proposed designation will improve resource protection by instituting new regulatory measures and by supplementing present surveillance and enforcement actions. The proposed regulations are designed to protect Sanctuary resources from the harmful discharge of oil and other pollutants and to prevent damage to benthic organisms. The overall effect of these

regulations, narrowly focused on specific activities, will be beneficial. The impacts of each regulation are discussed below.

(a) Discharges

Discharges or deposits are prohibited within the Sanctuary with the exception of fish wastes, vessel cooling waters, marine sanitation device effluents, and other biodegradable effluents incidental to routine vessel operations. Discharges or deposits are prohibited outside of the Sanctuary if the substances or materials discharged enter the Sanctuary and injure its resources.

The regulation prohibiting the discharge of oil and related pollutants and of litter directly or indirectly into Sanctuary waters complements the existing regulatory system, enhances the area's overall appeal, and helps maintain the present good water quality in the Sanctuary. Although particular discharges, such as oil, are now generally regulated under the Clean Water Act (CWA), the Sanctuary regulation is designed specifically to protect the area's important living resources from the effects of all harmful effluents and solid wastes.

(1) Oil Spill Hazard

The major source of concern in protecting Cordell Bank's resources is tanker oil spills. From 1974 to 1981, there were 81 oil spills of more than 1,000 barrels in U.S. waters. Only six of these were on the West Coast--three in port and three at sea (The Futures Group, 1982). More recently, in late 1984, the tanker, Puerto Rican, was disabled about eight miles seaward of the Golden Gate by on-board explosions. The vessel eventually broke apart and discharged refined oil products within the boundary of the Point Reyes-Farallon Islands National Marine Sanctuary (PRNMS). The progress of this

incident demonstrates the seriousness of the potential hazard to Cordell Bank.

The Puerto Rican was disabled shortly before the predicted on-set of the Davidson current, which reverses the direction of California coastal currents from a southerly to northerly flow. The wind and current direction in the San Francisco Bight, however, was still to the south and initial trajectory estimates indicated that spills occurring in the area would move southward. It was therefore decided to tow the burning vessel out to sea, south of the Farallon Islands. The ship broke apart southwest of the Farallones and the resulting spill did move southward initially. Unexpectedly, wind and current direction changed and the spill moved rapidly north through the PRNMS and up to Bodega Bay and beyond. Some 48,000 barrels of hydrocarbons were released into the ocean from the Puerto Rican. Of this amount, only 1,460 barrels were recovered during cleanup operations (USCG, 1985)

Although Cordell Bank was not in the path of the spill from the Puerto Rican, it could be impacted by future spills in the area. Tankers and other ships entering the northern approaches to San Francisco Bay pass to the east of the Bank. A spill occurring northeast of the Bank during the period that the California current governs offshore circulation could be driven directly to the Bank and cause considerable damage to Bank resources.

(2) Oil Spill Impact on Seabirds

Oil spills in Cordell Bank waters could have a major impact on foraging seabirds. The major cause of immediate mortality among seabirds contaminated by oil is fouling of the feathers, which reduces flying and swimming ability and results in a loss of buoyancy and of thermal insulation. The ingestion of toxic hydrocarbons, sometimes by preening contaminated feathers, can produce physiological stress which may eventually result in death. If non-fatal

contamination occurs during the breeding season it may lead to reproductive failure. Birds that have ingested toxic elements may produce inviable eggs, and birds whose feathers are contaminated may transfer oil to eggs or chicks, thus reducing hatching or fledgling success (NOAA, 1980).

Diving birds and species that spend a considerable amount of time resting on the water are especially vulnerable to contact with spilled oil. The most vulnerable are murre, guillemots, auklets, murrelets, puffins, loons, grebes, scoters and cormorants. Shearwaters, fulmars, albatrosses, petrels, gulls and terns are also vulnerable but less so than diving birds. With the exception of grebes, all of these birds have been identified foraging in Cordell Bank waters (Webber and Cooper, 1983).

(3) Oil Spill Impact on Marine Mammals

Pinnipeds exposed to oil spills may be adversely affected by hydrocarbons contacting their fur or skin or being ingested or inhaled. Oil contamination of their fur can cause loss of buoyancy and thermal insulation, as fouling of the feathers does with birds. Loss of insulation is probably more serious for pinnipeds than loss of buoyancy. Oil contamination of their fur is therefore especially harmful to fur seals which depend on their fur for insulation. Phocid seals rely on blubber and vascular mechanisms for thermal regulation and are thus more resistant to thermal loss caused by contact with oil (Geraci and St. Aubin, 1980). Of the pinnipeds in the Cordell Bank area, the northern fur seals and the California and Steller sea lions are fur seals; the northern elephant seals and harbor seals are phocids.

The ingestion of oil by pinnipeds is most likely to occur during feeding or as the animals clean their coats. The impact of such ingestion would probably depend upon the amount ingested, its toxicity, and the physical

condition of the pinnipeds. The long-term effects on pinnipeds of various levels of hydrocarbon bioaccumulation are unknown.

The adverse effects of oil spills on cetaceans are the result of oil contact with the skin or eyes, fouling of baleens and ingestion or inhalation. Because the skin of cetaceans is smooth and furless, oil is unlikely to adhere to it, although it may adhere to the callosities that occur on right and humpback whales. In a study of bottlenose dolphins to determine the effects of direct skin contact with spilled oil, it was found that exposure to crude oil for periods of up to 45 minutes produced short-term, morphological and biochemical changes to the skin, but recovery appeared to be rapid (Geraci and St. Aubin, 1982).

It has been assumed that cetaceans may suffer eye irritation as the result of contact with oil, but this assumption has not been scientifically confirmed. Baleen whales such as the humpback, blue and gray whales (all observed in Cordell Bank waters) are subject to baleen fouling as a result of exposure to spilled oil. This may impair their ability to feed, however, humpback whales have been observed feeding in oil-slicks without apparent immediate ill effects (NOAA, 1979).

The bioaccumulation of oil in both baleen and toothed cetaceans is most apt to occur as the result of eating contaminated food supplies. There is little likelihood that oil would be inhaled through the blow-hole although it is possible that toxic fumes might be inhaled in small quantities (Geraci and St. Aubin, 1980). Although the effects of hydrocarbon accumulation in cetaceans are unknown, it can be assumed that the longer an animal is exposed to spilled oil, the more likely it is to suffer adverse effects. Prolonged exposure is most apt to occur when contamination occurs in a feeding ground,

such as Cordell Bank.

In general, little is known about the ability of cetaceans to avoid oil spills. As noted above, humpback whales have been observed feeding in an oil slick. Bottlenose dolphins, however, can detect and will avoid thick oil accumulations but do not avoid thin oil sheens (Geraci and St. Aubin, 1982, 1983).

(4) Oil Spill Impact on Pelagic and Benthic Biota

The impact of an oil spill on Cordell Bank fishing stocks and benthic fauna would depend largely upon the type of oil involved and on the timing of the spill with respect to reproduction and larval development. The lethal toxicity of oil ranges from .1 to 100 parts per million of soluble aromatics for adult marine organisms. Larvae are usually 10 to 100 times more sensitive than adults. Sublethal effects have been demonstrated with aromatic compounds in concentrations as low as 10 to 1,000 parts per billion (Johnston, 1979). The impact of a spill is thus apt to depend on the magnitude of egg and larval mortality. Because the early life stages are often pelagic, they are more susceptible to the effects of a surface slick.

Heavier hydrocarbon elements are characterized by aromatics of higher molecular weight and lower water solubility. These elements may be avoided by adult finfish, but benthic organisms such as those populating Cordell Bank are highly susceptible to their lethal effects. The sublethal effects of hydrocarbons on marine organisms include the disruption of normal feeding behavior, breeding, and locomotion; interference with thermo-regulation; reduced resistance to stress; and diseases caused by the intake of carcinogenic or potentially metagenic chemicals (MMS, 1986). Some organisms, however, may have the ability to compensate for minor toxic stress and may

thus be able to tolerate low concentrations of toxic hydrocarbons.

(5) Impact of Regulation on Human Activity

In addition to its applicability to oil discharges, the regulation prohibiting discharges would prohibit the disposal of litter and other solid wastes, such as fishing lines and non-biodegradable plastic or metal objects, which animals and birds in the Sanctuary could eat or in which they could become entangled. The regulation would also prohibit sewage outfall discharges, dumping and the disposal of dredge material within the Sanctuary.

The impact of this regulation on vessel operations is expected to be minor. The regulation of oil discharges in the CWA would be extended to prohibit all harmful discharges, including discarded fishing gear and other non-biodegradable solid wastes. Potentially harmful solid wastes would have to be retained on vessels until they can be disposed of properly. These restrictions are not expected to cause any hardship to vessel operators. Fish parts, bait, waste waters incidental to routine vessel operations, marine sanitation wastes and other biodegradable wastes are specifically exempted from the regulation. The disposal of dredged material in Cordell Bank waters has not been proposed in the past and does not now occur. Furthermore, the area seems unlikely to become attractive for this purpose in the future. The application of this regulation to such dumping codifies the existing situation and should have no adverse impact.

(b) Removing, Taking, or Injuring Sanctuary Resources

The regulation prohibiting removing, taking or injuring, or attempting to remove, take, or injure benthic invertebrates or algae is designed to protect sensitive Bank resources. This regulation does not apply to accidental removal, injury, or takings during normal fishing operations. Permits may be

granted for research, educational, salvage or Sanctuary management purposes pursuant to Sanctuary regulations. The regulation is not expected to affect significantly activities in the Sanctuary.

(c) Hydrocarbon Activities

Although Cordell Bank is excluded from the 5-year plan for outer continental shelf (OCS) leasing, if hydrocarbon exploration and development were permitted at a later date, such operations could threaten Bank resources. Hazards to living resources from oil exploration or development operations can result from the on-site discharge of drill cuttings and drilling muds which may adversely affect benthic biota or from accidental oil spills which may adversely affect fishery resources, marine mammals, and seabirds as well as benthic organisms.

Drilling muds consist of naturally occurring minerals such as barite, simple chemicals such as sodium hydroxide and potassium chloride, and complex organic compounds such as lignosulfonates and formaldehydes. Department of the Interior OCS Order Number 7 forbids the discharge of drilling muds containing toxic substances into ocean waters.

In 1983, the Marine Board of the National Research Council conducted a study of drilling discharges. The study found that these discharges present minimal risk to the marine environment. The Marine Board did note, however, that drilling discharges do have an impact on the immediate benthic environment (National Research Council - Marine Board, 1983). However, more recent research (EPA, 1985) has shown significant benthic impacts from platform discharges up to two miles from drilling sites.

Fluids and the lighter elements in drilling discharges are rapidly dispersed in the water column. The heavier elements, over 90 percent of the

discharged material, settle to the bottom, usually in a plume extending in the direction of prevailing bottom currents. The potential impacts on marine organisms resulting from the discharge of drilling muds and cuttings are: 1) decreased primary production caused by increased turbidity which reduces light levels; 2) interference with filter feeding caused by high particulate loads; 3) burial of benthic communities; and 4) injury resulting from the acute or chronic toxic effects of drilling mud constituents. In areas of strong currents, such as Cordell Bank, drilling muds would normally be dispersed rapidly over large areas and thus have a reduced impact (MMS, 1984).

A considerably greater hazard to marine resources than the discharge of drilling wastes is presented by accidental oil spills. The most severe impacts on marine environments would result from large, acute oil spills (greater than 1,000 barrels) usually associated with well blowouts or tanker accidents (MMS, 1984). Subsurface well blowouts could be particularly hazardous to a submerged reef ecosystem like Cordell Bank because of their potential for depositing high concentrations of toxic substances in the water column. This process was demonstrated by the IXTOC well blowout, which occurred in June, 1979, in Mexican waters of the Gulf of Mexico. The IXTOC blowout released some 10,000 barrels (one barrel holds 42 gallons) of oil per day into the ocean for nine months, thus providing scientists with their first major opportunity to study the transport of oil from a subsurface spill (MMS, 1986).

Although most spilled crude oil initially floats, approximately 1% - 5% of the volume of a surface slick will occur in the water column as a result of dissolution, dispersion, sinking, or sedimentation in the vicinity of the spill. Additional oil may be retained in the water as the result of a less

known mechanism, the formation of a subsurface oil plume. Because the oil in such a plume remains below the surface it may have a different chemistry than the surface slick and be more toxic to marine organisms. In the case of the IXTOC blowout, it was found that a subsurface plume of oil droplets, extending from the wellhead and generally aligned with the surface slick, contained high concentrations of low molecular weight aromatics, alkyl benzenes and naphthalene compounds which are acutely toxic to marine organisms (MMS, 1986). The adverse effects of oil spills on marine biota are discussed above (see (d) Discharges).

In addition to the acute effects of large oil spills on marine ecosystems, such spills may have long-term effects on surviving marine organisms. Sublethal and long-term hydrocarbon impacts on ecosystems are associated with low oil concentrations in marine environments which may result from the evaporation, degradation, and dispersion of hydrocarbons following a large spill or from chronic, low-level, small spills (less than 1,000 barrels). Of the two, chronic small spills may pose a greater hazard to marine ecosystems than isolated large spills.

Oil spills are caused by pipeline leaks and breaks and barge and tanker accidents as well as by well blowouts and other platform accidents. However, during the period 1964 - 1980, inclusive, sixty-five percent of oil spills associated with drilling and production problems were caused by blowouts. During these 17 years, a total of 102,382 barrels were discharged into marine waters as a result of blowouts at offshore wells in the Gulf of Mexico, while about half that amount, 55,213 barrels, was spilled as a result of non-blowout associated incidents (The Futures Group, 1982).

Massive spills caused by well blowouts have been highly publicized, but

such spills are rare. The OCS spill-rate for platform spills of more than 1,000 barrels is one per billion barrels produced (MMS, 1986). Most blowouts have been relatively minor, especially in recent years. From 1964 to 1981, 99.5% of the spill volume caused by blowouts in the Gulf of Mexico was spilled in the years, 1964 through 1971. After 1971 the volume of blowout-produced spills was negligible, yet there was no reduction in the number of blowout spills (The Futures Group, 1982). The OCS spill-rate for small platform or pipeline spills is 379 spills per billion barrels produced or transported. Ninety-nine percent of these spills are less than 50 barrels and 89% are less than one barrel (MMS, 1986).

Although the offshore oil industry has been successful in reducing the volume of oil spills, the record indicates that, if oil development were to take place in the area of Cordell Bank, spills from blowouts and platform accidents are likely to occur, although the volume spilled would probably be minor.

Under the preferred alternative, if future Five-Year OCS Leasing Plans allow leasing within the Sanctuary such oil and gas activities could be regulated by the Sanctuary program. Moreover, if exploration and development activities were to occur in the area or beyond the Sanctuary, they could be monitored to assess the likelihood of spills. Precautions could then be taken to minimize spill-risk and to improve contingency planning to reduce the impact of any spills that did occur.

(e) Enforcement

The impact of enhanced surveillance and enforcement efforts focused on Sanctuary resources should be beneficial. What is proposed is a coordinated emphasis on resource protection at Cordell Bank rather than an elaborate

surveillance and enforcement presence.

2. Research and Interpretation

The impacts resulting from implementation of the research and interpretation program are also expected to be positive. The research program will result in a coordinated mechanism for studying Cordell Bank's resources and developing effective management strategies. The interpretive program is designed to enhance public awareness of the Bank's resources and the importance of protecting such special marine areas.

The research program would provide a coordinated effort to obtain vital baseline and monitoring data on the resources and on human activities at Cordell Bank. Information on water quality and circulation, species density and diversity, fisheries resources and marine mammals and seabirds would be used in assessing the health of the Bank environment and the effects of human activity in the area. This would improve management's ability to develop long-term planning for the Sanctuary and would provide data useful in responding to oil spills.

The interpretive program would improve public awareness of the importance and fragility of Cordell Bank's resources and thus engender support for resource protection efforts. The program would provide audiovisual material, exhibits, and other information products for individuals, schools and interested groups.

3. Boundary Alternatives

All three boundary alternatives would protect the benthic organisms on Bank surfaces. The first alternative, however, would incorporate Cordell Bank itself and a large area around the Bank that is used by marine mammals and birds during migration or for feeding and resting. The area also supports

seabirds feeding and resting in these waters. Finally the first alternative would be contiguous with the Point Reyes-Farallon Islands National Marine Sanctuary boundary and would facilitate management and enforcement activities throughout the area.

The second and third alternatives on the other hand would not provide sufficient habitat protection to migrating and foraging marine mammals and seabirds. In addition the boundaries of the these two alternatives would leave unprotected gaps between the Cordell Bank National Marine Sanctuary and the adjacent Point Reyes-Farallon Islands National Marine Sanctuary.

4. Management Alternatives

Both management alternatives have the same impact in terms of resource protection and research. The preferred alternative, however, offers better opportunities for interpretation and is far more cost-effective.

B. The Status Quo Alternative

Under the status quo alternative, Cordell Bank will not have the degree of management, protection or public understanding warranted by the significance of its marine resources. In the existing regime, management is provided by individual Federal agencies, each of which is responsible for regulating specified activities under the authority of statutes directed to specific and sometimes narrow objectives. These regulatory activities are not performed in the context of a comprehensive management plan, and no organizational structure exists to coordinate research and regulation. There is no systematic environmental monitoring program nor is there a mechanism for applying research findings to the resolution of management issues.

The Magnuson Fishery Conservation and Management Act (MFCMA) provides for enforcement of Fishery Management Plans (FMP's) prepared by the Pacific

Fishery Management Council and approved by the National Marine Fisheries Service. Fishing in Cordell Bank waters is regulated by the groundfish and salmon Fishery Management Plans. In the FMP's, the Council establishes catch limits for groundfish and specifies the duration of the fishing season and catch and size limits for salmon. Commercial fishing-gear restrictions are specified for both the groundfish and salmon fisheries. These fishing-gear restrictions prohibit gill-net fishing above 38° north latitude, the northern part of the Bank. Below this line gill-net fishing is prohibited by California and enforced by the CF&G.

Although the existing regime provides protection to Cordell Bank from the effects of overfishing, it is inadequate in preventing adverse effects to Bank resources from other activities. The CWA prohibits the discharge of oil and other hazardous substances "which may affect natural resources.....under the exclusive management authority of the United States" (33 U.S.C. 1251-1367). The CWA also provides for the establishment of the National Contingency Plan to contain, disperse, or remove oil and hazardous substances after a spill (see Part II, Section III). The CWA thus furnishes some protection to marine resources from the harmful effects of effluent discharges.

The CWA, however, provides for a maximum penalty of only \$10,000 for a single discharge incident without the initiation of a civil action. This does not provide a sufficient deterrent for protecting important Sanctuary resources; \$50,000 is the maximum penalty allowed under the Marine Protection, Research and Sanctuaries Act (MPRSA). Moreover, under the status quo, there would probably be no specialized effort by the U.S. Coast Guard to enforce the CWA in the Cordell Bank area as distinct from other offshore waters.

Neither the CWA nor Title I of the MPRSA provide for the regulation of casual litter. Thus, there is no restriction on the disposal of non-biodegradable solid wastes that may injure Cordell Bank resources. Animals and birds may eat or become entangled in floating or submerged wastes such as plastic packing materials or discarded fishing lines.

Under the Outer Continental Shelf Lands Act, the Secretary of the Interior has the responsibility for regulating activities associated with oil and gas leasing. The leasing decisions of the Secretary have indicated the sensitivity of the Department of the Interior to environmental concerns and Cordell Bank, within the approximate fifty-fathom contour, is excluded from the Five-Year Outer Continental Shelf Leasing Plan. The area beyond the fifty-fathom depth contour, however, is not excluded. There is also no guarantee that any part of Cordell Bank will be excluded from future OCS Leasing Plans.

The MMPA and the ESA prohibit the "taking" of marine mammals and threatened or endangered species. The Migratory Bird Treaty Act prohibits the hunting of seabirds. The term "taking" has been interpreted broadly by the administering agencies, so that the ESA and MMPA provide considerable protection. However, the potential threats to marine mammals and endangered species range from direct injuries to a specific animal or population to indirect or cumulative degradation of their habitats. Neither the MMPA nor the ESA fully prevent such degradation of habitats.

Section 7(a) of the ESA does provide protection against actions which jeopardize endangered species or their critical habitats, but this section applies only to activities authorized, funded or carried out by Federal agencies, not to private or state actions. There is no explicit provision for

the designation or protection of marine mammal habitats under the MMPA.

A portion of the habitat used by marine mammals and seabirds foraging on Cordell Bank is protected under the National Marine Sanctuary Program. The nearby PRNMS provides protection for marine habitats used by mammals and seabirds, but Cordell Bank, which is an important feeding ground for many of the same mammals and seabirds and which also supports a unique combination of benthic organisms, is not similarly protected under the present regime.

Although the present management regime appears to be effective in regulating fisheries, it is inadequate in protecting Cordell Bank habitats from the effects of waste discharges. It is also weak in providing long-term protection from the effects of hydrocarbon development activities. Moreover, because the agencies that now have regulatory responsibility in the area act independently on the basis of their own statutory mandates, there is little likelihood that the present management regime could organize the research and monitoring program needed to identify environmental changes or that it would respond adequately to increased human activity on the basis of ecosystem or habitat issues.

Finally, no literature or other educational information on Cordell Bank and its habitat values is available to the general public. Recreational fishermen and nature enthusiasts who visit the Bank thus have little or no knowledge of its geology or of the complex communities of invertebrates that inhabit its upper reaches. Nor do they realize the value of Bank waters to the mammals and birds that feed there or pass through in transit. The non-fishing public is barely aware of the Bank's existence. Consequently, there is no informed public that can appreciate the worth of its resources and support efforts to protect them.

Section II: Unavoidable Adverse Environmental or Socioeconomic Effects

No unavoidable adverse environmental or socioeconomic impacts due to implementation of the management plan are foreseen. In fact it is possible that there will be a positive local socioeconomic impact due to increased awareness of Cordell Bank's ecological value and visitation by the public.

Section III: Relationship Between Short-term Uses of the Environment and the Maintenance and Enhancement of Long-term Productivity

Sanctuary designation emphasizes the importance of the natural resources of Cordell Bank. The quality of the Cordell Bank environment is still pristine and the healthy and diverse natural ecosystem is unaltered. Designation will enhance public awareness of the area and provide long-term assurance that its natural resources will be available for future use and enjoyment. Implementation of the preferred alternative ensures that changes in use patterns which degrade the Bank environment are monitored.

The interpretation, research and resource protection programs will provide information, management and protection that develops a foundation for wise public use of the area and results in long-term productivity. Similarly, information collected in the research program will assist Federal managers in making better management decisions. Better management will in turn help resolve use conflicts and mitigate the adverse effects of human activities.

PART V: LIST OF PREPARERS

Mr. Phil Williams - Project Manager, Marine and Estuarine Management Division, NOAA. Mr. Williams was responsible for the overall supervision of this project. Specifically, he assisted in the analysis of comments received on the Sanctuary proposal and preparation of the final EIS/MP and the final Sanctuary regulations. His academic background includes a Bachelor's Degree in Marine Zoology and a Master's Degree in Biology from San Diego State University.

Mr. William Windom - Project Manager, Marine and Estuarine Management Division, NOAA. Mr. Windom wrote the draft EIS/MP, the draft regulations and assisted with the analysis of comments received on the draft EIS. He received a Bachelor of Science Degree from Georgetown University's School of Foreign Service.

Mr. Mark Murray-Brown - Program Specialist, Marine and Estuarine Management Division, NOAA. Mr. Murray-Brown assisted in the analysis of comments received on the Sanctuary proposal and preparation of the final EIS/MP and the final Sanctuary regulations. His academic background includes a Bachelor's Degree in Biology from Bates College, ME; a Master's Degree in Oceanography from the Graduate School of Oceanography, University of Rhode Island; and a Master's Degree in Marine Policy from the Marine Affairs Department, URI.

List of Agencies, Organizations, and Persons Receiving Copies

PART VI: LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS RECEIVING COPIES

Federal Agencies

Advisory Council on Historic Preservation
Department of Agriculture
Department of Commerce
Department of Defense
Department of Energy
Department of Health and Human Services
Department of the Interior
Department of Justice
Department of Labor
Department of Transportation - U.S. Coast Guard
Environmental Protection Agency
Federal Energy Regulatory Commission
Marine Mammal Commission
Nuclear Regulatory Commission
Pacific Fishery Management Council

Congressional

Honorable Alan Cranston, United States Senate
Honorable Pete Wilson, United States Senate
Honorable Douglas H. Bosco, U.S. House of Representatives
Honorable Barbara Boxer, U.S. House of Representatives
Honorable Tom Lantos, U.S. House of Representatives

State Government and Agencies

The Board of Supervisors of Marin County
Sonoma County Board of Supervisors
California Coastal Commission
Pacific Marine Fisheries Commission
The Resources Agency of California
Sonoma County Regional Parks
Sonoma County Department of Planning

National and Local Interest Groups

American Association of Port Authorities
American Bureau of Shipping
American Fisheries Society
American Gas Association
American Petroleum Institute
Amoco Production Company
Atlantic Richfield Company
Boating Industry Association
Center for Law and Social Policy
Center for Marine Conservation
Chevron U.S.A., Inc.

National and Local Groups (continued)

Cities Service Company
Coast Alliance
Conservation Foundation
Continental Oil Company
The Cousteau Society
CZM Newsletter
Defenders of Wildlife
Edison Electric Institute
El Paso Natural Gas Company
Environmental Policy Center
Environmental Defense Fund, Inc.
Environmental Law Institute
Exxon Company, U.S.A.
Friends of the Coast
Friends of the Earth
Friends of the Sea Otter
The Greenpeace Foundation
Gulf Oil Company
Inverness Association
Marine Technology Society
The Marine Wilderness Society
Mobil Oil Corporation
National Association of Conservation Districts
National Association of Counties
National Audubon Society
National Coalition for Marine Conservation, Inc.
National Federation of Fishermen
National Fisheries Institute
National Ocean Industries Association
National Parks and Conservation Association
National Recreation and Park Association
National Research Council
National Wildlife Federation
Natural Resources Defense Council
Natural Resources Law Institute
Pacific Coast Federation of Fisherman's Associations, Inc.
Point Reyes Bird Observatory
Stinson Beach Village Association
Tomales Bay Association
The Whale Center
Union Oil Company
Water Pollution Control Federation
Wilderness Society
Worldwildlife Fund-U.S.

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APPENDIX 1: DESIGNATION DOCUMENT AND PROPOSED REGULATIONS

Final Designation Document for the Cordell Bank National Marine Sanctuary

Preamble

Under the authority of Title III of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, 16 U.S.C. §§ 1431 et seq. (the "Act"), the Cordell Bank and its surrounding waters offshore northern California, as described in Article 2, are hereby designated as a National Marine Sanctuary for the purpose of protecting and conserving that special, discrete, highly productive marine area and ensuring the continued availability of the ecological, research, educational, aesthetic, historical, and recreational resources therein.

Article 1. Effect of Designation

The Act authorizes the promulgation of such regulations as are necessary and reasonable to protect the characteristics of the Sanctuary that give it conservation, recreational, ecological, historical, research, educational, or aesthetic value. As used in the Act, this Designation Document, and the Sanctuary regulations, the word "historical" includes cultural, archaeological, and paleontological. Article 4 of this Designation Document lists those activities requiring regulation now or which may require regulation in the future in order to protect Sanctuary resources. Listing of an activity authorizes but does not require its regulation. Therefore, the listing of an activity does not imply that the activity will be regulated in the future. However, if an activity is not listed it can not be regulated, except on an emergency basis for no longer than 120 days where necessary to prevent immediate, serious, and irreversible damage to a Sanctuary resource, without amending Article 4 to list the activity. Such an amendment can only be

accomplished by following the same procedures through which the original designation was made.

Article 2. Description of the Area

The Sanctuary consists of a 397.05 square nautical mile area encompassed by a boundary extending at 180° from the northernmost boundary of the Point Reyes-Farallon Islands National Marine Sanctuary (PRNMS) to the 1,000 fathom isobath northwest of the Bank, then south along this isobath to the PRNMS boundary and back to the northeast along this boundary to the beginning point. The precise boundaries are set forth in the regulations.

Article 3. Characteristics of the Area that Give it Particular Value

Cordell Bank is characterized by a combination of oceanic conditions and undersea topography that provides for a highly productive environment in a discrete, well-defined area. In addition, the Bank and its surrounding waters may contain historical resources of national significance. The Bank consists of a series of steep-sided ridges and narrow pinnacles rising from the edge of the continental shelf. It lies on a plateau 300-400 feet (91-122 meters) deep and ascends to within about 115 feet (35 meters) of the surface. The seasonal upwelling of nutrient-rich bottom waters to the upper levels of the Bank stimulates the growth of planktonic organisms. These nutrients, combined with high light penetration in Bank waters and wide depth ranges in the vicinity, have led to a unique association of subtidal and oceanic species. The vigorous biological community flourishing at Cordell Bank includes an exceptional assortment of algae, invertebrates, fishes, marine mammals and seabirds.

Article 4. Scope of Regulation

Section 1.--Activities Subject to Regulation

The following activities may be regulated within the Sanctuary and adjacent waters to the extent necessary and reasonable to ensure the protection of the Sanctuary's conservation, recreational, ecological, historical, research, education or aesthetic values:

- a. Depositing or discharging any material or substance;
- b. Removing, taking, or injuring or attempting to remove, take, or injure benthic invertebrates or algae located on the Bank or within the 50 fathom isobath surrounding the Bank;
- c. Hydrocarbon (oil and gas) activities;
- d. Anchoring on the Bank or within the 50 fathom contour surrounding the Bank; and
- e. Removing, taking, or injuring or attempting to remove, take, or injure historical resources.

Section 2.--Consistency with International Law

The regulations governing activities listed in Section 1 of this Article shall apply to foreign flag vessels and foreign persons only to the extent consistent with generally recognized principles of international law, and in accordance with treaties, conventions, and other agreements to which the United States is a party.

Section 3.--Emergency Regulations

Where necessary to prevent immediate, serious and irreversible damage to a Sanctuary resource, activities, including those not listed in Section 1 of this Article, may be regulated within the limits of the Act on an emergency

basis for a period not to exceed 120 days.

Article 5. Relation to Other Regulatory Programs

Section 1.--Fishing

The regulation of fishing is not authorized under Article 4. Fishing vessels, however, are subject to regulation under Article 4 with respect to discharges and anchoring. All regulatory programs pertaining to fishing, including Fishery Management Plans promulgated under the Magnuson Fishery Conservation and Management Act, 16 U.S.C. §§ 1801 et seq. ("Magnuson Act"), shall remain in effect. All permits, licenses, approvals, and other authorizations issued pursuant to the Magnuson Act shall be valid within the Sanctuary subject only to regulations issued pursuant to Article 4.

Section 2.--Defense Activities

The regulation of activities listed in Article 4 shall not prohibit any Department of Defense (DOD) activities that are necessary for national defense. All such activities being carried out by DOD within the Sanctuary on the effective date of designation shall be exempt from any prohibitions contained in the Sanctuary regulations. Additional DOD activities initiated after the effective date of designation that are necessary for national defense will be exempted after consultation between the Department of Commerce and DOD. DOD activities not necessary for national defense, such as routine exercises and vessel operations, shall be subject to all prohibitions contained in the Sanctuary regulations.

Section 3.--Other Programs

All applicable regulatory programs shall remain in effect, and all permits, licenses, approvals, and other authorizations issued pursuant to those programs shall be valid, subject only to the regulation of activities

pursuant to Article 4.

Article 6. Alterations to this Designation

This designation may be altered only in accordance with the same procedures by which it has been made, including public hearings, consultation with interested Federal and State agencies and the Pacific Fishery Management Council, review by the appropriate Congressional committees, and approval by the Secretary of Commerce or his/her designee.

[End of Designation Document]

Accordingly, for the reasons set forth above, 15 CFR is amended as follows:

1. Part 942 is added to read as follows:

Part 942 - Cordell Bank National Marine Sanctuary
Sec.

- 942.1 Authority
- 942.2 Purpose
- 942.3 Boundary
- 942.4 Definitions
- 942.5 Allowed activities
- 942.6 Prohibited activities
- 942.7 Penalties
- 942.8 Permit applications--procedures and criteria
- 942.9 Certification of other authorizations
- 942.10 Appeals of administrative action

Appendix I - Cordell Bank National Marine Sanctuary Boundary Coordinates.

Authority: Sections 303, 304, 305, and 307 of Title III of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, 16 U.S.C. §§ 1431 et seq.

§ 942.1 Authority.

The Sanctuary has been designated by the Secretary of Commerce pursuant to the authority of Title III of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, 16 U.S.C. §§ 1431 et seq. ("Act"). The regulations in this part are issued pursuant to the authority of sections 303, 304, 305, and 307 of the Act.

§ 942.2 Purpose.

The purpose of designating the Sanctuary is to protect and conserve the special, discrete, highly productive marine area of Cordell Bank and its surrounding waters and to ensure the continued availability of the ecological, research, educational, aesthetic, historical and recreational resources therein.

§ 942.3 Boundary.

The Sanctuary consists of an area of marine waters approximately 50 miles west-northwest of San Francisco, California. The Sanctuary consists of a 397.05 square nautical mile area extending at 180° from the northernmost boundary of the Point Reyes-Farallon Islands National Marine Sanctuary (PRNMS) to the 1,000 fathom isobath northwest of the Bank, then south along this isobath to the PRNMS boundary and back to the northwest along this boundary to the beginning point. The boundary coordinates are listed in Appendix I following subsection 942.10.

§ 942.4 Definitions.

- (a) "Act" means Title III of the Marine Protection, Research, and

Sanctuaries Act of 1972, as amended, 16 U.S.C. § 1431 et seq.

(b) "Administrator" means the Administrator of the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce, or designee.

(c) "Assistant Administrator" means the Assistant Administrator for Ocean Services and Coastal Zone Management, National Ocean Service, NOAA, or designee.

(d) "Injure" means to change adversely, either in the long-or short-term, a chemical or physical quality of, or the viability of, a Sanctuary resource.

(e) "Person" means any private individual, partnership, corporation, or other entity; or any officer, employee, agent, department, agency or instrumentality of the Federal government, any state or local government, or any foreign government.

(f) "Sanctuary" means the Cordell Bank National Marine Sanctuary.

(g) "Sanctuary resource" means a living or non-living resource of the Sanctuary that contributes to its conservation, recreational, ecological, historical, research, educational, or aesthetic value.

Other terms appearing in these regulations are defined in 15 CFR § 922.2.

§ 942.5 Allowed Activities.

All activities except those prohibited by subsection 942.6 may be conducted within the Sanctuary subject to all other prohibitions, restrictions, and conditions imposed by any other authority.

§ 942.6 Prohibited Activities.

(a) Except as necessary for national defense, as necessary to respond to an emergency threatening life, property or the environment, or as

permitted by the Assistant Administrator in accordance with subsection 942.8, the following activities are prohibited and thus are unlawful for any person to conduct:

(1) Depositing or Discharging Materials or Substances.

(i) Depositing or discharging, from any location within the boundary of the Sanctuary, materials or substances of any kind except:

(A) Fish, fish parts and chumming materials (bait) produced and discarded during routine fishing activities conducted in the Sanctuary; and

(B) Water (including cooling water) and other biodegradable effluents incidental to use of a vessel in the Sanctuary and generated by: marine sanitation devices approved by the United States Coast Guard; routine vessel maintenance, e.g., deck wash down; engine exhaust; or meals on board vessels.

(ii) Depositing or discharging, from any location beyond the boundary of the Sanctuary, materials or substances of any kind, except for the exclusions listed in (i) above, which enter the Sanctuary and injure a Sanctuary resource.

(2) Removing, Taking, or Injuring Sanctuary Resources. Removing, taking, or injuring or attempting to remove, take, or injure benthic invertebrates or algae located on Cordell Bank or within the 50 fathom isobath surrounding the Bank. There is a rebuttable presumption that any such resource found in the possession of a person within the Sanctuary was taken or removed by that person. This prohibition does not apply to accidental removal, injury, or takings during normal fishing operations.

(b) All activities being carried out by the Department of Defense (DOD) within the Sanctuary on the effective date of designation that are necessary for national defense are exempt from the prohibitions contained in these

regulations. Additional DOD activities initiated after the effective date of designation that are necessary for national defense will be exempted by the Assistant Administrator after consultation between the Department of Commerce and DOD. DOD activities not necessary for national defense, such as routine exercises and vessel operations, are subject to all prohibitions contained in these regulations.

(c) The prohibitions in this section are applicable to foreign persons and foreign flag vessels only to the extent consistent with generally recognized principles of international law, and in accordance with treaties, conventions, and other international agreements to which the United States is a party.

(d) Where necessary to prevent immediate, serious, and irreversible damage to a Sanctuary resource, any activity may be regulated within the limits of the Act on an emergency basis for no more than 120 days.

§ 942.7 Penalties.

(a) Section 307(c) of the Act authorizes the assessment of a civil penalty of not more than \$50,000 for each violation of the Act or any regulation or permit issued pursuant to the Act. Each day of a continuing violation constitutes a separate violation. Section 307(c)(3) further authorizes a proceeding in rem against any vessel used in such violation and for which a civil penalty has been assessed.

(b) Regulations setting forth the administrative procedures governing the assessment of civil penalties, enforcement hearings and appeals, permit sanctions and denials for enforcement reasons, and the issuance of written warnings appear at 15 CFR Part 904.

§ 942.8 Permit Applications - Procedures and Criteria.

(a) If a person wishes to conduct an activity prohibited under subsection 942.6, that person must apply for, receive, and have in possession on board any vessel used a valid permit issued pursuant to this Part authorizing that person to conduct that activity.

(b) Permit applications shall be addressed to the Assistant Administrator, Ocean Services and Coastal Zone Management; ATTN: Marine and Estuarine Management Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, 1825 Connecticut Avenue, N.W., Washington, D.C. 20235. An application shall include a description of all activities proposed, the equipment, methods, and personnel (particularly describing relevant experience) involved, and a timetable for completion of the proposed activity. Copies of all other required permits, licenses, approvals, and other authorizations shall be attached.

(c) Upon receipt of a complete application, the Assistant Administrator may seek the views of any person, within or outside the Federal Government, and may hold a public hearing, at his or her discretion.

(d) The Assistant Administrator, at his or her discretion, may issue a permit subject to such terms and conditions as deemed appropriate, to conduct an activity otherwise prohibited by subsection 942.6, if the Assistant Administrator finds that the activity will further research related to Sanctuary resources; further the educational or historical value of the Sanctuary; further salvage or recovery operations in or near the Sanctuary in connection with a recent air or marine casualty; or assist in the management of the Sanctuary. In deciding whether to issue a permit, the Assistant Administrator may consider such factors as the professional

qualifications and financial ability of the applicant as related to the proposed activity; the appropriateness of the methods and procedures proposed by the applicant for the conduct of the activity; the extent to which the conduct of the activity may diminish or enhance the values for which the Sanctuary was designated; and the end value of the applicant's overall activity.

(e) A permit issued pursuant to this section is nontransferable.

(f) The Assistant Administrator may amend, suspend or revoke a permit issued pursuant to this subsection, in whole or in part, if the Assistant Administrator determines that the permittee has acted in violation of the terms or conditions of the permit or of these regulations or that other good cause exists for amending, suspending or revoking the permit. Any such action shall be communicated in writing to the permittee, and shall set forth the reason(s) for the action taken. Procedures governing permit sanctions and denials for enforcement reasons are found at Subpart D of 15 CFR Part 904.

§ 942.9 Certification of other authorizations.

(a) All permits, licenses, approvals, and other authorizations issued pursuant to any authority are valid within the Sanctuary subject only to the prohibitions set forth in subsection 942.6. All applicable regulatory programs remain in effect.

(b) A permit, license, approval, or other authorization allowing the discharge or deposit of materials or substances otherwise prohibited under subsection 942.6(a)(1), or the removal, taking, or injury of, or an attempt to remove, take, or injure benthic invertebrates or algae otherwise prohibited under subsection 942.6(a)(2) shall be valid if certified by the

Assistant Administrator as consistent with the purpose of the Sanctuary and having no significant effect on Sanctuary resources. Such certification may impose terms and conditions as deemed appropriate to ensure consistency.

(c) In considering whether to make the certifications called for in this section, the Assistant Administrator may seek and consider the views of any other person, within or outside the Federal government, and may hold a public hearing as deemed appropriate.

(d) Any certification called for in this section shall be presumed unless the Assistant Administrator acts to deny or condition the certification within 60 days from the date that the Assistant Administrator receives notice of the permit, license, approval, or other authorization, and the supporting data deemed necessary by the Assistant Administrator in order to make a decision on the certification.

(e) The Assistant Administrator may amend, suspend, or revoke any certification made under this section whenever the continued conduct of the activity would violate any terms or conditions of the certification. Any such action shall be communicated in writing to both the holder of the certified permit, license, approval, or other authorization and the issuing agency and shall set forth reason(s) for the action taken.

(f) Either the holder or the issuing agency may appeal any action conditioning, denying, amending, suspending, or revoking any certification in accordance with the procedure provided for in subsection 942.10.

§ 942.10 Appeals of Administrative Action.

(a) Except for permit actions taken for enforcement reasons and therefore covered by the procedures at Subpart D of 15 CFR Part 904, an applicant for a permit, a permittee, or any other interested person

(hereinafter appellant) may appeal the grant, denial, conditioning, amendment, suspension, or revocation of any permit under subsection 942.8 to the Administrator of NOAA. In order to be considered by the Administrator, such appeal must be in writing, must state the action(s) appealed and the reason(s) therefor, and must be submitted within 30 days of the action(s) by the Assistant Administrator. The Administrator, in his or her discretion, may hold an informal hearing on the appeal.

(b) Upon receipt of an appeal authorized by this section, the Administrator may request the appellant, the permit applicant or permittee, if other than the appellant, or any person, within or outside the Federal government, to submit such information as the Administrator may deem appropriate in order to decide the appeal. The Administrator shall decide the appeal based on the record before the Assistant Administrator and the record of the appeal. The Administrator shall notify the appellant and other interested persons of the final decision and the reason(s) therefor in writing, normally within 30 days of the date of the receipt of adequate information to make the decision.

(c) If the Administrator determines that an informal hearing should be held, the Administrator may designate an officer before whom the hearing shall be held. Notice of the time, place, and subject matter of the hearing shall be published in the Federal Register. Such hearing shall be held no later than 30 days following publication of the notice in the Federal Register, unless the hearing officer extends the time for reasons deemed equitable. The appellant, the applicant or permittee and other interested persons may appear personally or by counsel at the hearing and submit such material and present such arguments as determined appropriate by the hearing

officer. Within 30 days of the conclusion of the hearing, the hearing officer shall recommend a decision in writing to the Administrator.

(d) The Administrator may adopt the hearing officer's recommended decision, in whole or in part, or may reject or modify it. In any event, the Administrator shall notify the appellant and other interested persons of his/her decision, and the reason(s) therefor in writing within 30 days of receipt of the recommended decision of the hearing officer. The Administrator's decision shall constitute final agency action for the purposes of the Administrative Procedure Act.

(e) Any time limit prescribed in this section may be extended by the Administrator for good cause for a period not to exceed 30 days, either upon his/her own motion or upon written request from the appellant, permit applicant or permittee, stating the reason(s) therefor.

Appendix I: Proposed Cordell Bank National Marine Sanctuary Boundary Coordinates

Point No.	Latitude	Longitude	Point No.	Latitude	Longitude
1	38°15'51.72"	123°10'52.44"	25	37°51'42.81"	123°31'19.10"
2	38°07'55.88"	123°38'33.53"	26	37°50'59.58"	123°31'02.96"
3	38°06'45.21"	123°38'00.40"	27	37°48'49.14"	123°28'44.61"
4	38°04'58.41"	123°37'14.34"	28	37°49'22.64"	123°29'34.07"
5	38°04'28.22"	123°37'17.83"	29	37°48'49.14"	123°28'44.61"
6	38°03'42.75"	123°36'55.66"	30	37°48'36.95"	123°28'08.29"
7	38°03'11.10"	123°36'19.78"	31	37°48'03.37"	123°28'23.27"
8	38°02'46.12"	123°36'21.98"	32	37°47'41.54"	123°28'01.97"
9	38°02'02.74"	123°35'56.56"	33	37°47'01.78"	123°27'16.78"
10	38°01'27.10"	123°35'55.12"	34	37°46'51.92"	123°26'48.98"
11	38°01'22.28"	123°36'55.13"	35	37°46'13.20"	123°26'04.79"
12	38°01'11.54"	123°37'28.21"	36	37°46'00.73"	123°25'36.99"
13	38°00'49.16"	123°37'29.77"	37	37°50'25.31"	123°25'26.53"
14	37°59'54.49"	123°36'47.90"	38	37°54'32.28"	123°23'16.49"
15	37°59'12.39"	123°35'59.55"	39	37°57'45.71"	123°19'17.72"
16	37°58'39.40"	123°35'14.85"	40	37°59'29.27"	123°14'12.16"
17	37°58'00.57"	123°34'42.93"	41	37°59'43.71"	123°08'27.55"
18	37°57'18.99"	123°33'43.15"	42	38°03'10.20"	123°07'44.35"
19	37°56'56.42"	123°32'51.97"	43	38°04'01.64"	123°06'58.92"
20	37°56'18.90"	123°32'49.24"	44	38°08'33.32"	123°04'56.24"
21	37°55'22.37"	123°32'36.96"	45	38°12'42.06"	123°07'10.21"
22	37°54'26.10"	123°32'21.73"			
23	37°53'07.46"	123°31'46.81"			
24	37°52'34.93"	123°31'13.90"			

APPENDIX 2: STATE AND FEDERAL AUTHORITIES APPLICABLE TO CORDELL BANK

State and Federal Authorities Applicable to Cordell Bank

Introduction

This appendix is designed to provide reviewers additional information beyond that provided in the status quo section of the environmental impact statement (Part III, Section I) on the existing state and Federal authorities with jurisdiction applicable to the proposed Cordell Bank National Marine Sanctuary. This information serves as a basic reference to the status quo and the environmental consequences sections of the DEIS/MP.

State

1. California Department of Fish and Game

The California Department of Fish and Game (CF&G), under the Fish and Game Code (and Chapter 14 of the Administrative Code), regulates and manages a wide variety of activities affecting the living marine resources found in the territorial sea and in the 200-mile wide exclusive economic zone. The focus of the Department's activities in Cordell Bank waters consists of the enforcement of state laws in areas that are not administered under federal regulations such as those Federal authorities listed below. The CF&G also enforces Federal regulations established under the Magnuson Fishery Conservation and Management Act.

Federal

1. Magnuson Fishery Conservation and Management Act (MFCMA) (16 USC 1801 et seq.)

The MFCMA provides for the conservation and management of all fishery resources in the zone between 3 and 200 nmi offshore. The National Marine Fisheries Service (NMFS), within NOAA, is charged with establishing guidelines for, and approving, fishery management plans (FMP's) prepared by

Regional Fishery Management Councils for selected fisheries. These plans determine the levels of commercial and sport fishing, consistent with the goal of achieving and maintaining an optimum yield for each fishery. The Pacific Fishery Management Council is responsible for preparing FMP's for west coast fisheries, including those in the area of Cordell Bank.

The MFCMA is enforced by the U.S. Coast Guard (USCG) and the NMFS. The Act also empowers the Secretary of Commerce to enter into agreements with any state agency for enforcement purposes. Such an agreement exists between the California Department of Fish and Game (CF&G) and the Department of Commerce. Under this cooperative agreement, signed December 3, 1978, the CF&G and NMFS are deputized to enforce each other's laws. NMFS personnel can enforce State law within three nautical miles of the coast and state officers can enforce Federal laws in waters between three and 200 nautical miles off the coast. The USCG also has agreements with NMFS and CF&G under which it provides transportation and other facilities for law enforcement.

The Pacific Coast groundfish FMP, prepared by the Pacific Fishery Management Council, went into effect in September, 1980. The regulations established by this FMP govern recreational and commercial fishing for a variety of groundfish, among them rockfish and lingcod, the two most abundant stocks in Cordell Bank waters. The FMP sets daily bag limits on the number of rockfish and lingcod that can be taken by recreational fishermen. The commercial harvest of rockfish is managed by gear regulations and catch limits adopted by the Council.

Catch statistics indicate that jack mackerel and salmon are the third and fourth most abundant fish stocks in Bank waters. However, the jack mackerel FMP covers only that part of the fishery that extends north of 39°

N. latitude. It thus does not apply to Cordell Bank, which is one degree to the south. The salmon FMP on the other hand does govern fishing at the Bank.

The Pacific salmon FMP was prepared by the Council in 1978 and has since been amended annually. Under the terms of the 1983 amendment, Cordell Bank waters are included in a fishery management unit that extends from Cape Vizcaino to the Mexican border. In this unit, all species of salmon may be caught by recreational fishermen. The fishing season in this unit, as well as bag and size limits, is established by the Council in the FMP. The FMP also regulates commercial fishing by gear limitations and catch and size limits.

2. Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.)

The ESA provides protection for listed species of plants and animals in both state and Federal waters. The Fish and Wildlife Service (FWS), in the Department of the Interior, and NMFS determine which species need protection and maintain the lists of endangered and threatened species. The most significant protection provided by the ESA is the prohibition on taking. The term "take" is defined broadly to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in such conduct" (16 USC 1532(19)). The FWS regulations interpret the term "harm" to include acts that cause significant environmental modification or degradation or that annoy listed species to such an extent that they significantly disrupt essential behavior patterns (50 CFR 17.3).

The ESA also provides some protection to endangered species and their habitat from less direct threats. This is accomplished by means of a consultation process (known as Section 7) designed to insure that projects authorized, funded, or carried out by Federal agencies do not jeopardize the

continued existence of endangered or threatened species or "result in the destruction or modification of habitat of such species which is determined by the Secretary (of the Interior or Commerce) to be critical" (16 USC 1536). Critical habitat areas for endangered species are designated by the FWS and NMFS depending on the species. No critical habitats have been designated in marine areas.

3. Marine Mammal Protection Act of 1972 (MMPA) (16 U.S.C. 1361 et seq.)

The MMPA applies to U.S. citizens and foreign nationals subject to U.S. jurisdiction; and it is designed to protect all species of marine mammals. The MMPA is jointly implemented by the NMFS, which is responsible for whales, porpoises, and pinnipeds other than walruses, and the FWS, which is responsible for all other marine mammals. The Marine Mammal Commission advises these implementing agencies and sponsors relevant scientific research. The primary management features of the Act include: (1) a moratorium on the "taking" of marine mammals; (2) the development of a management approach designed to achieve an "optimum sustainable population" for all stocks of marine mammal species, and (3) protection of populations determined to be "depleted."

Marine mammal species whose populations have been determined to be depleted receive additional protection (16 USC 1362). No permit may be issued for the taking of any marine mammal determined to be depleted except for scientific research purposes. The fin, humpback, gray, sperm, sei, and blue whales are treated as "depleted" based on their listing as endangered or threatened species under the ESA.

4. Clean Water Act (CWA) (33 U.S.C. 1251 et seq.)

The CWA establishes the basic scheme for restoring and maintaining the

chemical, physical, and biological integrity of the Nation's waters. The CWA contains two basic mechanisms for preventing water pollution: (1) the regulation of discharges from known sources, and (2) the regulation of oil and hazardous substance discharges. The Act also regulates the disposal of vessel sewage and dredged material.

(a) Discharges

The CWA's chief mechanism for preventing or reducing water pollution is the National Pollutant Discharge Elimination System (NPDES), administered by the Environmental Protection Agency (EPA). Under the NPDES program, a permit is required for the discharge of any pollutant from a point source into the navigable waters of a state, the contiguous zone, or the ocean.

(b) Oil and Hazardous Substance Pollution

The CWA prohibits discharges of oil and hazardous substances in such quantities as may be harmful to public health or to the environment, except for discharges outside the territorial sea permitted by the Act to Prevent Pollution from Ships (APPS), 1987 (33 USC 1901 et seq) (See Act to Prevent Pollution from Ships, below). When such discharges do occur, the National Contingency Plan for the removal of oil and hazardous substance discharges will take effect. The USCG, in cooperation with EPA, administers the plan, which establishes the organizational framework for cleaning up all discharges of oil in the contiguous zone and oil spills resulting from activities under the Outer Continental Shelf Lands Act, discussed below.

(c) Recreational Vessels

The CWA (33 U.S.C. 1322) requires recreational vessels with toilet facilities to contain operable marine sanitation devices. The regulations state that boats, 65 feet in length and under, may use either type I, II, or

III sanitation devices which must be certified by the USCG. Types I and II are chemical treatment devices and type III is a holding tank. The CWA requires non-commercial craft to comply with marine sanitation device regulations issued by EPA and enforced by the USCG.

(d) Dredging and Discharging Dredged Materials

Section 404 permits from the Army Corps of Engineers, based on EPA-developed guidelines, are required prior to filling or discharging dredged materials within three miles of shore. Such operations include the discharge of wetloads or the transportation of dredged material for the purpose of dumping it into ocean waters.

5. The River and Harbor Act (33 USC 401 et seq.)

Section 10 (33 USC 403) prohibits the unauthorized obstruction of navigable waters of the United States. The construction of any structure in the territorial sea or on the outer continental shelf is prohibited without a permit from the Army Corps of Engineers. Section 13 (33 USC 407) prohibits the discharge of refuse and other substances into navigable waters, but has been largely superseded by the CWA, discussed above. In effect, such discharges are regulated under this section only insofar as they affect navigation or anchoring.

6. Ports and Waterways Safety Act (PWSA) (33 USC 1221 et seq)

The PWSA, as amended by the Port and Tanker Safety Act of 1978, is designed to promote navigation and vessel safety and the protection of the marine environment. The PWSA authorizes the USCG to establish vessel traffic services and systems for ports, harbors, and other waters subject to congested vessel traffic. Vessel Traffic Separation Schemes (VTSS's) are applicable to commercial ships other than fishing vessels weighing 300 gross tons (270

gross metric tons) or more. The USCG has established a VTSS for ship traffic approaching San Francisco Bay from the north or departing in that direction. It consists of two, mile-wide inbound and outbound vessel traffic lanes with a separation zone between them. The separation zone is not to be used by vessels except for crossing between inbound and outbound lanes. Vessel traffic in the approaches to San Francisco Bay is discussed in Part II, Section II.C of the FEIS/MP.

In addition to vessel traffic control, the USCG regulates other navigational and shipping activities and has promulgated numerous regulations relating to vessel design, construction, and operation designed to minimize the likelihood of accidents and to reduce vessel source pollution. Finally, the USCG is vested with the primary responsibility for maintaining boater safety, including the conduct of routine vessel inspections and coordination of rescue operations.

7. Act to Prevent Pollution from Ships (APPS), 1987 (33 USC 1901 et seq.)

The International Convention for the Prevention of Pollution of the Sea by Oil, 1954, and the Oil Pollution Act of 1961 have been superseded by the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol relating thereto (MARPOL 73/78) and implemented by the Act to Prevent Pollution from Ships, 1980 as amended 1982, 1987. The APPS regulates discharges of oil or oily mixtures from vessels with the exception of tankers of less than 150 gross tons and other vessels of less than 500 gross tons. Enforcement of the Act is the responsibility of the USCG.

Except for discharges from machinery space bilges, tankers subject to the Act may not discharge oil or oily mixtures unless they are 50 nautical

miles from the nearest land; the total quantity of oil discharged cannot exceed one part in 15,000 of the total cargo capacity. Discharges from other vessels regulated by the Act, and discharges from the machinery bilges of tankers, must be made as far as practicable from land and may not have an oil content of more than 100 parts per million. In addition to these requirements, discharges by any vessel regulated by the Act must be made while the vessel is en route. The instantaneous discharge rate must not exceed sixty liters per mile.

8. Outer Continental Shelf Lands Act, (OCSLA) (43 USC 1331 et seq.)

The OCSLA, as amended in 1978 and 1985, establishes Federal jurisdiction over the natural resources of the Outer Continental Shelf (OCS) beyond 3 nautical miles, and gives the Secretary of the Interior primary responsibility for managing OCS mineral exploration and development. The Secretary's responsibility has been delegated to the Minerals Management Service (MMS).

The MMS has overall responsibility for leasing OCS lands. In unique or special areas, MMS may impose special lease stipulations designed to protect specific geological and biological phenomena. These stipulations may vary among lease tracts and sales.

Secretarial Order No. 2974 of August 1978 (655.DMI) establishes a framework for interagency coordination during the OCS leasing process. Pursuant to this order, other Department of the Interior agencies, including the FWS and the National Park Service, are consulted on the potentially adverse impacts of OCS development and on the development of stipulations necessary to control them.

The MMS is also charged with supervising OCS operations, including the

approval of plans for exploration and development drilling and applications for pipeline rights-of-way on the OCS. Several types of regulatory authority are used in carrying out its supervisory role. Such authority includes the enforcement of regulations made pursuant to the OCSLA (30 CFR Part 250 and 256) and the enforcement of stipulations applicable to particular leases and OCS orders.

9. Title I of the Marine Protection, Research, and Sanctuaries Act (33 USC 1401 et seq.)

Title I of the Marine Protection, Research, and Sanctuaries Act (MPRSA), also known as the Ocean Dumping Act, prohibits the transportation of any materials from the United States for the purpose of dumping them into the territorial sea, the contiguous zone, and the ocean beyond, without a permit from EPA. The dumping of dredged materials is controlled by the Army Corps of Engineers. No materials are presently transported to Cordell Bank for the purpose of dumping and no such operations are likely in the future.

APPENDIX 3: ABBREVIATIONS

Abbreviations

APPS - Act to Prevent Pollution from Ships (33 U.S.C. 1901 et seq.)

BLM - Bureau of Land Management, Department of the Interior

CENMS - Cordell Bank National Marine Sanctuary

CERCLA - Comprehensive Environmental Response, Compensation and Liability Act

CF&G - California Department of Fish and Game

CWA - Clean Water Act (33 U.S.C. 1251 et seq.)

EPA - Environmental Protection Agency

ESA - Endangered Species Act (16 U.S.C. 1531 et seq.)

FMP - Fishery Management Plan

FWS - Fish and Wildlife Service, Department of the Interior

GGNRA - Golden Gate National Recreation Area

LRA - List of Recommended Areas

MEMD - Marine and Estuarine Management Division, NOAA, Department of Commerce
Formerly called Sanctuary Programs Division (SPD)

MFCMA - Magnuson Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.)

MMS - Minerals Management Service, Department of the Interior

MMPA - Marine Mammal Protection Act (16 U.S.C. 1361 et seq.)

MPRSA - Marine Protection, Research and Sanctuaries Act (33 U.S.C. 1401 et seq.)

NMFS - National Marine Fisheries Service, NOAA, Department of Commerce

NOAA - National Oceanic and Atmospheric Administration, Department of Commerce

NPDES - National Pollutant Discharge Elimination System

NPS - National Park Service, Department of the Interior

NRP - National Research Plan (MEMD)

OCS - Outer Continental Shelf

OCSLA - Outer Continental Shelf Lands Act (43 U.S.C. 1331 et seq.)

PRBO - Point Reyes Bird Observatory

PRNMS - Point Reyes-Farallon Islands National Marine Sanctuary

PRNS - Point Reyes National Seashore

PWSA - Ports and Waterways Safety Act (33 U.S.C. 1221 et seq.)

RFP - Request for proposals

SEL - Site Evaluation List

SPD - Sanctuary Programs Division, NOAA, Department of Commerce
Now called Marine and Estuarine Management Division (MEMD)

SRP - Sanctuary Research Plan

USCG - United States Coast Guard, Department of Transportation

VTSS - Vessel Traffic Separation Scheme (USCG)