
Channel Islands

National Marine Sanctuary

Management Plan

U.S. Department of Commerce

National Oceanic and
Atmospheric Administration

Sanctuary Programs Division

Channel Islands

**CHANNEL ISLANDS
NATIONAL MARINE SANCTUARY
MANAGEMENT PLAN**

September, 1983

Prepared for:

U.S. Department of Commerce
National Oceanic and Atmospheric
Administration

Sanctuary Programs Division
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About this plan.

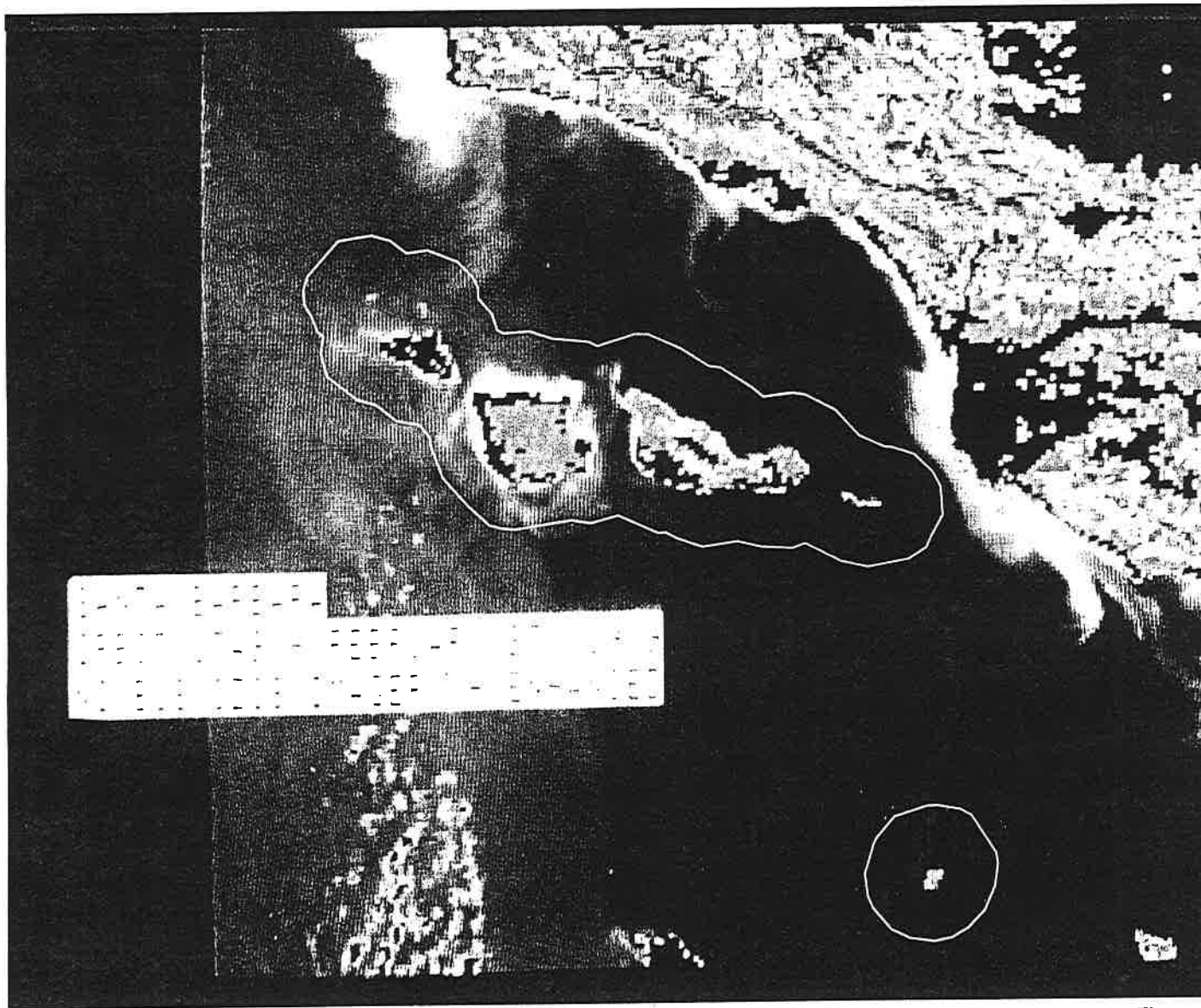
This management plan is designed to inform sanctuary users and the general public about the Channel Islands National Marine Sanctuary and the various activities that are planned for the site over time. The final Environmental Impact Statement and final regulations established the sanctuary boundary and regulatory controls, with the sanctuary formally being designated in September 1980. This plan serves to guide the agencies responsible for sanctuary management in implementing the goals and objectives stated in the Final Environmental Impact Statement.

The National Marine Sanctuary Program is responsible for review and periodic update of this plan so that it reflects the information and experience gained through sanctuary operations. Readers are invited to contribute their comments and suggestions to this process. For copies of this document, you may write to:

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**Satellite View
of the Channel
Islands National
Marine Sanctuary**


 Sanctuary Boundary

Figure 1

Source: Coastal Zone Color Scanner Imagery of
Southern California (February 27, 1979)

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**Management Plan
for the Channel Islands
National Marine
Sanctuary**

SECTION 1

A Management Plan for the Channel Islands National Marine Sanctuary

1. INTRODUCTION

The waters within six nautical miles of the northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa Islands) and Santa Barbara Island were formally designated as a national marine sanctuary in 1980, in accordance with Title III of the Marine Protection, Research and Sanctuaries Act. The sanctuary lies between 8 and 40 nautical miles (nm) off the southern California mainland, north of Los Angeles and immediately south of the Santa Barbara Channel (Figure 2).

Encompassing approximately 1252 square nautical miles, the Channel Islands National Marine Sanctuary includes a variety of nearshore habitats and unique marine resources characteristic of the southern California bight. Being relatively remote from the heavily urbanized mainland, the sanctuary is considered a refuge for one of the largest and most diverse populations of marine mammals and seabirds in the world. Six species of seals and sea lions use the area as feeding grounds. Large numbers of whales, dolphins, and resident seabirds also depend on the rich waters of the sanctuary. Because of the major ocean currents that meet in the vicinity of the islands, the fish and invertebrates inhabiting the extensive kelp forests represent both cold temperate and warm temperate waters, with many species found only in this unique transition zone.

The abundant marine resources of the Channel Islands National Marine Sanctuary have traditionally supported several important commercial and sport fisheries. Today, the nearshore waters continue to provide for these activities and are also used for recreational diving, boating, and nature viewing. These opportunities account for



2. Anchorage at Santa Cruz Island.

NPS File

the human significance placed upon sanctuary resources.

The Channel Islands National Marine Sanctuary was established to protect significant marine resources and, in doing so, ensure that visitors would continue to appreciate and enjoy the area. Objectives and recommendations set out in the

Final Environmental Impact Statement (Department of Commerce, 1980) have guided sanctuary management through its initial years until a more comprehensive, long-term strategy could be developed. This management plan will guide development of programs for resource protection, research, and interpretation for the next five years. The plan prescribes actions to resolve immediate

management concerns and formulates guidelines for continuing management over the longer term.

The plan also provides an administrative framework that recognizes the need for cooperation and coordination for effective management. The Sanctuary Programs Division, National Oceanic and Atmospheric Administration (NOAA), the Sanctuary Manager and staff, the California Department of Fish and Game (CF&G), and the National Park Service (NPS) are key participants in management of the Channel Islands National Marine Sanctuary.

Variable funding for staff and program development over the next five years may affect specific aspects of sanctuary management as described in this plan. The timing for the installation of facilities and the scale of programs may have to be adjusted based on such unforeseeable factors. Nonetheless, the goals and management objectives embodied in this plan will remain unchanged.

2. SANCTUARY GOALS AND MANAGEMENT OBJECTIVES

The preliminary goals and objectives which appeared in the *Final Environmental Impact Statement* (Department of Commerce, 1980) have been updated and refined during preparation of the plan. Four main goals provide the basis for the major program areas for sanctuary management. More detailed management objectives establish specific targets that will help achieve sanctuary goals within a five-year plan.



3. California sea lions.

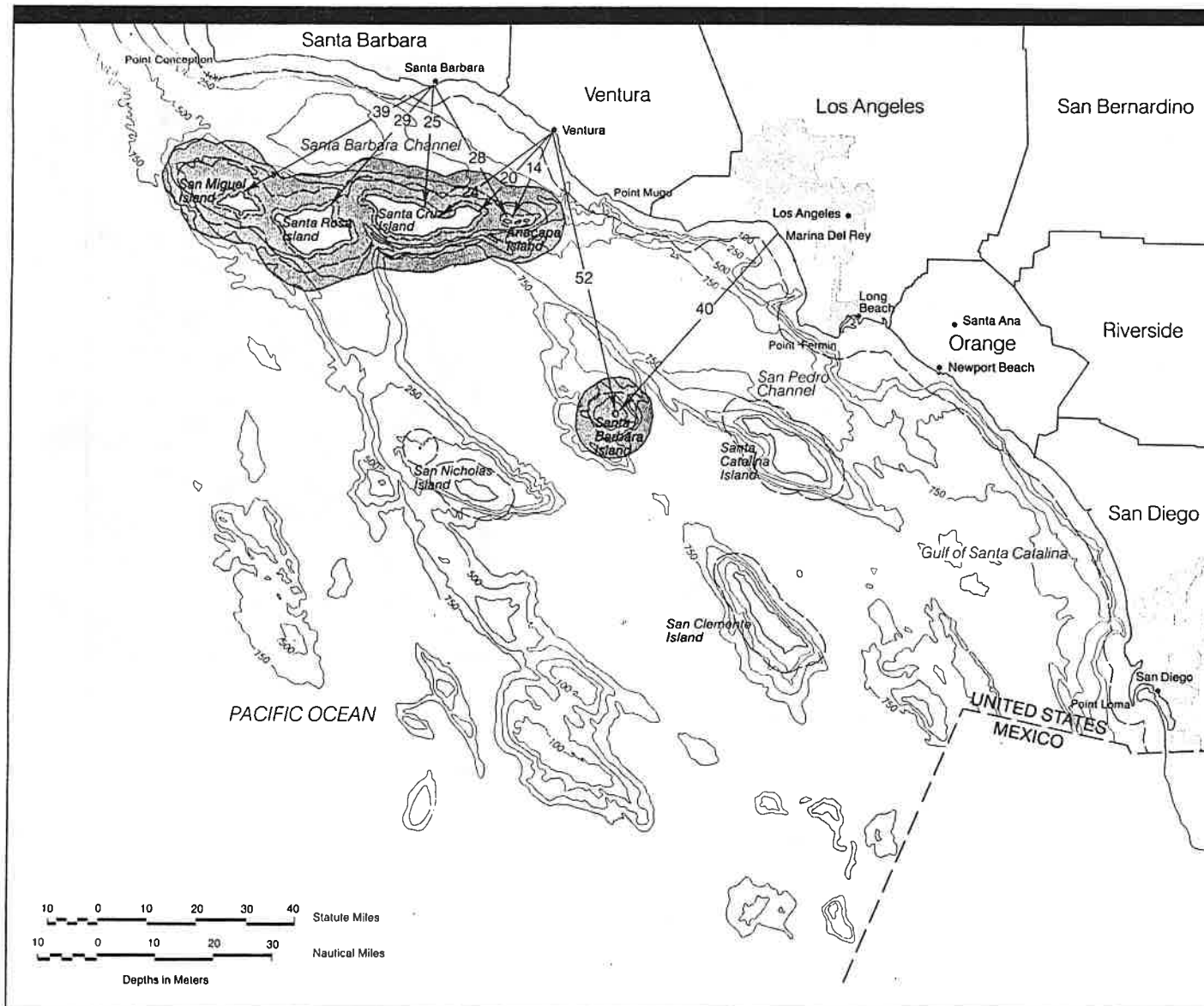
NPS File

(a) Resource Protection

The goal assigned highest priority for management is to enhance protection of the marine environment and resources of the Channel Islands National Marine Sanctuary.

Specific objectives aimed at this goal are:

- Establish cooperative agreements and other mechanisms for coordination and collaboration among all the federal and state agencies participating in sanctuary management;



The Study Area and its Regional Context






-  Channel Islands National Marine Sanctuary
-  Channel Islands National Park
-  Distance (in Nautical Miles) to a Destination within the Sanctuary
-  3-mile Limit
-  1 Nautical Mile NPS Administrative Boundary

Figure 2

- Promote public awareness of and voluntary user compliance with regulations through an educational program stressing resource sensitivity and wise use;
- Develop an effective and coordinated program for the enforcement of sanctuary regulations; and
- Reduce threats to sanctuary resources raised by major emergencies through contingency and emergency response planning.

(b) Research

Research activities within the program are directed to resolving management concerns and increasing the understanding of the sanctuary environment and significant resources.

Specific objectives for the research program are as follows:

- Establish a framework and procedures for administering research to ensure that projects are responsive to management concerns and that results contribute to improved management of the sanctuary;
- Make effective use of research results by incorporating them into information and interpretation programs; and
- Encourage information exchange among all the organizations and agencies undertaking management-related research in the sanctuary to promote more informed management.

(c) Interpretation

Interpretive programs aim to enhance 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:

- Enhance public access to relevant information on the sanctuary, its goals, and resources;
- Improve opportunities for a wider public access to the sanctuary and first-hand appreciation of significant sanctuary resources;
- Broaden public support for the sanctuary and sanctuary management by offering on-site and off-site programs suited to visitors of diverse interests, ages, and skills;
- Provide for public involvement by encouraging feedback on the effectiveness of interpretive programs, collaboration with sanctuary management staff in extension/outreach programs, and participation in other volunteer programs; and
- Collaborate with other organizations to provide interpretive services complementary to the sanctuary program.

(d) Visitor Use

The sanctuary goal for visitor management is to encourage commercial and recreational use of the sanctuary that is compatible with protection of its significant resources.

Specific management objectives are:

- Provide relevant information about sanctuary regulations, use policies, and standards;
- Collaborate with public and private organizations in promoting compatible use of the sanctuary by coordinating surveys and monitoring programs and by exchanging information concerning commercial and recreational use of the sanctuary; and



4. Diver in kelp.

NPS File

- Assess the current levels of use and monitor use over time to identify and control potential degradation of resources and minimize potential user conflicts.

The Sanctuary Setting

SECTION 2

The Sanctuary Setting

The Channel Islands National Marine Sanctuary presents very distinct conditions for resource protection owing to its location, significant resources, current and potential uses, and existing jurisdictions. These characteristics are described below in order to introduce the concerns and needs addressed in the management plan.

1. THE REGIONAL CONTEXT

(a) Sanctuary Location

The sanctuary is located in the southern California bight, a wide section of the eastern Pacific continental shelf dissected by submerged canyons, basins, and ridges. The boundaries of the sanctuary include the waters within six nautical miles (nm) of the northern Channel Islands and Santa Barbara Island (Figure 2). Coordinates for these boundaries are included in Appendix 1.

The Channel Islands National Marine Sanctuary is located comparatively far from the mainland. Distances range from 14 nm (30 km) from Ventura to Anacapa Island, to 40 nm (74 km) from Los Angeles to Santa Barbara Island. The distances between major southern California urban areas and sanctuary waters are indicated in Figure 2. These distances and the size of the sanctuary emerge as an important consideration since they affect visitor access and on-site management operations.

(b) Regional Access

The Sanctuary Headquarters is located in Ventura at the Channel Islands National Park Visitor Center—an interpretive and administrative

facility. The National Park Service (NPS) provides the Sanctuary Programs Division with office space and interpretive and research facilities at the Visitor Center. The Sanctuary Manager coordinates management of the sanctuary including on-site and off-site programs from this location.

Regular public access to the sanctuary and the national park is offered adjacent to the Center through the Islands Packers Company, a NPS concessionaire. Ventura thus serves as the major staging point for visitors to the sanctuary within the region.

Access for recreational users is provided by the large marinas located between Santa Barbara and Newport. Commercial operations throughout the region offer special chartered tours to most parts of the sanctuary for diving, sailing, sport fishing, and nature viewing. Due to its location and access, the sanctuary serves a large region including the urban areas of Santa Barbara, Ventura, Oxnard, greater Los Angeles, and Orange County.

2. SANCTUARY RESOURCES

The Channel Islands National Marine Sanctuary is located at the transition between two distinct biogeographic coastal provinces: the Oregonian and the Californian provinces (Briggs, 1974). South of Point Conception the cold temperate waters of the California current flowing from the north meet the warm temperate waters of the California countercurrent and seasonally with the Davidson Current, both flowing from the south. The current patterns affect the distribution of marine fauna. Species representative of both cold-

temperate and warm-temperate regions thrive in the transition zone, and overlap in their distributions at some locations within the sanctuary. The environmental conditions and resources contributing to the ecological significance of the Channel Islands National Marine Sanctuary are described further below.

(a) Environmental Conditions

The sanctuary belongs to a region referred to by geologists as the Southern California Continental Borderland. A glance at bathymetric and geological maps (Figures 3, 4) confirms that the Borderland is a complex of basins, canyons, ridges, and shelves skirting high-cliffed islands. The area is also characterized by active seismic faults, shallow oil and gas reservoirs, and natural oil and gas seeps. These are most common in the northern Santa Barbara Channel and are periodic or unconfirmed elsewhere (California State Water Resources Control Board, 1979a, 1979b, 1981a; BLM, 1981c).

The submarine geology of the sanctuary consists of undifferentiated sedimentary rock and quaternary volcanic rock (Figure 4) overlaid with unconsolidated sediments including gravel, sand, shell rubble, silt, and clay (Figure 5). The rocky shelves around San Miguel and Santa Rosa Islands are among the widest in California and are evidence of intense oceanographic dynamics that have precluded the accumulation of fine sediments (Welday and Williams, 1975). The abrupt depth change from these shallow shelves to deep trenches combined with the gradation from deepwater silt and clay deposits to shallow sand and rock account for the wide variety of intertidal and subtidal habitats in the sanctuary.

Oceanographic conditions are another influence on the distribution and diversity of sanctuary habitats and resources. When the cold California Current reaches Point Conception, the direction of flow carries it away from the shoreline, inducing a large gyre effect or eddy in the southern California bight. The return flow of this gyre, the southern California countercurrent, moves waters from southeast to northwest, through the Channel Islands toward the mainland (Figure 6). The resulting gyres and eddies affect the distribution of marine fauna leading to the presence of both cold and warm temperate species. Surface and bottom currents also circulate nutrients and pollutants in the sanctuary. For example, currents and winds are known to affect turbidity around the islands, with turbidity generally higher on the north or windward side and to the east off Anacapa and Santa Cruz Islands (California State Water Resources Control Board, 1979a).

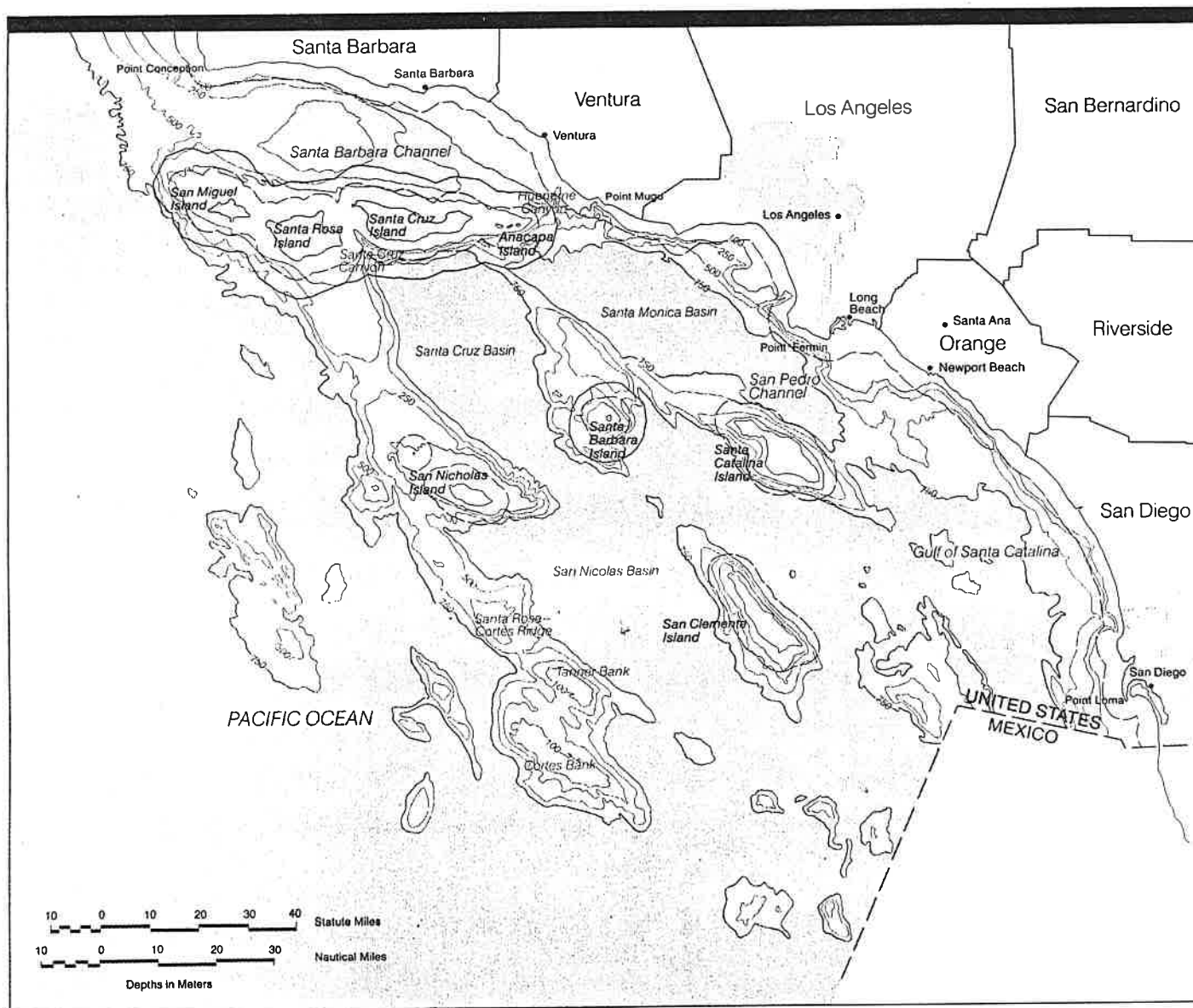
An upwelling period occurs in the southern California bight from February or March through August, during which nutrient-rich deep waters are drawn to the surface by offshore winds. During the spring, high nutrient levels combined with increasing day length and light intensity foster exceptionally high phytoplankton and algal productivity. This increase in the food supply supports even greater numbers of fish, shellfish, and other marine life in the sanctuary.

Other aspects of water quality in the sanctuary have been documented only to a limited extent (NPS, 1982b; California State Water Resources Control Board, 1979a, 1979b, 1981a, 1981b; BLM, 1981c). Owing to the absence of municipal or industrial point sources, and relative isolation from mainland sources, water quality around the islands is generally good. However, chronic

oil and tar pollution from non-point sources outside the sanctuary is reported as an important concern particularly along the north shore of the islands (California State Water Resources Control Board, 1979a, 1979b). Data collected for the California Mussel Watch Program at stations along the mainland and at the offshore islands indicate significant accumulations of heavy metals at Anacapa, Santa Barbara, San Miguel Island Areas of Special Biological Significance (California State Mussel Watch, 1979 in BLM, 1981c). It is not currently known if these levels of pollutants are accumulating at higher trophic levels and whether they are affecting individuals or populations.

Weather conditions in the area tend to be localized and seasonally variable, but typical of a coastal mediterranean climate. Over the course of an average year, January to March are the months receiving the most rain. Associated with the frequent weather fronts are strong winds, poor water visibility, and four to six foot (one to two meter) swells. Winter water temperatures around the Channel Islands do not exceed 55°F to 60°F (13°C to 15°C). Coastal fog and low clouds prevail during April and May and the sea surface grows calmer as frontal activity diminishes. The most favorable and predictable weather conditions for diving and boating are from June to October when weather fronts are infrequent and seas are generally calm. Summer fogs are also common. Average water visibilities around the islands are reported between 30 to 40 feet (9 to 12 meters) and water temperatures range from 65°F to 70°F (18°C to 21°C). Stormy and windy conditions tend to prevail again from October to December (Fagan and Pomeroy, 1980).

This yearly weather pattern is considered predictable and is largely responsible for the May to October peak recreational use season. Conditions do vary among parts of the sanctuary. San Miguel Island, for example, is completely surrounded by the cold water mass of the California current and is exposed to the open seas of the Pacific. Nearshore waters are usually colder, more turbid, and subject to heavy surge. Weather conditions are reported to change quickly even during the summer, thus presenting constraints for on-site operations. The Santa Barbara Island nearshore is also exposed to strong westerly winds, but waters are more characteristic of the clear and warm conditions of the California countercurrent. Similar warm and clear conditions prevail in the vicinity of Anacapa Island with nearshore waters being more sheltered by the islands to the west. Conditions around Santa Rosa and Santa Cruz Islands resemble those described for San Miguel Island with the waters around Santa Cruz being somewhat more protected and warmer than those around Santa Rosa Island. The general weather conditions are an important consideration for on-site operations such as surveillance, search and rescue, and oil spill containment in the sanctuary. Differences in the sanctuary suggest distinct safety and "comfort" zones which can affect the planning of visitor use and interpretation.

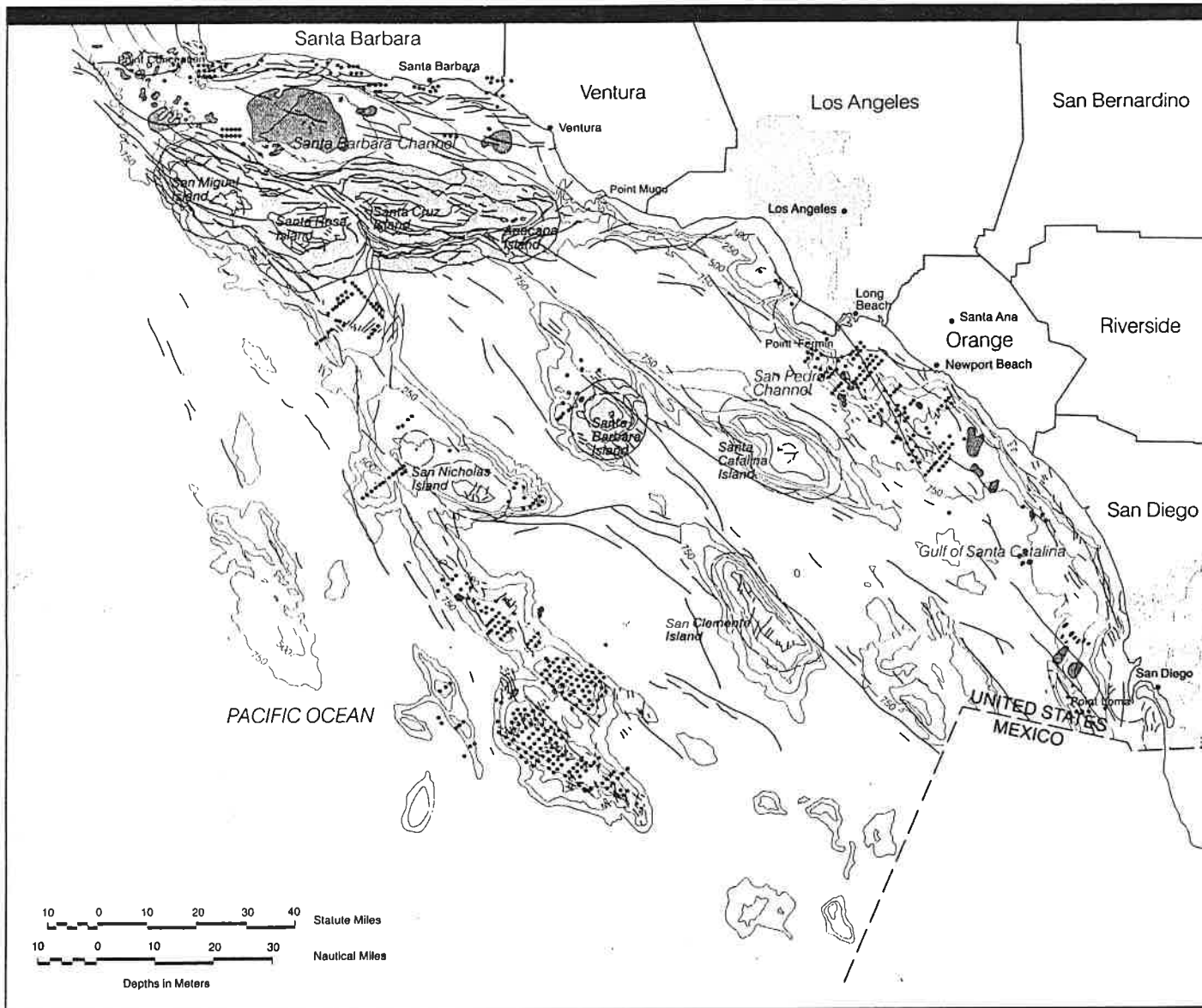


Bathymetry




- Channel Islands National Marine Sanctuary
- 0-100 Meters
- 101-750 Meters
- >750 Meters

Source: Welday and Williams, 1975.

Figure 3



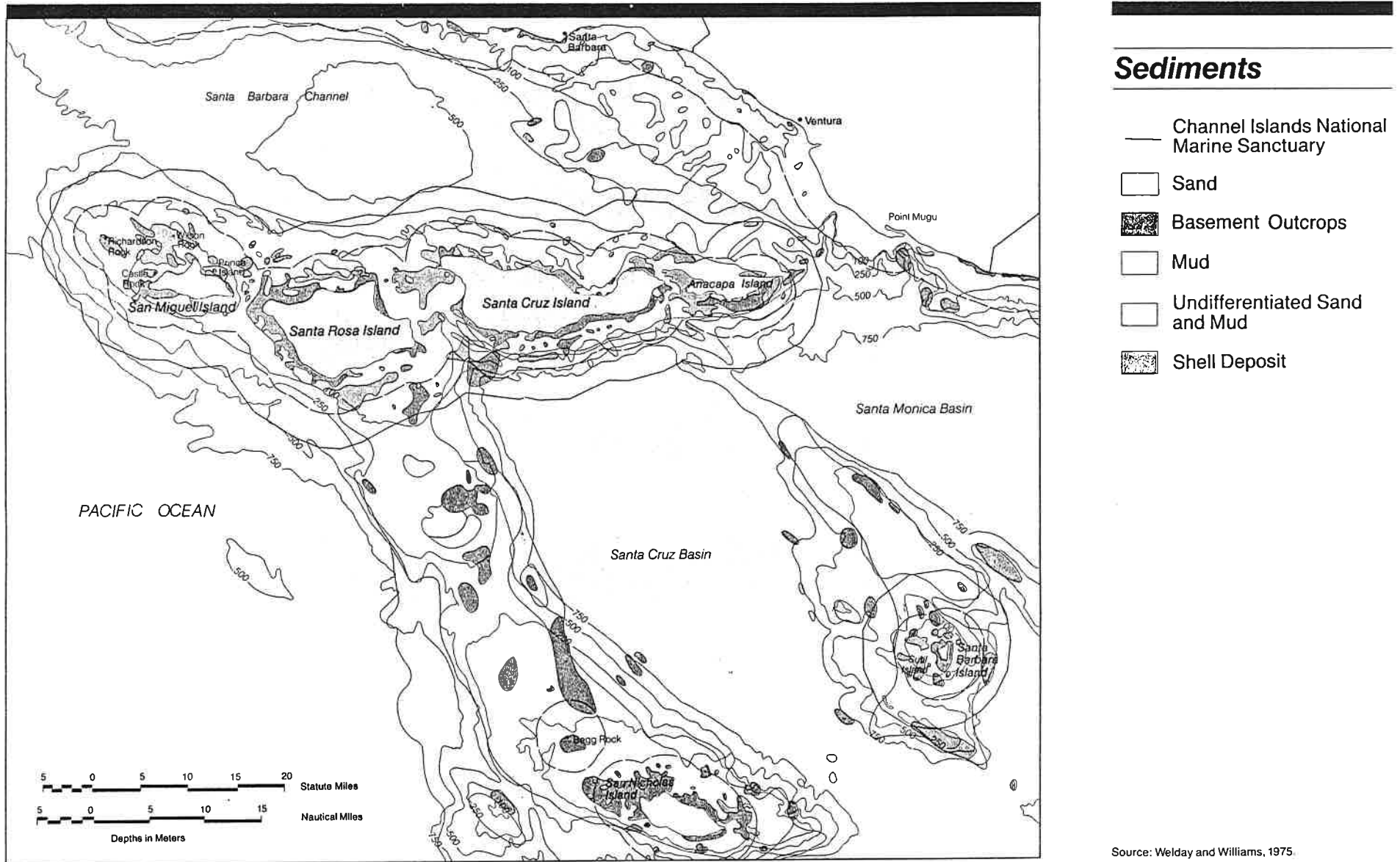
Geology

-  Channel Islands National Marine Sanctuary
-  Shallow Faults
-  Reported Oil or Gas Seep
-  Shallow Gas Zone

Note: The occurrence of natural oil seeps within the sanctuary has not been confirmed.

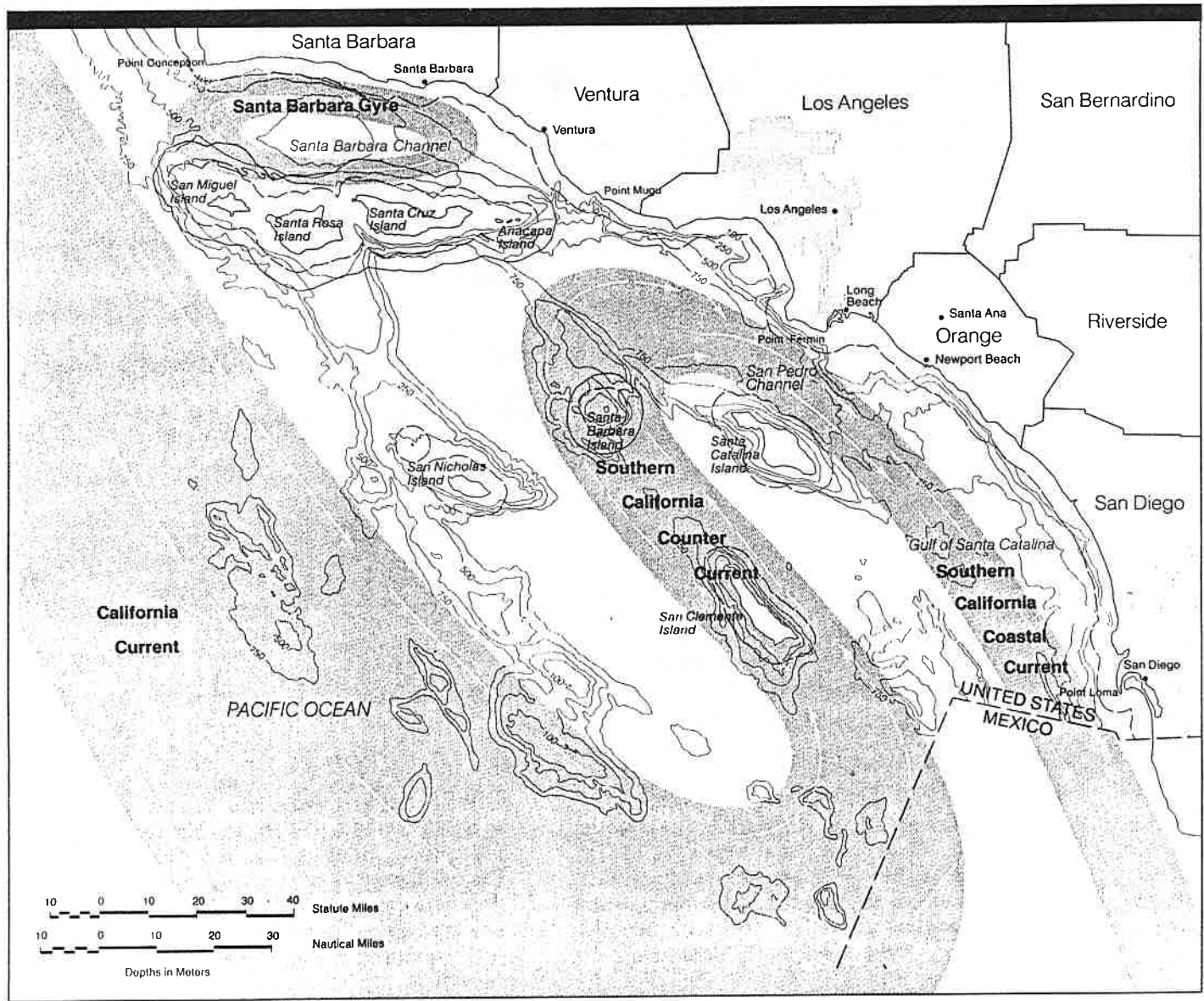
Source: Bureau of Land Management, 1981.
C. Pillsbury, pers. comm.

Figure 4



Source: Welday and Williams, 1975.

Figure 5



Surface Currents





-  Channel Islands National Marine Sanctuary
-  General Area of the California Current and Counter Current
-  Surface Current Direction
-  Weak or Seasonal Current Direction

Figure 6

Source: Bonnell et al., 1980; Bureau of Land Management, 1981.

(b) Living Resources

The area was selected and designated as a national marine sanctuary because of concentrations of these living resources of exceptional significance: (1) marine mammals (pinnipeds and cetaceans); (2) seabirds; (3) fish, shellfish, and kelp; and (4) intertidal organisms (Department of Commerce, 1980). A review of these resources is helpful in understanding the populations and ecological linkages being protected, their status, and options for protection.

Pinnipeds

The dramatic recovery of pinniped populations in the Channel Islands since the end of the fur trade has been documented through several systematic studies in recent decades (Le Boeuf and Bonnell, 1980). Past and on-going research has also helped establish the status of seals and sea lions in different parts of the Southern California bight including the Channel Islands National Marine Sanctuary.

The Channel Islands National Marine Sanctuary currently provides habitat for breeding populations of five species of pinnipeds: the California sea lion, the Stellar sea lion, the northern fur seal, the northern elephant seal, and the harbor seal. A sixth species, the Guadalupe fur seal, is an occasional visitor to the area. All six species are found in the sanctuary at different times of the year, feeding on the abundant fish and invertebrate resources of the island shelves or hauling out on rocks and beaches.

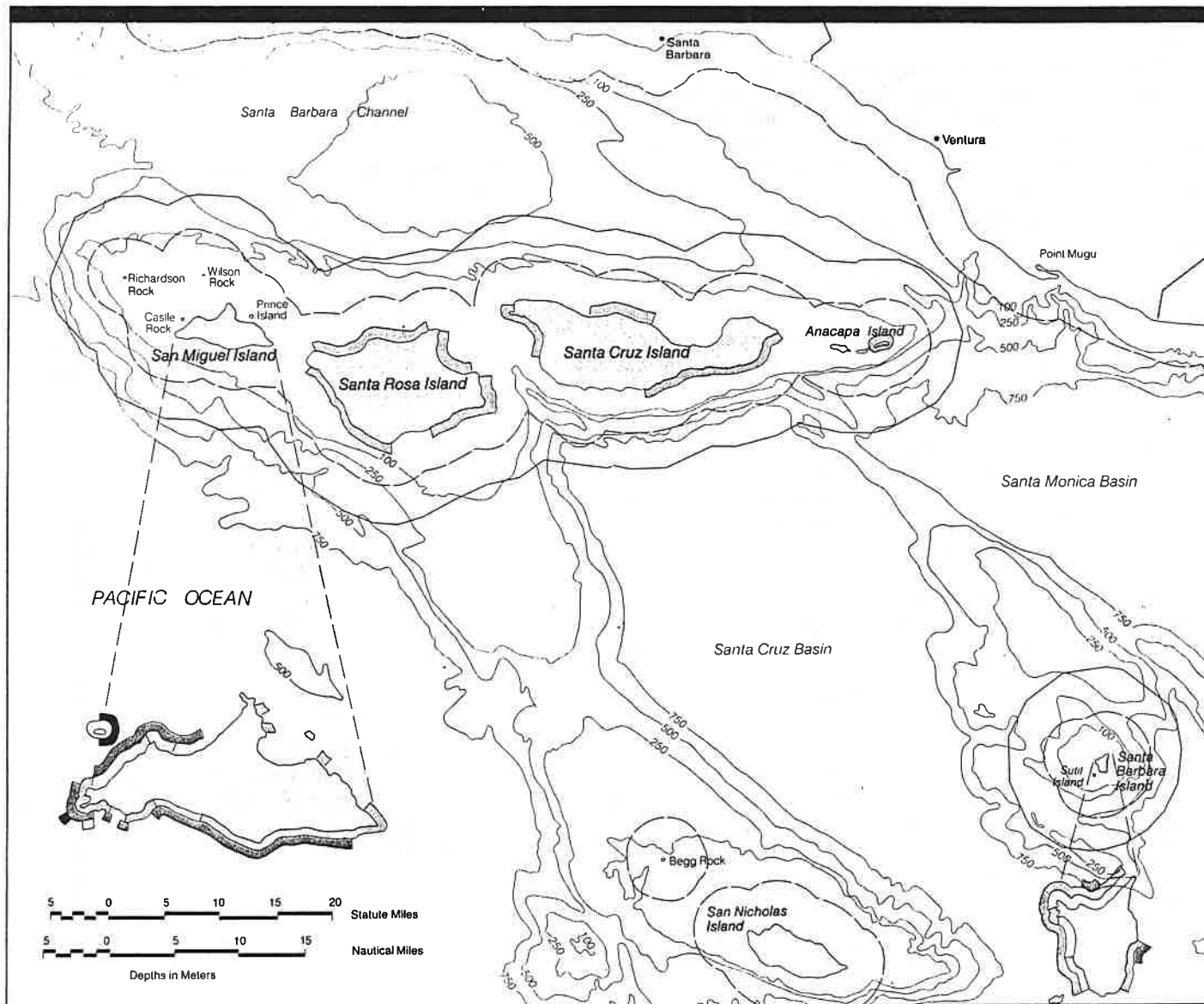


5. California sea lions on San Miguel Island during the breeding season.

James Dobbin

Pinniped species' diversity and concentration varies across the sanctuary (Figure 7). The greatest numbers occur around the western tip of San Miguel Island, the only location in the United States, and one of the very few in the world, where breeding populations of five species of pinnipeds can be found. Three species—California sea lions,

northern elephant seals, and harbor seals—breed at Santa Barbara Island. Harbor seals breed on Santa Rosa, Santa Cruz, and Anacapa Islands. The life history of each species has been described elsewhere (see Department of Commerce, 1980). The description below focuses on aspects relevant to the sanctuary resource protection program.



Pinniped Hauling and Breeding Areas

- Channel Islands National Marine Sanctuary
- Harbor seal
- California sea lion
- Elephant seal
- Northern fur seal
- Stellar sea lion

Note: California sea lions also occur in the vicinity of Santa Rosa, Santa Cruz, and Anacapa Islands but no pupping was reported in 1981. All breeding distributions shown are schematic representations only.

Sources: National Marine Fisheries Service, 1982; Bonnell and Le Boeuf, 1980.

Figure 7

The California sea lion (*Zalophus californianus*) is the most abundant and widely distributed pinniped of the sanctuary with approximately 30,000 individuals hauling out and breeding in the area (NMFS, 1982). These numbers represent about 25 percent of the total world population. San Miguel Island is also considered the northernmost rookery for this species. Estimates for 1981 set the annual pup production in the sanctuary at 8,955 with San Miguel accounting for most of these numbers (NMFS, 1982). Some pups are also born at Santa Barbara Island. Growth of the San Miguel population in the last two decades has been rapid and is expected to continue (Le Boeuf and Bonnell, 1980). Premature pupping and aborted pups have been reported in recent years but it is currently not known whether human-related factors such as pollution or natural causes are involved (Le Boeuf and Bonnell, 1980).

The northern elephant seal (*Mirounga angustirostris*) is the largest and second most abundant pinniped in the sanctuary. The total population in 1981 was estimated at 24,000 or 38 percent of the world's total population (NMFS, 1982). Elephant seal rookeries are located on Santa Barbara and San Miguel Islands—the latter now being the largest colony in the world (De Master, pers. comm.). Total pup production in 1981 was estimated to be 7,125 and further rapid growth of the San Miguel Island population is expected (NMFS, 1982). Le Boeuf and Bonnell (1980) report that elephant seal groups have expanded their breeding area on the island from 1968 to 1979 to include virtually the entire southern shore. Colonies may be forming on the northern shore and establishment on the islands further to the east is also a possibility.

The small colony of northern fur seals (*Callorhinus ursinus*) on San Miguel Island represents the southern breeding limit for this species. It is also the only colony along the eastern Pacific south of Alaska. Since about 100 individuals were first discovered at Adams Cove in 1968, the population has grown exponentially to about 2,195 animals in 1981 of which 1,220 were pups (NMFS, 1982). The species has also expanded its breeding area to include Castle Rock. The waters within 3 miles (5 km) of both rookeries are reported areas of concentration (BLM, 1981c).

All five islands (San Miguel, Santa Rosa, Santa Cruz, Anacapa, and Santa Barbara) are hauling sites and rookeries for harbor seals (*Phoca vitulina*). The total population in 1981 amounted to about 2,100 individuals, with the largest colonies occurring on Santa Rosa and San Miguel Islands (NMFS, 1982). Le Boeuf and Bonnell (1980) report that the harbor seal population has been increasing slowly but consistently in southern California and throughout their range. This species is much more wary than any of the other pinnipeds found in the Channel Islands area, avoiding pupping at beaches used by other species and also avoiding areas that are chronically disturbed by human activities (NMFS, 1982).

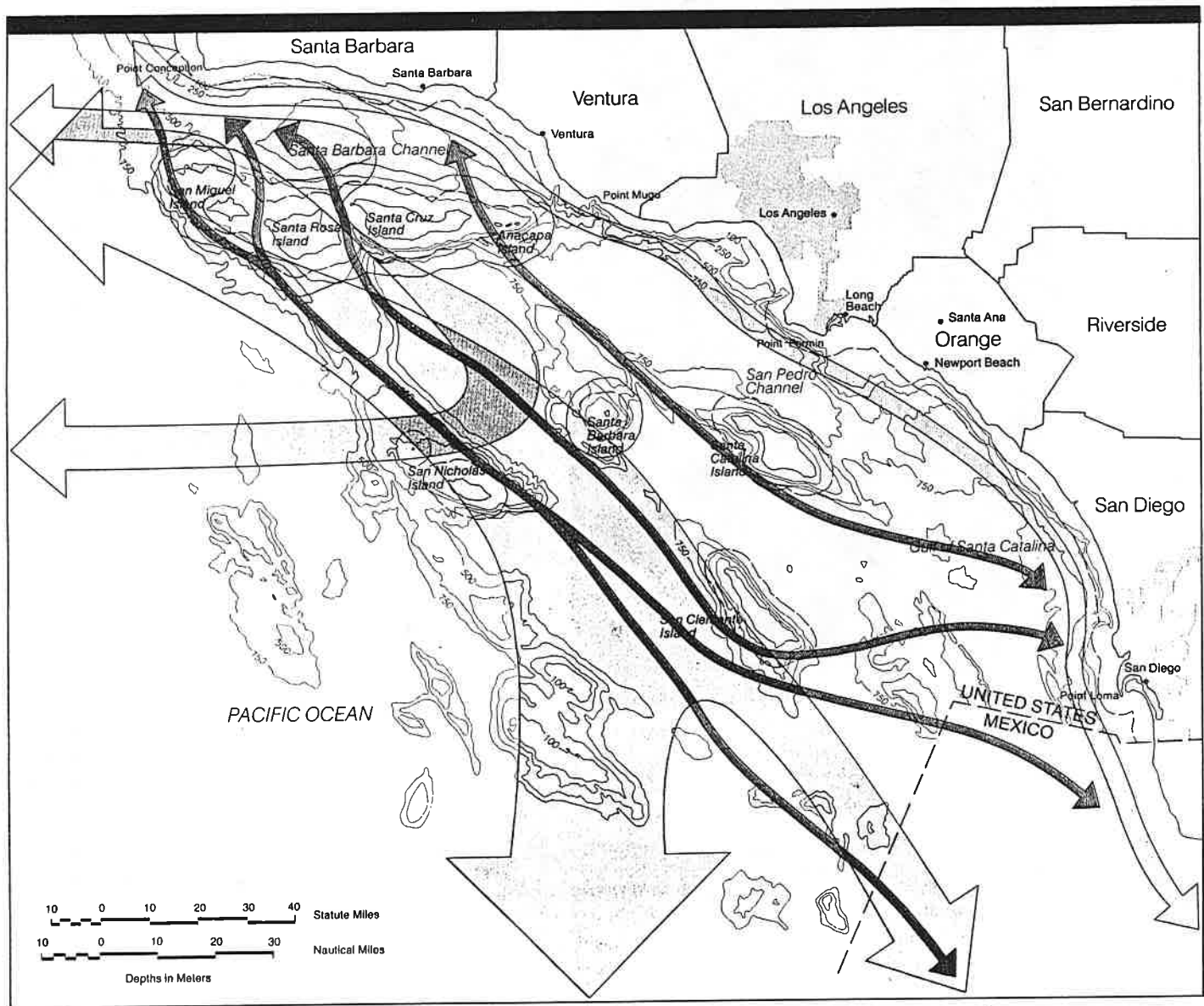
Since 1968, the Stellar or northern sea lion (*Eumetopias jubatus*) has been observed in the southern California bight only on San Miguel Island (Point Bennett, Richardson Rock, Castle Rock), and in steadily decreasing numbers (Le Boeuf and Bonnell, 1980). The island is also the species' southernmost rookery. Total numbers breeding on San Miguel Island are thought to be low, with the total state population estimated at 1,000, and with no more than 5 pups being born annually (NMFS, 1982). Factors contributing

to the decline of the population are not understood, but may involve a decline in prey availability, competition with other pinnipeds, fluctuations in habitat parameters, or some combination of these factors (NMFS, 1982).

The Guadalupe fur seal (*Arctocephalus townsendi*) currently breeds only on the Isla de Guadalupe in Mexico although it was once a resident of the Channel Islands. In recent years, occasional male Guadalupe fur seals have been sighted on San Miguel Island but pups have not been observed to date (NMFS, 1982). This species is listed by the State of California as rare. It is also being considered for listing under the Federal Endangered Species Act (R. Hofman, pers. comm.).

In summary, the significance of the pinniped resources of the sanctuary rests on the following characteristics:

- It is one of the few areas of the world with an overlap in distribution of species characteristic of warm-temperate waters (i.e., the California sea lion, the Guadalupe fur seal) and cold temperate waters (northern fur seal, Stellar sea lion);
- The rookeries for several species have been expanding in recent years and further growth is expected;
- For some species, the sanctuary population represents a high percentage of either the southern California population or the world's total population;
- The indication that sanctuary waters must be highly productive to support such a large and rapidly growing mammal population; and
- The populations are relatively accessible to major urban centers, providing opportunities for research and interpretation.



Cetacean Migration Routes






-  Channel Islands National Marine Sanctuary
-  Primary Gray Whale Route
-  Secondary Gray Whale Route
-  Blue, Fin, and Sei Whale Route
-  Humpback Whale Route

Figure 8

Source: University of California at Santa Cruz, 1981.

While much is now known about the status of pinnipeds, several key questions remain with respect to their ecology and behavior that may affect how they can be protected in the sanctuary. Management concerns which are being jointly addressed by agencies such as the National Marine Fisheries Service, the CF&G, and the Sanctuary Programs Division include: (1) the nature and extent of interactions between pinnipeds and several net fisheries; (2) the effects of hydrocarbon spills and chronic pollution on individuals and populations; (3) the potential effects of the Space Shuttle Program; (4) food requirements of pinniped populations and their implications for fisheries management; and (5) the need to minimize existing and future levels of human disturbance.

Cetaceans

At least 27 species of whales and dolphins have been sighted in the sanctuary. About 18 species are seen regularly and of these common dolphin, Pacific white-sided dolphin, bottlenose dolphin, Dall's porpoise, northern right whale dolphin, short-finned pilot whale, killer whale, and minke whale are considered "residents" (Leatherwood, pers comm.). Risso's dolphin, fin whale, humpback whale and gray whale are other species possibly residing in the sanctuary. Very little is known concerning the areas of concentration, life history, or behavior of the resident populations in the sanctuary.

The sanctuary also lies on the migratory pathway of the California gray whale and other large baleen and toothed whales (Figure 8). Gray whales with calves have been observed in the nearshore kelp beds of the sanctuary which are thought to offer protection from strong seas and resting habitat for calves (Leatherwood, pers. comm.). The Pacific



6. *Migrating gray whales.*

William Ehorn

right whale, one of the rarest of the great whales, has also been sighted in the area.

Cetaceans are considered a significant sanctuary resource because of the frequency and diversity of sightings in the vicinity of the islands, and the fact that the world's total populations are so small.

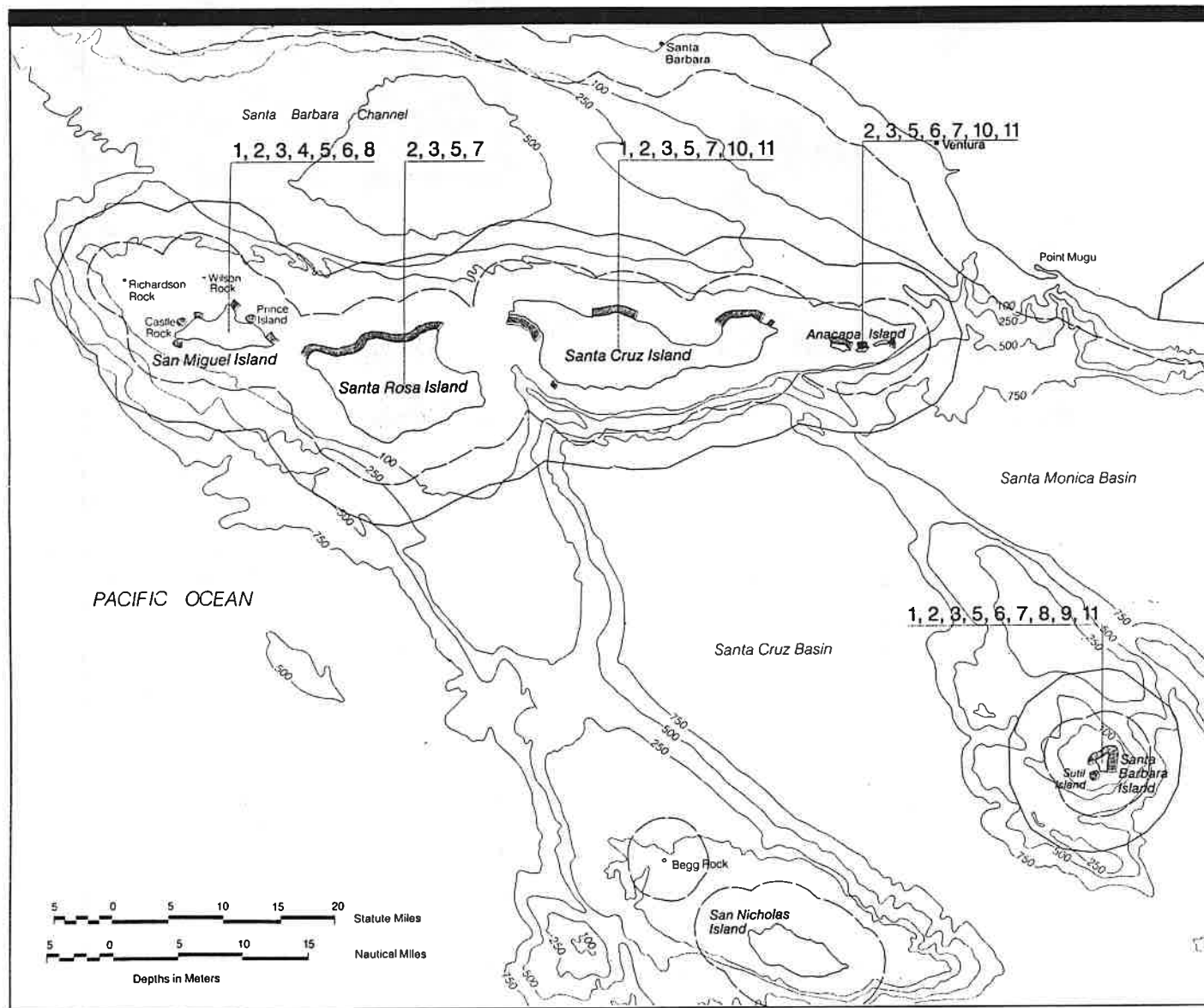
Marine Birds

Marine birds constitute another significant resource because of the large concentrations and high species diversity observed in the sanctuary. Over 60 species may be using sanctuary waters to varying degrees as nesting and feeding habitat, for wintering, and/or as migratory staging areas (Department of Commerce, 1980).

Of the sixteen resident species of marine birds in the southern California bight, eleven breed in the sanctuary. Some of the colonies represent large percentages of the southern California or statewide total population (Sowls et al., 1980).

San Miguel Island, together with its small islets (i.e., Prince Island, Castle Rock, and Richardson Rock) supports the most abundant and diverse avifauna in the sanctuary (Figure 9). Nine species have established colonies on the island and form dense feeding concentrations in nearshore waters during their nesting season. Santa Barbara Island has several nationally and internationally significant seabird colonies including the largest Xantus' murrelet colony in the United States and the only U.S. colony of black storm-petrels.

The only permanent rookery in California for the brown pelican—an endangered species—occurs on Anacapa Island. As with the other marine birds, this species is critically dependent on the abundant fish resources of the sanctuary. The island also supports a large western gull colony. Seabird colonies and approximate nearshore concentrations in the sanctuary are shown in Figure 9.



Marine Birds

— Channel Islands National Marine Sanctuary

■ Nesting and Breeding Site

Species

- 1 Ashy Storm-Petrel
- 2 Pelagic Cormorant
- 3 Pigeon Guillemot
- 4 Leach's Storm-Petrel
- 5 Brandt's Cormorant
- 6 Double-crested Cormorant
- 7 Western Gull
- 8 Cassin's Auklet
- 9 Black Storm-Petrel
- 10 Brown Pelican
- 11 Xantus' Murrelet

Sources: National Park Service, 1982; Hunt et al., 1980; Sowls et al., 1980.

Figure 9

In summary, the significance of the marine bird resources of the sanctuary is based on the following characteristics:

- The large concentrations and high species diversity, particularly in the vicinity of San Miguel, Santa Barbara, and Anacapa Islands;
- The presence of a unique colony of an endangered species (the brown pelican) and several other rare species on Anacapa and Santa Barbara Islands, all of which depend on the productivity of sanctuary waters; and
- The colonies and nearshore feeding habitats accommodate major percentages of the State's total populations that no longer breed on the southern California mainland.

The biology and ecology of a few species of marine birds such as the California brown pelican and the western gull have been well documented in the sanctuary (NPS, 1982b; Ingram et al., 1983). If the distribution of nesting colonies are known for most other species, information is lacking on colony sizes across the sanctuary, reproductive success, foraging areas and habits. A handbook has recently been prepared to guide monitoring of selected seabird species of the national park and sanctuary (Ingram et al., 1983). The monitoring program will be used to detect changes in seabird populations over time.

Other management concerns being addressed by agencies such as the NPS, the U.S. Fish and Wildlife Service, the CF&G, and others include: (1) the food habits and biomass requirements of some species and possible effects on commercial fishery stocks; (2) interactions with certain types of fishing practices; and (3) the effects of hydrocarbon spills and other types of pollution on various species.



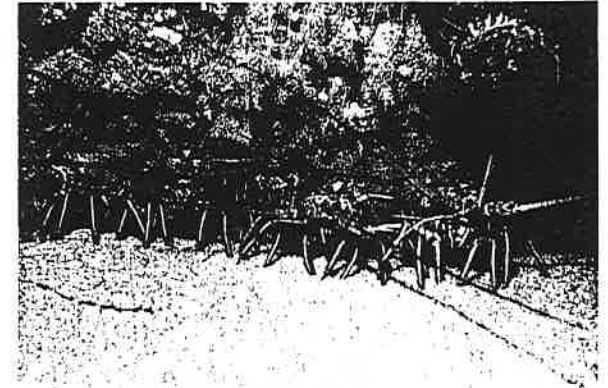
7. Common murre pair.

NPS File

Subtidal Invertebrates, Fish, and Kelp

Descriptions of subtidal environments and species assemblages are available, albeit not complete, for some sites within the Channel Islands National Marine Sanctuary (California State Water Resources Control Board, 1979a, 1979b; NPS, 1982b). The predominant nearshore communities are: (1) the kelp forest rock bottom community, and (2) the shallow sand bottom community (CF&G, 1979).

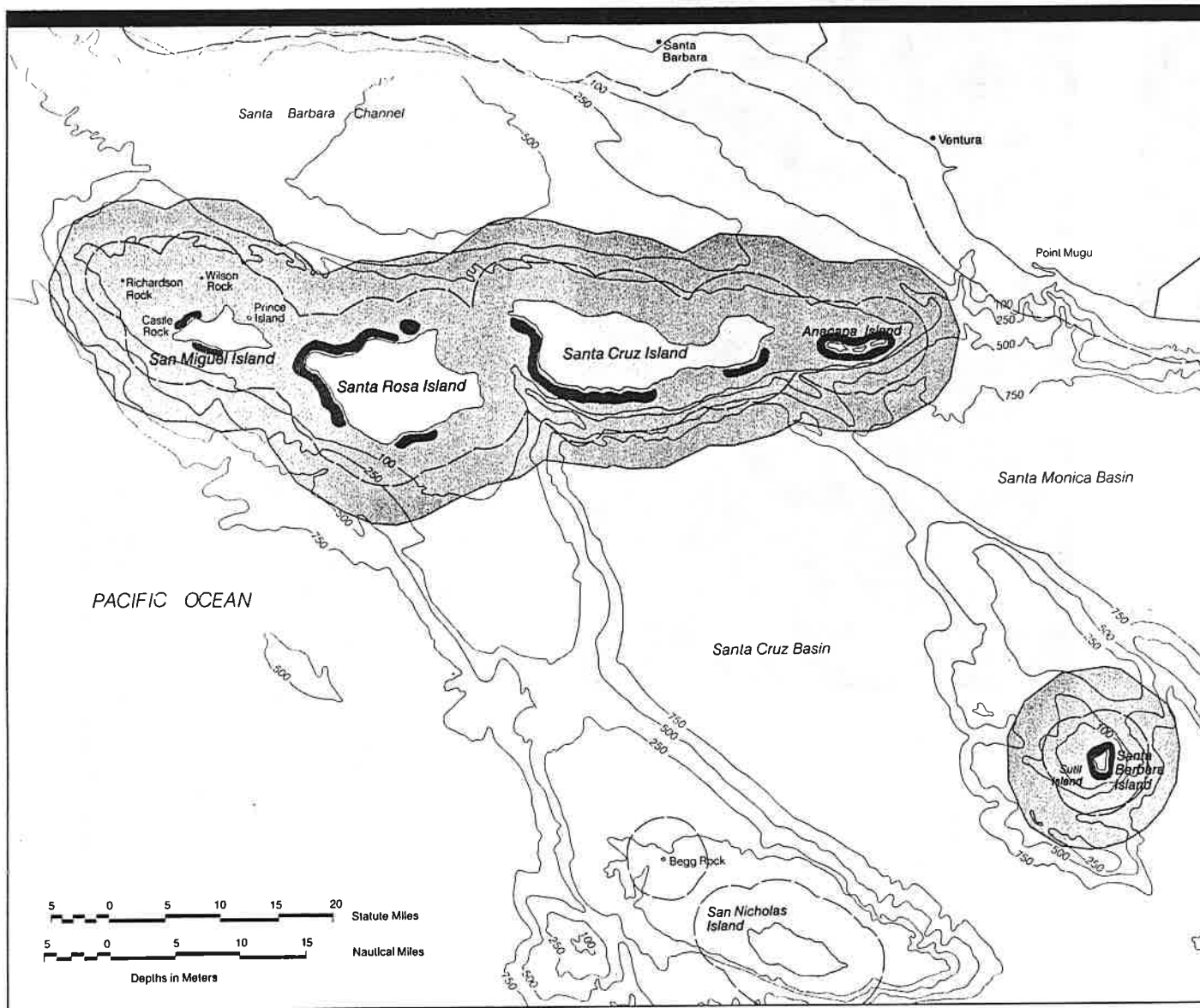
The kelp forest rock bottom community is by far the better studied nearshore habitat type in the sanctuary. Luxuriant forest-like growth of giant kelp (*Macrocystis pyrifera*) occurs in shallow waters, usually from 26 ft (8 m) to 112 ft (34 m)





8. Spiny lobsters, Santa Cruz Island.

Tim Herrlinger

throughout the sanctuary (CF&G, 1979; Department of Commerce, 1980). While the kelp canopy will vary from year to year depending on storms and other factors, the most dense and extensive formations occur along protected island shores (e.g., the southwest side of San Miguel Island, southern and western shores of Santa Rosa, around all of Anacapa Island, the northeast side of Santa Barbara Island) (Figure 10). Several other numerous brown algae (e.g., *Agarum* sp., *Laminaria farlowii*, *Pterygophora californica*) occur in association with giant kelp. Other subtidal algal zones reported in the sanctuary are: (1) a shallow zone from the intertidal to 26 ft (8 m) dominated by other brown algae such as southern palm kelp (*Eisenia arborea*), feather boa kelp (*Egregia* sp.), and *Laminaria farlowii*; and (2) a deeper zone below 112 ft (34 m) typified by small red algae (Rhodophyta) and scattered *Agarum fimbriatum* (California State Water Resources Control Board, 1979a; Neushul, 1967; see also CF&G, 1979 for a more complete list of common algae).



Kelp Distribution

-  Channel Islands National Marine Sanctuary
-  Kelp Bed

Note: The distribution shown is generalized; kelp distribution will vary seasonally and annually.

Sources: Davis, pers. comm. 1983; California Department of Fish and Game, 1980.

Figure 10



9. *Garibaldi (Hypsypops rubicundus)*, Santa Cruz Island.
Tim Herrlinger

The kelp forest rocky bottom community occurs in association with an unusually diverse and abundant invertebrate fauna (CF&G, 1979). However species lists are available only for a few sites such as the ecological reserves (around Anacapa and San Miguel Islands) and Areas of Special Biological Significance. Additional research is required to delineate areas of exceptional significance. Large conspicuous invertebrates of the rocky bottom kelp forest include several sponges, kelp crabs, spiny lobster, abalone, octopus and squid, sea stars, and sea urchins. Common fish of the kelp forest community include garibaldi, opaleye, kelp bass, California sheephead, sea perch, painted greenling and several species of rockfish.

Shallow sandy bottoms are another nearshore subtidal habitat prevalent in the sanctuary (CF&G, 1979). Except in very calm shallow coves, sandy substrates do not support extensive algal growth. Fish and invertebrate species tend to be less diverse and abundant than in kelp forest communities.



10. Rare purple coral found near Santa Barbara and Santa Cruz Islands.
Tim Herrlinger

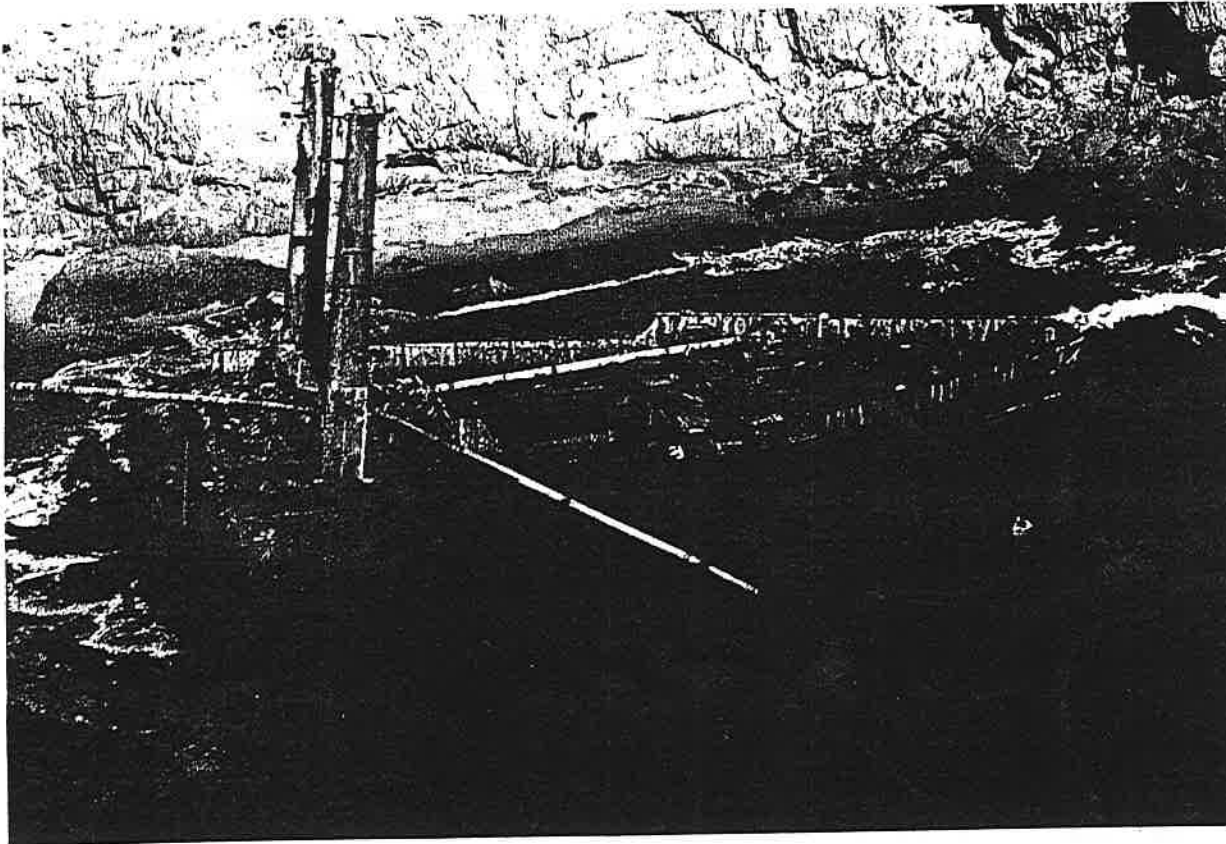
Common species include sea pansies, polychaetes, sand dollars, several species of rays, sanddab, and turbot (CF&G, 1979).

Accurate characterizations of the deeper subtidal habitats of the sanctuary are extremely limited (CF&G, 1979). Surveys have shown that the ben-

thic fauna of the silt-dominated canyons is diverse (CF&G, 1979). The walls of such canyons are often covered by a dense animal "turf"—a thin living mat of encrusting sponges, bryozoans, and tunicates. Equally high diversities and concentrations are found in the offshore pelagic environment of the sanctuary. Common pelagic invertebrates include several copepods and euphausiids, a pelagic shrimp, squid, and the pelagic red crab. Over 30 species of fish are also common to the pelagic environment of the sanctuary. Concentrations of the pelagic schooling species such as northern anchovy are a critical food source for other sanctuary inhabitants, such as the brown pelican.

Intertidal Organisms

Intertidal fish and invertebrates of the Channel Islands have been comparatively well documented (Littler, 1980). Common habitat types include rock shelves, boulder beaches, tidepools, rubble piles, and sand flats. A diverse and abundant fauna is reported at the sites that have been surveyed (California State Water Resources Control Board, 1979a, 1979b, 1981a, 1981b). Common species include acorn barnacles, periwinkles, limpets, chitons, sea stars, shore crabs, several species of brown, red, and green algae, sea lettuce, California mussel, and black and green abalone. Black abalone concentrations in remote areas of Santa Cruz, Santa Rosa and San Miguel Islands are particularly significant as these no longer occur in more accessible areas.



11. Shipwreck on Santa Rosa Island.

Michele Lemay

(c) Cultural and Historic Resources

Excavations in recent decades have uncovered numerous archaeological and prehistoric resources on the northern Channel Islands and Santa Barbara Island including seasonally occupied sites and village sites of the seafaring Chumash and Gabrielino people (NPS, 1982b). Given that sea

levels were considerably lower during past geologic eras and that the islands are eroding, scientists believe that the Channel Islands National Marine Sanctuary also contains evidence of prehistoric cultures (Berger, 1980; Department of Commerce, 1980). Very little research to date has been undertaken to locate and establish the significance of the submerged cultural resources.

Historic resources of the sanctuary include the shipwrecks of significance to our maritime history and the remains of ships and aircraft of more recent decades. Numerous shipwrecks from the mid-19th century to the post-war era occur on most of the island shelves and nearshore rocks (*Winfield Scott* paddle steamer, 1853; the *J.F. West* schooner, 1848; the schooner *Comet*, 1911; *'Cuba'* cargo steamer, 1923). A few underwater historic sites such as the *Winfield Scott* in Frenchy's Cove are well documented but generally the resource is known only to experienced divers of the region.

3. SANCTUARY USES

The Channel Islands National Marine Sanctuary supports scientific, recreational, and commercial uses, many of which depend on the unique environment and abundant resources of the area. The multiple use character of the sanctuary contributes to its significance and is an important consideration for this management plan.

(a) Recreation

The marine environment of the sanctuary provides an ideal setting for a variety of recreational activities. The predominant uses are boating (sailing and power boating), windsurfing, sport fishing, diving, and nature viewing (i.e., pelagic birding, whale watching). Several activities such as tidepooling and island hiking also represent uses dependent on the aesthetic resources of the sanctuary.

The most important means of recreational access to the sanctuary is by boat although chartered small aircraft appear to be increasingly used for wildlife observation. Boat access to the sanctuary is provided at the large marinas and harbors between Santa Barbara and Newport. Private boat owners from Santa Barbara and Ventura tend to use Santa Rosa, Santa Cruz, and Anacapa Island areas while boaters from Los Angeles use the Santa Barbara Island area.

Access to the sanctuary for out-of-state tourists and non-boat owners is provided at the same major staging points. Regular boat trips are available daily during the summer and on weekends, or by charter at other times during the year, to East Anacapa and Santa Barbara Islands through Island Packers Company operating out of Ventura Harbor. Special dive tours, trips to other islands, and fishing boat charters are offered seasonally with departures from Santa Barbara, Ventura, and Los Angeles area harbors and marinas.

Boating, and other water-oriented uses such as fishing, diving, and scenic viewing, are the most popular recreational activities within the sanctuary. All the islands are popular destinations for sailboats and yachts for both one-day outings and overnight cruising. Several island anchorages are used year-round although they tend to be busiest on weekends between June and September (Figure 11). Santa Cruz Island, with its many protected coves, is most heavily used by private boaters (Fagan and Pomeroy, 1979; Davis and Choven, 1982). Anacapa Island also receives heavy boating use because of its proximity to the mainland. A survey undertaken in 1982 established boating use of the sanctuary at approximately 42,085 boat-days (Davis, pers. comm.).

Sportfishing is most popular in the waters north of Santa Rosa, Santa Cruz, and Anacapa Islands and in the waters surrounding Santa Barbara Island. Past surveys indicate that the sanctuary supports some 20,000 to 30,000 angler-days annually (CF&G, 1979). The most commonly taken species are spiny lobster, abalone, rock scallop, kelp bass, sand bass, sheepshead, rockfish, halibut, sculpin, and cabezon (Grant, pers. comm.).

The northern islands are considered prime diving destinations by southern California divers. Although colder, the waters tend to be clearer than on the mainland and the fauna more abundant and diverse. Divers primarily use the kelp dominated reefs for underwater photography, harvesting abalone, lobster and rock scallop, and spearfishing. Sites frequently used by dive boat operators include Talcott Shoal, Wilson and Richardson Rocks, Smuggler's Cove, Frenchy's Cove, East Fish Camp, Gull Island, and Webster Point (Figure 12). In addition to day-long excursions, dive clubs organize three-day excursions around all the northern islands.

Sightseers and nature viewers account for a growing proportion of sanctuary visitors. Whale watching during the gray whale migration season is becoming increasingly popular. Estimates for the 1983 January to March season indicate that about 22,000 people went on the larger commercial tours offered to the northern Channel Islands to view whales (Pillsbury, pers. comm.). Kaza (1981) estimates that about 67,400 people participated in such tours in 1981 from Los Angeles.

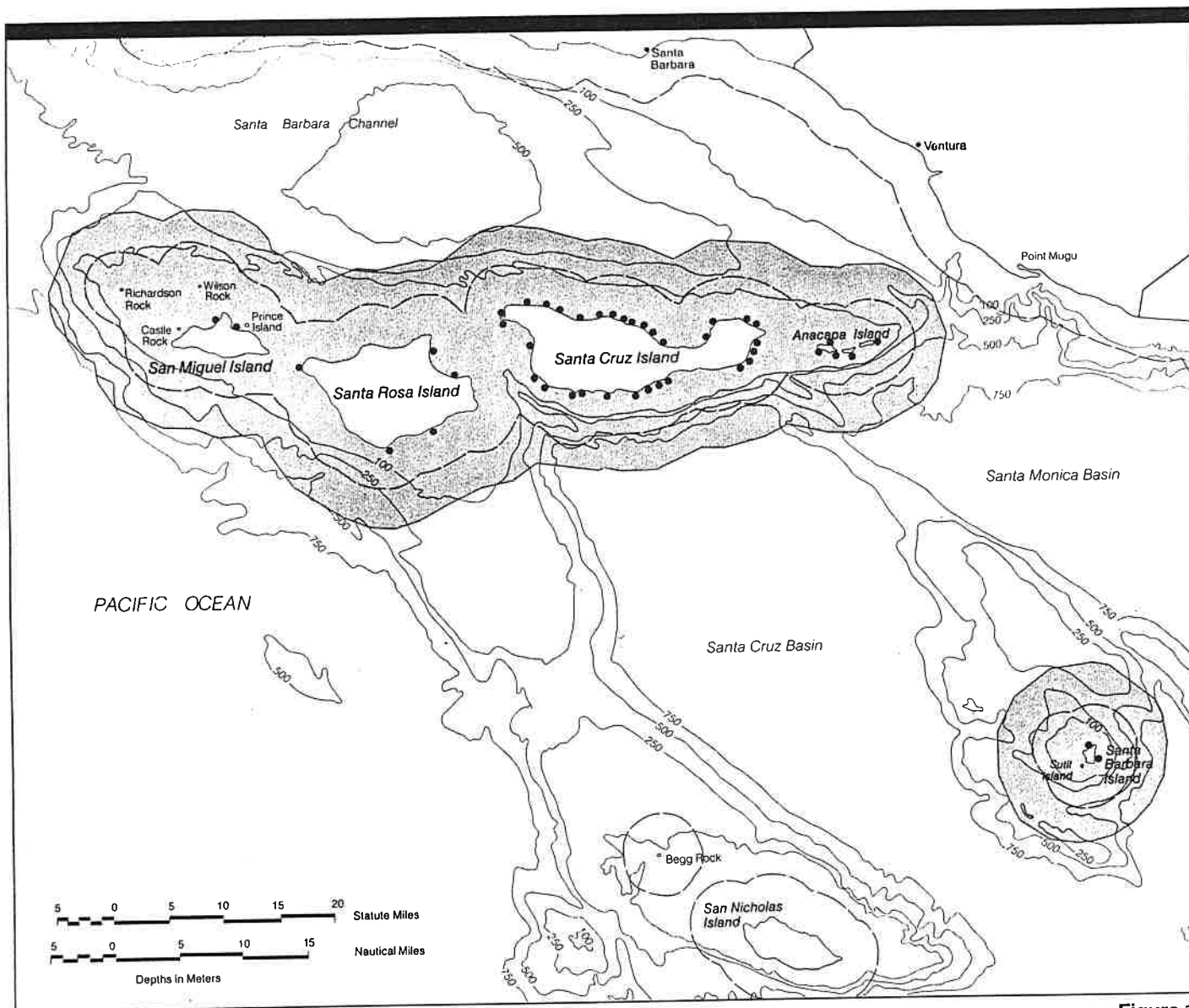
Sanctuary visitors also include the hikers and wilderness campers who travel through the sanctuary to visit the NPS-managed islands. In 1980, 133,422 visitors came to East Anacapa Island,



12. Diver with abalone catch.

NPS File

Frenchy's Cove, Santa Cruz Island (Prisoner's Harbor and Pelican Cove), and Santa Barbara Island, the park areas currently receiving the most visitor use (Whelan, pers. comm.). In addition, landowners on Santa Cruz and Santa Rosa Islands issued approximately 1,038 permits (Santa Cruz Island Company, pers. comm.) and 150 (Vail and Vickers Company, pers. comm.) respectively to private boaters to visit these islands in 1980.

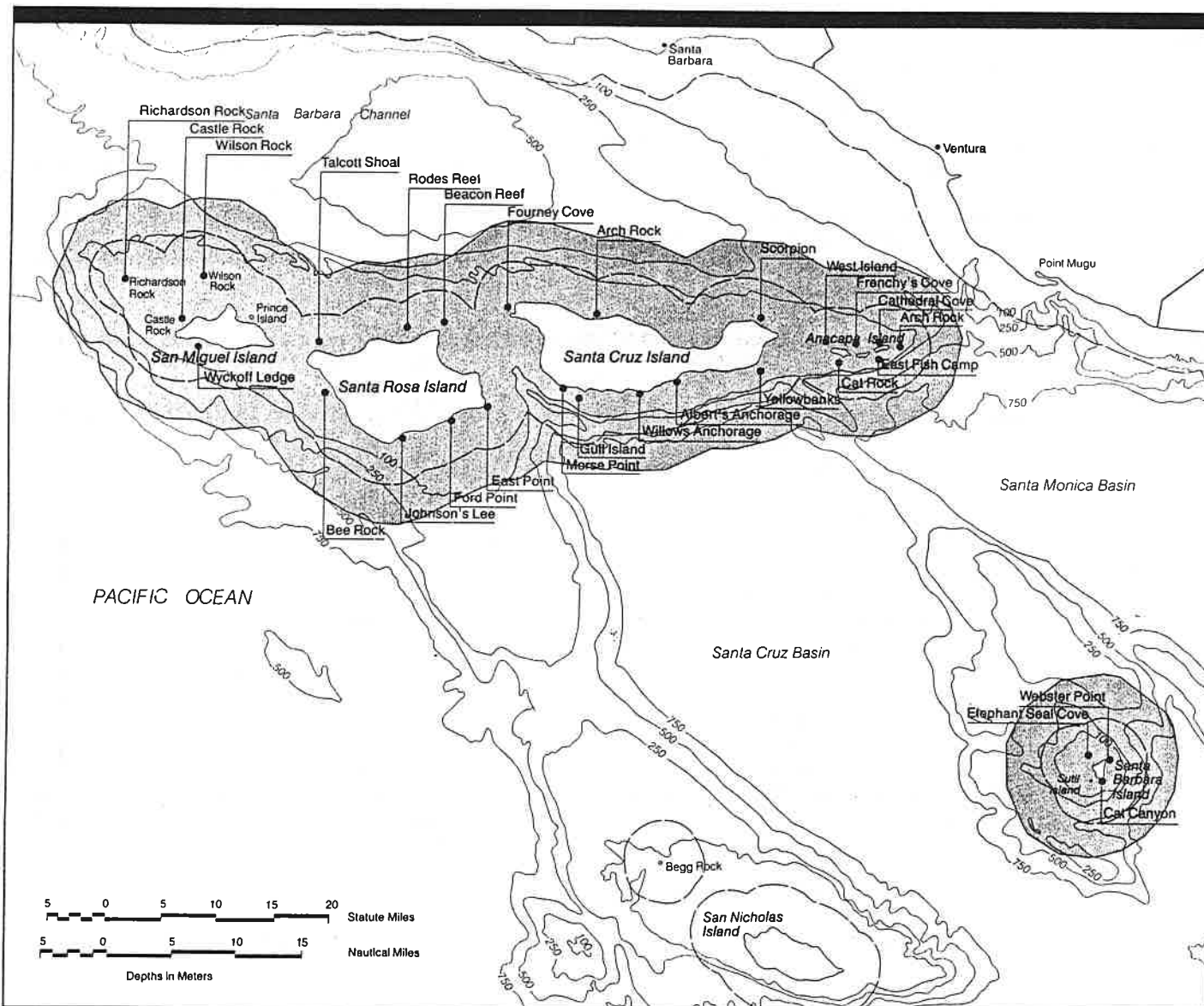


Recreational Anchorages

- Channel Islands National Marine Sanctuary
- Anchorage Sites

Sources: Davis, pers. comm. 1983; Craig, pers. comm. 1983; Fagan and Pomeroy, 1980.

Figure 11



Scuba Diving

Channel Islands National Marine Sanctuary

Popular Dive Sites

Sources: Davis, pers. Comm. 1983; Craig, pers. comm. 1983; Chartguide Ltd., 1982.

Figure 12

(b) Commercial Fishing and Mariculture

The abundant marine resources of the sanctuary support several large year-round and seasonal fisheries. The more important harvests of the sanctuary, based on dollar value, are: sea urchin, jack and Pacific mackerel, California halibut, red, black, and pink abalone, rockfish, northern anchovy, spiny lobster, rock crab, swordfish, thresher and angel shark (CF&G, 1981). Most of the commercial catches harvested in the sanctuary are landed at Santa Barbara and Oxnard and, to a lesser extent, at Port Hueneme and Ventura. Abalone mariculture is a newly introduced and largely experimental activity in the sanctuary. As of 1982, offshore leases for mariculture had been issued by the CF&G at San Miguel, Santa Cruz, and Anacapa Islands, (CF&G, 1982b; University of California Cooperative Extension, 1982).

Kelp harvesting is another commercial activity undertaken in the sanctuary. The giant kelp beds of the Channel Islands have been harvested for about 30 years. Leased beds occur off San Miguel, Santa Rosa, Santa Cruz, and Santa Barbara Islands. The 1978 harvest produced over 25,000 wet tons of kelp (McPeak, pers. comm.).

(c) Commercial Shipping

The sanctuary is adjacent to several major shipping routes serving one of the most urbanized areas in the world. Two major traffic lanes run through the Santa Barbara Channel and partly in the sanctuary. These lanes are adjacent to one another in opposite directions, approaching within 2 nm (3.7 km) of Anacapa Island at the eastern end of the channel and within about 20 nm (35 km)

of San Miguel Island at the western end, in accordance with a traffic separation scheme established by the U.S. Coast Guard (Figure 13).

One study estimates that large vessels (in excess of 100 gross tons) pass through Santa Barbara Channel at a rate of 6.5 vessels per day in a northbound direction and 5.5 vessels per day in a southbound direction (McMullen, 1977). Another survey reports a daily average traffic load of nine large vessels (300 feet or longer) northbound, and a daily combined average of seven medium (100-299 feet long), small (less than 100 feet long), and tug-in-tow vessels travelling north (Cherney et al., 1978). Steady increases in merchant vessel traffic in the Santa Barbara Channel are expected by the year 2000 (MMS, 1983).

Petroleum products, both crude and refined, constitute the most common product shipped through the area. In 1976, these products comprised 66 percent of the total cargo (by weight) in and out of Long Beach Harbor, Los Angeles Harbor, and Port Hueneme. The bulk of oil movements consists of tank vessels transporting foreign or Alaskan crude to refineries located in the Los Angeles Basin. Transportation of refined products and fuel oil is of considerable but lesser significance (USCG, n.d.).

The channel waters around the sanctuary are also widely used by supply ships servicing current offshore oil and gas leases in this region of the Outer Continental Shelf (OCS). This activity will increase following future lease sales depending on the transportation scenarios selected.

Traffic is also likely to increase as a result of full operation of the Space Shuttle program; expendable external booster tanks and boosters recov-

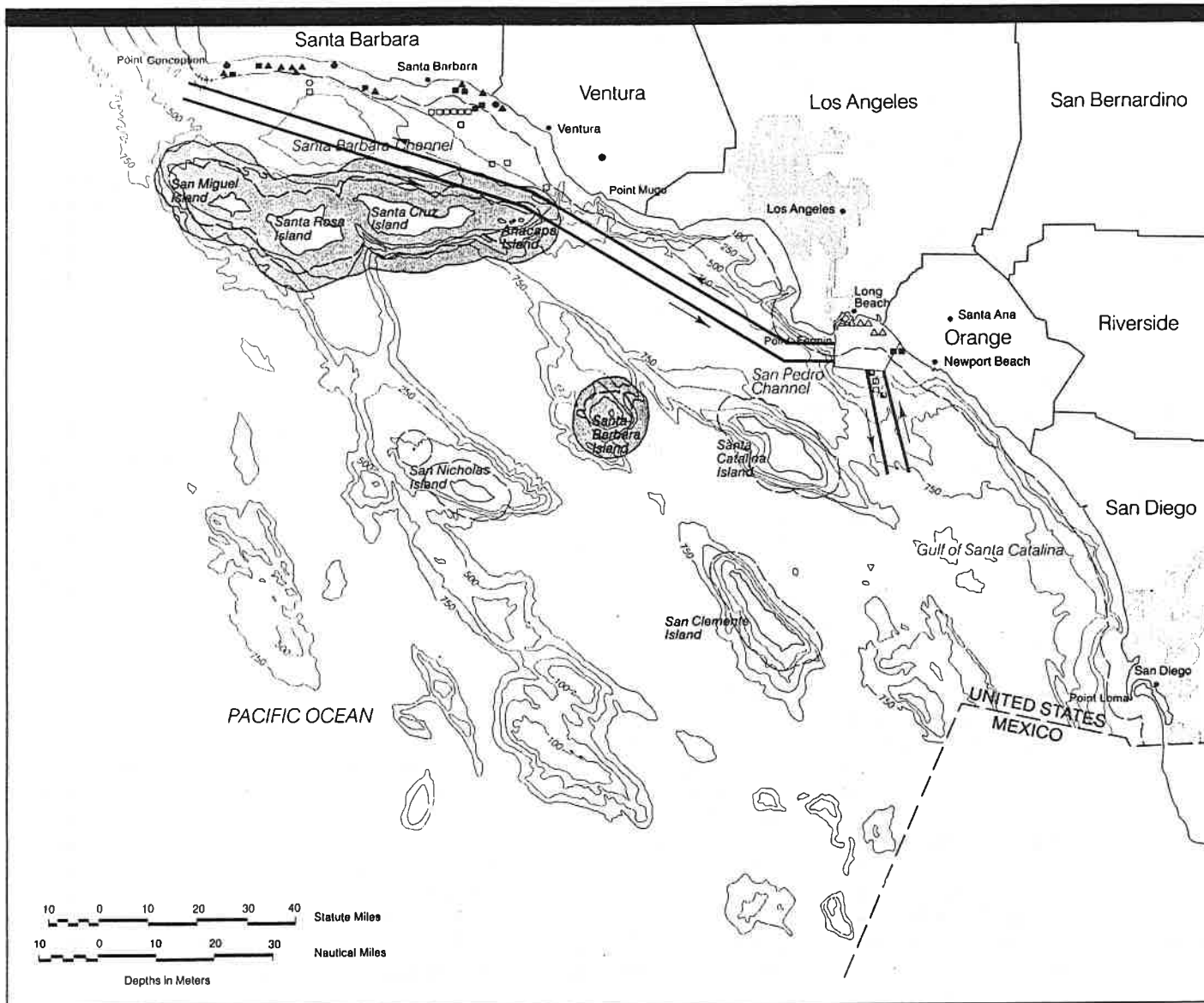
ered after launching will be transported through the channel area (USAF, 1978).

(d) Offshore Oil and Gas Activities










Oil and gas development began in Santa Barbara County in the late 1800's. Since then, hydrocarbon development has occurred in the vicinity of the sanctuary—in the nearshore waters off Santa Barbara and Ventura Counties—but not within the sanctuary.

Areas from the mean high tide line seaward to the three-mile boundary are under the State of California's jurisdiction. Active state leases—most of which were issued in the 1950's and the 1960's—occur between Point Conception and Goleta Point in Santa Barbara County, and in Ventura County. There are currently eight producing platforms operating in state waters and two proposed platforms (Sanders, pers. comm.). Most of the oil produced is transported to shore in pipelines. Since the Santa Barbara spill that occurred in federal waters in 1969, the California State Lands Commission has allowed some exploratory work. With the concurrence of the California Coastal Commission, the State Lands Commission will proceed with a restricted lease sale in state waters between Point Conception and Point Arguello beyond 15 fathoms. The State Lands Commission proposes to offer 8 tracts totaling about 40,000 acres on September 30, 1983, pending litigation (Hansch, pers. comm.).

The federal government has jurisdiction over OCS waters seaward of the three mile limit to the edge of the continental shelf. Since 1966, there have



Offshore Energy Infrastructure

-  Channel Islands National Marine Sanctuary
-  State Platform
-  Federal Platform
-  Federal Platform (Proposed)
-  Island
-  Seafloor Completion
-  Offshore Storage and Treatment Vessel
-  Marine Terminal
-  Existing Shipping Lanes

Sources: Minerals Management Service, 1983;
Stadnychenko and McCord, 1982.

Figure 13

been five federal lease sales involving the Santa Barbara Channel area and one lease sale involving the Santa Maria Basin, to the north of the sanctuary. Eight active federal lease tracts lie at least partly within the sanctuary (MMS, 1983) (Figure 14).

There are currently fourteen production platforms operating in the southern California OCS and several proposed platforms (Stadnychenko and McCord, 1982). Eleven structures are situated between Point Mugu and Point Conception in waters adjacent to the sanctuary. Platform Gina, the closest structure, lies approximately eight nautical miles from Anacapa Island (Figure 13).

According to the Department of the Interior's final 5-year OCS oil and gas leasing schedule approved July 21, 1982, two lease sales are planned for southern California federal waters in the near future. Southern California Lease Offering/February 1984 (formerly Lease Sale #80) will be held in February 1984 and Lease Sale 95 in January 1986.

The oil produced under existing leases is eventually transported to shore for additional processing and refining. Most of the oil produced in federal waters is currently transported to shore by pipelines. Only the production of oil from Platform Hondo is transported by tanker. Several oil and gas transportation strategies are currently under consideration for the Santa Barbara Channel including the construction of additional offshore pipelines, increased transport by tankers, and offshore storage and treatment facilities (Stadnychenko and McCord, 1982). A recent Port Access Route Study performed by the Eleventh Coast Guard District has also recommended changes to the Traffic Separation Scheme (TSS) in the Santa

Barbara Channel to reduce potential conflicts between vessel safety and offshore oil and gas operations. Re-routing of the TSS in the vicinity of Anacapa Island to accommodate OCS development is being considered.

The probability of an oil spill in adjacent waters reaching the sanctuary is related to the type and proximity of nearby structures, tanker traffic density, and oceanographic conditions (TetraTech, 1983; U.S. National Maritime Research Center, 1981). Past oil spills in the area serve as indicators of the potential for future spills. According to the U.S. Coast Guard Polluting Incident Reporting System (PIRS) data base, 187 spills were reported in the Santa Barbara Channel between 1973 and 1980, of which 74 were attributable to natural seeps (USCG, 1980).

Mitigation measures and improved offshore technology have probably reduced the risk of a major accidental spill related to drilling, production or offshore storage (MMS, 1983). Nonetheless, the possibility that major or intermediate size spills may occur because of a tanker grounding, the collision of any type vessel with an offshore structure, or a well blow-out are still a prime concern of both government and industry. To further reduce the potential impacts of oil spills in the Santa Barbara Channel and beyond, the Environmental Protection Agency (EPA) and U.S. Coast Guard have formed an emergency response team and have prepared a Regional Pollution Contingency Plan, in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan. In addition, oil companies have pooled their resources by forming an oil spill cleanup cooperatives (Clean Seas is the cooperative operating in the Santa Barbara Channel and Santa Maria Basin). The effectiveness of these plans is affected

by proximity to the mainland, containment equipment, and prevailing offshore weather conditions.

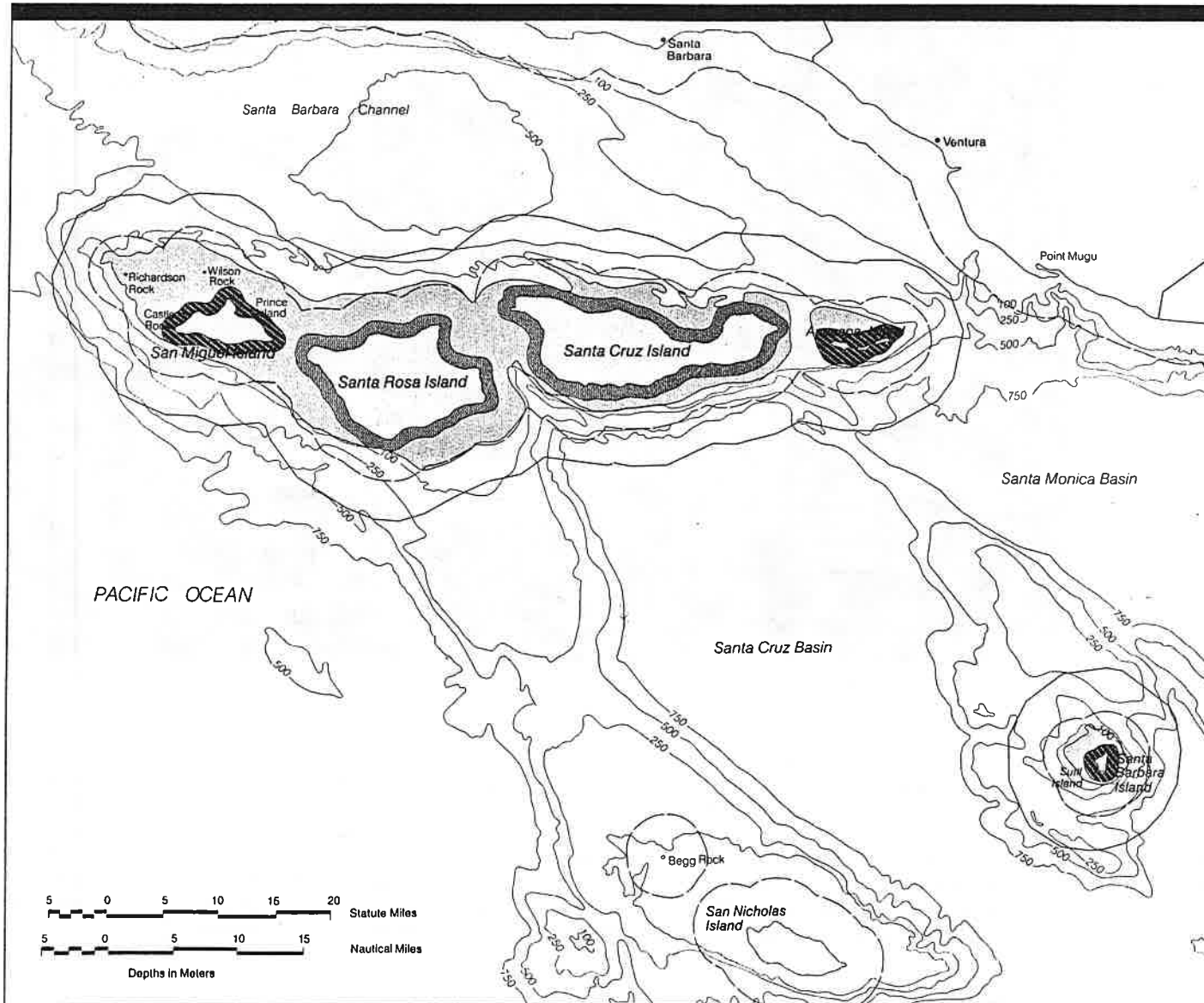
(e) Military Activities

Both the Navy and Air Force conduct a variety of military operations in the sanctuary. All are strictly controlled and require extensive zones free of nonparticipants. These include missile launches, inert bomb drop exercises, mining exercises, and some submarine activities.





Operation of the Space Shuttle system also occurs in the sanctuary area. Launching returning shuttles are scheduled to use the Vandenberg Air Force Base beginning in 1984. They will approach the area at an altitude of about 24,000 m to 30,300 m near or over San Miguel, creating an overpressure wave resembling a sonic boom. In addition, spent booster rockets are towed through the Santa Barbara Channel area by barge from Port Hueneme to the Vandenberg Air Force Base (USAF, 1978).

(f) Research and Education

The special ecological qualities of the sanctuary area attract scientific research into all areas of marine science by organizations such as the University of California, the Santa Barbara Museum of Natural History, Hubbs Sea World, Scripps Institution of Oceanography, and agencies such as the NPS, the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and the Minerals Management Service.



Marine Protected Areas Within the Sanctuary

-  Channel Islands National Marine Sanctuary
-  Channel Islands National Park (Including 1 Nautical Mile Administration Area)
-  Area of Special Biological Significance
-  Ecological Reserve

Sources: Department of Commerce, 1980; California Department of Fish and Game, 1982.

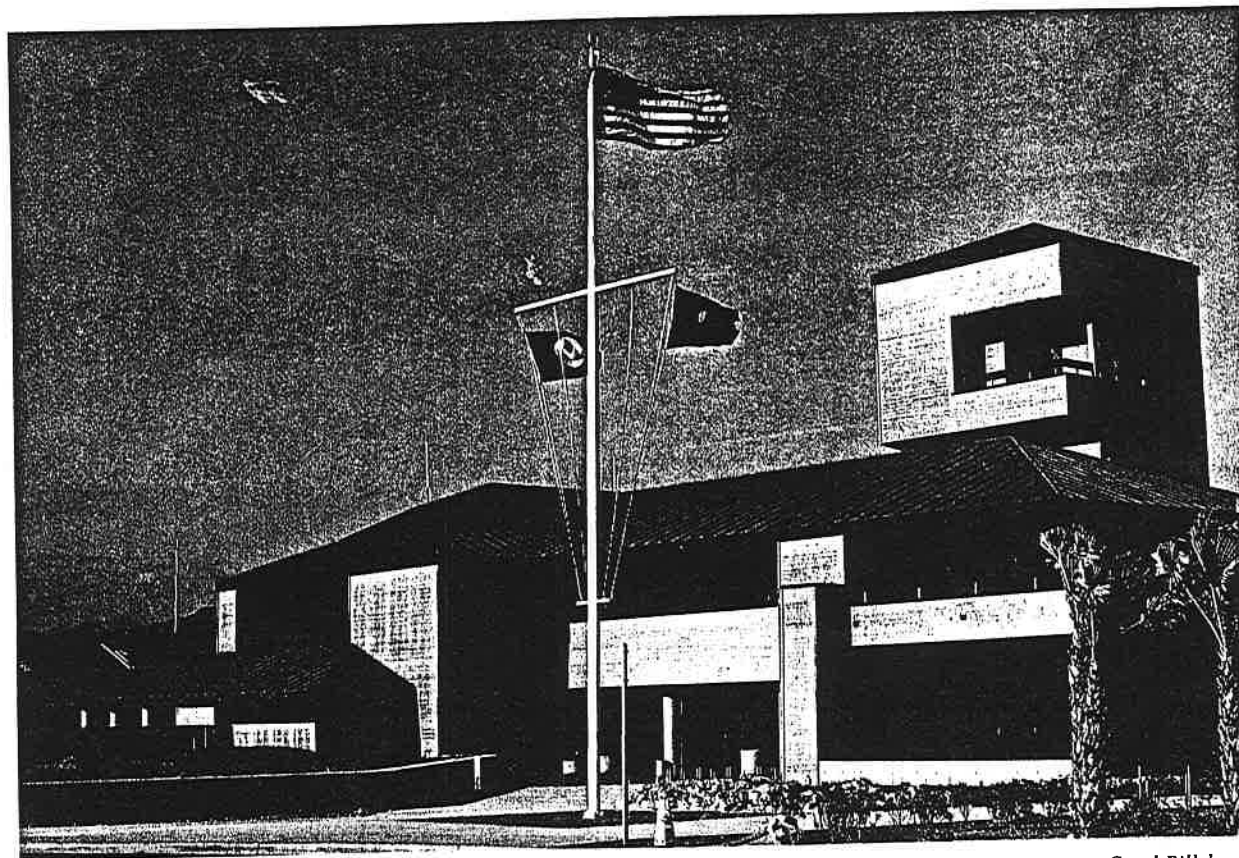
Figure 15

has the authority to prohibit any activity which may harm the resources, including fishing, collecting, swimming, boating, and public entry. Regulations specific to the ecological reserves within the sanctuary include, for example, prohibitions on the taking of invertebrates, boating closure areas, and restrictions on the use of nets within specified depths (CF&G, 1982a).

Since sanctuary designation, the CF&G has augmented surveillance and enforcement in the sanctuary through cooperative agreements with the Sanctuary Programs Division and has coordinated its other activities through a State Sanctuary Coordinator/Manager. Because of their responsibility over sanctuary resources and their operational capabilities, the National Park Service and the CF&G have been key participants in the day-to-day management of the sanctuary. Several other agencies including the National Marine Fisheries Service, the U.S. Coast Guard, and the California Coastal Commission have cooperated with the Sanctuary Programs Division on specific issues.

The California State Water Resources Control Board has designated Areas of Special Biological Significance (ASBS) in the waters around the northern Channel Islands and Santa Barbara Island to a distance of 1 nm (1.8km) offshore or to the 300 ft (90m) isobath, whichever is greater (Figure 15). ASBS sites are designated to preserve and maintain high water quality in special biological communities by prohibiting discharges of elevated temperature wastes and point source sewage of industrial wastes.

Since designation, management of the Channel Islands National Marine Sanctuary has been aimed at the protection of significant marine resources. The resource protection program has focused on



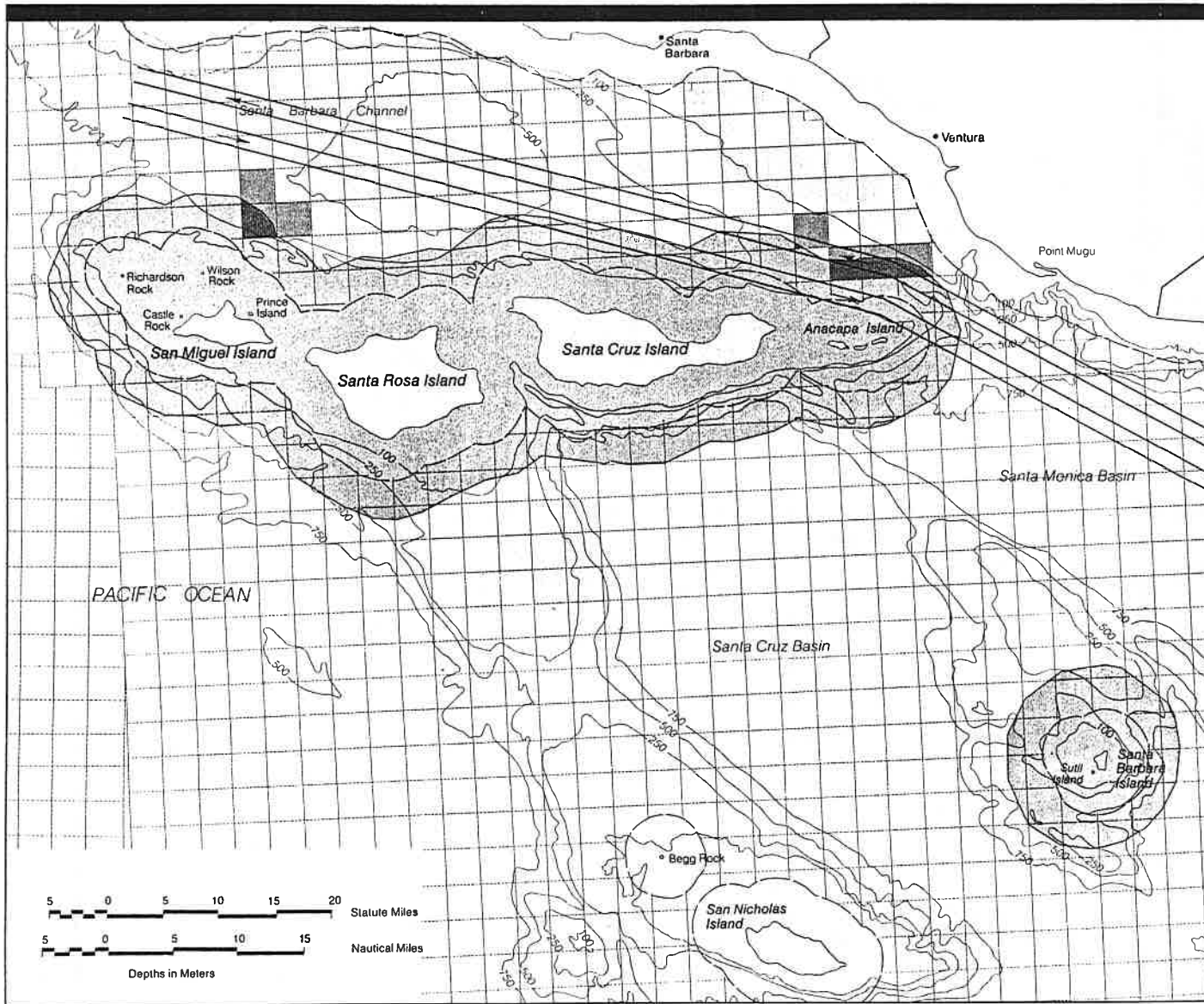
14. Channel Islands Visitor Center.

Carol Pillsbury





augmenting and improving the coordination of surveillance and enforcement activities, in collaboration with the CF&G and the NPS.

The interpretive program, undertaken in cooperation with the NPS, has led to the design and distribution of a sanctuary brochure, the design and installation of exhibits in the Visitor Center,

and the provision of interpretive services on the islands. Past and on-going research, undertaken with the NPS and the National Marine Fisheries Service, has included the design of monitoring systems for pinnipeds, seabirds, the kelp forest ecosystem, boat use in the sanctuary, the development of an information management system, and other pinniped studies (Appendix 2).



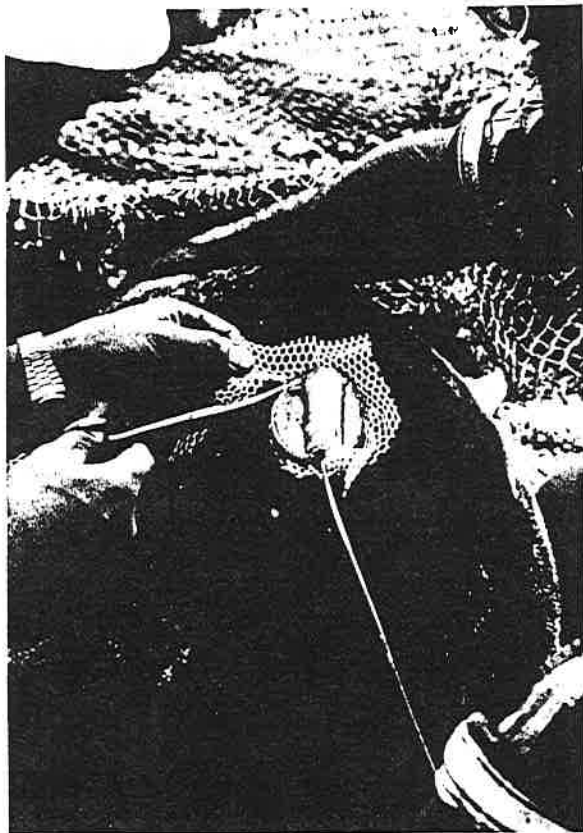
Outer Continental Shelf Activity

-  Channel Islands National Marine Sanctuary
-  Active Federal Lease (as of May 1983)
-  Active Federal Lease Within the Sanctuary
-  Existing Shipping Lanes

Note: For several of the tracts shown, only a relatively minor percentage is within sanctuary boundaries.

Sources: Minerals Management Service, 1983; Stadnychenko and McCord, 1982.

Figure 14



13. Attaching radio transmitter to seal. Dana Seagars

Research organizations and non-profit groups also provide educational programs in the sanctuary for the public. The Santa Barbara Museum of Natural History, the Cabrillo Marine Museum, the Ventura County Department of Parks and Recreation, and others organize educational tours to the northern Channel Islands. Naturalists accompany school groups on these excursions and

provide them with information about sanctuary resources.

4. EXISTING JURISDICTIONS AND MANAGEMENT

The Channel Islands National Marine Sanctuary overlaps several existing jurisdictions. Coordination and cooperation among the responsible agencies has been an important aspect of sanctuary management since designation. These agencies and their involvement in managing the sanctuary to date is described below. A more detailed description of roles and responsibilities is provided under "Administration".

The NPS administers the Channel Islands National Park which includes San Miguel, Santa Rosa, Santa Cruz, Anacapa and Santa Barbara Islands and a one nautical mile administrative boundary surrounding the islands. Management of the park focuses on the protection of terrestrial island resources and surrounding marine resources. Since most of these resources are in some way dependent on the marine environment, and since marine sanctuary resources also use the islands' shores as critical habitat, efforts are being made to coordinate the national park and national marine sanctuary programs. Coordination has involved sharing staff and facilities and undertaking joint projects. The NPS has provided the Sanctuary Programs Division space in the Channel Islands National Park Visitor Center for administration and public interpretation of the sanctuary. Both agencies have worked jointly in developing sanctuary-related facilities in the Center. As stipulated in an interagency agreement, park staff have interpreted the sanctuary to the public and assisted in surveillance and enforcement activities.

Cooperative arrangements have also been formulated for conducting research on intertidal and subtidal resources as well as visitor use. A complete list of research projects undertaken jointly with the NPS is provided in Appendix 2.

The addendum to the existing General Management Plan for Channel Islands National Park, to include Santa Cruz and Santa Rosa Islands, is currently being developed by the Denver Service Center of the NPS, and will be submitted in final form to Congress in Spring of 1983. The areas that are tentatively being considered for development of visitor use and interpretive facilities are Scorpion Anchorage and Smugglers Cove at the east end of Santa Cruz Island. In the future, interpretive facilities may be located at Beecher's Bay (ranch headquarters for Santa Rosa Island) and Johnson's Lee on the south side of Santa Rosa. Interpretive facilities proposed in the future for these islands are likely to offer opportunities for interpretation of the national marine sanctuary (Pillsbury, pers. comm.).

The CF&G is responsible for the management of living marine resources in California, including the state waters' portion of the sanctuary (Fish and Game Code, Title 14 of the California Administrative Code). State management is aimed at the conservation, maintenance, and utilization of living marine resources. The primary management vehicle is the dissemination and enforcement of California commercial and sport fishing regulations which are updated periodically by the Fish and Game Commission. The CF&G has established ecological reserves in the ocean waters and submerged lands surrounding San Miguel, Santa Barbara, and Anacapa Islands from the mean high tide line seaward to one nautical mile (Figure 15). Within ecological reserves, the CF&G

Action Plan

SECTION 3

Action Plan

1. OVERALL MANAGEMENT AND DEVELOPMENT CONCEPT

During the preparation of this plan, the Sanctuary Programs Division reviewed various concepts and alternatives for management and development. Options developed progressively through consideration of the constraints and opportunities of the sanctuary's setting and through consultation with the agencies participating in management.

The plan reflects the fact that long-term protection of resources is the highest priority for management. Improving the level of protection of resources in the sanctuary will depend on several factors affecting the feasibility of programs and actions under consideration. The most important factors affecting management of the Channel Islands National Marine Sanctuary relate to the size and characteristics of the marine area, its regional context, communication needs for visitors, and the need to share and coordinate the responsibility for comprehensive management.

The Channel Islands National Marine Sanctuary is the nation's largest designated sanctuary. Within the area, concentrations of resources and people tend to vary considerably. The plan prescribes management actions that are tailored to the specific issues affecting different parts of the sanctuary. It recognizes that a clear identification of resource issues is essential for a responsive management approach. Assigning priorities based on issues to different areas and resources is also necessary for a cost-effective use of limited funds and staff distributed over the entire sanctuary.

Understanding the life history and ecological relationships of the many species found in the sanctuary, knowing why they concentrate here, and

how to protect them amounts to a challenging task given the size and diversity of the area. It is known that some species, such as the seals and sea lions, are highly dependent upon the remoteness and relatively low levels of disturbance in the sanctuary for breeding and other stages of their life history. For this reason, introduction of on-site programs has to proceed gradually and be synchronized with research aimed at understanding the sensitivity to disturbance of marine mammals, seabirds and other populations. The approach taken in the plan is to rely on existing services and facilities rather than introduce fixed or permanent structures until research confirms potential impacts and carrying capacity.

The Channel Islands National Marine Sanctuary is situated in a context of rapid change. Onshore industrial development, vessel traffic, and OCS exploration and development in the Santa Barbara Channel and areas immediately to the north of the sanctuary are all expected to accelerate during the coming decades. The trend of increasing recreational use of sanctuary waters is also likely to continue. The implications of these changes for the protection of sanctuary resources cannot be predicted. However, problems can be detected at an early stage if an effective monitoring program is in place. Monitoring conditions in the sanctuary to detect significant changes in the status of populations is therefore an important component of this management plan. Being prepared to respond to major changes and emergencies with the appropriate contingency plans is another aspect of planning for a rapidly changing environment. The sanctuary thus provides an opportunity to develop conservation strategies that work hand in hand with adjacent industrial development as advocated by the World Conservation Strategy, prepared by the International Union

for the Conservation of Natural Resources (IUCN, 1980).

The general public and various organizations in southern California will play an important role in attaining resource protection goals in the sanctuary. Communication and education programs fostering public understanding and hence, support for management objectives, are inherent to the plan's concept. The Channel Islands National Marine Sanctuary offers outstanding opportunities for interpreting the marine resources of southern California and communicating the need for careful use and management. Effective communication will depend on publications, exhibits, and special events that convey to a varied public the significance and sensitivity of the sanctuary.

While the plan does not call for the installation of interpretive facilities within the sanctuary, it does address the need for increased on-site access and marine interpretation. Efforts will be directed at providing more on-site tours, initially only during certain seasons and in collaboration with organizations already offering tours, to the sanctuary. New exhibits are also being planned for installation on the NPS-managed islands to improve visitors' appreciation of the marine resources of the national park and national marine sanctuary.

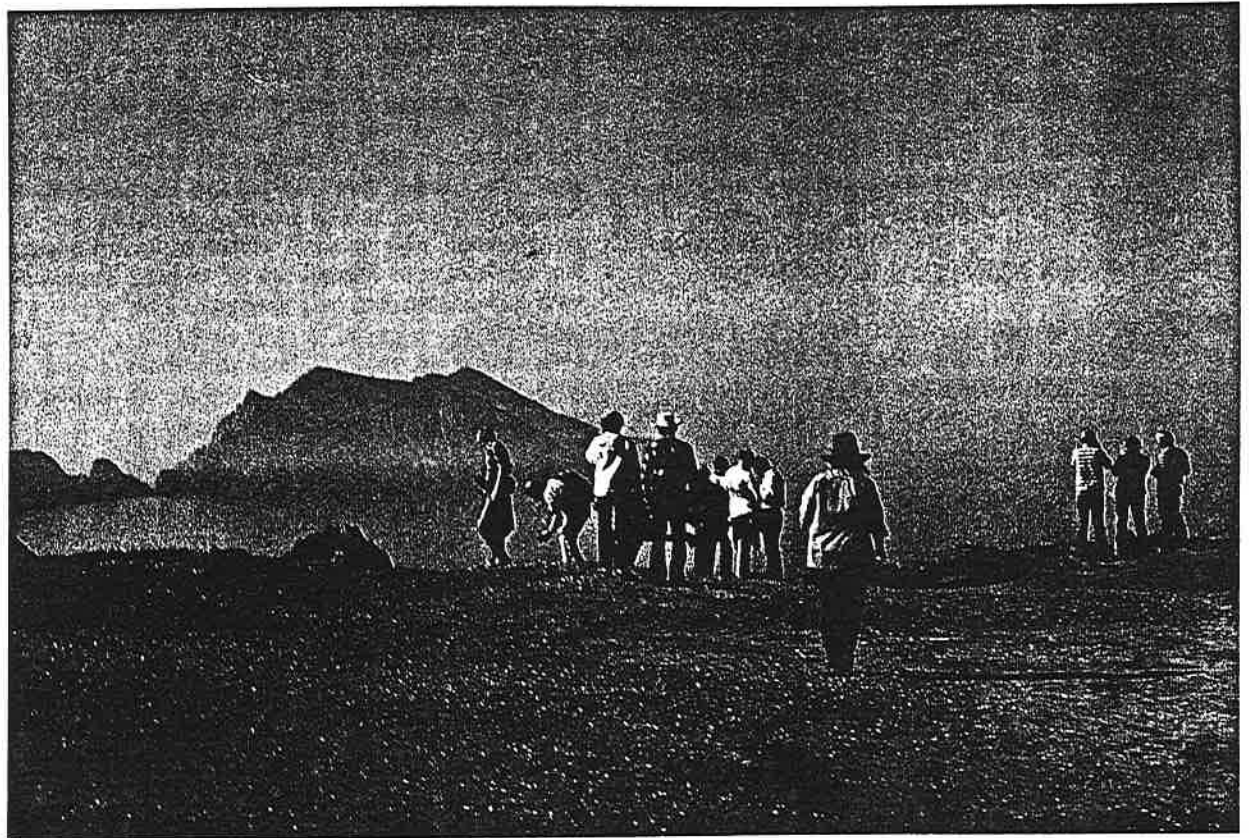
Implementation of this plan will entail cooperation and coordination among several agencies including the California Department of Fish and Game (CF&G) and the National Park Service (NPS). Information exchange, sharing facilities and staff, and coordinating policies and procedures for resource protection are recommended for all programs, including research and interpretation.

The plan presents management of the Channel Islands National Marine Sanctuary for the next five years. Over this time period, management initiatives will generally fall into three basic program areas: Resource Protection, Research, and Interpretation. In the section below, guidelines are provided for identifying actions for these program areas that meet sanctuary objectives and are a step towards realizing long-term resource protection goals.

2. GUIDELINES FOR DETERMINING MANAGEMENT ACTIONS

There are several ways of analyzing the existing status of the sanctuary to determine management actions that are required now and over the next few years. An effective approach—and the one used here—is to identify potential issues and clearly define why these represent a problem or concern for sanctuary management. Information presented in the earlier section on sanctuary resources and uses (Section 2) provides an indication of what these management concerns are.

The management concerns have formed the basis for a 3-step analysis for determining management actions. In Step 1, the management concern is defined and fully described. In Step 2, evidence is put forth to ensure that real and immediate concerns have been identified. In Step 3, management actions are formulated to address the concerns. Some management actions may simultaneously address several concerns. These may be assigned higher priority than actions resolving a single issue.



15. Hikers viewing the sanctuary from Anacapa Island.

Michele Lemay

The significance of the sanctuary to pinnipeds provides an example of how a management concern is used to formulate actions. As discussed in Section 2, the sanctuary serves as a critical refuge for pinnipeds, of which five species breed in the sanctuary but no longer on the southern California mainland. There is a concern for allowing the trend of recovery exhibited by some species to

continue by minimizing any potential sources of disturbance. This suggests the need to monitor all species of pinnipeds to detect changes in status. The management concern also raises questions concerning the habitat conditions and food resources which have contributed to the recovery. Communicating to the public the significance of the resource through brochures and compati-

ble on-site interpretation is yet another action addressing the management concern.

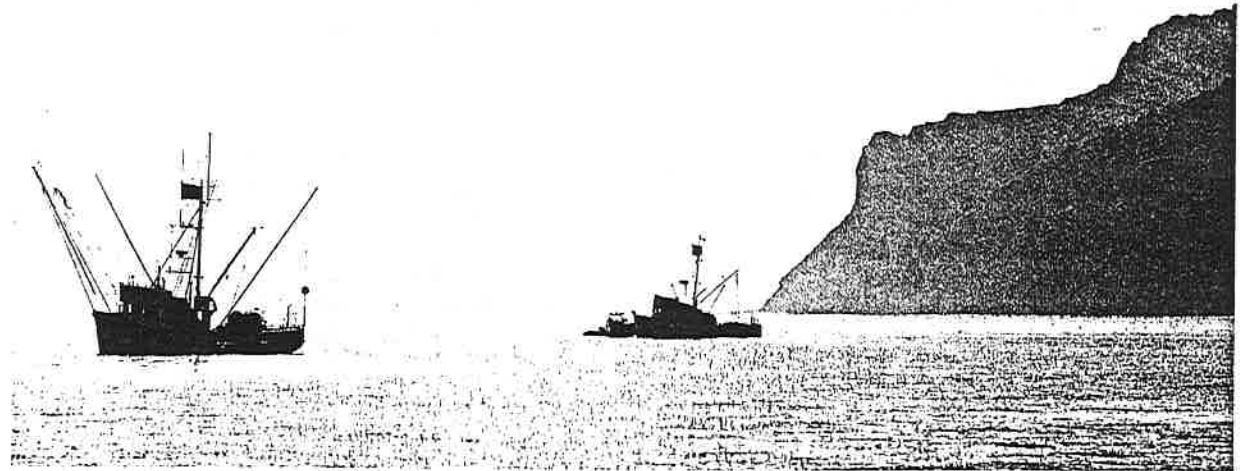
A broad array of issues and concerns were discussed in the course of preparing this plan. Of all the concerns identified, some were determined to be particularly relevant to sanctuary management because: (1) they related specifically to program objectives for the protection of significant resources; (2) they pointed to a clear gap in management; (3) they raised a key research question; and (4) they represented an important operational constraint. The complete analysis of concerns carried out for the Channel Islands National Marine Sanctuary is presented in Table 1.

The analysis has provided a list of individual and at times unrelated actions. Through a comparison with program objectives and a screening process, actions have been consolidated into three program areas. Specific projects and further guidelines for each program area are provided in the remainder of this section.

3. RESOURCE PROTECTION

(a) General Context for Management

Designation of the waters surrounding San Miguel, Santa Rosa, Santa Cruz, Anacapa and Santa Barbara Islands as a National Marine Sanctuary has focused attention both regionally and nationally on the value of the marine resources of the area. A responsibility for developing measures to improve resource protection has ensued from the designation.



16. Commercial fishing off Anacapa Island.

James Dobbin

Presented in this section is a multi-faceted resource protection program which takes the form of: (1) coordination of policies and procedures among the other federal and state agencies sharing the responsibility for resource protection; (2) joint review of proposed changes to the sanctuary environment; (3) participation in the development of new procedures to address specific management concerns (i.e., monitoring and emergency response programs); and (4) the enforcement of reasonable regulations in addition to existing regulatory programs pertaining to living marine resources and all other applicable regulatory programs. This approach is consistent with the objectives for resource protection stated in an earlier section of the plan.

An initiative which is to be applied to all aspects of the resource protection program is the identifica-

tion of specific resource areas and activities to receive priority for management. This action is aimed at further delineating (i.e., in time and space) the management concerns listed in this plan. This will ensure that effective use is made of limited funds and staff being assigned to an extensive area. The initiative will consist of a thorough review of currently available data on commercial and visitor use, and resources. It will draw heavily upon the baseline research described later in this section. It may entail joint working sessions to determine implications for surveillance, enforcement, and research. In particular, the review will serve in determining heavily used areas meriting special attention for surveillance and monitoring, and specific recreational activities and fisheries for which additional information is required.

TABLE 1: Channel Islands National Marine Sanctuary: Management Concerns and Actions

MANAGEMENT CONCERN	EVIDENCE	ACTIONS
<p>The size and configuration of the sanctuary and distance from the mainland</p> <p>Operations in the sanctuary are hampered by its size and remoteness. Significant resources are distributed over a large area. The distances involved and the distribution of resources and uses create logistical problems for consistent management efforts across the Sanctuary. The more remote islands (i.e., San Miguel, and Santa Barbara Island) can present operational problems.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Travel distances to get to different parts of the sanctuary by boat from the mainland vary from 1 to 8 hours. <input type="checkbox"/> Travelling distances and time needed to cross the entire stretch of the sanctuary represent about 6—8 hours. <input type="checkbox"/> The size of the sanctuary implies greater costs for monitoring resources and visitors. Funds and staff have to be scattered over a much greater area. 	<ul style="list-style-type: none"> <input type="checkbox"/> Identify specific resource areas and activities to receive priority for management in order to make programs for research and surveillance and enforcement more responsive to critical areas in the sanctuary. <input type="checkbox"/> Investigate options for additional cooperative agreements (or changes to existing agreements) to share the resource protection responsibility across the sanctuary (i.e., through volunteer programs and hiring additional staff). <input type="checkbox"/> Increase public and industry awareness of resource protection objectives and regulations through interpretation to reduce on-site violations.
<p>The need to continue to coordinate surveillance and enforcement</p> <p>The sanctuary is an extensive area overlapping several jurisdictions. These factors and the nature of the resources and activities that are regulated require coordination of surveillance and enforcement activities. Coordination could help focus this activity on priorities and therefore ensure best use of staff resources.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The number and complexity of applicable regulations within the sanctuary. <input type="checkbox"/> The fact that operational procedures have not been formulated for the enforcement of sanctuary regulations. <input type="checkbox"/> The current format of surveillance and enforcement reports does not allow for an effective analysis of trends using the Sanctuary Information Management System. 	<ul style="list-style-type: none"> <input type="checkbox"/> Improve the coordination of surveillance and enforcement activities through scheduling and joint development of operational procedures. <input type="checkbox"/> Formulate operational procedures for the enforcement of sanctuary regulations. <input type="checkbox"/> Investigate options for additional cooperative agreements (or changes to existing agreements) to enhance resource protection.

TABLE 1: Channel Islands National Marine Sanctuary: Management Concerns and Actions—Continued

MANAGEMENT CONCERN	EVIDENCE	ACTIONS
<p>The need to assess available resource information and organize it into a useable comprehensive data base for the Sanctuary</p> <p>The Sanctuary Manager will need a convenient and comprehensive data base which can be referred to on a day-to-day basis, and which can be updated with the results of on-going research.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> There is currently no way of either comparing or adding results from research to readily available information. <input type="checkbox"/> The computerized bibliography is a starting point to establishing a baseline picture of the Sanctuary. However, in the present form, it is not useful for management and cannot be used for providing an overview or analyzing problems. 	<ul style="list-style-type: none"> <input type="checkbox"/> Improve access to information needed for management. <input type="checkbox"/> Design a management-oriented and collaborative ecosystem monitoring program (compatible with the Sanctuary Information System). <input type="checkbox"/> Investigate options for additional cooperative agreements for exchanging information on fisheries, diving, surveillance and enforcement activities.
<p>The significance of the Sanctuary to the pinnipeds</p> <p>Pinnipeds are a special management concern in the sanctuary because the islands represent the last breeding refuge in southern California. They are also a concern because populations in the sanctuary have shown very dramatic changes. There is a need to understand the rapid changes and study characteristics of, and threats to, critical habitats.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> There are no rookeries on the southern California mainland. <input type="checkbox"/> Some species are re-occupying former rookeries on the islands. <input type="checkbox"/> Island populations represent a significant percentage of California populations. <input type="checkbox"/> While extensive observations of the northern fur seal and elephant seal rookeries around San Miguel have been made, much less is known of pinniped activities around Santa Cruz and Santa Rosa Islands. 	<ul style="list-style-type: none"> <input type="checkbox"/> Implement the pinniped monitoring program. <input type="checkbox"/> Investigate the food resources and specific nearshore areas upon which pinnipeds are most dependent. <input type="checkbox"/> Develop educational materials designed to sensitize visitors to pinniped behavior and vulnerability to various types of disturbance.

TABLE 1: Channel Islands National Marine Sanctuary: Management Concerns and Actions—Continued

MANAGEMENT CONCERN	EVIDENCE	ACTIONS
<p>The significance of the sanctuary for the endangered brown pelican and significant seabird colonies</p>	<p><input type="checkbox"/> There are virtually no long-term data bases for pinniped population dynamics from which the effects of such activities as human disturbance, specimen collecting and petroleum extraction may be distinguished from natural fluctuations. Detailed information regarding seasonal distributions of pinnipeds around the park islands relative to the distributions of boats and fishing activity is also lacking. (D. DeMaster: pers. comm.).</p>	<p><input type="checkbox"/> Investigate options for additional cooperative agreements (or changes in existing agreements) to carry out seabird-fishery interaction studies.</p>
<p>The waters of the sanctuary support one of the most abundant and diverse marine bird assemblages in the United States. Both resident breeding populations and migrant species are dependent on the rich fishery resources and undisturbed habitat of the sanctuary. The populations are vulnerable to the adverse impacts of visitor use, aircraft overflights, fluctuations in fishery stocks and pollution.</p>	<p><input type="checkbox"/> The only permanent breeding colony of the endangered brown pelican in California and the largest breeding colony of western gulls in the sanctuary are found on Anacapa Island and forage in sanctuary waters.</p> <p><input type="checkbox"/> The eleven species of marine birds breeding in the sanctuary represent five avian families.</p> <p><input type="checkbox"/> Some species (such as Cassin's auklet and Xantus' murrelet) have fairly restricted diets and foraging areas which makes them highly dependent on fishery stocks. Recent evidence indicates that any natural or man-induced declines in the food available to these birds or the need to seek alternative foraging areas (e.g., due to oil spills or depleted stocks) would likely result in partial or complete reproductive failures.</p>	

TABLE 1: Channel Islands National Marine Sanctuary: Management Concerns and Actions—Continued

MANAGEMENT CONCERN	EVIDENCE	ACTIONS
<p>Lack of information on the probability of and effects of accidental oil spills and chronic oil pollution in the sanctuary</p>	<p>There are several sources of accidental and chronic oil pollution in the vicinity of the sanctuary, including offshore oil fields with infrastructure, heavy tanker traffic and natural seeps. The probability of a major oil spill from any sources is a subject to controversy and the magnitude of the impacts on significant sanctuary resources are not fully understood. Accident probabilities are likely to increase over the next ten years. There is also a concern for being able to respond within the sanctuary in the event of a major oil spill. The effects of chronic oil pollution are also poorly understood.</p> <ul style="list-style-type: none"> <input type="checkbox"/> The various oil spill models that have been applied to the Santa Barbara Channel and the Santa Maria Basin confirm that there is a high probability that a major oil spill will reach San Miguel and Anacapa Islands over the life of the oil fields. <input type="checkbox"/> There have been several reports of rigs causing small spills in the vicinity of the sanctuary (Penrod rig has had 10 small spills; L.A. Times, 1983). <input type="checkbox"/> There are 19 platforms and drillships operating within 2 to 20 miles of the Sanctuary boundary. These numbers are expected to increase dramatically with the accelerated development of new fields. Concentrated infrastructure is likely to increase problems of chronic rig discharges and traffic hazards. <input type="checkbox"/> Recreational vessel use of the Sanctuary (also a potential source of chronic pollution) is also expected to increase in the future. 	<ul style="list-style-type: none"> <input type="checkbox"/> Increase public and industry awareness of resource protection objectives, priorities and regulations (for pollutant discharges and vessel traffic). <input type="checkbox"/> Evaluate existing contingency plans to determine if additional capabilities and equipment are required to protect priority areas. <input type="checkbox"/> Initiate a collaborative program with federal/state agencies and industry to understand and reduce accidental pollutant spills and chronic discharges in and around the sanctuary. <input type="checkbox"/> Design a management-oriented and collaborative environmental monitoring program. <input type="checkbox"/> Collaborate with the U.S. Coast Guard and other agencies in determining the need to monitor vessel traffic in the sanctuary. <input type="checkbox"/> Maintain a record of oil spills and other pollutant spills.

TABLE 1: Channel Islands National Marine Sanctuary: Management Concerns and Actions—Continued

MANAGEMENT CONCERN	EVIDENCE	ACTIONS
<p>The possible impacts of increased visitor use on significant Sanctuary resources</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The results of aerial boat surveys. <input type="checkbox"/> Tidepool monitoring study. <input type="checkbox"/> Decrease in average abalone take and size, particularly around the islands closest to the mainland. <input type="checkbox"/> Decrease in lobster take. <input type="checkbox"/> More remote anchorages being used because overcrowding is shifting boating use further east. Some of these remote anchorages are historical pupping grounds. 	<ul style="list-style-type: none"> <input type="checkbox"/> Identify specific resource areas and activities to receive priority for management. <input type="checkbox"/> Increase public and industry awareness of resource protection objectives, priorities, and regulations. <input type="checkbox"/> Design a management-oriented and collaborative program for monitoring visitor use in the sanctuary. <input type="checkbox"/> Determine historic pinniped rookeries and haulout sites.
<p>Public Awareness of the Sanctuary</p>	<ul style="list-style-type: none"> <input type="checkbox"/> On-site contacts with recreational visitors indicate that many are not aware of the Sanctuary, why it was created, and the intent of the regulations. <input type="checkbox"/> The fact that it is a very extensive sanctuary located offshore makes it difficult for visitors to visualize the designated area. The overlapping marine protected areas within the Sanctuary also make it difficult for the public to understand what represents the sanctuary. 	<ul style="list-style-type: none"> <input type="checkbox"/> Update as necessary and distribute orientation and other interpretive documentation on the sanctuary. <input type="checkbox"/> Investigate the feasibility of expanding off-site marine interpretation cost effectively.

TABLE 1: Channel Islands National Marine Sanctuary: Management Concerns and Actions—Continued

MANAGEMENT CONCERN	EVIDENCE	ACTIONS
<p>The need for increased access to the Sanctuary and marine interpretation</p> <p>The sanctuary is relatively distant from the mainland locations and relatively inaccessible to tourists and visitors that do not own boats or dive. Appreciation for and understanding of Sanctuary resources rests on having the opportunity to “experience” first-hand the marine environment. A meaningful experience can be provided to a wider public through tours (thus the need for more access to the sanctuary) or through the effective design of marine interpretive exhibits.</p>	<ul style="list-style-type: none"> <li data-bbox="722 488 1283 630">❑ The only land base providing indenty and visibility on the mainland is at the Ventura NPS Center, however, the potential public for the Sanctuary extends from Santa Barbara to Los Angeles. <li data-bbox="722 824 1226 911">❑ Only 20% of visitors to the National Park Visitor Center make it to the park, or the sanctuary. <li data-bbox="722 943 1188 997">❑ Fee for a regular boat trip to Anacapa Island is about \$25.00/person. <li data-bbox="722 1029 1184 1141">❑ Regular access now is to NPS islands not the Sanctuary. Capacity of the sanctuary to accommodate additional non-landing tours is probably high. <li data-bbox="722 1203 1150 1315">❑ There is a high demand for marine interpretation in the region that cannot be fully met at the Visitor Center. <li data-bbox="722 1344 1142 1401">❑ Marine-theme exhibits are limited in the Visitor Center. 	<ul style="list-style-type: none"> <li data-bbox="1346 488 1856 630">❑ Initiate additional cooperative agreements for interpretation (including the development of new facilities) with appropriate organizations throughout the region (i.e., from Santa Barbara to Los Angeles). <li data-bbox="1346 824 1906 911">❑ Expand the marine interpretive exhibits and events, and the Channel Islands National Park Visitor Center. <li data-bbox="1346 943 1871 1029">❑ Investigate the feasibility of expanding off-site marine interpretation (from Ventura to Santa Barbara and Los Angeles). <li data-bbox="1346 1062 1793 1115">❑ Provide for additional on-site marine interpretation of the Sanctuary. <li data-bbox="1346 1148 1814 1195">❑ Investigate the feasibility of increasing access to the Sanctuary.

(b) Surveillance and Enforcement

Since designation, an important aspect of the resource protection program has been the surveillance of sanctuary waters and enforcement of protective regulations. The sanctuary designation document, approved by the President on September 21, 1980, first promulgated these regulations. The designation document:

- Identified a list of activities that may be regulated;
- Provided for emergency regulations; and
- Defined the relationship of sanctuary designation to other regulatory programs.

The protective regulations that are now in effect within the sanctuary (15 CFR, Part 935, Department of Commerce) apply to the following:

Hydrocarbon operations: Oil and gas exploration and development on leases executed on or after the effective date of the sanctuary regulations are prohibited. Oil and gas exploration and development and pipeline placement resulting from any lease executed prior to the effective date of these regulations are permitted subject to applicable authorities and sanctuary oil spill contingency equipment requirements.

Discharges: Discharges are prohibited within the sanctuary with the exception of vessel cooling waters, fish wastes and bait, marine sanitation device effluents, and effluents incidental to permitted hydrocarbon activities.

Alteration of, or construction on the seabed: Except for permitted pipeline construction resulting from existing leases, no seabed alteration or construction is permitted within 2 nautical miles of any island.

Commercial vessel operations: Access for fishing, recreational, and research vessels is not restricted within the sanctuary. Other vessels, such as those engaged in carrying cargo or servicing offshore installations are prohibited within 1 nautical mile of any island, except to transport persons or supplies to or from an island.

Overflights: Aircraft are not permitted below 1,000 feet within one nautical mile of any island within the sanctuary. This restriction will minimize disturbance to marine mammals or seabirds. Exceptions to this restriction are provided for enforcement purposes, kelp bed surveys, and transportation of persons or supplies to or from any island.

Removing or damaging historical or cultural resources: Removal or damage to any historical or cultural resources of the sanctuary are prohibited.

The Sanctuary Programs Division will formulate operational procedures for the enforcement of sanctuary regulations. The procedures will include a formal interpretation of each regulation; matters of policy; and contact, warning, citation and legal procedures where appropriate. This information will be assembled in an operational manual for use in training sanctuary wardens and rangers. The Sanctuary Programs Division and the CF&G will jointly administer this initiative.

In addition to the sanctuary regulations which are specified in the designation document, there are several regulatory programs and statutes which apply to the Channel Islands National Marine Sanctuary. For instance, the living marine resources regulations promulgated under the California Fish and Game Code remain in effect in the sanctuary. The regulations are considered integral to the resource protection program of the sanctuary.

Implementation of the surveillance and enforcement program entails the following activities:

Planning and Coordination of Surveillance and Enforcement Activities

Under a cooperative agreement with the Sanctuary Programs Division, U.S. Department of Commerce, NOAA, the CF&G and associated federal agencies, including the NPS, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and U.S. Coast Guard, enforce designated laws and regulations within the sanctuary.

Planning of enforcement activities requires the establishment of patrol schedules, and assigning vessels and staff to specific parts of the sanctuary. Planning is undertaken by the CF&G throughout the sanctuary and by the NPS (in collaboration with the CF&G) in nearshore waters and the intertidal zone of the sanctuary.

Once agreement is reached on the resources, sections of the sanctuary, time periods and activities that should receive priority for management, there will be a further need to adjust surveillance operations within the sanctuary to be more responsive to priorities. This will entail periodic meetings of the Sanctuary Manager, the CF&G, the NPS, and the U.S. Coast Guard to review and adjust schedules and assess the adequacy of the enforcement capability.

Training of Surveillance and Enforcement Staff

Consistent training programs are designed so that NPS and CF&G staff involved in enforcement are adequately prepared to execute regulations and operational procedures within the sanctuary.

The Sanctuary Programs Division and Sanctuary Manager assist both the CF&G and the NPS in the development of these programs.

Reporting and Analysis of Trends

Soon after the initiation of this plan, surveillance and enforcement reporting procedures will be refined. This action will require reformatting quarterly and annual surveillance reports to ensure consistency among CF&G and NPS summaries. The Sanctuary Manager and the State Sanctuary Coordinator/Manager, with the assistance of enforcement staff, will determine relevant summary statistics, possible analyses to be conducted to establish trends and statistically reliable methods for monitoring the effectiveness of surveillance and enforcement of various activities in different parts of the sanctuary.

Quarterly and annual reports of all surveillance and enforcement activities (including the nature and number of incidents) in the sanctuary are to be prepared by the CF&G and submitted to the Sanctuary Programs Division. These reports are intended as summaries, consolidating NPS and all other agency records, upon which trends in violations and the effectiveness of the overall surveillance and enforcement program can be assessed.

A record of all warnings, citations and summary statistics is maintained by the Sanctuary Manager and the State Sanctuary Coordinator/Manager. Significant violations may in some instances require consultation with the Sanctuary Programs Division, Washington, D.C. office. In addition, the State Sanctuary Coordinator/Manager is responsible for transferring the relevant statistics onto



17. *Interpreting sanctuary resources.*

James Dobbin

the Sanctuary Information Management System and conducting a periodic “analysis of trends”.

Public Education and Information

The most effective measures in law enforcement are preventive. It is therefore essential that recrea-

tional visitors and users of the sanctuary be provided with complete and easily understood information about regulations, the reasons for them, and the shared government responsibility for their enforcement. Communication through brochures, signs, and other devices will be directed primarily at the major access points on the mainland (i.e., public marinas, dive shops, airports) but

will also be undertaken within the sanctuary (see Interpretation).

Initiatives to be undertaken early on include: (1) developing and distributing a brochure explaining sanctuary regulations and their intent; (2) posting sanctuary regulations in relevant locations (i.e., yacht and dive clubs, local airports); and (3) establishing contact with industry, and recreational and commercial groups (i.e., fishing, oil and gas shipping industries). Discussion with various groups will serve in determining appropriate educational materials for promoting compatible use of the sanctuary. This initiative will be administered by the Sanctuary Manager with the assistance of the NPS and the CF&G.

(c) Contingency Plans for Major Emergencies

The significant resources of the Channel Islands National Marine Sanctuary are susceptible to natural and human-related changes. Many of these changes are gradual and can be detected only through long-term monitoring of various environmental and biological indicators. However, certain sudden changes in conditions (due to an accidental spill for example) could seriously impact resources and present severe health and safety hazards. While major accidents adjacent to or within the sanctuary cannot be predicted, there is a need for a state of readiness to avoid unacceptable impacts.

Measures and plans are currently in place within the region to respond to an offshore emergency such as a major accidental oil spill (USCG, n.d). The degree to which these measures apply to the sanctuary needs to be confirmed.

The Sanctuary Programs Division will monitor and assess the state of preparedness as it relates to the sanctuary. This action will entail exchanging information with government and industry emergency response teams and seeking their support in assessing detection and clean-up capabilities in and around the sanctuary. Agreements may be formulated to reduce spill probabilities (i.e., through more effective detection programs) and augment containment capabilities (i.e., with additional equipment, staff, and deployment plans). The applicable emergency measures for alerting response teams and deploying equipment within the sanctuary will be incorporated into the operational plan for resource protection (see below).

(d) Encouraging Compatible Use of the Sanctuary

Encouraging the public to use the sanctuary in ways that are compatible with the protection of sensitive significant resources is an important aspect of this program. Sanctuary management does not encompass direct management of activities (other than that provided through the regulations stated above) since this is a responsibility assigned to other state and federal agencies. The Sanctuary Programs Division does however encourage compatible visitor use by undertaking the following:

- Monitoring commercial and recreational activities in the sanctuary and/or encouraging other agencies to do so to detect areas of particular management concern;
- Exchanging information on commercial and recreational activities in the sanctuary;

- Reviewing and consulting with other agencies on policies or proposals for the management of activities which may affect protection of sanctuary resources;
- Developing information brochures and other materials aimed at informing the public about potential disturbances to significant resources, critical areas, and time periods.

Monitoring and information exchange programs are discussed further under research. The development of information brochures is discussed under interpretation.

(e) Preparation of an Operational Plan for Resource Protection

The experience gained during the first two years of management and the initial coordination among the Sanctuary Programs Division and other agencies will help further define the guidelines provided above. Once agreement has been reached, an operational plan for resource protection will be prepared by the Sanctuary Manager jointly with the Sanctuary Programs Division. It will describe in detail regulatory procedures, contingency plans, schedules, and cooperative and funding agreements in effect.

4. RESEARCH

(a) General Context for Management

The waters surrounding the Channel Islands National Marine Sanctuary are recognized as an area of national significance. The abundant and diverse pinniped populations and seabird colonies, the unique subtidal habitats, and the management concerns outlined in earlier sections clearly require a broad research program that is integrated with other management programs.

Research conducted within the Sanctuary and funded by the Sanctuary Programs Division will continue to focus on management issues which relate to the protection of significant resources. General directions and priorities for additional research are provided in this section as a guide for the Sanctuary Manager to identify and select future research projects.

(b) Framework for Research

The broad categories of research to be given priority at the Channel Islands National Marine Sanctuary are shown in Figure 16.

Within each broad category of research (i.e., Significant Resources, Marine Ecology, Socio-economics), research projects may be directed to three basic management questions as follows:

- What are the general characteristics and distributions of resources, habitats, and uses (Baseline/Characterization)?
- What are the changes over time in resources, habitats, and uses (i.e., in abundance, distribution) and what are the influences of natural

variability and human-caused disturbances on these long-term trends (Monitoring)?

- What are the possible cause and effect relationships accounting for changes observed in resource distribution, abundance, and diversity (Experimental/Predictive)?

Priorities will shift among the different categories as baseline inventories are completed for all significant resources and new management issues emerge. The Sanctuary Manager and the Sanctuary Programs Division will adjust research priorities based on these factors and given available funding.

(c) Research Priorities

Several on-going and proposed research projects will be assigned a high priority in the first years of implementing this plan. These projects are described further below as they all address key management questions and needs.

Undertake a comprehensive resource mapping study

The Sanctuary Manager requires a comprehensive set of maps of sanctuary resources and uses that can be referred to on a day-to-day basis and be refined and updated periodically. The development of this data base will involve: (1) establishing the scope and format of the mapped data base so that it addresses management concerns and is readily assessable; (2) conduct a search of the computerized bibliography on the marine environment prepared for the Channel Islands National Park to retrieve relevant sources; (3) compile the

data onto a base map; and (4) evaluate the completeness and reliability of the data base. This data base will help delineate priority areas in the sanctuary and illustrate the distribution of and overlaps among resources and uses.

Implement the pinniped monitoring program

Seals and sea lions will continue to be a high priority for monitoring because of their dependence on the sanctuary as a refuge and because of their rapidly changing status. Aerial photography will be used in combination with ground censuses to produce an effective and accurate monitoring program. This will entail formatting observations for effective management use, developing reliable analyses of the data, and developing agreements for implementing the program.

Investigate the food resources and specific near-shore areas upon which pinniped populations are most dependent

This involves continuing the feeding ecology research undertaken at San Miguel Island, and expanding the research to include additional areas and species. This research will also provide information on the relative suitability of these feeding areas and how this changes seasonally. Results from all the research on pinnipeds should serve to assess the status of the current population, sensitivity to various types of disturbance, and areas requiring special management within the sanctuary. Other on-going research on pinnipeds will include monitoring and tagging California sea lions and northern elephant seals at Santa Barbara Island and monitoring historic sea lion rookery sites at Santa Rosa and Santa Cruz Islands.



18. Pinniped researchers on San Miguel Island.

Dana Seagars

Undertake baseline research on the cetacean populations of the sanctuary

To address the existing gap in knowledge concerning whale and dolphin populations dependent on the sanctuary, the Sanctuary Programs Division will initiate a study to establish: (1) the current status of knowledge of cetaceans (i.e.,

species known to occur, distribution); (2) general behavior and life history in the sanctuary for certain easily observed and identifiable species; (3) potential disturbance sources; and (4) options for a cost-effective monitoring and selective research program. Special effort will be addressed to those species that have resident populations in the sanctuary (D. De Master, pers. comm). This

initiative will be administered by the Sanctuary Manager in collaboration with the Southwest Fisheries Center (National Marine Fisheries Service).

Design a management-oriented and collaborative environmental monitoring program

In addition to monitoring species or groups of species of particular management concern (i.e., pinnipeds, cetaceans), there is a need for a broad biophysical monitoring program. Periodic analysis of biological and environmental data will help detect any changes in sanctuary ecosystems, determine possible consequences of change, and what management decisions should be made.

Development of a permanent monitoring system for an extensive and diverse area such as the Channel Islands National Marine Sanctuary is a difficult task. There is a need to carefully select indicator species, relevant environmental variables, and the most representative sites before committing funds permanently to the program.

Work undertaken to date to design monitoring programs for the subtidal ecosystem has been described in Section 2. The Sanctuary Programs Division will continue to support and collaborate with other agencies such as the NPS, the National Marine Fisheries Service, and the CF&G in designing and testing permanent environmental monitoring programs.

While a permanent monitoring program is being developed and tested, temporary measures will be taken to periodically record conditions in certain critical parts of the sanctuary. The Sanctuary Programs Division in collaboration with the CF&G may initiate an "environmental indicator"

***A Framework for
Research at the
Channel Islands
National Marine
Sanctuary***

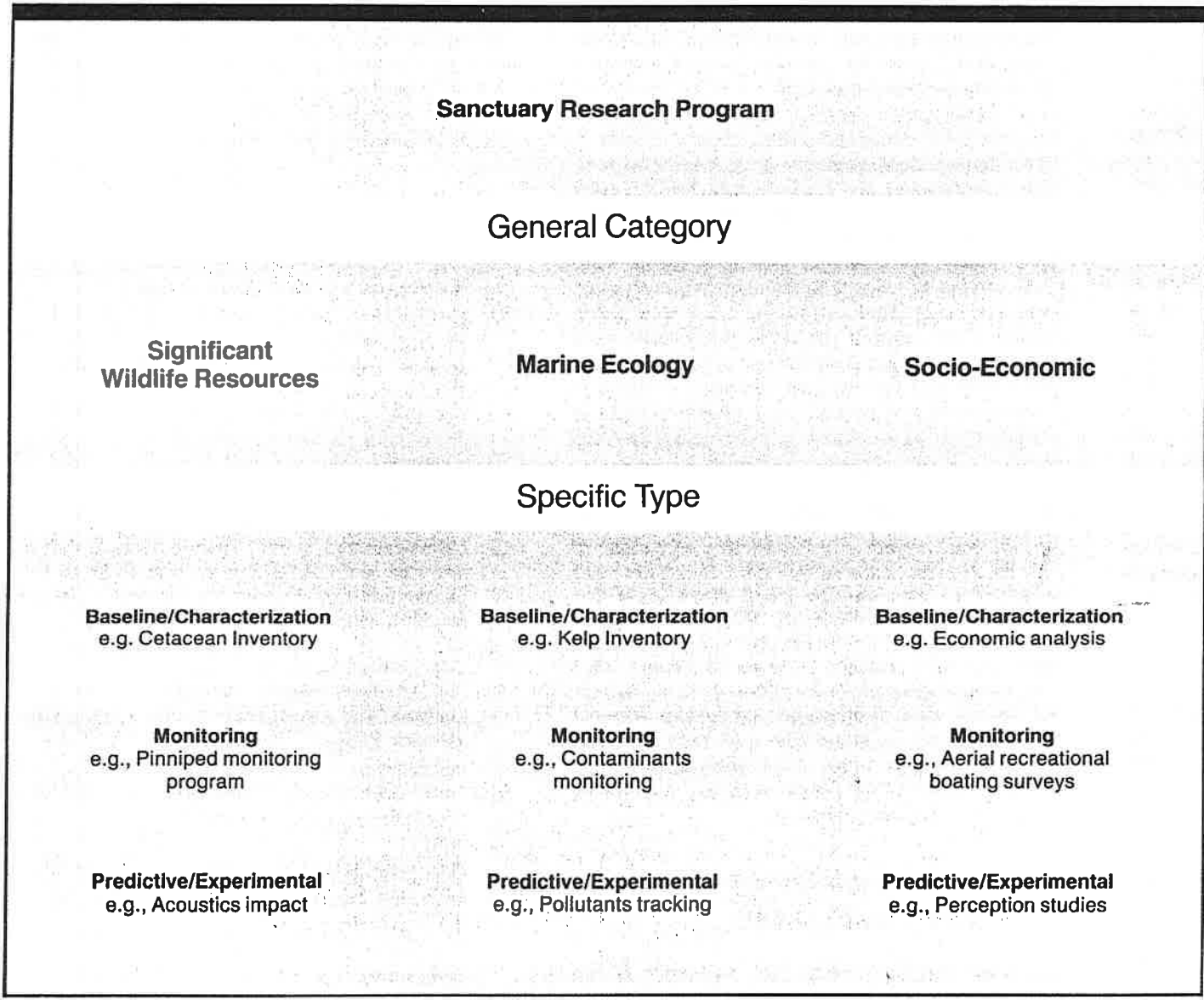


Figure 16

program similar to the "mussel watch" program being carried out at several locations in California.

The Sanctuary Programs Division will also proceed in selecting commercial and recreational activities for monitoring. Working with the CF&G, the National Marine Fisheries Service, and the U.S. Coast Guard, the Division will review currently available use data for commercial and sport fisheries, mariculture, commercial and recreational shipping. Having established the format and reliability of the data available for the sanctuary, the Sanctuary Programs Division will collaborate with the relevant agencies in: (1) developing agreements to exchange and transfer use data to the Information Management System (see below); and (2) testing and analyzing the data to answer specific questions about use in various parts of the sanctuary (i.e., the status of various fisheries, trends in marine recreation, commercial shipping traffic densities in the vicinity of the sanctuary).

Develop in cooperation with the National Fisheries Service, a systematic salvage effort for stranded marine mammals at San Miguel Island

This initiative will involve shore surveys of the major beaches at San Miguel Island (the area where strandings are most likely to occur) to record the numbers of pinnipeds and cetaceans stranded and evidence of disturbance (i.e., predation, gill-net fragments). The Southwest Region's Marine Salvage Network (National Marine Fisheries Service), the Southwest Fisheries Center (National Marine Fisheries Service), with the NPS and the Sanctuary Manager will determine an optimum design for sampling and recovery procedures. Once the sampling design is finalized, NPS personnel and Sanctuary Programs Division staff will be trained in recovery and

handling procedures. The Southwest Fisheries Center under an agreement with the Sanctuary Programs Division will be responsible for synthesizing information on stranded marine mammals (D. DeMaster, pers. comm.).

The research described above clearly relates to basic management questions with respect to sanctuary resources. By confirming the status of populations and providing an indication of sensitivity, research results will help in selecting locations suitable for on-site interpretation for example. They may also assist scheduling when and where surveillance efforts should be concentrated. Research may suggest the need for increased coordination with other agencies on specific resources. It may also unravel new significant aspects of the sanctuary and provide an explanation as to its significance, all of which can be channeled into the interpretive program.

An important aspect in administering this research will be to establish requirements to ensure that research results can be used effectively for management. For example, the Sanctuary Manager may require that results are formatted for transfer on the Information Management System; that data be summarized on standard maps to update the baseline study (see above) and provide material for interpretive publications; and that research materials such as video films, photographs, and sound recordings be made available for use in designing interpretive exhibits.

(d) Future Directions for Research

On-going research projects (see Appendix 2) and those described above will continue to be assigned a

high priority until completed. The following are additional research directions that will be considered as high priority over the next five years. A review procedure such as a regional workshop on sanctuary research will be considered as a means of clarifying these directions.

Baseline/Characterization

For the "Significant Resources" Category:

- Continue to participate in studies of the population dynamics (i.e., life history), of resident northern elephant seals, northern and California sea lions, northern fur seals, harbor seals, and Stellar sea lions;
- Document the foraging habits and feeding preferences of resident pinnipeds;
- Document the life history and behavior of resident cetaceans of the sanctuary;
- Investigate the habitat requirements and food resource needs of resident marine birds; and
- Document the population dynamics of the resident marine birds.

For the "Marine Ecology" Category:

- Undertake a detailed survey of certain critical and unique subtidal habitats within the sanctuary;
- Undertake detailed community descriptions of representative intertidal and subtidal habitats;
- Document potential environmental factors (i.e., nearshore currents, sediments) possibly affecting ecosystem processes; and
- Document the presence of endemic species and factors controlling their distribution.

For the "Socio-economic" Category:

- Inventory the distribution and density of commercial and recreational uses of the sanctuary;
- Document the economic linkages between commercial and recreational uses of the sanctuary and onshore economic activity; and
- Identify the location of significant cultural/historical resources.

Monitoring

For the "Significant Resources" Category:

- Monitor the effects of boating use and island visitation on resident pinnipeds and birds (in addition to aerial monitoring program);
- Monitor the effects of boating use and island visitation on seabird colonies (in addition to seabird monitoring program); and
- Implement a cooperative program for monitoring resident cetacean populations of the sanctuary.

For the "Marine Ecology" Category:

- Continue to participate in the permanent subtidal monitoring program;
- Design and test a monitoring program for nearshore oceanographic conditions likely to affect pollution transport; and
- Implement a permanent pollution monitoring program for target areas within the sanctuary.

For the "Socio-economic" Category:

- Assist the CF&G in designing and implementing a fisheries monitoring program for the sanctuary;

- Investigate the feasibility of a commercial shipping traffic monitoring program for the sanctuary.

Experimental/Predictive

For the "Significant Resources" Category:

- Evaluate and/or adapt existing models to predict the effects of a major spill on target pinniped and seabird populations;
- Investigate the causes for lack of breeding success of the northern (Stellar) sea lion;
- Investigate factors affecting the distribution of pinnipeds across the sanctuary;
- Review existing models to predict the effects of space shuttle overflights and forecasted increases in visitor use on target pinniped populations;
- Investigate trends, cycles, and impacts in pinniped-fishery and seabird-fishery interactions.

For the "Marine Ecology" Category:

- Investigate pathways for oil and other pollutant transport within the sanctuary; and
- Assess the results of existing oil spill trajectory models for the sanctuary.

For the "Socio-economic" Category:

- Determine models to predict the economic impacts of a major spill on visitor use; and
- Determine models to predict the economic impacts of a major decline in target resources with the CF&G (i.e., fish populations).

(e) Guidelines for Management of the Research Program

To ensure that projects funded by the Sanctuary Programs Division are relevant and directed to the resolution of management questions and issues, the Sanctuary Manager will follow general procedures that have been developed to administer the sanctuary research program at the national level. These procedures relate to : (1) setting annual research priorities; (2) formulating the scope and requirements of research projects; (3) selecting and administering projects; and (4) maintaining an information management and exchange program.

Setting Annual Priorities for Research

Annual review of research needs at the Channel Islands National Marine Sanctuary will involve the Sanctuary Programs Division, the State Sanctuary Manager/Coordinator and may also involve scientists from agencies such as the National Marine Fisheries Service and the NPS. The following factors will be considered in the course of setting annual priorities:

- Immediate and evolving management issues that could benefit from or be resolved through directed research;
- Achievements of research in progress or recently completed;
- Immediacy of need and environmental consequence (i.e., is the sanctuary the best place to conduct the study? Will it result in user conflict?); and
- Funding considerations.

Having established a list of annual priorities, the Sanctuary Manager and others (as assigned by the Sanctuary Programs Division) will formulate the scope of projects and develop "Requests for Proposals" (RFP).

Selection and Administration of Projects

Selection and funding of studies will be accomplished through a competitive process (RFP) or unsolicited proposals submitted by qualified applicants. While most Sanctuary Programs Division's research projects will be procured by the RFP process, unsolicited proposals of outstanding scientific merit will be encouraged. The proposal should address specific sanctuary management needs and demonstrate that the offeror is uniquely qualified to conduct the study. Guidelines for the preparation of proposals are available from the Sanctuary Programs Division.

Additionally, the Sanctuary Programs Division will maintain cooperative agreements with the National Marine Fisheries Service, the NPS, and the CF&G to perform research in the sanctuary and to exchange research information.

The Sanctuary Programs Division will also receive proposals requesting research permits. When proposals include activities that are prohibited by sanctuary regulations, it may be determined that all or part of the activity should be conducted outside the sanctuary. Areas containing special resources protected under state or federal statutes (i.e., state ecological reserves, the endangered brown pelican, marine mammals) may require additional research permits.

The Sanctuary Programs Division and the Sanctuary Manager will monitor the performance of research projects. Progress reports and final reports will be required as well as conformance to schedules outlined under the terms of the contract. Final reports may also be reviewed by recognized scientists and resource managers and approved by the Sanctuary Programs Division. Outstanding projects may be published by the Sanctuary Programs Division in its Technical Report Series.

The Sanctuary Manager will also keep records of all research underway, sites in use, equipment being used on site, frequency of researchers' visits, and progress to date.

Information Management System and Exchange Programs

A special requirement of sanctuary research projects will be the formatting of results so that they are compatible with the sanctuary's Information Management System. A micro-computer is currently being used jointly by the NPS and the Sanctuary Programs Division. Its primary purpose is to store and manage population dynamics data, maintain bibliographic files, and process text (Davis, pers. comm.). In the upcoming years, cost-effective approaches for updating the system with all on-going research and for querying the system with specific management questions will be investigated. Another aspect of the research program will be to exchange sanctuary research data with larger resource data bases being maintained by other agencies.

(f) Preparation of an An Operational Plan for Research Management

An operational plan for research will be prepared in the first years of the five year plan by the Sanctuary Programs Division with the assistance of the Sanctuary Manager. The plan will include a detailed description of on-going and future projects, their level of priority, funding, logistical and reporting requirements, and an explanation of how results will be formatted for management use.

5. INTERPRETATION

(a) General Context for Management

Public demand for interpretation in the sanctuary will certainly increase over the next few years. As the office responsible for overall sanctuary management, the Sanctuary Programs Division can answer the growing need to inform the public of the value of sanctuary resources and the issues confronting marine resource protection in southern California. Several initiatives have been undertaken in collaboration with the NPS to address this need. Increased public understanding and appreciation through interpretation will continue to be a high priority because they are essential to the achievement of resource protection goals over the long term. This area of management is therefore dealt with in some detail.

(b) Interpretive Opportunities

Located in a unique marine transition zone, with protected waters in close proximity to the most densely populated area in California, the Channel Islands National Marine Sanctuary offers distinct opportunities for interpretation. But there are also significant constraints associated with marine resources that are sensitive to overuse and disturbance and there are limitations associated with the location and size of the area.

Opportunities for interpretive programs within the Channel Islands National Marine Sanctuary fall into three broad categories: those to be provided within the sanctuary; those to be offered at the Channel Islands National Park Visitor Center; and those to be disseminated within the broader southern California region.

For non-diving visitors, opportunities for on-site interpretation rely on the unique resources of the sanctuary that are visible from the surface and those underwater resources that can be observed from the water surface. Falling within the first category are pinniped rookeries and haul-out sites, seabird colonies, whales and other cetaceans, kelp bed residents visible from the surface, and the unique sea "cave" scenery of the islands' shore. Such resources are not evenly distributed throughout the area making certain parts (such as Anacapa and San Miguel Islands) more attractive destinations. However, the susceptibility of wildlife populations to even low levels of disturbance restricts when and how often these areas can be visited. This suggests the need to explore alternative means to on-site interpretation at least during critical time periods.

Subtidal resources in the sanctuary such as submarine forests, turf, algal and reef fish communities represent important interpretive opportunities. These provide support systems upon which the other, perhaps more obvious resources of the sanctuary depend, such as marine mammals and seabirds. Fish and invertebrate resources of the sanctuary also provide an opportunity to illustrate general marine ecology concepts such as the notion of transition zones, seasonal and long term changes in populations, and human impacts. Traditionally these subtidal resources have been accessible only to experienced divers, snorkelers, and sport fishermen. Yet if one of the objectives of the sanctuary is to enhance public appreciation for the unique marine environment of the Channel Islands, then it is important that all visitors be exposed to the three-dimensional quality and intense biological activity of the waters surrounding the islands.

Distances to different parts of the sanctuary from the mainland represent a constraint to on-site interpretive programs since they affect average travel times to the sanctuary. Travel to San Miguel and Santa Barbara Islands from the nearest mainland location requires 5.5 and 3.5 hours respectively. Anacapa, Santa Cruz, and Santa Rosa Islands, being closer to the mainland, require an average 1.5 to 2 hour trip. Weather, limited safe anchorages, and restricted landings are other constraints for on-site interpretation (see Table 2).

The Channel Islands National Park Visitor Center in Ventura offers excellent opportunities for interpreting the sanctuary environment to a large number of visitors who, while interested in marine issues, will not actually visit the sanctuary because



19. Sanctuary interpreter in the Channel Islands Visitor Center.
Carol Pillsbury

of its distance from the mainland, limited means of access, or lack of interest in boating or diving. Working with the NPS, the Sanctuary Programs Division will continue to provide visitors to the Center an informative and enjoyable introduction to underwater resources which would otherwise be inaccessible.

TABLE 2: Opportunities and Constraints for Interpretation

AREA WITHIN THE SANCTUARY	OPPORTUNITIES	CONSTRAINTS
San Miguel	<ul style="list-style-type: none"> <input type="checkbox"/> Diverse and abundant breeding population of pinnipeds (particularly California sea lions and elephant seals) of world significance. <input type="checkbox"/> A diverse and abundant seabird population of world significance owing to the presence of rare species nesting in large numbers. <input type="checkbox"/> Good fishing and diving for those who brave the rough conditions. 	<ul style="list-style-type: none"> <input type="checkbox"/> Distance from the mainland and required travel time (5 hour trip). <input type="checkbox"/> Generally exposed and rough sea conditions. <input type="checkbox"/> Limited number of safe and legal anchorages and difficult approach owing to reefs and surge. <input type="checkbox"/> Susceptibility of seabird and pinniped populations to very low levels of disturbance. <input type="checkbox"/> Regulated on-shore access.
Santa Rosa and Santa Cruz	<ul style="list-style-type: none"> <input type="checkbox"/> Extensive submarine kelp forests. <input type="checkbox"/> Spectacular and varied coastline. <input type="checkbox"/> Reef fish communities characteristic of both warm temperate and cold marine regions. <input type="checkbox"/> Relative proximity of Santa Cruz to the mainland (Santa Barbara). <input type="checkbox"/> Good fishing and diving. <input type="checkbox"/> Isolated harbor seal population may be less affected by onshore and nearshore visitor use. <input type="checkbox"/> Being considered by NPS for onshore research and interpretive facilities. 	<ul style="list-style-type: none"> <input type="checkbox"/> Relatively small pinniped and seabird populations providing fewer opportunities for observation. <input type="checkbox"/> Onshore access requiring permits from island owners at Santa Cruz. <input type="checkbox"/> No permits to land are granted by island owners at Santa Rosa. <input type="checkbox"/> Only two safe anchorages at Santa Rosa.

TABLE 2: Opportunities and Constraints for Interpretation—Continued

AREA WITHIN THE SANCTUARY	OPPORTUNITIES	CONSTRAINTS
Anacapa	<ul style="list-style-type: none"> <input type="checkbox"/> Extensive submarine kelp forests. <input type="checkbox"/> Unique colony of brown pelicans. <input type="checkbox"/> Location relatively close to the mainland (Ventura). <input type="checkbox"/> Good vantage point for whale watching. <input type="checkbox"/> Intensive recreational use. <input type="checkbox"/> Relatively sheltered and warm waters. <input type="checkbox"/> Existing NPS interpretive facility can be used for sanctuary interpretation. 	<ul style="list-style-type: none"> <input type="checkbox"/> Very limited safe anchorages. <input type="checkbox"/> Nearshore approach limited by kelp beds. <input type="checkbox"/> Possible visitor impacts on the intertidal and subtidal resources owing to intensive Use. <input type="checkbox"/> Importance of total lack of disturbance to pelican colony on West Anacapa.
Santa Barbara	<ul style="list-style-type: none"> <input type="checkbox"/> Extensive submarine kelp forests. <input type="checkbox"/> Unique seabird colonies of rare species nesting in large numbers. <input type="checkbox"/> Significant California sea lion rookery. <input type="checkbox"/> Good vantage point for whale watching. <input type="checkbox"/> Existing NPS interpretive facility can be used for sanctuary interpretation Angeles. 	<ul style="list-style-type: none"> <input type="checkbox"/> Limited safe anchorages. <input type="checkbox"/> Nearshore approach limited by kelp beds and shallow reefs. <input type="checkbox"/> Susceptibility of seabird and pinniped populations to very low levels of disturbance. <input type="checkbox"/> Distance from Mainland and required travel time (from Los Angeles).

Another component of the interpretive program will be reaching out to audiences throughout southern California by developing exhibits for marine-related facilities within the region. Extension programs will also help contact sanctuary users and visitors that cannot be reached through the Visitor Center.

(c) Interpretive Themes and Messages

The objectives for interpretation are presented in Section 1. The basic categories of information to be conveyed to the public are as follows:

- Orientation
- Resources
- Marine Issues
- Sanctuary Management
- Visitor Use Safety

Interpretive messages are specific topics or ideas illustrating a theme. The messages considered most important for the sanctuary public are answers to those obvious questions that come to mind before, during, or after a visit. Not all questions can be anticipated since they will vary considerably with the background, skill, and familiarity with the marine environment of the individual visitors. Questions will also vary depending on where and when the visit takes place (i.e., offshore in the sanctuary, on an island, in the Visitor Center or at another facility). Yet there are some recurring questions which will form the basic context for sanctuary documentation and exhibits. These are summarized in Table 3.

(d) Interpretive Programs

Interpretation related to the sanctuary will consist of three distinct sets of programs:

- On-site programs aimed at visitors and recreational users traveling to the sanctuary;
- Land-based programs aimed at "vicarious" visitors—that is an interested public visiting the Visitor Center usually with the intention of learning more about the Channel Islands and their marine setting; and
- Land-based programs aimed at "extension audiences"—that is individuals and groups with an interest in the Channel Islands National Marine Sanctuary but not likely to visit the sanctuary or the Visitor Center to learn about the area (and which therefore require an "outreach" or extension service).

Described below are the publications, exhibits, and special events being planned for the three programs.

On-site Programs

On-site programs for the sanctuary will be expanded during the next five years to include: (1) materials and additional interpretive staff for existing tours to the sanctuary; (2) island-based exhibits to the extent that this is compatible with the NPS general management plan; and (3) additional access to the sanctuary.

The development and/or updating of published materials will involve the following tasks:

- Designing and producing a condensed sanctuary regulations brochure;
- Designing and producing a sanctuary poster;
- Designing and producing a sanctuary newsletter (perhaps jointly with the Point Reyes-Farallon Islands National Marine Sanctuary);
- Updating the existing sanctuary brochure as required;
- Developing boating and diving safety materials; and
- Expanding the distribution network for all sanctuary documentation.

The documentation will emphasize basic orientation to the sanctuary, the significance of sanctuary resources, and the need for effective management. The advice of agencies participating in sanctuary management will be sought in developing the materials. Publications will also comply with program graphic standards to reinforce public awareness of the special status of the Channel Islands National Marine Sanctuary. The Sanctuary Manager will administer this initiative. Once the basic orientation materials are produced (i.e., the brochures, newsletters, and poster), the Sanctuary Manager will develop a strategy for producing specialized brochures and other documentation over the long term. This is to be coordinated with the NPS program.

TABLE 3: Priority Themes and Messages for Sanctuary Interpretation

<p>ORIENTATION</p>	<p>What is the sanctuary?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Definition <input type="checkbox"/> Is it different or similar to a park? a reserve? <input type="checkbox"/> How big is it? What does it include? 	<p>Where is the sanctuary?</p> <ul style="list-style-type: none"> <input type="checkbox"/> How far is it from L.A.? Santa Barbara? Ventura? <input type="checkbox"/> What region does it belong to? 	<p>How to get there?</p> <ul style="list-style-type: none"> <input type="checkbox"/> What are the mainland access points? <input type="checkbox"/> How and when can I get there? 	<p>What to do there?</p> <ul style="list-style-type: none"> <input type="checkbox"/> What can I expect to see? When? <input type="checkbox"/> What sport activities can I do? What are the best places and times? <input type="checkbox"/> What can I not do? <input type="checkbox"/> What other information is available?
<p>OCEAN PROCESSES IN THE SANCTUARY</p>	<p>The sea floor</p> <ul style="list-style-type: none"> <input type="checkbox"/> What is it made of? How do the sediments differ? <input type="checkbox"/> What are the major underwater landforms? <input type="checkbox"/> Has the sea floor changed? Is it still changing? <input type="checkbox"/> Where are the oil basins? What are oil seeps? 	<p>Water masses and movements</p> <ul style="list-style-type: none"> <input type="checkbox"/> How deep, cold, clear is the water? <input type="checkbox"/> Is it different from the mainland? from areas north or south? <input type="checkbox"/> Has the water changed in time? Does it change from season to season? <input type="checkbox"/> How does the water move around the islands? 	<p>The ocean and atmosphere</p> <ul style="list-style-type: none"> <input type="checkbox"/> How does the ocean affect weather in the sanctuary? <input type="checkbox"/> How windy, foggy is it? <input type="checkbox"/> Why is the weather different from the mainland? 	
<p>LIVING MARINE RESOURCES</p>	<p>The major life zones</p> <ul style="list-style-type: none"> <input type="checkbox"/> What is the intertidal zone? <input type="checkbox"/> Where can I see tidepools? <input type="checkbox"/> What are underwater kelp forests? <input type="checkbox"/> What happens in the deep canyons and offshore? <input type="checkbox"/> Biogeographic zone. 	<p>Invertebrates and fishes</p> <ul style="list-style-type: none"> <input type="checkbox"/> What are the most common species in the sanctuary? Where and when can I see them? <input type="checkbox"/> How do these differ from the mainland? <input type="checkbox"/> What are the interesting or unique species? <input type="checkbox"/> What habitat do they depend on? 	<p>Seabirds</p> <ul style="list-style-type: none"> <input type="checkbox"/> What are the most common species in the sanctuary? Where and when can I see them? <input type="checkbox"/> How do these compare with other areas in California? U.S.? <input type="checkbox"/> What are the unique, rare or endangered species? 	<p>Mammals</p> <ul style="list-style-type: none"> <input type="checkbox"/> What are the most common species in the sanctuary? Where and when can I see them? <input type="checkbox"/> How do these compare with other populations in California? U.S.?

TABLE 3: Priority Themes and Messages for Sanctuary Interpretation —Continued

MAN IN THE SANCTUARY

Prehistoric man

- What evidence is there of post cultures depending on sanctuary resources?
- Were there different cultures in the area? Did these change with time?
- What kind of underwater archaeology is taking place in the sanctuary?

Recent maritime history

- Chumash Indians.
- Spanish exploration of Sanctuary waters.
- The fur trade era.
- 20th century military history.
- Shipwrecks and aircraft wrecks.

Man's use of sanctuary today

- How, what and where do fishermen harvest in sanctuary?
- What about abalone mariculture?
- What about kelp harvesting?
- How many merchant vessels go through the sanctuary in a day?
- Is there any oil and gas activity in the sanctuary?

MANAGEMENT OF THE SANCTUARY

The Sanctuaries Programs Division

- What is the SPD? NOAA?
- What other areas does SPD administer in California? West Coast?
- What is its role in the sanctuary?
- Who is the sanctuary manager?

Coordinated management

- What do other agencies do in the sanctuary?
- What is being protected?
- What kind of research is taking place in sanctuary waters?
- How are activities controlled?

What you can do to help

- Participating in visitor surveys and monitoring projects.
- Providing comments on exhibits and tours.
- Following regulations.
- Let others know about the sanctuary.



20. Concessionaire leading a cave tour to Santa Barbara Island.

NPS File

The Sanctuary Programs Division in collaboration with the National Park Service will also undertake the following initiatives aimed at providing more information to visitors during their visit to the sanctuary:

1. Enter into agreements with concessionaires and private organizations offering special tours (i.e.,

Nature Conservancy, Cabrillo Marine Museum) to provide marine interpretive materials oriented specifically to the sanctuary; and

2. Develop with the NPS island-based exhibits and tours with a sanctuary theme. This will be undertaken for Santa Barbara and Anacapa Island landing sites first. Signs and exhibits will be

planned for the other islands in collaboration with the NPS after the national park general management plan is approved.

The Sanctuary Programs Division will encourage other agencies to increase access to the sanctuary taking into account predicted visitor demand, and possible impacts on the resources. Several options will be considered including funding special seasonal tours (i.e., for whalewatching) organized through non-profit organizations.

Additional expansion of on-site programs will depend on the effectiveness and public response to these early initiatives. Given visitor demand and available funding, the following additional on-site programs may also be considered:

- Develop guidebooks and keys for on-site visitors (i.e., diving guidebook pinniped observation guidebook; cetacean checklist);
- Co-sponsor special tours to the sanctuary organized by non-profit organizations and provide on-site interpreters;
- Encourage private concessionaires to expand regular no-landing tours to include Santa Cruz; and
- Expand shore interpretive tours from Santa Barbara Island.

Land-based Programs at the Visitor Center

The marine interpretive exhibits and events at the Channel Islands National Park Visitor Center are to be expanded. There is a need to consolidate the existing exhibits so that they are clearly associated with the sanctuary. The Sanctuary Manager will develop concepts for additional and updated exhibits jointly with the NPS.

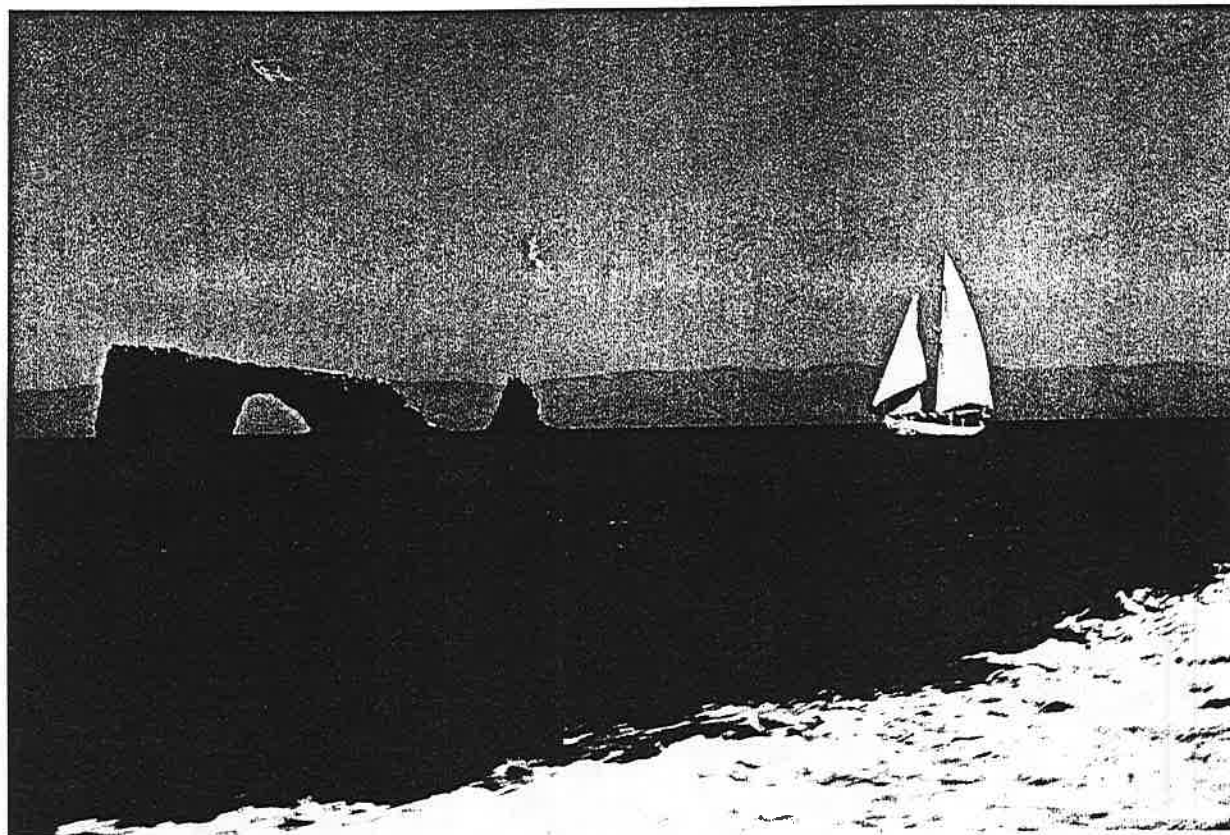
Exhibits under consideration include: (1) a three-dimensional sanctuary display; (2) a cetacean exhibit; and (3) an underwater video display area. The Sanctuary Manager will also investigate the feasibility of introducing audio-visual presentations (i.e., movie, slide shows, video-films) and tours in the sanctuary, if funding is available. Expansion of the marine interpretive exhibits to take place over the longer term includes the following:

- Designing and developing with the NPS a "marine section" completely devoted to marine themes;
- Developing a marine research and monitoring exhibit;
- Expanding the video display area to include "underwater sounds", and a selection of surface and underwater videos of pinnipeds, seabirds and subtidal resources in the sanctuary; and
- Organizing special events in the Center revolving around a sanctuary resource (e.g., Whale Week; The Value of Kelp). These could be organized in collaboration with a research institute or industry (i.e., kelp harvesting, mariculture).

Extension Programs

The Sanctuary Programs Division in collaboration with the NPS will determine options for providing some marine resource interpretation at mainland locations other than Ventura. The initiatives to be considered in light of available funding for the next five years are:

1. A sanctuary exhibit area for the "Sea Life Center" being planned by the Santa Barbara Museum of Natural History for Stearns Wharf, Santa



21. *Sailing off Anacapa Arch.*

James Dobbin

Barbara (Rogow and Bernstein Inc., 1982). The development of this proposal is considered a high priority because it is in line with the need to broaden public appreciation for the sanctuary;

2. A series of land-based signs and exhibits located at mainland points overlooking the sanctuary

(i.e., popular whalewatching sites, marinas). This initiative will involve designing the content and structure of the exhibits using the general graphic and industrial standards for the sanctuary; surveying the region to determine suitable locations for installation; and issuing a contract for production and installation;

3. A mobile exhibit for display at various facilities in the region such as the Santa Barbara Museum of Natural History in Santa Barbara and the Cabrillo Marine Museum in Los Angeles;
4. Resource-specific brochures to be developed with agencies such as the National Marine Fisheries Service, the CF&G, and the US FWS on topics such as the pinnipeds of the sanctuary, common fishes, invertebrates and sea-birds;
5. A joint Channel Islands National Marine Sanctuary/National Park newsletter issued perhaps once or twice annually providing an update on the status of management activities, interesting research being undertaken in the sanctuary, new policies, and current issues;
6. A mobile standing exhibit orienting the public to the sanctuary but providing more detailed information than that contained in the orientation brochure on relevant research in the sanctuary and the overall National Marine Sanctuary Program; and
7. Slide and film presentations.

(e) Preparation of an Operational Plan for Interpretation

An operational plan will be prepared by the Sanctuary Programs Division and the Sanctuary Manager to present in detail the materials and other media to be developed, schedules for design and distribution, and funding requirements.

Administration

SECTION 4

Administration

1. ADMINISTRATIVE FRAMEWORK

Management of the Channel Islands National Marine Sanctuary consists of three functions—resource protection, research, and interpretation. A fourth function—administration—is an aspect that oversees all other functions since it establishes who is responsible for implementing specific programs. The administrative framework also ensures that all management activities are coordinated.

The Sanctuary Programs Division of the National Oceanic and Atmospheric Administration, Department of Commerce, is responsible for overall management of the Channel Islands National Marine Sanctuary. The Division coordinates its on-site activities and cooperates with the California Department of Fish and Game (CF&G) and the National Park Service (NPS). Both these agencies are key participants in sanctuary management based on cooperative agreements with the Sanctuary Programs Division. The general administrative role of each agency for management of the Channel Islands National Marine Sanctuary is depicted in Figure 17.

Sanctuary Programs Division

The National Marine Sanctuary Program is administered by the Sanctuary Programs Division. Program regulations require that the Division prepare a management plan for the sanctuary to ensure that proposals for resource protection, research, and interpretation are coordinated and consistent with sanctuary goals and objectives. The Sanctuary Programs Division is responsible

for implementing this plan through funding of on-site operations, and inter-agency agreements.

The Sanctuary Programs Division in Washington, D.C. develops, in collaboration with the Sanctuary Manager, an annual budget setting out expenditures for program development, operating costs, and staffing. Funding priorities are reviewed and adjusted annually to reflect evolving conditions in the Channel Islands National Marine Sanctuary and overall National Marine Sanctuary Program priorities and requirements. The Sanctuary Programs Division in Washington, D.C. is also responsible for establishing policies and procedures in response to specific issues in the sanctuary. The complete set of responsibilities held by this office are detailed under resource protection, research, and interpretation later in this section.

The Sanctuary Manager represents the Sanctuary Programs Division at the Channel Islands National Marine Sanctuary. The Sanctuary Manager's headquarters are located at the Channel Islands National Park Visitor Center in Ventura. Specific responsibilities of the Sanctuary Manager are highlighted later in this section.

National Park Service

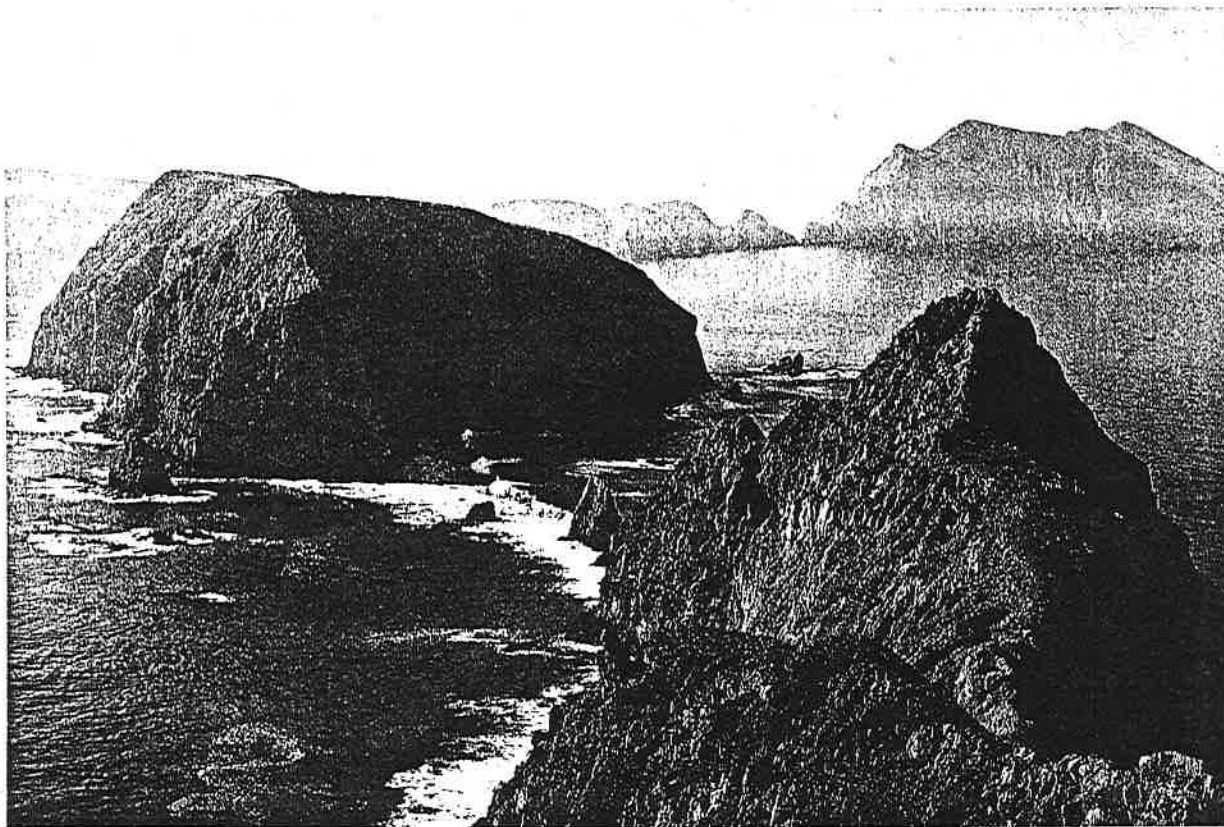
The NPS is responsible for managing the Channel Islands National Park which includes the northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa) and Santa Barbara Island. The NPS has administrative jurisdiction within a one nautical mile boundary around the islands and undertakes enforcement subject to an agreement with the CF&G.

Through a cooperative agreement with the Sanctuary Programs Division, the NPS has assumed additional responsibilities in the Channel Islands National Marine Sanctuary relating to administration, research, interpretation, and resource protection. The Channel Islands National Park staff assist the Sanctuary Manager in developing and operating specific programs for these functions. The Channel Islands National Park Superintendent also assumes responsibility for day to day supervision of the Sanctuary Manager.

California Department of Fish and Game

The CF&G is responsible for the management of living marine resources in California (Fish and Game Code, Title 14 of the California Administrative Code). Management in marine areas is aimed at the conservation, maintenance, and utilization of living marine resources. This mandate extends throughout state waters of California, including the state waters' portion of the Channel Islands National Marine Sanctuary. The CF&G's role in managing living marine resources has not been affected by the designation of the sanctuary.

Through a cooperative agreement, the Sanctuary Programs Division has provided funds to the CF&G to supplement its enforcement of living marine resource regulations within the sanctuary. The cooperative agreement between the Sanctuary Programs Division and the CF&G also assigns a management role to a State Sanctuary Coordinator/Manager (operating within the Marine Resources Region of the CF&G). The State Sanctuary Coordinator/Manager ensures that Sanctuary Programs Division activities are consistent



22. Anacapa Island Scenery.

Michele Lemay

with CF&G's regulations, policies, and procedures for managing living marine resources within state waters of the Sanctuary.

2. RESOURCE PROTECTION: ROLES AND RESPONSIBILITIES

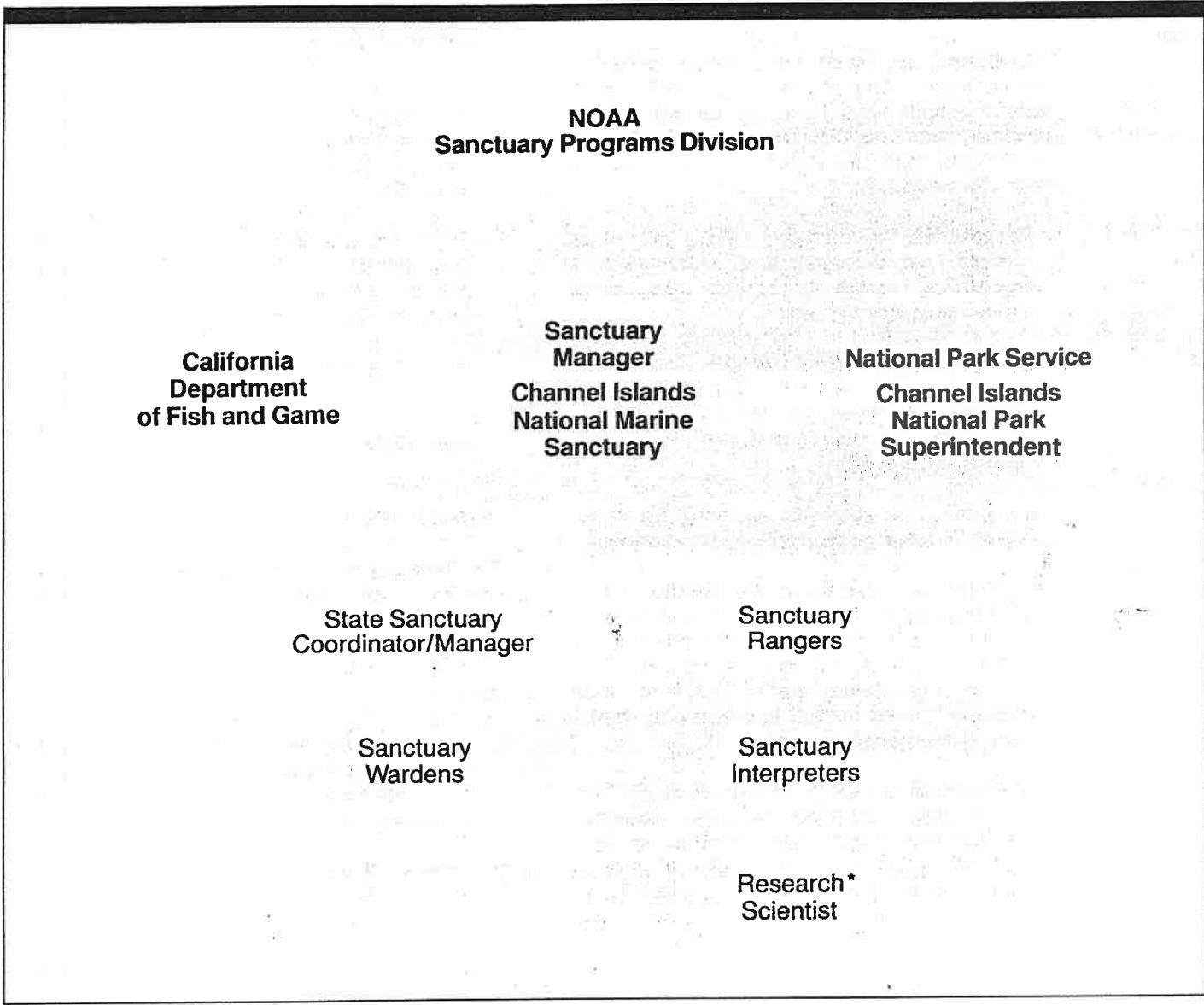
Sanctuary Programs Division

1. Approves priorities for funding for resource protection based on the recommendations of the Sanctuary Manager;

2. Assigns roles and responsibilities for surveillance and enforcement of sanctuary regulations through interagency agreements;
3. Monitors the effectiveness of interagency agreements for surveillance and enforcement and institutes changes where required;
4. Develops and negotiates interagency agreements for other aspects of resource protection including environmental contingency planning and visitor use management in the sanctuary;
5. Reviews quarterly and annual summary reports of surveillance and enforcement activities prepared by the CF&G; reviews the annual analysis of trends report; reviews monthly and semi-annual progress reports prepared by the Sanctuary Manager;
6. Evaluates progress towards management objectives for resource protection with the Sanctuary Manager and Coordinator/Manager; adjusts annual priorities accordingly; and
7. Monitors the effectiveness of existing sanctuary regulations and considers and enacts changes where necessary.

Sanctuary Manager

1. Recommends to the Sanctuary Programs Division priorities for allocating funds annually to resource protection;
2. Assists in the coordination of surveillance and enforcement activities in the sanctuary by providing liaison between the NPS, the CF&G, and the U.S. Coast Guard;



Organization and Administration

* Under the direction of the National Park Service, Western Region.

Note: The above is a schematic representation of the key participants in sanctuary management. It is not intended to represent lines of responsibility.

Figure 17

3. Reports regularly to the Sanctuary Programs Division on surveillance and enforcement activities, violations and emergencies; as part of this responsibility, recommends in consultation with the CF&G, changes in regulations, and interagency agreements (i.e., relating to patrol methods or enforcement procedures) to enhance resource protection;
4. Develops in cooperation with the CF&G, the NPS, and the Sanctuary Programs Division an operational plan for resource protection. The operational plan is intended as a working manual that can be referred to on a daily basis for relevant policies concerning significant resources, detailed permitting and enforcement procedures, and emergency response procedures;
5. Provides information for use in training sanctuary wardens and rangers;
6. Develops and distributes educational material aimed at improved public awareness of and voluntary compliance with sanctuary regulations;
7. Monitors and evaluates the adequacy of emergency response plans and procedures in the sanctuary;
8. Maintains a record of emergency events (e.g., spills) in and around the sanctuary; and
9. Evaluates overall progress towards resource protection objectives of the sanctuary program; assists the NPS in the preparation of a semi-annual progress report; and prepares a bi-monthly report highlighting activities for the Sanctuary Programs Division.

California Department of Fish and Game

The following are responsibilities which the CF&G assumes as the agency enforcing state living marine resource regulations. These are not affected by sanctuary designation but are listed here because they are an important aspect of resource protection in the sanctuary:

1. Responsible for managing living marine resources and enforcement of state laws and regulations thereto throughout state waters within the sanctuary; and
2. Is deputized to enforce specific federal laws throughout the sanctuary, (e.g., the Marine Mammal Protection Act, the Endangered Species Act, the Fisheries Conservation and Management Act).

The following are additional responsibilities directly related to resource protection in the sanctuary:

3. Prepares and submits to the Sanctuary Programs Division quarterly and annual summaries of CF&G and NPS enforcement data, including data on the type, nature, and location of surveillance and enforcement cases (relating to both CF&G and sanctuary regulations) in the sanctuary; and
4. Is deputized by the Sanctuary Program Division to enforce sanctuary regulations throughout the sanctuary (mean high tide limit out to 6 nautical miles). The development of such an agreement is in progress and is expected to come into effect shortly after release of this plan.

Responsibilities assigned to the State Sanctuary Coordinator/Manager are as follows:

1. Ensures that activities funded by the Sanctuary Programs Division in the sanctuary are consistent with CF&G regulations, policies, and procedures for managing living marine resources;
2. Facilitates CF&G/Sanctuary Programs Division information exchange and cooperation towards meeting resource protection goals and objectives for the sanctuary; and
3. Analyzes violations of regulations in the sanctuary based on the quarterly and annual summaries and submits on an annual basis an "analysis of trends" report.

National Park Service

The following are responsibilities which the NPS assumes in managing the Channel Islands National Park. These are not affected by sanctuary designation but are listed here because they are an important aspect of resource protection in the sanctuary:

1. Deputized to enforce state living marine resources regulations in the sanctuary within the 1 mile administrative boundary of the Channel Islands National Park;
2. Enforces all applicable federal regulations within the 1 mile administrative boundary of the Channel Islands National Park; and
3. Assists the CF&G in surveillance activities throughout the sanctuary.

The following are additional responsibilities directly related to resource protection in the sanctuary:

4. Is deputized by the Sanctuary Programs Division to enforce sanctuary regulations within the 6 nautical mile boundary of the sanctuary. The development of such an agreement is in progress and is expected to come into effect shortly after release of this plan; and
5. Submits to the CF&G surveillance and enforcement data for the sanctuary to be incorporated into the quarterly and annual summaries.

U.S. Coast Guard

The following is a responsibility which the U.S. Coast Guard assumes as a federal enforcement agency. It is not affected by sanctuary designation but is listed here because it is an important aspect of resource protection in the sanctuary:

1. Holds a broad responsibility for enforcing all federal laws in navigable waters (i.e., throughout the sanctuary) and coordinates activities with the CF&G where state waters and resources are impacted.

3. RESEARCH: ROLES AND RESPONSIBILITIES

Sanctuary Programs Division

1. Prepares an operational plan for research outlining long-term research priorities, admin-

istrative guidelines, and administrative procedures for Sanctuary Programs Division funded projects;

2. Reviews and approves the list of annual research priorities, the annual research budget, and Requests for Proposals (RFP) for specific projects prepared by the Sanctuary Manager (or by other agencies to whom this task may be delegated);
3. Administers interagency agreements for research;
4. Assigns "Contracting Officer Technical Representative" (COTR) responsibility for research projects to the Sanctuary Manager or other government agencies as required;
5. Reviews and approves all research proposals for Sanctuary Programs Division funded projects;
6. Reviews and approves interim and final research reports submitted by the Sanctuary Manager;
7. Evaluates overall progress towards achieving research priorities for research and adjusts long-term directions accordingly;
8. Awards research permits as provided under sanctuary regulations; and
9. Coordinates research activities in the Channel Islands National Marine Sanctuary and the Point Reyes-Farallon Islands National Marine Sanctuary.

Sanctuary Manager

1. Assists the Sanctuary Programs Division in preparing an operational plan for research;
2. Develops in coordination with the Sanctuary Programs Division an annual list of research priorities (consistent with the priorities set in the operational plan) and an annual budget for research;
3. Prepares and submits for approval RFP's for priority research projects where the Sanctuary Manager is to act as COTR;
4. Reviews and circulates research proposals to the Sanctuary Programs Division;
5. Reviews and circulates interim and final research reports;
6. Acts as a primary Sanctuary Programs Division contact person to the COTR and principal investigators for research performed within the sanctuary by other government agencies;
7. Coordinates research activities within the sanctuary with the Channel Islands National Park where required;
8. Circulates research reports to all relevant agencies including the NPS, CF&G and the National Marine Fisheries Service; and
9. Maintains a record of relevant research projects being conducted in the sanctuary by other agencies and research organizations.

California Department of Fish and Game

The State Sanctuary Coordinator/Manager:

1. Coordinates CF&G research projects undertaken within the sanctuary with research funded by the Sanctuary Programs Division;
2. Assists the Sanctuary Programs Division in reviewing research proposals, interim, and final reports; and
3. Reviews research permits as required by state laws and regulations.

4. INTERPRETATION: ROLES AND RESPONSIBILITIES

Sanctuary Programs Division

1. Reviews and approves the operational plan for interpretation;
2. Reviews and approves the list of annual priorities for interpretation and the annual budget prepared by the Sanctuary Manager;
3. Reviews and approves design proposals for all interpretive facilities;
4. Coordinates interpretive content and design with related activities at the Point Reyes/Farallon Islands National Marine Sanctuary; and

5. Evaluates progress towards achieving priorities for interpretation and adjusts long-term priorities accordingly.

Sanctuary Manager

1. Develops an operational plan for marine interpretation in the sanctuary with the assistance of the NPS;
2. Prepares and submits for approval an annual list of priorities for interpretation and an annual budget;
3. Prepares and circulates where required RFP's for interpretive projects;
4. Reviews design proposals for interpretive materials and facilities for the sanctuary;
5. Supervises the design and production of interpretive materials and facilities for the sanctuary;
6. Coordinates marine interpretive programs for the sanctuary with related programs of the Channel Islands National Park;
7. Assists the NPS in training interpretive staff in marine interpretation for the sanctuary;
8. Assigns in consultation with the NPS, specific responsibilities and tasks to sanctuary interpretive staff; and
9. Encourages local and regional organizations to participate in sanctuary interpretation.

National Park Service

1. Assists the Sanctuary Manager in developing an operational plan for marine interpretation in the sanctuary;
2. Reviews and approves with the SPD design proposals for interpretive materials and facilities for the sanctuary for use in the Channel Islands National Park (i.e., the Visitor Center, and the islands);
3. Assists the Sanctuary Manager in reviewing all other design proposals for materials and facilities as appropriate;
4. Assists the Sanctuary Manager in supervising the design and production of materials and facilities for sanctuary interpretation; and
5. Is responsible for training NPS interpretive staff in interpretation of the sanctuary.

5. GENERAL ADMINISTRATION: ROLES AND RESPONSIBILITIES

Sanctuary Programs Division

1. Develops and updates the management plan;
2. Provides funds for overall sanctuary management and administration;

3. Develops an annual budget for sanctuary management, setting out expenditures and operating costs for the various program areas jointly with the Sanctuary Manager;
4. Selects and monitors the performance of the Sanctuary Manager;
5. Determines additional staffing requirements; and
6. Provides for the necessary legal support for administering the sanctuary.

Sanctuary Manager

1. Reviews the management plan periodically and recommends changes to the Sanctuary Programs Division;
2. Assists the Sanctuary Programs Division in the development of an annual budget;
3. Prepares bi-monthly reports and semi-annual progress reports in cooperation with the NPS, highlighting activities and events in all program areas (i.e., resource protection, research interpretation, and administration); and
4. Assigns responsibilities to sanctuary staff.

California Department of Fish and Game

1. Assists in the periodic review of the management plan and recommends changes to the Sanctuary Programs Division; and
2. Assists in determining funding requirements for surveillance and enforcement as part of the annual budget.

National Park Service

1. Assists in the periodic review of the management plan and recommends changes to the Sanctuary Programs Division;
2. Assists in determining funding requirements for resource protection, research, and interpretation as part of the annual budget; and
3. Provides day-to-day supervision of the Sanctuary Manager and provides support for general administration.

Appendices

APPENDIX 1

The Channel Islands National Marine Sanctuary Regulations

REPRINTED FROM—Federal Register/Vol. 45, No. 193, 15 CFR Part 935

PART 935—THE CHANNEL ISLANDS NATIONAL MARINE SANCTUARY REGULATIONS

- Sec.
- 935.1 Authority.
- 935.2 Purpose.
- 935.3 Boundaries.
- 935.4 Definitions.
- 935.5 Allowed activities.
- 935.6 Hydrocarbon operations.
- 935.7 Prohibited activities.
- 935.8 Penalties for commission of prohibited acts.
- 935.9 Permit procedures and criteria.
- 935.10 Certification of other permits.
- 935.11 Appeals of administrative action.

Authority: 16 U.S.C. 1431-1434.

§ 935.1 Authority.

The Sanctuary has been designated pursuant to the authority of Section 302(a) of Title III of the Marine Protection, Research and Sanctuaries Act of 1972, 16 USC 1431-1434 (the Act). The following regulations are issued pursuant to the authorities of Sections 302(f), 302(g) and 303 of the Act.

§ 935.2 Purpose.

The purpose of designating the Sanctuary is to protect and preserve the extraordinary ecosystem including marine birds and mammals and other natural resources of the waters surrounding the northern Channel Islands and Santa Barbara Island and ensure the continued availability of the area as a research and recreational resource. This area supports a particularly rich and diverse marine biota, partially because it is located in a transition zone between northern and southern waters and partially because it is one of very few areas off the Southern California coast that has been relatively unaltered by human use.

§ 935.3 Boundaries.

The Sanctuary consists of an area of the waters off the coast of California of approximately 1252.5 square nautical miles adjacent to the following islands and offshore rocks: San Miguel Island, Santa Cruz Island, Santa Rosa Island, Anacapa Island, Santa Barbara Island, Richardson Rock, and Castle Rock extending seaward to a distance of 6 nautical miles (nm). The coordinates are shown in Appendix 1A.

§ 935.4 Definitions.

(a) "Administrator" means the Administrator of the National Oceanic and Atmospheric Administration.

(b) "Assistant Administrator" means the Assistant Administrator for Coastal Zone Management, National Oceanic and Atmospheric Administration.

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

(d) "Islands" means San Miguel Island, Santa Cruz Island, Santa Rosa Island, Anacapa Island, Santa Barbara Island, Richardson Rock, and Castle Rock.

(e) "Vessel" means watercraft of any description capable of being used as a means of transportation on the waters of the Sanctuary.

§ 935.5. Allowed activities.

All activities except those specifically prohibited by Sections 935.6 and 935.7 may be carried on in the Sanctuary subject to all prohibitions, restrictions and conditions imposed by any other

authority. Recreational use of the area is encouraged.

§ 935.6. Hydrocarbon operations.

(a) Hydrocarbon exploration, development and production pursuant to any lease executed prior to the effective date of these regulations and the laying of any pipeline is allowed subject to paragraph 935.6(b) and to all prohibitions, restrictions and conditions imposed by applicable regulations, permits, licenses or other authorizations and consistency reviews including those issued by the Department of the Interior, the Coast Guard, the Corps of Engineers, the Environmental Protection Agency and under the California Coastal Management Program and its implementing regulations.

(b) No person may engage in any hydrocarbon operation unless the following oil spill contingency equipment is available at the site of such operation:

(1) 1500 feet of open ocean containment boom and a boat capable of deploying the boom;

(2) One oil skimming device capable of open ocean use; and

(3) Fifteen bales of oil sorbent material.

(c) Hydrocarbon exploration, development and production activities pursuant to leases executed on or after the effective date of these regulations are prohibited.

§ 935.7. Prohibited activities.

(a) Except as may be necessary for the national defense, in accordance with Article 5, Section 2 of the Designation, or as may be necessary to respond to an emergency threatening life, property, or the environment, the following activities

are prohibited within the Sanctuary unless permitted by the Assistant Administrator in accordance with Section 935.9. All prohibitions shall be applied consistently with international law.

(1) *Discharge of substances.* No person shall deposit or discharge any materials or substances of any kind except:

(i) Fish or parts and chumming materials (bait);

(ii) Water (including cooling water) and other biodegradable effluents incidental to vessel use of the sanctuary generated by:

(A) marine sanitation devices;

(B) routine vessel maintenance, e.g. deck wash down;

(C) engine exhaust; or

(D) meals on board vessels;

(iii) Effluents incidental to hydrocarbon exploration and exploitation activities as allowed by Section 935.6.

(2) *Alteration of, or construction on, the seabed.* Except in connection with the laying of any pipeline as allowed by Section 935.6, within 2 nautical miles of any Island, no person shall:

(i) Construct any structure other than a navigation aid, or

(ii) Drill through the seabed, or

(iii) Dredge or otherwise alter the seabed in any way, other than

(A) to anchor vessels, or

(B) to bottom trawl from a commercial fishing vessel.

(3) *Commercial vessels operations.*

Except to transport persons or supplies to or from an Island, no person shall operate within one nautical mile of an Island any vessel engaged in the trade of carrying cargo, including but not limited to tankers and other bulk

carriers and barges, or any vessel engaged in the trade of servicing offshore installations. In no event shall this section be construed to limit access for fishing (including kelp harvesting), recreational, or research vessels.

(4) *Disturbing marine mammals and birds.* No person shall disturb seabirds or marine mammals by flying motorized aircraft at less than 1000 feet over the waters within one nautical mile of any Island except:

- (i) for enforcement purposes;
- (ii) to engage in keep bed surveys; or
- (iii) to transport persons or supplies to or from an Island.

(5) *Removing or damaging historical or cultural resources.* No person shall remove or damage any historical or cultural resource.

(b) All activities currently carried out by the Department of Defense within the Sanctuary are essential for the national defense and, therefore, not subject to these prohibitions. The exemption of additional activities having significant impact shall be determined in consultation between the Assistant Administrator and the Department of Defense.

(c) The prohibitions in this section are not based on any claim of territoriality and will be applied to foreign persons and vessels only in accordance with recognized principles of international law, including treaties, conventions and other international agreements to which the United States is signatory.

§ 935.8 Penalties for commission of prohibited acts.

(a) Section 303 of the Act authorizes the assessment of a civil penalty of not more than \$50,000 against any person

subject to the jurisdiction of the United States for each violation of any regulation issued pursuant to the Act, and further authorizes a proceeding in rem against any vessel used in violation of any such regulation. Procedures are set out in Subpart D of Part 922 (15 CFR Part 922) of this chapter. Subpart D is applicable to any instance of a violation of these regulations.

§ 935.9 Permit procedures and criteria.

(a) Any person in possession of a valid permit issued by the Assistant Administrator in accordance with this section may conduct any activity in the Sanctuary prohibited under Section 935.7 if such activity is either (1) research related to the resources of the Sanctuary, (2) to further the educational value of the Sanctuary, or (3) for salvage or recovery operations.

(b) Permit applications shall be addressed to:

Assistant Administrator for Coastal
Zone Management
Attn: Sanctuary Programs Office,
Division of Operations and
Enforcement

National Oceanic and Atmospheric
Administration, 3300 Whitehaven
Street, N.W., Washington, D.C. 20235.

An application shall provide sufficient information to enable the Assistant Administrator to make the determination called for in paragraph (c) and 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 licenses or permits shall be attached.

(c) In considering whether to grant a permit the Assistant Administrator shall evaluate such matters as (1) the general professional, and financial responsibility of the applicant; (2) the appropriateness of the methods envisioned to the purpose(s) of the activity; (3) the extent to which the conduct of any permitted activity may diminish or enhance the value of the Sanctuary as a source of recreation, or as a source of educational or scientific information; (4) the end value of the activity and (5) such other matters as may be deemed appropriate.

(d) In considering any application submitted pursuant to this section, the Assistant Administrator may seek and consider the views of any person or entity, within or outside of the Federal Government, and may hold a public hearing, as deemed appropriate.

(e) The Assistant Administrator may, at his or her discretion, grant a permit which has been applied for pursuant to this section, in whole or in part, and subject to such condition(s) as deemed appropriate. The Assistant Administrator or a designated representative may observe any permitted activity and/or require the submission of one or more reports of the status or progress of such activity. Any information obtained shall be available to the public.

(f) The Assistant Administrator may amend, suspend or revoke a permit granted pursuant to this section, in whole or in part, temporarily or indefinitely, if the permit holder (the Holder) has acted in violation of the terms of the permit or of the applicable regulations. Any such action shall be set forth in writing to the Holder, and shall set forth the reason(s) for the action

taken. The Holder may appeal the action as provided for in Section 935.11.

§ 935.10 Certification of other permits.

(a) All permits, licenses and other authorizations issued pursuant to any other authority are hereby certified and shall remain valid if they do not authorize any activity prohibited by Sections 935.6 or 935.7. Any interested person may request that the Assistant Administrator offer an opinion on whether an activity is prohibited by these regulations.

§ 935.11 Appeals of administrative action.

(a) Any interested person (the Appellant) may appeal the granting, denial, or conditioning of any permit under Section 935.9, to the Administrator of NOAA. In order to be considered by the Administrator, such appeal shall be in writing, shall state the action(s) appeal and the reason(s) therefore, and shall be submitted within 30 days of the action(s) by the Assistant Administrator. The Appellant may request an informal hearing on the appeal.

(b) Upon receipt of an appeal authorized by this section, the Administrator will notify the permit applicant, if other than the Appellant, and will request such additional information and in such form as will allow action upon the appeal. Upon receipt of sufficient information, the Administrator will decide the appeal in accordance with the criteria set out in Section 935.9(c) as appropriate, based upon information relative to the application on file at OCZM and any additional information, the summary record kept of any hearing and the Hearing Officer's recommended

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decision, if any, as provided in paragraph (c), and such other considerations as deemed appropriate. The Administrator will notify all interested persons of the decision, and the reason(s) therefor, in writing, normally within 30 days of the receipt of sufficient information, unless additional time is needed for a hearing.

(c) If a hearing is requested or if the Administrator determines that one is appropriate, the Administrator may grant an informal hearing before a Hearing Officer designated for that purpose after first giving notice of the time, place, and subject matter of the hearing in the Federal Register. Such hearing shall normally 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 (if different) and, at the discretion of the Hearing Officer, 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 last day of the hearing, the Hearing Officer shall recommend in writing a decision 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 will notify interested persons of the decision, and the reason(s) therefor in writing within 30 days of receipt of the recommended decision of the Hearing Officer. The Administrator's action shall constitute final action for the Agency for the

purposes of the Administrative Procedures Act.

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

Appendix 1.A.—Coordinates of the Channel Islands Marine Sanctuary

	Latitude N	Longitude W
01.....	33°56'28.959"	119°16'23.800"
02.....	33°58'03.919"	119°14'56.964"
03.....	34°01'33.846"	119°14'07.740"
04.....	34°04'24.203"	119°15'21.308"
05.....	34°06'06.653"	119°17'27.002"
06.....	34°06'54.809"	119°19'46.046"
07.....	34°06'57.988"	119°23'24.905"
08.....	34°06'51.627"	119°24'04.198"
09.....	34°07'01.640"	119°25'40.819"
10.....	34°06'59.904"	119°26'50.959"
11.....	34°08'02.002"	119°28'47.501"
12.....	34°08'17.693"	119°29'27.698"
13.....	34°08'52.234"	119°30'39.562"
14.....	34°09'16.780"	119°35'22.667"
15.....	34°09'05.106"	119°36'41.694"
16.....	34°08'02.782"	119°39'33.421"
17.....	34°08'46.870"	119°41'48.621"
18.....	34°09'35.563"	119°45'57.284"
19.....	34°09'32.627"	119°46'37.335"
20.....	34°09'33.396"	119°47'32.285"
21.....	34°09'43.668"	119°48'09.018"
22.....	34°10'10.616"	119°50'07.659"
23.....	34°10'21.586"	119°51'05.146"
24.....	34°10'33.161"	119°53'17.044"
25.....	34°10'36.545"	119°55'57.373"
26.....	34°10'21.283"	119°57'26.403"
27.....	34°08'07.255"	120°01'07.233"
28.....	34°08'13.144"	120°02'27.930"
29.....	34°07'47.772"	120°05'05.449"
30.....	34°07'29.314"	120°06'36.262"
31.....	34°07'30.691"	120°09'35.238"
32.....	34°06'36.285"	120°12'39.335"

33.....	34°06'40.634"	120°13'33.940"	72.....	33°53'38.865"	119°32'51.578"
34.....	34°08'10.759"	120°15'07.017"	73.....	33°54'02.277"	119°31'06.274"
35.....	34°09'12.290"	120°17'07.046"	74.....	33°54'56.444"	119°28'54.052"
35A.....	34°09'50.706"	120°17'31.649"	75.....	33°54'39.349"	119°27'37.512"
36.....	34°10'56.346"	120°18'40.520"	76.....	33°54'15.236"	119°25'23.779"
36B.....	34°11'28.249"	120°19'29.213"	77.....	33°54'07.847"	119°24'22.849"
37.....	34°12'08.078"	120°21'00.835"	78.....	33°54'04.682"	119°22'58.006"
37C.....	34°12'25.468"	120°25'01.261"	79.....	33°54'14.311"	119°21'44.573"
38.....	34°12'18.754"	120°25'39.373"	80.....	33°54'22.824"	119°21'09.003"
38D.....	34°11'33.184"	120°27'33.921"	81.....	33°54'46.904"	119°19'54.677"
39.....	34°12'19.470"	120°30'22.620"	82.....	33°55'05.834"	119°19'16.027"
39E.....	34°12'17.540"	120°32'19.959"			
40.....	34°10'54.592"	120°35'57.887"			
40F.....	34°06'07.491"	120°38'27.883"			
41.....	34°04'53.454"	120°38'16.602"			
41G.....	34°03'30.539"	120°37'39.442"			
42.....	34°01'09.860"	120°35'04.808"			
42H.....	34°00'48.573"	120°34'25.106"			
43.....	33°59'13.122"	120°33'53.385"			
44.....	33°57'01.427"	120°31'54.590"			
45.....	33°55'36.973"	120°27'37.188"			
46.....	33°55'30.037"	120°25'14.587"			
47.....	33°54'50.522"	120°22'29.536"			
48.....	33°55'01.640"	120°19'26.722"			
49.....	33°54'34.409"	120°18'27.344"			
50.....	33°53'23.129"	120°17'39.927"			
51.....	33°50'39.990"	120°15'13.874"			
52.....	33°49'53.260"	120°13'41.904"			
53.....	33°49'03.437"	120°12'06.750"			
54.....	33°48'36.087"	120°11'10.821"			
55.....	33°47'39.280"	120°07'59.707"			
56.....	33°47'37.617"	120°06'04.002"			
57.....	33°47'59.351"	120°04'08.370"			
58.....	33°48'38.700"	120°02'33.188"			
59.....	33°48'52.167"	120°01'50.244"			
60.....	33°50'28.486"	119°57'50.820"			
61.....	33°50'55.128"	119°55'19.934"			
62.....	33°52'13.338"	119°52'53.439"			
63.....	33°52'04.900"	119°52'10.719"			
64.....	33°51'39.919"	119°47'21.152"			
65.....	33°51'48.592"	119°46'13.213"			
66.....	33°51'35.798"	119°44'34.589"			
67.....	33°51'44.374"	119°41'12.738"			
68.....	33°52'23.857"	119°39'14.708"			
69.....	33°53'09.365"	119°37'30.784"			
70.....	33°53'12.754"	119°35'35.793"			
71.....	33°53'17.114"	119°34'54.567"			

Santa Barbara Island Section

83.....	33°28'56.904"	119°10'04.092"
84.....	33°26'32.364"	119°10'01.328"
85.....	33°24'19.904"	119°08'52.236"
86.....	33°23'26.019"	119°07'54.826"
87.....	33°22'04.836"	119°05'16.716"
88.....	33°21'49.387"	119°04'01.551"
89.....	33°21'44.594"	119°02'49.887"
90.....	33°21'49.556"	119°01'37.839"
91.....	33°22'07.538"	118°59'49.357"
92.....	33°22'27.774"	118°58'51.623"
93.....	33°22'47.957"	118°58'07.633"
94.....	33°23'20.805"	118°57'14.375"
95.....	33°24'18.458"	118°56'08.450"
96.....	33°26'24.130"	118°54'51.352"
97.....	33°29'02.820"	118°54'22.276"
98.....	33°31'27.917"	118°54'50.367"
99.....	33°32'17.935"	118°55'18.396"
100.....	33°35'10.090"	118°59'40.091"
101.....	33°35'24.575"	119°01'22.108"
102.....	33°35'06.497"	119°03'59.463"
103.....	33°34'48.322"	119°05'03.374"
104.....	33°32'37.151"	119°08'37.201"
105.....	33°30'41.731"	119°09'45.845"

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APPENDIX 2

Recent and Ongoing Research Projects Related to the Channel Islands National Marine Sanctuary

PROJECT	PRINCIPAL INVESTIGATOR(S)	OBJECTIVES	STATUS & REFERENCE
Pinniped Population Dynamics Monitoring	Dr. Douglas DeMaster, Leader Coastal Marine Mammal Project, National Marine Fisheries Service Southwest Fisheries Center LaJolla, CA 92037	To produce and implement a monitoring program for pinniped populations conducted by professional resource managers repeatedly, with little or no disturbance to the animals and at a reasonable cost. The program relies on a combination of census techniques including ground counts, counts using survey aircraft, and counts using vertical high resolution photography. The program is designed to answer questions about the seasonal distributions and abundance of pinnipeds; detect changes in response to increased visitor uses; and be computer-compatible with the Sanctuary Data Management System.	On-going "A guide to censusing pinnipeds in the Channel Islands Marine Sanctuary" (in progress) "Annual report on research to develop photogrammetric censusing techniques within the Channel Islands Marine Sanctuary"
Sanctuary Data Management System	Gary Davis, Research Scientist National Park Service (NPS) Channel Islands National Park 1901 Spinnaker Drive Ventura, CA 93001	Design and implementation of an automated data management system for the Channel Islands National Marine Sanctuary and the adjacent Channel Islands National Park for storage, retrieval, and production of hard copy digital, graphic and textual material describing the abundance, distribution, reproductive efforts, recruitment, phenology, population age and sex compositions, growth rates and mortality rates of the diverse array of terrestrial, intertidal, and subtidal plants and animals in these areas.	Completed

PROJECT	PRINCIPAL INVESTIGATOR(S)	OBJECTIVES	STATUS & REFERENCE
<p>Channel Islands National Marine Sanctuary Visitor Use Survey</p>	<p>Gary Davis, Research Scientist National Park Service (NPS) Channel Islands National Park 1901 Spinnaker Drive Ventura, CA 93001</p>	<p>To design and test a system for monitoring boating activity within the Sanctuary. Observations taken during a 15-month long study period have shown that various parameters of boating activity (including number, type and distribution of vessels) may be accurately determined with regression analysis-generated equations based on observations at selected anchorages. The information generated by the system is needed to better apportion personnel for visitor services and law enforcement, to determine levels of disturbance, to define relationships among harvest levels and resource conditions, and to understand existing patterns and levels of waterborne transportation for an analysis of transportation alternatives.</p>	<p>Completed Misc. progress reports; final report in progress</p>
<p>Monitoring of Selected Seabird Populations</p>	<p>Dr. George L. Hunt University of California, Irvine, CA 92717 Dr. Daniel Anderson University of California, Davis, CA 95616</p>	<p>To design and test a system for monitoring selected seabird population levels and seabird behavior. The system will help in determining changes in populations and understanding the causes of the changes.</p>	<p>Completed “Handbook for monitoring selected seabird species in the Channel Islands National Park”.</p>

PROJECT	PRINCIPAL INVESTIGATOR(S)	OBJECTIVES	STATUS & REFERENCE
<p>Movement Patterns and Hauling Behaviour of Harbor Seals in the Channel Islands National Marine Sanctuary</p>	<p>Dr. Douglas DeMaster, Leader Coastal Marine Mammal Project National Marine Fisheries Service Southwest Fisheries Center LaJolla, CA 92037</p>	<p>The long term objectives of this study are threefold: (1) to document the natural movement pattern and hauling behavior of individual harbor seals and to determine how much variability exists between age and sex classes; (2) to determine how human disturbance affects the behavior and movement patterns; (3) to determine correction factors for beach counts of hauled out harbor seals that will allow the estimates of the entire population to be made. The research involves radio tracking to assess interisland movements or change of hauling activities.</p>	<p>On-going Misc. progress reports</p>
<p>Food Habits of Pinnipeds within the Channel Islands National Marine Sanctuary</p>	<p>Dr. Douglas DeMaster, Leader Coastal Marine Mammal Project National Marine Fisheries Service Southwest Fisheries Center LaJolla, CA 92037</p>	<p>To determine what areas in the Sanctuary are critical feeding areas for pinnipeds and what is the duration of the average feeding cycle on these prime feeding areas. Two species will initially be studied California sea lions (<i>Zalophus californianus californianus</i>) and harbor seals (<i>Phoca vitulina</i>) because population levels are thought to be increasing and therefore it is likely that change in the distribution and abundance of prey species may occur. Currently, there is no, or only limited, dietary information for these two species.</p>	<p>On-going Misc. progress reports</p>

PROJECT	PRINCIPAL INVESTIGATOR(S)	OBJECTIVES	STATUS & REFERENCE
Marine Ecosystem Dynamics Monitoring	Gary Davis National Park Service (NPS) Channel Islands National Park 1901 Spinnaker Drive Ventura, CA 93001	To design a system to monitor over the long term the population dynamics of marine organisms in the Sanctuary. The initial years of the project have focused on rocky bottom kelp-dominated communities. The first phases were aimed at determining target species for monitoring, locating, sampling transects and establishing sampling techniques for the various species. The subsequent phases (being funded by the NPS) will help finalize the sampling program and develop reliable statistical analyses of the monitoring data.	Completed Annual status Reports (1982)
Visitor Use Impacts on Tidepools	Gary Davis National Park Service (NPS) Channel Islands National Park 1901 Spinnaker Drive Ventura, CA 93001	To assess the impact of visitors on intertidal invertebrate and algal communities. Natural and controlled experiments were undertaken to determine effects of visitor trampling, specimen collecting, and rock overturning. Another objective was to develop a handbook to be used by trained personnel in monitoring the effects of visitors, the recovery of species and naturally caused population fluctuation.	Completed

APPENDIX 3

Selected References

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APPENDIX 4

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