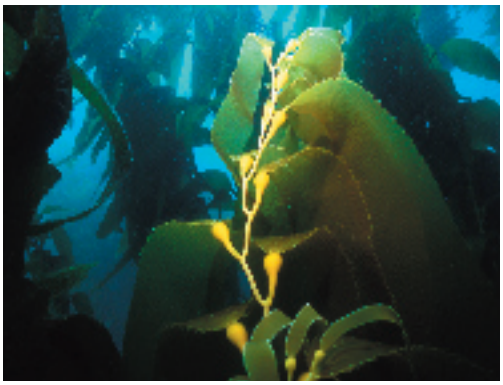
Channel Islands
National Marine Sanctuary


Final Environmental Impact Statement for the Establishment of Marine Reserves and Marine Conservation Areas

April 2007

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service
National Marine Sanctuary Program

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

APR 12 2007

Dear Reviewer:

In accordance with provisions of the National Environmental Policy Act of 1969 (NEPA), we enclose for your review a final environmental impact statement (FEIS) for the establishment of no-take and limited take marine zones in the Channel Islands National Marine Sanctuary (CINMS).

Designated by the National Oceanic and Atmospheric Administration (NOAA) in 1980, the CINMS consists of an area of approximately 1,113 square nautical miles off the coast of southern California's Santa Barbara and Ventura counties. The CINMS supports a rich and diverse range of marine life and habitats, unique and productive oceanographic processes and ecosystems, and culturally significant resources.

NOAA's preferred alternative is to establish a network of marine zones in the CINMS to further protect biodiversity in the CINMS and complement an existing network of marine zones established by the State of California in October 2002 and implemented in April 2003 under its authorities. Two types of zones are being proposed by this action: marine reserves and a marine conservation area. The proposed action would establish approximately 110.5 square nautical miles of marine reserves and 1.7 square nautical miles of marine conservation areas in the CINMS. All extractive activities (i.e., removal of any sanctuary resource) would be prohibited in marine reserves. Lobster harvest and recreational fishing for pelagic species (with hook and line only) would be allowed within the marine conservation area, while all other extraction would be prohibited. Regulations proposed under this rulemaking would be written in a manner so as to avoid unnecessary redundancy with regulations promulgated by NOAA under the Magnuson-Stevens Fishery Conservation and Management Act.

NOAA is not required to respond to comments received as a result of issuance of the FEIS. However, comments will be reviewed and considered for their impact on issuance of a record of decision (ROD). Please send comments to Chris Mobley, CINMS Superintendent, NOAA National Marine Sanctuary Program, 113 Harbor Way, Suite 150, Santa Barbara, California, 93109. The ROD will be made available publicly following final agency action on or after May 21, 2007.

Sincerely,

Rodney Weiher

Rodney F. Weiher, Ph.D.
NOAA NEPA Coordinator

Enclosure

EXECUTIVE SUMMARY

This final environmental impact statement (FEIS) presents the impacts of various alternatives considered to establish marine zones in the Channel Islands National Marine Sanctuary (CINMS or Sanctuary), located offshore southern California. This document was preceded by a draft environmental impact statement, which was issued for public review by the National Oceanic and Atmospheric Administration (NOAA) in August 2006. NOAA is the lead agency for this action. NOAA's National Marine Sanctuary Program (NMSP) is the implementing program for this action. This FEIS is a separate document from the FEIS currently being finalized by CINMS staff in association with revision of the Sanctuary's management plan.

This FEIS provides detailed information and analysis of a range of reasonable alternative marine zones. Marine zones are discrete areas contained within or above a national marine sanctuary that have special regulations differing from the regulations that apply throughout or above the sanctuary as a whole. The purpose of these CINMS zones is to further the protection of Sanctuary biodiversity and to complement the existing network of marine zones established by the State of California in October 2002, and implemented under its authority in April 2003.

Of the alternatives analyzed in the DEIS, NOAA's current preferred alternative is Alternative 1C, which adds nine new marine zones to the Federal waters of the Sanctuary: eight marine reserves and one marine conservation area. All extractive activities (e.g., removal of any Sanctuary resource) and injury to sanctuary resources are prohibited in the marine reserves. Lobster harvest and recreational fishing for pelagic finfish are allowed within the marine conservation area, but all other extraction and injury to sanctuary resources is prohibited.

In a separate process, NOAA has amended the Pacific Coast Groundfish Fishery Management Plan (Groundfish FMP) to protect essential fish habitat (EFH) along the west coast of the United States. This amendment, which was implemented through regulations issued under the Magnuson-Stevens Fishery Conservation Act (MSA) in 2006, complements the existing State marine zones by prohibiting the use of bottom contact fishing gear in the Federal waters of the proposed zones.[1] The NMSA regulations analyzed in this FEIS would prohibit all other forms of take from the proposed marine zones not prohibited by the Groundfish FMP regulations (as amended). NOAA would implement the actions analyzed in this FEIS and the amendment to the Groundfish FMP (and its associated regulations) using a cooperative and coordinated approach. The Groundfish FMP amendment is detailed in Section 3.0.

Changes to the DEIS

This FEIS incorporates changes to the DEIS based on comments received during the public comment period and on the NMSP's subsequent review. A small number of technical and

[1] EFH designation applies to both State and Federal waters. The associated regulations only apply to Federal waters.

grammatical edits were made to the document as well as updates to certain sections of the ecological and socioeconomic analyses.

Between August and October of 2006, NOAA received public comment and held two hearings on the proposed rule and DEIS. Over 30,000 individuals submitted written comments and/or presented oral testimony on NOAA's proposal. The vast majority of these individuals supported the establishment of marine zones in some form. During the public comment period, the State of California also submitted comments on NOAA's proposal. In its October 2006 letter, the CDFG stated that it could only support Alternative 1C as described in the DEIS. Under Alternative 1C, NOAA would only establish marine reserves in federal waters. NOAA's original preferred alternative, identified as Alternative 1A in the DEIS, would have established marine zones in both federal and state waters with federal regulations overlaying the entire network (i.e., from the outer boundary of the federal waters reserves to the shore of the Channel Islands). As indicated in the DEIS, Alternative 1C would leave small gaps in protection between the offshore extent of some of the state waters marine zones established by the State of California in 2003 and the marine zones proposed by NOAA (refer to Figure 6 for an illustration of these gaps).

On March 16, 2007, the California Coastal Commission (Coastal Commission) held a public meeting on NOAA's proposal pursuant to its authorities under section 307 of the Coastal Zone Management Act (16 U.S.C. § 1456). See http://www.coastal.ca.gov/meetings/mtg-mm7-3.html for more information about this meeting. At that meeting, the Coastal Commission passed a motion as follows:

> *In the event NOAA elects not to implement Alternative 1a, NOAA will implement Alternative 1c, with the following additional provisions: until such time as the Resources Agency and the Fish and Game Commission designate the areas in between the existing State-designated MPAs and the 3 mile limit (i.e., the "gaps" between the existing state MPAs and the federal MPAs depicted in Alternative 1c [and shown on Exhibit 9]), or the Fish and Game Commission/DFG and NOAA enter into an interagency agreement that establishes MPA protection for these "gap" areas, NOAA will expand Alternative 1c to include in its MPA designation these "gaps" between the outer boundaries of the existing state MPAs and the State-federal waters boundary (3nm from shore).*

At this meeting, the CDFG representative also stated that the California Fish and Game Commission could close these gaps in protection using state laws by August 2007.

Based on the record, including the comments received during the public comment period, and the record of the Coastal Commission, NOAA has ascertained that there is sufficient information and rationale to establish marine zones in the federal waters of the Sanctuary (i.e., implement NOAA's Alternative 1C). NOAA's preferred alternative in this FEIS is Alternative 1C. With regard to state waters of the Sanctuary, NOAA envisions deferring action on establishing marine zones until the California Fish and Game Commission has had an opportunity to close those gaps in a manner consistent with the Coastal Commission's motion and the CDFG representative's statement. NOAA would, therefore, leave the record open with regard to a decision to establish

marine zones in state waters of the Sanctuary, and request additional public comment on this specific issue.

If NOAA implements Alternative 1C, NOAA would make a final decision with regard to action in state waters in fall 2007. If the California Fish and Game Commission is able to take sufficient action before this time, NOAA would propose to take no further action under the NMSA. If the California Fish and Game Commission is not able to take sufficient action before this time, NOAA envisions finalizing regulations under the NMSA that would effectively close the gaps associated with Alternative 1C by extending federal protections into state waters to meet the boundaries of the marine zones established by the California Fish and Game Commission in 2003. This would resemble Alternative 1B (refer to Figure 5 for a map of Alternative 1B). In either case, NOAA would provide public notice of this action through issuance of a Federal Register notice at the appropriate time.

Finally, NOAA is changing the number identifying the total area of the CINMS from 1,252 square nautical miles (nmi) to 1,113 square nmi. This change is based on North American Datum of 1983 (NAD 83) and adjusts for technical corrections using updated technologies. The legal description of the CINMS is updated to reflect this change. This update does not constitute a change in the geographic area of the Sanctuary but rather an improvement in the estimate of its size.

Background and History

Comprehensive marine zoning network options were originally developed by NOAA and the California Department of Fish and Game (CDFG) following a stakeholder process conducted from 1999 through 2002. In 2002, the California Fish and Game Commission (FGC) supported establishment of State marine zones in State waters (0-3 nmi) (CDFG 2002).

The consideration of marine zones within the CINMS over the last seven years is described below in three distinct phases: 1) the community-based phase; 2) the State regulatory phase; and 3) the Federal regulatory phase, which is the focus of this FEIS. These three phases are collectively referred to as the "Channel Islands Marine Reserves Process."

Community-based Phase: 1998-2002

In 1998, the FGC received a recommendation from a local recreational fishing group to create marine reserves around the northern Channel Islands as a response to declining fish populations. The group recommended that 20 percent of the shoreline outward to 1 nautical mile (nmi) should be closed to all fishing. In addition, during public scoping for the CINMS management plan review, the public voiced similar concerns regarding declines in resources and recommended the application of ecosystem-based management tools, such as marine reserves. As a result, the NMSP began to investigate possible courses of action, including working with the State of California, to address the issues articulated by the public.

In April 1999, the NMSP and the CDFG developed a joint Federal and State partnership and process to consider establishing marine reserves within the CINMS. To support this joint process, the Sanctuary Advisory Council (SAC), which is comprised of local community and Federal, State and local government agency representatives, created a multi-stakeholder Marine Reserves Working Group (MRWG) to seek agreement on the establishment of marine reserves within the CINMS. From July 1999 to May 2001, the MRWG met monthly to receive, weigh, and integrate advice from a Science Advisory Panel (SAP), Socio-economic Team, and the public to develop a marine reserves recommendation. The MRWG identified the problems to be addressed in a consensus statement:

> *The urbanization of southern California has significantly increased the number of people visiting the coastal zone and using its resources. This has increased human demands on the ocean, including commercial and recreational fishing, as well as wildlife viewing and other activities. A burgeoning coastal population has also greatly increased the use of our coastal waters as receiving areas for human, industrial, and agricultural wastes. In addition, new technologies have increased the efficiency, effectiveness, and yield of sport and commercial fisheries.*
>
> *Concurrently, there have been wide scale natural phenomena such as El Niño weather patterns, oceanographic regime shifts, and dramatic fluctuations in pinniped populations.*
>
> *In recognizing the scarcity of many marine organisms relative to past abundance, any of the above factors could play a role. Everyone concerned desires to better understand the effects of the individual factors and their interactions, to reverse or stop trends of resource decline, and to restore the integrity and resilience of impaired ecosystems.*
>
> *To protect, maintain, restore, and enhance living marine resources, it is necessary to develop new management strategies that encompass an ecosystem perspective and promote collaboration between competing interests. One strategy is to develop reserves where all harvest is prohibited. Reserves provide a precautionary measure against the possible impacts of an expanding human population and management uncertainties, offer education and research opportunities, and provide reference areas to measure non-harvesting impacts.*

Following the development of this statement, the MRWG then reached consensus on the following goals for marine reserves:

- To protect representative and unique marine habitats, ecological processes, and populations of interest;
- To maintain long-term socioeconomic viability while minimizing short-term socioeconomic losses to all users and dependent parties;
- To achieve sustainable fisheries by integrating marine reserves into fisheries management;
- To maintain areas for visitor, spiritual, and recreational opportunities which include cultural and ecological features and their associated values; and

- To foster stewardship of the marine environment by providing educational opportunities to increase awareness and encourage responsible use of resources.

During the community phase, there was controversy associated with the size of marine zones recommended by the Science Advisory Panel (McGinnis 2006; Davis 2005; Helvey 2005). Given the goals established by the MRWG, the members of the group discussed the criteria for marine reserve size and design for six months. During this time, a number of newspapers published articles during the community phase in local papers, including a series of news and opinion articles. A vast majority of these newspaper articles supported the designation of marine reserves by NOAA. In general, a number of user groups and stakeholders from the fishing industry did not support the level of protection and size of marine reserves recommended by the Science Advisory Panel (SAP), while local conservation interests and other community groups and stakeholders supported the SAP's recommendation (Helvey 2005). This conflict over the scientific recommendations was not resolved during the community phase (McGinnis 2006; Davis 2005).

From March to May 2001, the MRWG mapped marine reserve networks in both State and Federal waters of CINMS to achieve the goals identified above. Over 40 possible marine reserve networks were developed. In May 2001, the MRWG forwarded to the SAC its problem statement, goals, implementation recommendations, Science Advisory Panel recommendations, and the socio-economic analyses. The MRWG also forwarded a composite map with two reserve network options ranging from 12 to 29 percent of the Sanctuary was also forwarded. In June 2001, the SAC transmitted the full public record of the MRWG to the NMSP and CDFG, and requested that the agencies craft a final recommendation for the FGC.

The CDFG and the NMSP continued to work with stakeholders to design a reserves network that built on community input, addressed scientific criteria, and satisfied agency mandates. In August 2001, CDFG and the NMSP forwarded the full public record to the FGC along with a recommended marine reserve network. The FGC directed the CDFG to initiate a State rulemaking process based on the agencies' recommended marine reserve network.

State Phase: 2002 to 2003

The CDFG prepared environmental documents in accordance with the California Environmental Quality Act (CEQA) that included an analysis of five alternative reserve networks and a no-project alternative (CDFG 2002). The alternatives analyzed in the CEQA document were split into an initial State-phase and subsequent Federal Phase. The NMSP and CDFG's recommended network was identified as the preferred alternative (CDFG 2002). The State's rulemaking process and Environmental Impact Report (EIR) assessed the potential cumulative effects of implementing marine zones in both State and Federal waters of the CINMS.

During the State phase, controversy continued over the size and location of marine reserves. In general, a number of resource user groups and members from the fishing industry did not support the level of protection recommended by the State. Local conservation interests and other

community groups, on the other hand, supported the State's preferred alternative. Hundreds of individuals in southern California attended public hearings on the State's proposal.

In October 2002, the FGC approved the preferred alternative in the EIR that included ten marine reserves and two conservation areas within State waters, encompassing approximately 102 nmi^2 of the CINMS. NOAA and the National Park Service (NPS) supported the FGC's decision. The State water portion of the marine zones went into effect in April 2003.

Federal Phase: 2003 to the present

Following the publication of the CDFG's final regulations in 2003, the NMSP hosted scoping meetings with the general public, the SAC, and the Pacific Fishery Management Council (PFMC). In 2004, the NMSP released a preliminary environmental document with a range of alternatives for public review. In 2005, the NMSP consulted with local, State, and Federal agencies and the PFMC on possible amendments to the CINMS designation document pursuant to section 303(b)(2) of the National Marine Sanctuaries Act (NMSA) (16 U.S.C. 1433(b)(2)). In addition, in 2005 the NMSP provided the PFMC with the opportunity to prepare draft Sanctuary (NMSA) fishing regulations pursuant to section 304(a)(5) of the NMSA (16 U.S.C. 1434(a)(5)) for the potential establishment of marine reserves and marine conservation areas.

In its response to NOAA's letter regarding draft fishing regulations, the PFMC stated its support for NOAA's goals and objectives for marine zones in the CINMS, but recommended that, rather than utilizing the NMSA, NOAA should issue fishing regulations under the MSA and the relevant authorities of the States of California, Oregon, and Washington. To that end, and in accordance with advice from the NOAA Administrator in his October 19, 2005 letter to the PFMC, the PFMC recommended the northern Channel Islands Federal marine zones be designated as Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC) under Amendment 19 of the Groundfish FMP. Corresponding management regulations issued by NOAA under the MSA would prohibit the use of bottom contact gear, while the water column in the marine zones would be closed under other fishery management plan authorities and complementary State laws.

NOAA reviewed the PFMC's recommendations and determined that they did not have the specificity or record to support the use of the MSA or state laws to establish limited take or no-take zones in the water column and thereby did not fulfill NOAA's goals and objectives for these marine zones in the CINMS. Amendment 19 to the Groundfish FMP would implement, in part, the proposed marine zones by prohibiting all bottom contact gear in those proposed zones. The final environmental impact statement for this action[2] is incorporated by reference herein. Accordingly, the proposed NMSA regulations analyzed in this FEIS would prohibit the take of resources from the proposed zones not prohibited by the Amendment 19 regulations. Thus, along with Amendment 19, the NMSA regulations establish comprehensive limited take and no-

[2] Pacific Coast Groundfish Fishery Management Plan-Essential Fish Habitat Designation and Minimization of Adverse Impacts Final Environmental Impact Statement; December 2005. Available at http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/

take zones in the Federal part of the CINMS in a manner that fulfills NOAA's goals and objectives for the marine zones in the CINMS.

Sensitive habitats, such as kelp, sea grass, rocky reefs and submarine features were further designated as HAPCs. HAPCs are areas within EFH that are ecologically important, sensitive, stressed or rare habitats or places. The designation of HAPCs could allow the PFMC and NMFS to focus their attention on conservation priorities during review of proposals and give the fish species within HAPCs an extra buffer against adverse impacts.

In August 2006, NOAA released the Draft Environmental Impact Statement (DEIS) for the Consideration of Marine Reserves and Marine Conservation Areas in the CINMS for public review and comment. The three principal alternatives analyzed in the DEIS were two zoning alternatives and a no-action alternative. The no-action alternative reflects the expected management environment that would occur without any action taken by the NMSP. Alternatives 1 and 2 were adapted principally from alternatives in the CDFG's (2002) Environmental Impact Report (EIR). Alternative 1 contains three sub-alternatives (Alternative 1A, 1B, and 1C) based on differing boundary options relative to the existing State marine zones.

- In Alternative 1A, the boundaries of the marine zones (and their corresponding NMSA regulations) completely overlay the existing State marine zones and terminate at the mean high water line of the northern Channel Islands.
- In Alternative 1B, the boundaries of the marine zones (and their corresponding NMSA regulations) abut the existing State marine zone boundaries, thereby including a small portion of State waters.
- In Alternative 1C, the boundaries of the proposed marine zones terminate at the boundary between State and Federal waters (3 nmi from shore), thereby including no State waters. Alternative 1C is NOAA's current preferred alternative.

- Alternative 2 is the largest of the alternatives proposed and includes a network of existing State marine zones and new Federal zones, and would increase protection of various habitats and species of interest, as compared to Alternative 1.

Contents of this Document

This document is comprised of the following sections:

Section 1: Introduction and Background

This section provides a summary of the NMSP, the CINMS, other relevant management authorities, and a description of the project location.

Section 2: Purpose and Need

This section briefly specifies the underlying purpose and need that the NMSP is addressing with this action.

Section 3: Alternatives

This section details the range of reasonable alternatives the NMSP identified as likely to address the purpose and need. It also includes the criteria the NMSP used for developing this range. Two types of marine zones are proposed by this action: marine reserves and marine conservation areas. The boundaries of the proposed marine zones in sanctuary waters would begin at the existing State-Federal water boundary (3 nmi from the shore), and would extend offshore to the Sanctuary boundary (approximately 6 nmi offshore). NOAA's action adds nine new marine zones, eight of which are no-take marine reserves and one limited take marine conservation area. NOAA's proposed action includes a total of 110.5 nmi^2 as marine reserves and 1.7 nmi^2 as marine conservation areas. The area of the total network, including the existing State marine zones, would be 214.1 nmi^2.[3] All extractive activities (e.g., removal of any Sanctuary resource) and injury to sanctuary resources would be prohibited in all marine reserves. All extractive activities and injury to Sanctuary resources would be prohibited in the marine conservation area with the exception of lobster harvest and recreational fishing for pelagic finfish.

Section 4: Affected Environment

This section describes the current baseline conditions of the marine ecosystems and human uses potentially affected by the NOAA's action.

Section 5: Environmental Impacts

This section provides an analysis of the ecological and socio-economic impacts associated with each alternative described in this FEIS. These impacts are summarized as follows:

Ecological Impacts

The implementation of marine zones in the CINMS is expected to have beneficial ecological impacts on marine communities and habitats. The analysis of ecological impacts was based on numerous scientific studies done on the efficacy of marine zones in the CINMS, California, and other parts of the world. Based on this information, the ecological impacts of implementing NOAA's action are anticipated to be as follows:

[3] This does not include the gaps between the marine zones established by the State of California and the Federal marine zones that would be established under Alternative 1C. If these gaps are closed, the total network size would be 240.4 nmi^2.

- The abundance, size, biomass, and diversity of targeted (fished) species in the Sanctuary is expected to increase within the marine zones as compared to areas outside of these marine zones;[4]
- Habitats supporting marine populations are expected to benefit via reduced disturbance and destruction of physical structures by fishing gear;
- Although displacement of fishing effort resulting from implementation of the marine zones may increase fishing pressure outside their bounds, vessel distribution and socioeconomic analyses indicate that relatively little fishing activity currently occurs within the proposed marine zones. Hence, little fishing activity congestion is expected outside these marine zones.

Socioeconomic Impacts

NOAA gathered and analyzed socioeconomic information for the CINMS through 2003. Analyses were based on a two-step approach: Step 1 analyses describe the potential impacts of the alternatives in this FEIS for commercial fisheries, consumptive recreational activities, and non-consumptive recreational activities. Step 2 analyses describe the factors that contribute to potential costs and, when possible, the benefits of the designation of the marine zones within the CINMS. In general, these analyses characterize the socioeconomic impacts as:

- Having a small impact on existing consumptive activities (commercial fishing and consumptive recreational activities).
- Beneficial to non-consumptive recreational users. These increased benefits take the form of increases in diversity of wildlife, viewing opportunities from increased abundance of fish and invertebrates, water quality, etc. Benefits may also be derived from the decrease in the density of users or in the reduction in conflicts with consumptive users.
- Beneficial to management, research, and education because relatively undisturbed areas (i.e., reference areas) will be available for comparison with areas outside the marine zones; and
- Beneficial for intrinsic and heritage purposes.

Management Considerations

Going beyond an analysis of the ecological and socioeconomic impacts, NOAA also assessed the impacts of the various alternatives on the management of the proposed zones. This assessment notes distinctions among the management regimes that would be possible under the various alternatives.

Section 6: Relationship with other Regulatory Requirements

This section describes NOAA's compliance with other legal requirements, such as the Endangered Species Act, among others.

[4] Species that are not fished or not fished heavily may not show significant changes in abundance and size as a result of marine zone designation.

Other Sections and Appendices

The remainder of the FEIS includes a list of preparers, references, and several appendices.

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1.0 INTRODUCTION AND BACKGROUND

This section provides context for NOAA's action. A summary of the NMSP, the CINMS, relevant management authorities, and a description of the project location are included. The consideration of marine zones within the CINMS over the last seven years is described in the Executive Summary, and Appendices A, B, and D.

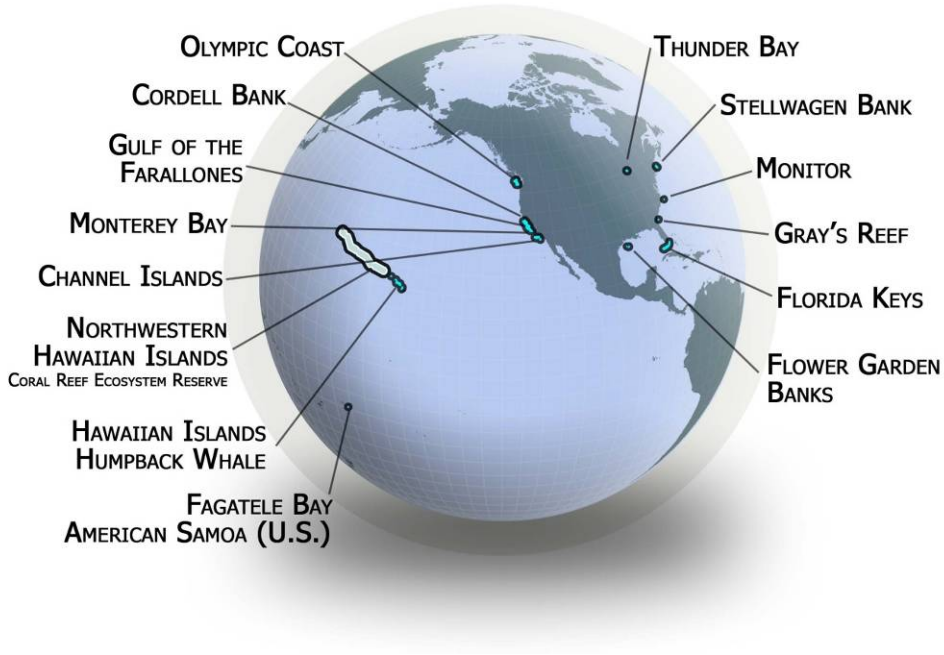
1.1 The National Marine Sanctuary Program

Under the NMSA, the Secretary of Commerce is authorized to designate and manage areas of the marine environment as national marine sanctuaries. Such designation is based on attributes of special national significance, including conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or aesthetic qualities. The primary objective of the NMSA is to protect all natural and historical resources of national marine sanctuaries.

The mission of the NMSP "is to identify, designate and manage areas of the marine environment of special national, and in some cases international, significance due to their conservation, recreational, ecological, historical, research, educational, or aesthetic qualities" (15 CFR 922.2(a)). Per the NMSA, the NMSP strives to improve the conservation and management of marine resources and seeks to "maintain for future generations the habitat, and ecological services, of the natural assemblage of living resources that inhabit these areas" (16 U.S.C. 1431 (a)(4)(C)). This statutory finding guides the NMSP to take a broad and comprehensive management approach consistent with the NMSA's primary objective of resource protection. The focus of such an approach is broad-scale, ecosystem-level protection and management, unique from the various agencies and laws directed at managing single or limited numbers of species or specific human activities within the ocean.

To date, thirteen national marine sanctuaries and one national marine monument have been designated by the Secretary of Commerce, Congress, or the President (Figure 1). These national marine sanctuaries include both nearshore and offshore marine areas. Their designation provides protection for sensitive marine ecosystems, such as coral reefs and kelp forests, other habitats used by ecologically and economically important marine species, and historically significant shipwrecks and artifacts. In addition, these areas serve as valuable educational, recreational, scientific, and economic resources. NMSP regulations implement the NMSA and are codified at 15 CFR Part 922.

Figure 1: Map of the National Marine Sanctuary System



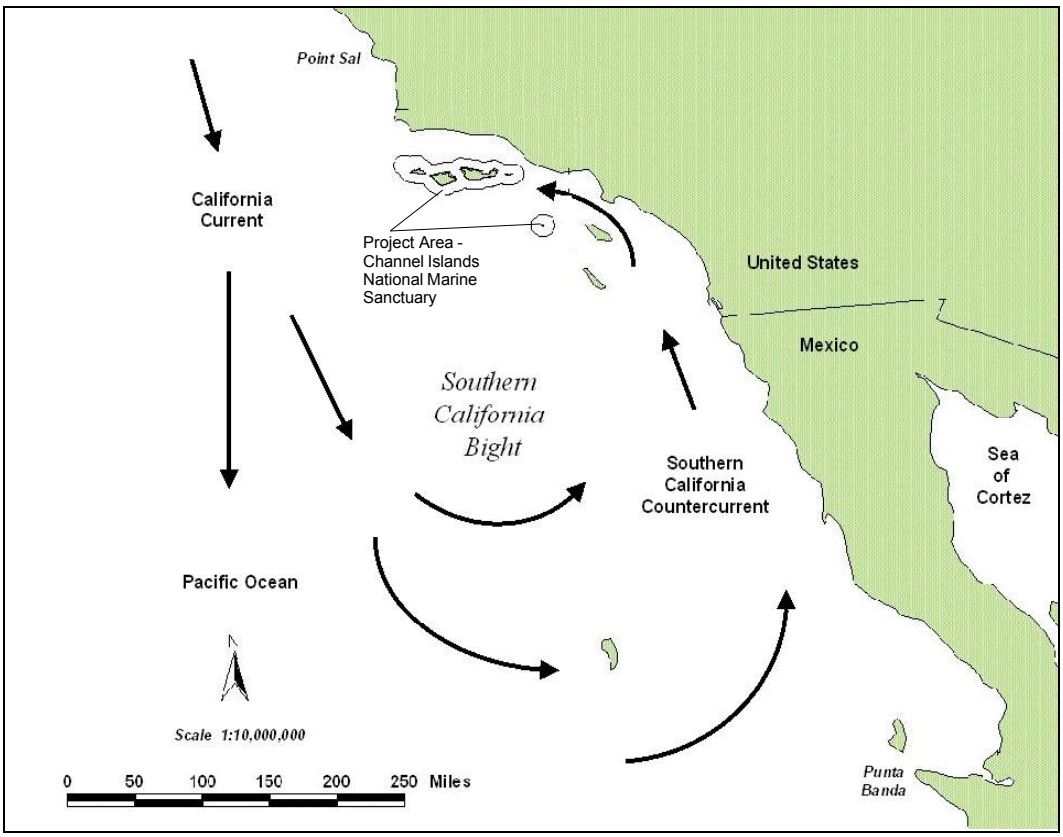
1.2 Project Location - The Channel Islands National Marine Sanctuary

Designated in 1980, the CINMS consists of an area of approximately 1,113 square nautical miles (nmi^2) off the southern coast of California. The sanctuary boundary begins at the mean high water line and extends seaward to a distance of approximately six nautical miles (nmi) from 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 (collectively the Islands). Located offshore from Santa Barbara and Ventura counties, the Sanctuary supports a rich and diverse range of marine life and habitats, unique and productive oceanographic processes and ecosystems, and culturally significant resources. A comprehensive characterization of the ecological, regulatory, and human setting of the CINMS may be found in CDFG (2002), NCCOS (2005), and Section 3 of the DEIS for the CINMS Draft Management Plan (NOAA 2006).

The CINMS is at the northwestern end of a much larger area referred to as the Southern California Bight (SCB) (Dailey *et al.* 1993). The SCB is formed by a transition in the California coastline wherein the north-south trending coast begins to trend east-west. Figure 2 shows the location of the CINMS within the SCB.

The rich oceanic and island areas of the CINMS are protected by multiple levels of government. The Islands are designated as a National Park by the Department of the Interior. The Park's boundary extends to one nmi offshore of the islands, overlapping the CINMS boundary. In 1986, the United Nations Educational, Scientific and Cultural Organization Program on "Man and the Biosphere" designated the Channel Islands Biosphere Reserve as part of the international network of Biosphere Reserves. In October 2002, the FGC approved the designation of ten marine reserves and two conservation areas within State waters of the CINMS, which encompass approximately 102 nmi^2 of the Sanctuary (CDFG 2002). NOAA and the National Park Service supported the State's action. This designation was one product of the Channel Islands Marine Reserve Process that began in 1999, and was based on a collaboration and partnership with Federal and State agencies, fishers, and conservationists from the region. The State's marine zones went into effect in April 2003.

Figure 2: Southern California Bight



2.0 PURPOSE AND NEED

2.1 Purpose of This Action

The primary objective of the NMSP is to protect national marine sanctuary resources (16 U.S.C. 1431). The NMSA compels the NMSP to take a broad and comprehensive, ecosystem-based approach to management and marine resource protection. The NMSA (16 U.S.C. 1431(a)(3)) states that "…while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of special areas of the marine environment." The NMSA also states that the NMSP is to "maintain the natural biological communities in the national marine sanctuaries and to protect and, where appropriate, restore and enhance the natural habitats, populations and ecological processes" (16 U.S.C. 1431(b)(3)).

NOAA is proposing establishing Federal marine zones in the CINMS to further the protection of sanctuary biodiversity, and to complement the existing network of marine zones established by the State of California in October 2002 (and implemented under its authorities in April 2003). The proposed action in this FEIS proposes the establishment of marine zones in Federal waters of the CINMS. NOAA's action adds nine new Federal marine zones: eight marine reserves and one marine conservation area. NOAA's proposed action includes a total of 110.5 nmi^2 as marine reserves and 1.7 nmi^2 as marine conservation areas. The area of the total network, including the existing State marine zones, would be 214.1 nmi^2.[5] All extractive activities (e.g., removal of any sanctuary resource) and injury to sanctuary resources are prohibited in marine reserves. Lobster harvest and recreational fishing for pelagic finfish (with hook and line only) are allowed within the marine conservation area, while all other extraction and injury to sanctuary resources is prohibited.

The boundaries of the proposed marine zones begin at the existing State-Federal water boundary (3 nmi from the shore) and extend offshore to the outer Sanctuary boundary (approximately 6 nmi). NMSP is proposing this action to meet the following six goals:

- To ensure the long-term protection of Sanctuary resources by restoring and enhancing the abundance, density, population age structure, and diversity of the natural biological communities.
- To protect, restore, and maintain functional and intact portions of natural habitats (including deeper water habitats), populations, and ecological processes in the Sanctuary.

[5] This does not include the gaps between the marine zones established by the State of California and the Federal marine zones that would be established under Alternative 1C. If these gaps are closed, the total network size would be 240.4 nmi^2.

- To provide, for research and education, undisturbed reference areas that include the full spectrum of habitats within the CINMS where local populations exhibit a more natural abundance, density, diversity, and age structure.
- To set aside, for intrinsic and heritage value, representative habitats and natural biological communities.
- To complement the protection of CINMS resources and habitats afforded by the State of California's marine reserves and marine conservation areas.
- To create models of and incentives for ways to conserve and manage the resources of CINMS.

These goals attempt to address the MRWG's consensus based goals where appropriate and are intended to be consistent with the State's goals described in the Marine Life Protection Act (MLPA).

Basically concurrent with this NMSP action, NOAA has amended the Pacific Coast Groundfish Fishery Management Plan (Groundfish FMP) to protect essential fish habitat along the west coast of the United States. Amendment 19 complements the existing State marine zones by prohibiting the use of bottom contact fishing gear in the Federal waters of the proposed zones.[6] The action analyzed in this FEIS prohibits or limits the take of resources from the marine zones not prohibited by the Amendment 19 regulations. NOAA would implement the action analyzed in this FEIS and the amendment to the Groundfish FMP (and its associated regulations) using a cooperative and coordinated approach. The final environmental impact statement for Amendment 19[7] is incorporated by reference herein.

2.2 Need for Action

The CINMS plays an important part of the ecology of the Southern California Bight (SCB) (NCCOS 2005; McGinnis 2000, 2006; Dailey et al. 1993). Marine resources in the SCB, such as kelp forest ecosystems, have declined under pressure from a variety of factors, including commercial and recreational fishing, changes in oceanographic conditions associated with El Niño and other large-scale oceanographic cycles, introduction of disease, and increased levels of pollutants (McGinnis 2006; Halpern *et al.* 2006; Davis 2005; McGowan *et al.* 1998; Dugan and Davis 1993). Science shows that prior to and since the designation of the CINMS, community structure and species diversity have changed in accordance with hydrographic perturbations, climate-ocean variability, and marine resource use (McGowan *et al.* 1998; Hayward *et al.* 1996).

[6] The EFH conservation areas include both State and Federal waters; the associated regulations, however, only apply to Federal waters.

[7] Pacific Coast Groundfish Fishery Management Plan-Essential Fish Habitat Designation and Minimization of Adverse Impacts Final Environmental Impact Statement; December 2005. Available at http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/

Roemmich and McGowan (1995a, b) document large-scale declines in primary and secondary biological productivity throughout the SCB between 1951 and 1993.[8]

In addition to large-scale changes in the marine ecosystems of the SCB, there has been a change in the level of marine resource use of the CINMS (Leeworthy, Wiley and Stone 2005). New markets for commercial fisheries have emerged since 1980 (Dugan and Davis 1993), adding pressure to significant commercial and recreational fisheries. CDFG data show decreases in landings for several categories of commercial and recreational fisheries (CDFG 2002). Davis (2005) describes evidence from the scientific literature showing that human factors have contributed to changes in productivity, biological diversity, and provision of marine ecosystem goods and services.

Fishery managers, such as NOAA Fisheries and CDFG, typically use fishing seasons and/or gear type restrictions, size and bag limits, temporary area closures, and other effort control measures to manage commercial and recreational harvests. Fisheries management tends to focus on optimizing the catch of a single target species and often does not address habitat, predators, and prey of the target species and other ecosystem components and interactions (Pikitch *et al.* 2004; Goodman *et al.* 2002). In addition, many former natural refuges for fished species, such as submarine canyons, submerged pinnacles, deep waters, and waters distant from harbors, can now be accessed due to advancements in fishing technology and increased fishing effort (Agardy *et al.* 2003).

An alternative approach to existing single-species fisheries management is ecosystem-based management, which recognizes that ecosystems, and the natural and human factors that influence them, are interdependent. Numerous government and scientific reports highlight the importance of protected areas to support ecosystem-based management (Rosenberg and McLeod 2005; McLeod *et al*. 2005). In ecosystem-based management, the direct and indirect effects of human activities are considered when making decisions about human interactions with resources, recognizing that marine systems are not static and acknowledging the uncertainties in the biotic, abiotic, and human components. The number of documented successful examples of no-take marine reserves is growing, providing substantial evidence that rapid increases in biomass, biodiversity, abundance and size of organisms usually result from their designation (Micheli and Halpern 2005; Halpern 2003; Schroeder and Love 2002; Paddack and Estes 2000). Increased biodiversity, abundance, and habitat quality within closed areas generally improve the resiliency and ability of marine ecosystems to adapt to ongoing human-caused or natural disturbance, such as climate shifts, major storm damage, and pollution (Roberts *et al.* 2003; NRC 2000; Lauk *et al*. 1998).

[8] The status of the marine environment of the CINMS is described further in Section 4.0 of this FEIS. A comprehensive description of the ecology and human uses of the CINMS may be found in Appendix E of the CINMS Draft Management Plan /DEIS (NOAA 2006), NCCOS (2005), and CDFG (2002).

The designation of marine reserves can also reinforce traditional fish management approaches to substantially reduce overall fishery impacts to the ecosystem. Traditional management, like controls on fishery catch and effort, may fail due to factors such as stock assessment errors, inadequate institutional frameworks, and uncertainty (Hilborn *et al.* 2004). Marine reserves can help to rebuild depleted populations, reduce bycatch and discards, and reduce known and as-yet-unknown ecosystem effects of fishing (Roberts *et al.* 2003). In addition, marine reserves offer scientists and resource managers a controlled opportunity to study the influence of change on marine ecosystems in the absence of direct human disturbance (PFMC 2004). As such, NOAA is proposing establishing a network of marine zones, including no-take marine reserves and one marine conservation area, as part of an ecosystem-based management approach to protect marine biodiversity and ecosystem function, and to increase the probability of long-term ecosystem resiliency and health of the Sanctuary. The marine conservation area, off Anacapa Island, is proposed in order to be consistent with the State's action regarding the State waters of that area.

3.0 ALTERNATIVES

3.1 Development of Alternatives

This section provides a description of the process by which the NMSP developed the range of alternatives in this FEIS.

3.1.1 *Overview*

The alternatives analyzed in this FEIS were reduced from a large number of options developed during the MRWG process, the State CEQA process, public scoping for this EIS, and through consultation with the other agencies and the PFMC. The factors taken into consideration during this analysis include:

- The ability of an alternative to meet the stated purpose and need;
- Consistency with the MRWG recommendations;
- Consistency with the existing State marine zones;
- Public scoping comments;
- Input from CDFG, NOAA Fisheries, and the PFMC;
- The best available ecological and economic information; and
- The administrative requirements to properly manage any action, including monitoring and enforcement.

Originally, over 40 marine reserve network maps were developed as part of the MRWG deliberative process. Based on the scientific literature and habitat distribution maps, the MRWG's Science Advisory Panel (SAP) provided ecological criteria to assess the potential ecological benefits of various marine reserve networks. The MRWG's Socioeconomic Team developed spatially-explicit socioeconomic use information, based on available information such as CDFG fishing log books and user survey data, to assess the relative socioeconomic impacts of different network options on consumptive users. Through an iterative mapping process using geographic-information-system (GIS) software, the MRWG developed a composite map that attempted to balance ecological benefits with potential short-term socioeconomic impacts on commercial and recreational fishermen. The CDFG and NMSP used the composite map to develop the preferred alternative in the CDFG (2002).

3.1.2 *Other Factors Considered*

3.1.2.1 Alternative Management Approaches

In the development of the alternatives analyzed in this FEIS, the NMSP considered the potential for achieving the purpose and need through actions that could be taken by other agencies under authorities other than the NMSA. Of particular relevance is NOAA's issuance of fishing regulations (71 FR 1998) to protect essential fish habitat (EFH)[9] within the CINMS under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). NOAA Fisheries is the implementing program for that action.

After making the determination that it is necessary to take precautionary action to protect EFH from the possible adverse impacts of fishing, NOAA Fisheries has issued a rule to implement Amendment 19 to the Groundfish FMP (71 FR 27408). Amendment 19 provides for a comprehensive program to describe and protect EFH for Pacific coast groundfish. As part of the Amendment 19 regulation, NOAA Fisheries has prohibited the use of bottom contact gear[10] in the Federal waters of the marine zones described in Alternative 1 in this FEIS.

The NOAA Fisheries rule states that the EFH measures will have a minimal impact on the fishery (71 FR 1998). The closures are mainly in areas that are not currently being fished. For areas that would require the industry to shift its location, the effect would be on less than 10 percent of the fishery (coast wide). That amount of effort is likely to be able to relocate so that there would be little net change in overall catch. Thus, the proposed management measures would have insignificant adverse socioeconomic consequences.

The EFH rule, final environmental impact statement and other background documents are available at http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/EFH-Final-EIS.cfm, and at the PFMC website at http://www.pcouncil.org. The proposed management measures are in accordance with the MSA, the Groundfish FMP, and 50 CFR parts 600 and 660 subpart G (the regulations implementing the Groundfish FMP).

The Amendment 19 action is limited to prohibiting the use of bottom-contact fishing gear, and does not completely fulfill the purpose and need defined in this FEIS. The NMSA regulations

[9] Essential Fish Habitat is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (16 U.S.C. 1802(10)).

[10] Bottom Contact Gear is defined as fishing gear designed or modified to make contact with the bottom. This includes, but is not limited to, beam trawl, bottom trawl, dredge, fixed gear, set net, demersal seine, dingle bar gear, and other gear (including experimental gear) designed or modified to make contact with the bottom. Gear used to harvest bottom dwelling organisms (e.g., by hand, rakes, and knives) are also considered bottom contact gear (71 FR 27408).

would address fishing activities that are not covered by MSA fishing regulations, as well as other non-fishing actions (e.g., scientific research, education, industrial and commercial activities).

3.1.2.2 Marine Conservation Areas – Allowing Limited Take

Several comments received during the scoping process for this action requested that the NMSP consider allowing limited take of pelagic finfish in certain marine zones, such as the proposed "Footprint" region south of Anacapa and Santa Cruz Islands. The primary arguments put forward in these comments to support allowing the take of pelagic finfish were:

- Pelagic species are highly mobile and do not stay in marine reserves long enough to be protected by any restriction imposed therein;
- Because of their mobility, there are no real ecological benefits to prohibiting the take of pelagic finfish in marine reserves; and
- Because there are no ecological benefits, the economic costs of prohibiting the take of pelagic finfish with marine reserves are not justified.

Regarding their mobility, some pelagic species are known to aggregate in particular areas (Worm *et al*. 2005; Heyman 2004). Aggregation sites have been observed in open water just offshore from promontories, at the edges of continental margins, above steep slopes, and in upwelling areas. Several areas with these characteristics are within the proposed zones in Alternatives 1 and 2, including the deep continental shelf north of Harris Point on San Miguel Island and southeast of Santa Barbara Island, and the edge of the Santa Cruz submarine canyon.

While marine reserves are not expected to yield the same benefits for highly migratory pelagic species (including thresher and mako sharks, tuna, and billfish), there are likely to be positive ecological benefits of protecting these species while they are within reserves (Gerber *et al*. 2005; Hooker and Gerber 2004). Many of these species play important roles as apex predators within the marine ecosystem. Their removal from the system may lead to trophic cascades that change the ecosystem structure, in some cases altering the composition and productivity of the system (Sosa-Lopez *et al*. 2005). Allowing the take of highly migratory pelagic species from protected areas therefore has the potential to disrupt the ecological relationship between these predators and their prey. Conversely, protecting pelagic species while they are within reserves will allow these ecological processes to occur naturally, potentially leading to greater abundance, density, diversity and age structure of local populations.

In addition, the economic impacts of these marine zones on pelagic fisheries (commercial and recreational) would be extremely low (see Section 5.2). The potential impacts are especially low when compared with the catch of pelagic species from other locations in southern California. Furthermore, NOAA's action would still allow these species to be caught outside reserves, while still protecting aggregation sites and the entire trophic structure of a reserve area.

In addition, management measures and regulations for marine conservation areas are necessarily more complicated and difficult to enforce than reserves. For example, to enforce marine conservation area regulations, enforcement agents would have to make on-water determinations as to the type and disposition of gear, the species being taken, and the location of the vessel (relative to the zone boundaries).

The CDFG and NMSP considered all of these factors while developing the range of alternatives for the State and Federal actions, respectively. The State marine zones include two marine conservation areas (Anacapa Marine Conservation Area and Painted Cave Marine Conservation Area). In these two cases, it was determined that the overall benefits of limited take status in these conservation areas might be studied in comparison to the overall benefits of no-take status in marine reserves. Alternatives 1A and 2 include these same areas.

3.2 Description of Alternatives

There are three principal alternatives analyzed in this FEIS: two zoning alternatives and a no-action alternative. The no-action alternative reflects the expected management environment that would occur without any action taken by the NMSP. Alternatives 1 and 2 were adapted principally from alternatives in the CDFG's (2002) Environmental Impact Report (EIR) and identify two different spatial compositions for the proposed marine zone network.

Alternative 1 contains three sub-alternatives (Alternative 1A, 1B, and 1C) based on differing boundary options relative to the existing State marine zones. The offshore boundary of the marine zones is identical in each of the sub-alternatives. The inshore boundary is different in each with Alternative 1C using the boundary between State and Federal waters,

- In Alternative 1A, the boundaries of the marine zones (and their corresponding NMSA regulations) completely overlay the existing State marine zones and terminate at the mean high water line of the Sanctuary.
- In Alternative 1B, the boundaries of the marine zones (and their corresponding NMSA regulations) abut the existing State marine zone boundaries, thereby including a small portion of State waters.
- In Alternative 1C, the boundaries of the proposed marine zones terminate at the boundary between State and Federal waters (3 nmi from shore), thereby including no State waters.

Alternative 2 is based on a larger network of marine reserves developed during the MRWG process (Alternative 5 in CDFG 2002) with slight modifications to conform to the boundaries of the existing State marine reserves and conservation areas. Alternative 2 is the largest of the alternatives proposed, thereby increasing protection of various habitats and species of interest, as compared to Alternative 1A.

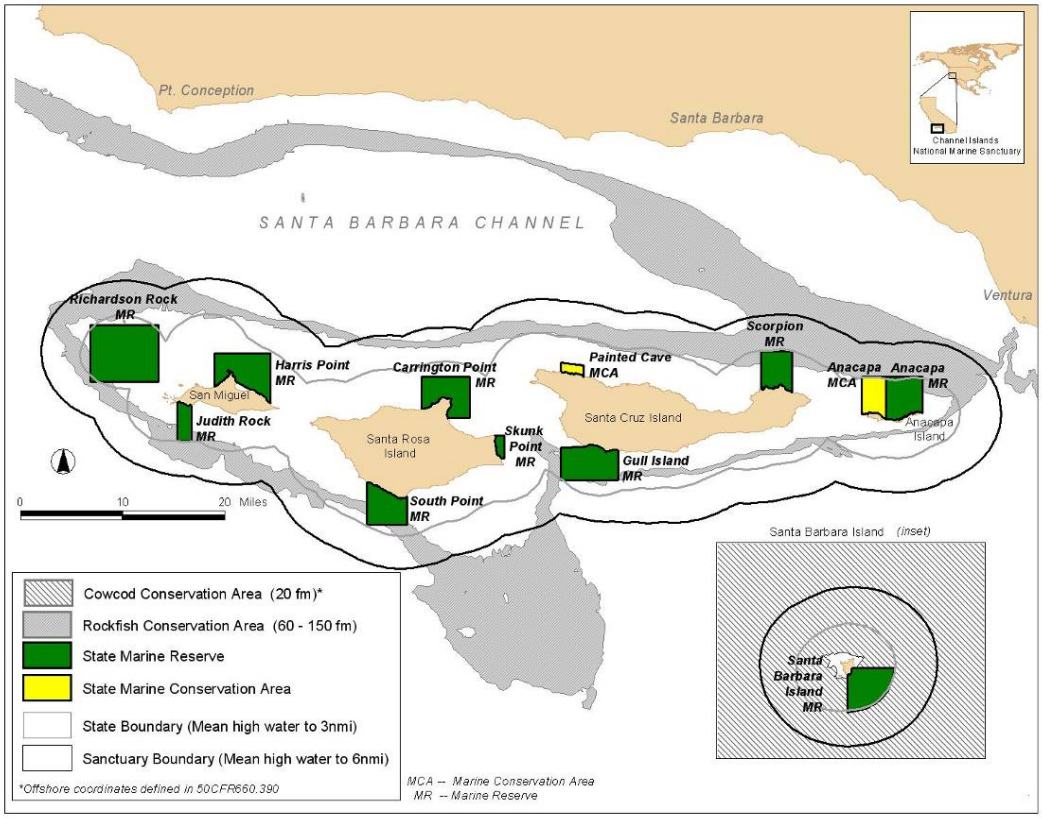
Each of these alternatives is described in more detail below.

3.2.1 *No Action (Status Quo) Alternative*

The no action alternative (Figure 3) maintains the *status quo* in the Sanctuary (i.e., no new marine zones would be designated). Under this alternative, the NMSP takes no new regulatory action under the NMSA. Existing Sanctuary regulations (e.g., no discharge) continue to apply throughout the CINMS. Existing State marine reserves and marine conservation areas and existing State and Federal management of commercial and recreational activities, including fishing, would remain in place. State marine zones contain 10 marine reserves and two marine conservation areas. Examples of existing fishery management measures that remain in effect include the Cowcod Conservation Area closures; the rockfish conservation emergency regulations; and Amendment 19 to NOAA's Groundfish FMP, which prohibits the use of all bottom contact gear in the Federal waters of the marine zones proposed in Alternative 1 of this FEIS.[11]

[11] See Appendix E for a detailed review of the existing fisheries management measures within CINMS.

Figure 3: No Action Alternative



3.2.2 *Alternative 1A*

Under Alternative 1A, the NMSP would establish a series of marine zones. The spatial extent of the overall marine zoning network alternative was developed by the CDFG and NMSP in 2001, based on the extensive work of the MRWG and its advisory panels, and is the original proposed project in the CDFG (2002). The portions of the marine zones within State waters[12] were established by the FGC and CDFG in 2003.[13] Alternative 1A would complete the Channel Islands marine reserves network by extending the network into Federal waters as envisioned by the State's action and supported by NOAA and the National Park Service (NPS).

[12] State waters around the Channel Islands extends from the mean high water line offshore to 3 nmi.
[13] Title 14, Section 632 of the California Code of Regulations.

When compared to the no-action alternative, Alternative 1A adds nine new marine zones, eight of which are no-take marine reserves, and one limited take marine conservation area. Alternative 1A has a total of 231.8 nmi^2 as marine reserves and 8.6 nmi^2 as marine conservation areas for a total of 240.4 nmi^2. For a description of the various ecological attributes of Alternative 1A, see Section 3.3.

The following restrictions apply to Alternative 1A:

- In the marine reserves it is unlawful to harvest, remove, take, injure, destroy, possess,[14] collect, move, or cause the loss of any living or dead organism, historical resource, or other Sanctuary resource, or attempt any of these activities. It is also unlawful to possess fishing gear on board a vessel unless such gear is stowed and not available for immediate use.
- In the marine conservation areas, it is unlawful to harvest, remove, take, injure, destroy, possess,[15] collect, move, or cause the loss of any living or dead organism, historical resource, or other Sanctuary resource, or attempt any of these activities, except that certain commercial and recreational fishing for lobster[16] and recreational fishing for pelagic finfish[17] are allowed. It is also unlawful to possess fishing gear on board a vessel, except legal fishing gear used to fish for lobster or pelagic finfish, unless such gear is stowed and not available for immediate use.

The regulations implementing these restrictions under Alternative 1A are drafted to be consistent with the regulations the State has adopted for the existing State marine zones. The regulations prohibit only those extractive activities within marine reserves that are not prohibited by 50 CFR part 660, which are the NOAA regulations that govern fishing for "West Coast fishery management unit species." Therefore, an extractive activity prohibited by NOAA fishing regulations would not be prohibited by the Sanctuary regulations. The regulations for the marine conservation areas similarly prohibit most extractive activities, but allow lobster harvesting and recreational fishing for pelagic finfish.

[14] Vessels would be allowed to transit through or be at anchor in a marine reserve with legal catch onboard provided fishing gear is stowed and not available for immediate use.

[15] Vessels would be allowed to transit through or be at anchor in a marine conservation area with legal catch onboard provided fishing gear is stowed and not available for immediate use.

[16] Alternative 1A would allow recreational lobster harvest in both MCAs. Commercial lobster harvest would also be allowed in the Anacapa MCA, but not in the Painted Cave MCA.

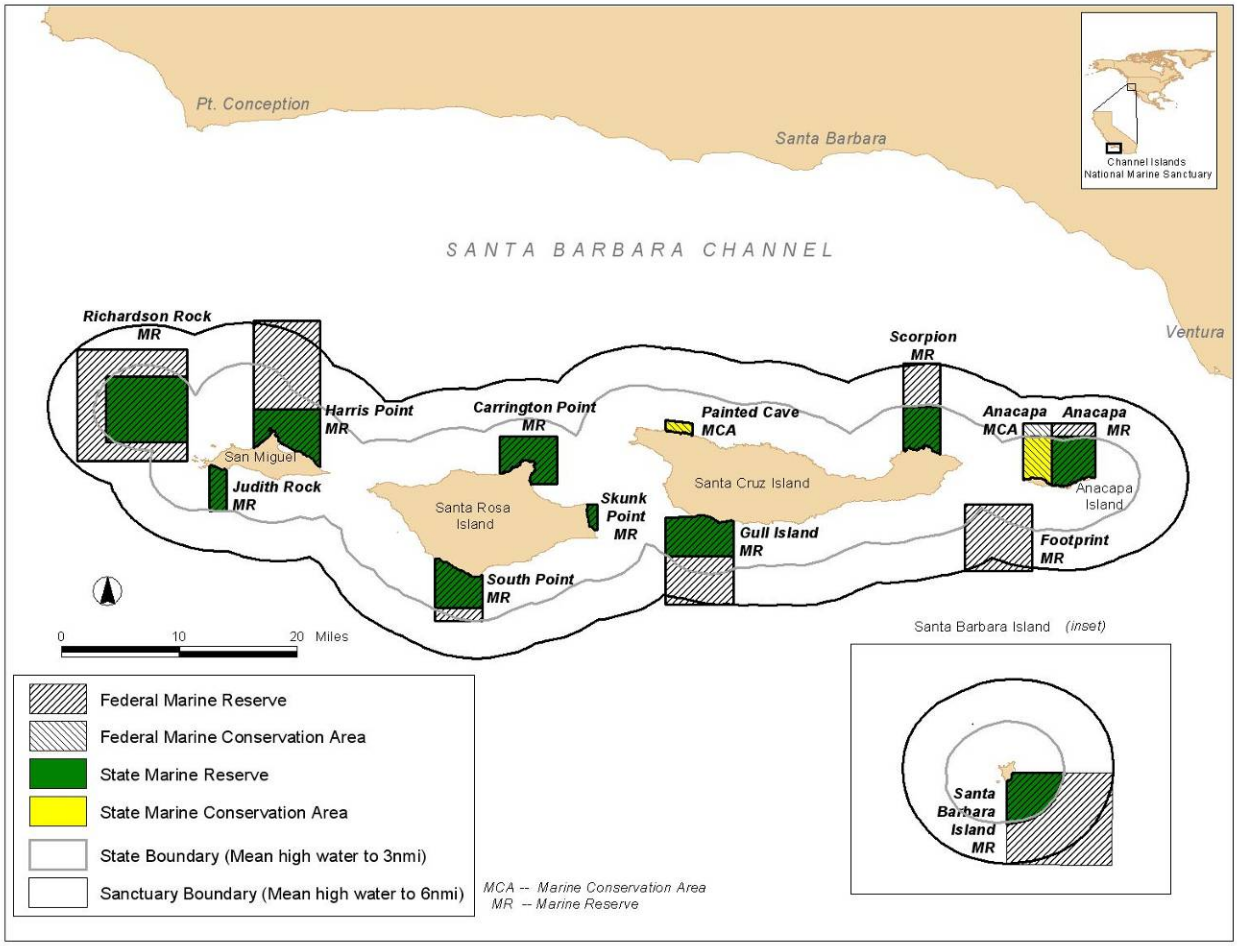
[17] Pelagic finfish are defined as: northern anchovy (*Engraulis mordax*), barracudas (*Sphyraena spp*.), billfishes (family Istiophoridae), dolphinfish (*Coryphaena hippurus*), Pacific herring (*Clupea pallasi*), jack mackerel (*Trachurus symmetricus*), Pacific mackerel (*Scomber japonicus*), salmon (*Oncorhynchus spp*.), Pacific sardine (*Sardinops sagax*), blue shark (*Prionace glauca*), salmon shark (*Lamna ditropis*), shortfin mako shark (*Isurus oxyrinchus*), thresher sharks (*Alopias spp*.), swordfish (*Xiphias gladius*), tunas (family Scombridae), and yellowtail (*Seriola lalandi*).

Regardless of the specific regulatory mechanism, however, the intended result of this alternative is for all extractive activities to be prohibited within the marine reserves, and for extractive activities within the marine conservation area to be limited to those allowed in the regulation.

In Alternative 1A, the boundaries of the marine zones (and their corresponding regulations) apply from mean high water of the Channel Islands to the seaward boundary of the zones; thus, Sanctuary regulations would apply to both State and Federal waters. To implement this alternative, the NMSP would amend the CINMS designation document to:

- allow for the regulation of fishing and other extractive or injurious activities in marine reserves and marine conservation areas;
- allow for the regulation of possession of fishing gear in marine reserves and conservation areas; and
- modify the outer boundary of the CINMS to accommodate the proposed Harris Point, Gull Island, Footprint and Santa Barbara Island marine reserves, which were drawn with straight lines of latitude and longitude and, as a result, extend slightly outside the current Sanctuary boundary.

Figure 4: Alternative 1A



3.2.3 *Alternative 1B*

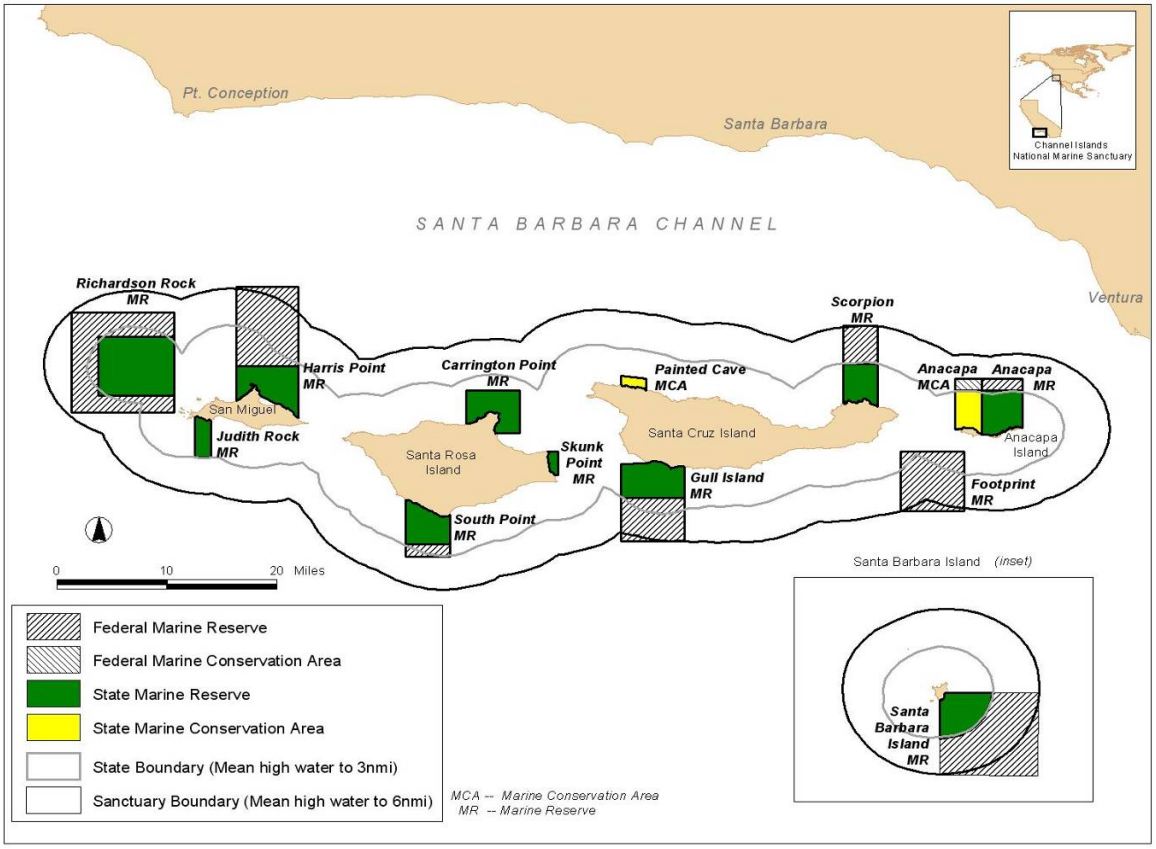
The Federal waters marine zones in Alternative 1B are identical in size to those in Alternative 1A. As such, Alternative 1B adds nine new marine zones, eight of which are no-take marine reserves and one limited-take marine conservation area. Alternative 1B has a total of 136.8 nmi^2 as marine reserves and 1.7 nmi^2 as marine conservation areas. The area of the total network, including the existing State marine zones, is 240.4 nmi^2.

For a description of the various ecological attributes of Alternative 1B, see Section 3.3 Alternative 1B is shown in Figure 5.

The boundaries of the marine zones in Alternative 1B (and their corresponding regulations) abut the existing State marine zone boundaries, including a small portion of State waters.

NOAA is proposing to implement this alternative in the event the California Fish and Game Commission (FGC) does not extend the boundaries of the State marine zones to the boundary between State and Federal waters (3 nmi from shore) by fall 2007.

Figure 5: Alternative 1B



3.2.4 *Alternative 1C (NOAA's Preferred Action)*

In Alternative 1C, the boundaries of the proposed marine zones terminate at the existing State-Federal waters boundary (3 nmi from shore). Alternative 1C adds nine NMSA marine zones, eight of which are no-take marine reserves and one limited take marine conservation area. Alternative 1C has a total of 110.5 nmi^2 as marine reserves and 1.7 nmi^2 as marine conservation areas. The area of the total network, including the existing State marine zones, would be 214.1 nmi^2. For a description of the various ecological attributes of Alternative 1C see Section 3.3. Alternative 1C is shown in Figure 6.

In an October 2006 letter to NOAA, the CDFG stated that it would only support Alternative 1C as described in the DEIS. In a January 2007 letter to NOAA[18], the Secretary of the California Resources Agency stated that Alternative 1C was the only alternative acceptable to the State of California and that overlap by Federal regulations in State waters was never contemplated by the State. The NMSA allows the Governor of a state in which the NMSP is making changes to a sanctuary's terms of designation to review and reject those changes with regard to State waters. Because implementation of Alternative 1A requires a change to the CINMS terms of designation (to allow regulation of fishing and other resource extraction in State waters), NOAA conducted a thorough re-evaluation of Alternatives 1A and 1C, given the above opposition to all NOAA alternatives but 1C.

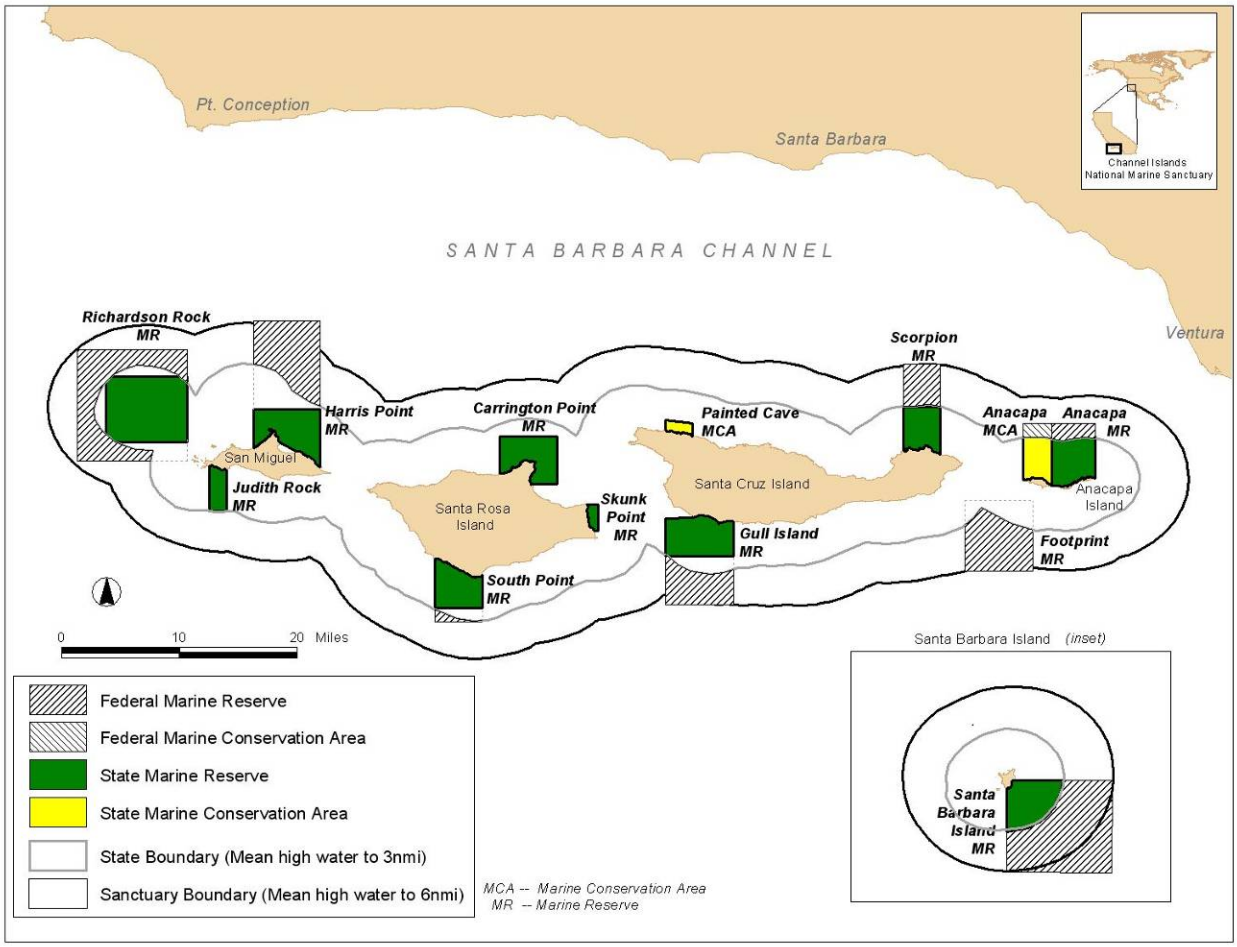
As identified in the DEIS, Alternative 1C leaves small gaps between five of the State-designated marine zones and the related Federal marine zones. The January 2007 letter stated that the CDFG and the FGC would as soon as possible initiate the regulatory process to close the gaps associated with Alternative 1C by bringing the boundaries of a number of the existing State marine zones out to the State-Federal jurisdictional line; that process is expected to be initiated in May 2007 with a final decision by the FGC in August 2007. If NOAA implements Alternative 1C and the State process is not completed by fall 2007, NOAA envisions taking action under the NMSA to close those gaps.

NOAA's analysis identifies that, if these gaps are closed, the differences among the three sub-alternatives are distinguished by management considerations, not ecological and socioeconomic impacts. As such, if the gaps associated with Alternative 1C are closed, the net ecological benefits and socioeconomic impacts between Alternatives 1A (NOAA's original preferred alternative) and 1C (the State of California's recommended alternative) will be the same. NOAA has determined, therefore, that Alternative 1C will accomplish the goals of the zoning network while respecting the position of the State, provided the gaps are closed in a timely manner.

[18] The letters can be viewed on the CINMS website at http://channelislands.noaa.gov/marineres/main.html.

The intent of the regulations for Alternative 1C is the same as described for Alternative 1A in Section 3.2.2. However, under Alternative 1C, NMSA regulations apply only in the Federal portion of the Sanctuary.

Figure 6: Alternative 1C



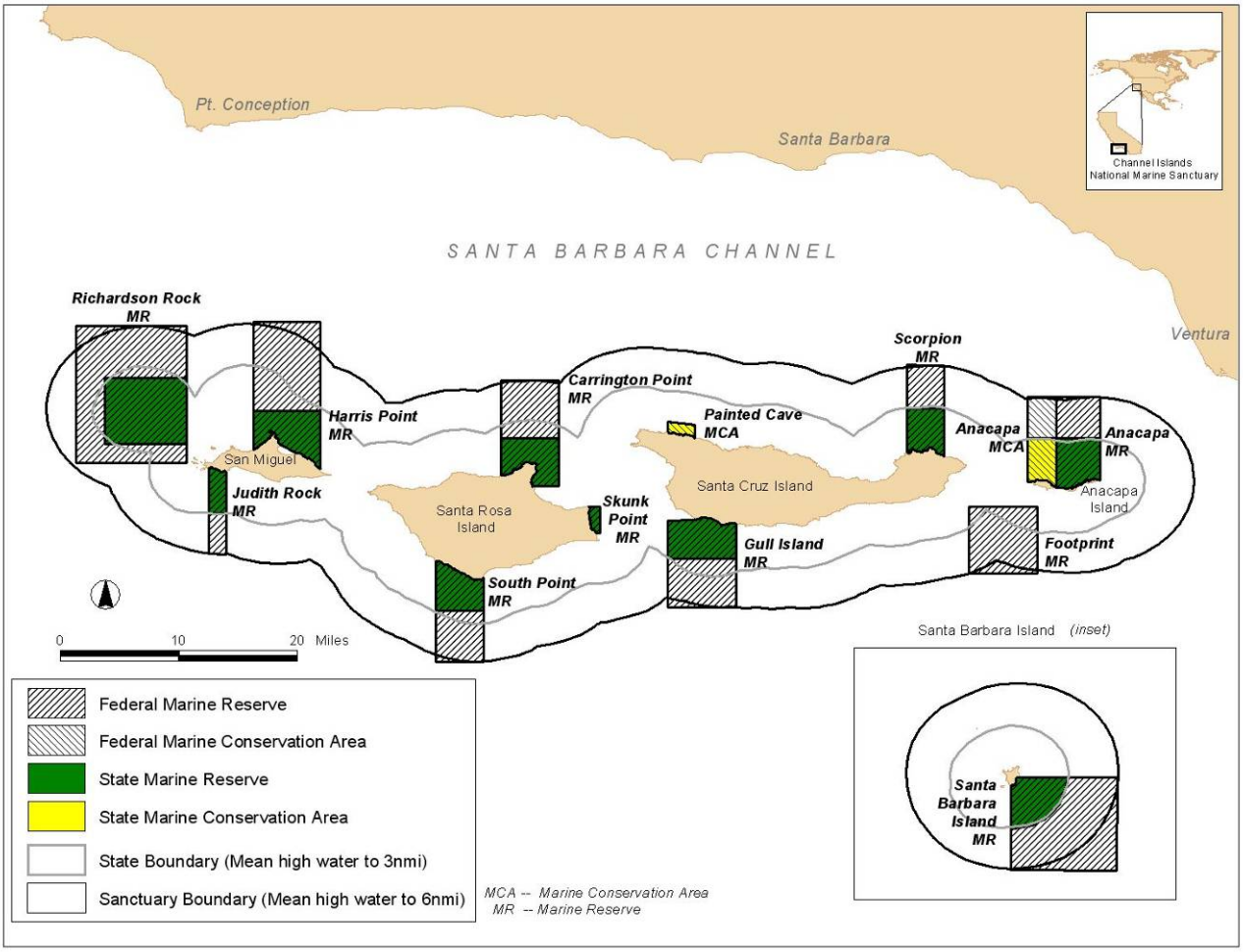
3.2.5 *Alternative 2*

Alternative 2 is based on a larger network of marine reserves developed during the MRWG process (Alternative 5 in the CDFG 2002) with slight modifications to conform to the boundaries of the existing State marine reserves and conservation areas (Figure 7). Alternative 2 is the largest of the alternatives proposed, thereby increasing protection of various habitats and species of interest, as compared to Alternative 1A. When compared to Alternative 1A, Alternative 2 adds two new marine reserves (Carrington Point and Judith Rock), extends the size of three marine reserves (Anacapa Island, Richardson Rock, and South Point), and extends the size of the marine conservation area off of Anacapa Island. When compared to the no-action alternative, Alternative 2 adds 11 new marine reserves and one new marine conservation area. Alternative 2 has a total of 276.9 nmi^2 as marine reserves and 12.1 nmi^2 as marine conservation areas for a total of 289.0 nmi^2. Alternative 2 has the same regulations as Alternative 1A (see Section 3.2.2).

To implement this alternative, the NMSP would amend the CINMS designation document to:

- allow for the regulation of fishing and other extractive or injurious activities in marine reserves and marine conservation areas;
- allow for the regulation of possession of fishing gear in marine reserves and conservation areas; and
- modify the outer boundary of the CINMS to accommodate the proposed Richardson Rock, Harris Point, Carrington Pt., South Pt., Gull Island, Scorpion, Footprint, Anacapa marine reserve and conservation areas, and Santa Barbara Island marine reserves, which were drawn with straight lines of latitude and longitude and, as a result, extend outside the current boundary.

Figure 7: Alternative 2



3.2.6 *Alternatives Considered But Rejected*

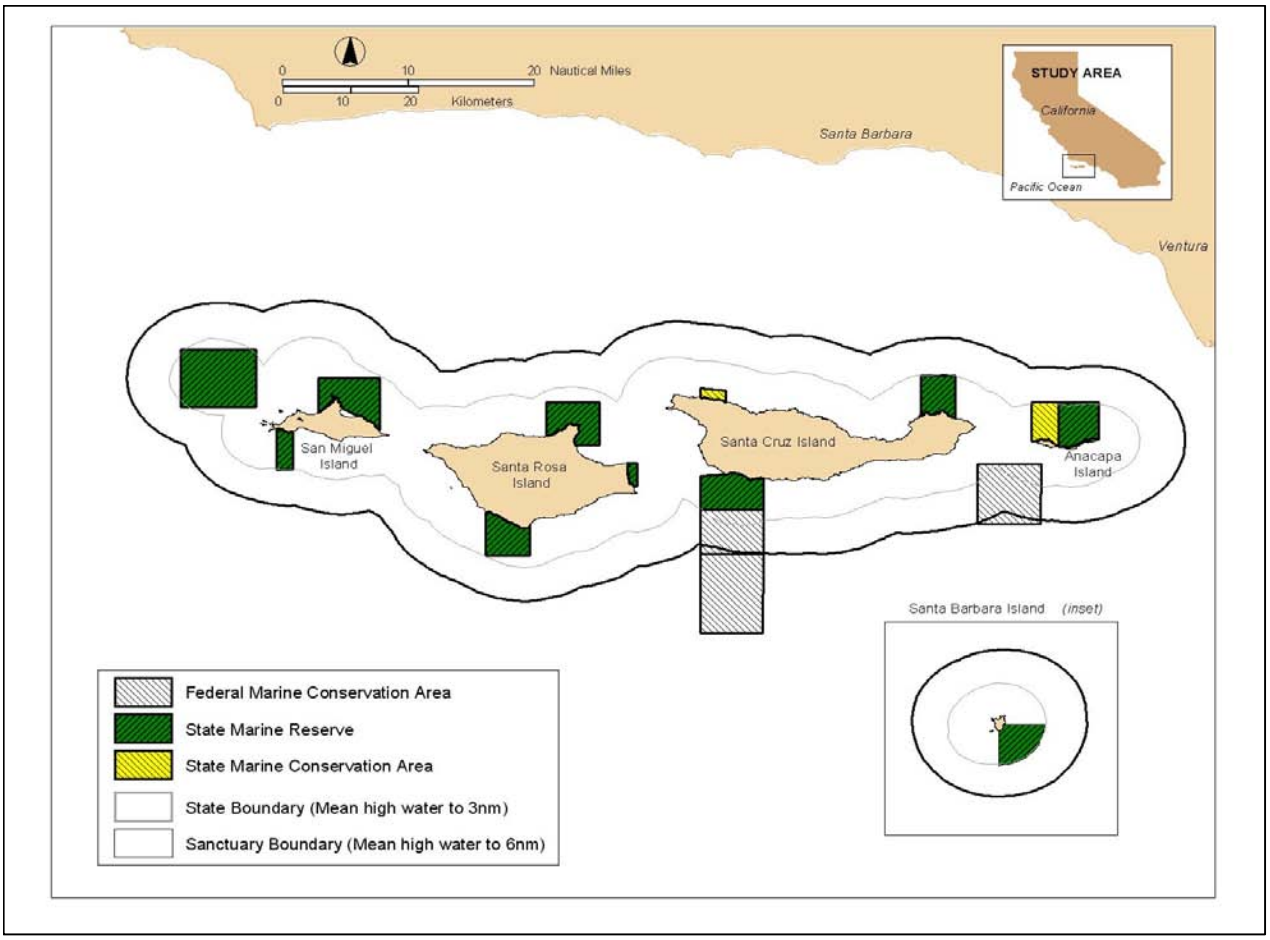
A group of regional commercial fishermen submitted an alternative proposing new limited-take marine conservation areas and harvest controls to supplement the existing State marine zones (Figure 8). They requested this alternative be implemented under the MSA and applicable State authorities. Specifically, this approach recommended two additions to the State marine zones: at Gull Island on the south side of Santa Cruz Island and the Footprint between Anacapa and Santa Cruz Islands. These proposed areas would allow all legally sanctioned pelagic fishing, spot prawn trapping, white sea bass fishing and squid fishing. Any gear targeting rockfish would not be allowed.

This alternative would add an additional 69.6 nmi^2 of marine conservation areas to the existing State marine zones for a total of 164.6 nmi^2 of the CINMS. Note that the proposed Gull Island conservation area would extend approximately 30.8 nmi^2 outside the current CINMS boundary.

The fishermen included as part of their proposed alternative a request that the PFMC rename the Cowcod Conservation Area the "Cowcod Conservation Marine Protected Area" and the Rockfish Conservation Area the "Rockfish Conservation Marine Protected Area." This alternative would add marine conservation areas in soft and hard sediment habitat of deeper waters (below 100 m depth) including submarine canyon habitat.

This alternative is rejected from inclusion in this FEIS for the following reason. Because this alternative does not adequately or completely protect a full range of habitats and populations in the CINMS, it does not satisfy the purpose and goals stated in Section 2.0 or the six ecological criteria detailed in Section 3.3. Further, this alternative was proposed to be implemented under the MSA and State authorities and not the NMSA. Thus, it would not require any action by the NMSP, and is therefore not appreciably different than the No Action Alternative.

Figure 8: Fishermen's Alternative



3.3 Comparison of Alternatives

Six ecological criteria, detailed below, provide the scientific framework for comparing the alternatives and provide further context for a description of each alternative. A longer discussion of the ecological criteria is included in CDFG (2002). Table 1 shows the six ecological criteria and a summary of their application to the project location**.** The list was developed by the SAP during the MRWG process, and is used here to compare alternatives. Unless otherwise noted, references to Alternative 1 in the descriptions below refer to Alternatives 1A, 1B, and 1C.

Table 1: Ecological Criteria that Contribute to Biodiversity Conservation in MPA Planning

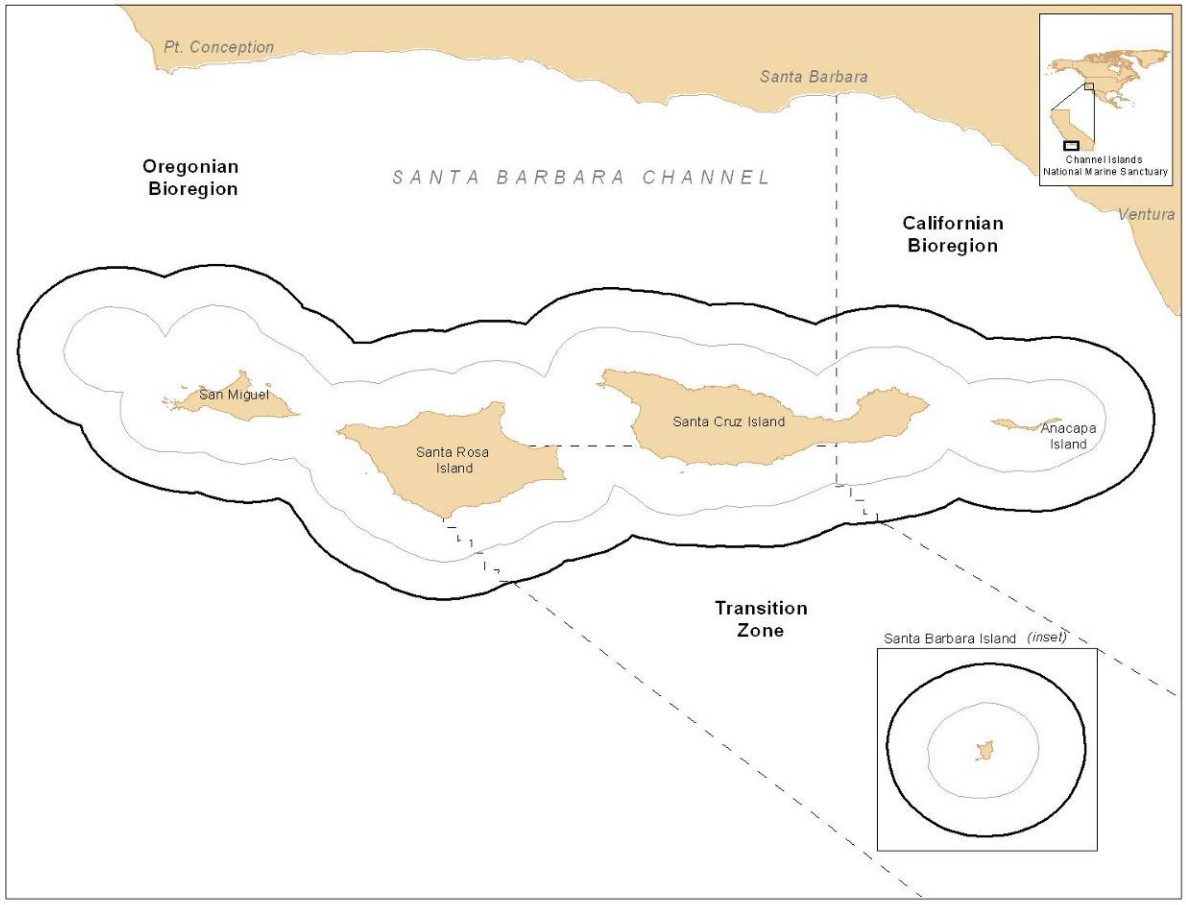
	Ecological Criteria	**Application to the Channel Islands**
1	Biogeographic representation	Three major biogeographical regions were identified using data on biota and Sea Surface Temperature (SST).
2	Habitat representation	Representative and unique marine habitats in each biogeographical region were classified using depth, substrate type, and a variety of additional features.
3	Habitat replication	At least one, and no more than four, zones should be placed in each of the three biogeographical regions. By way of example, in one region (650 nmi^2), 2-3 zones (~60-160 nmi^2 each) were recommended.
4	Species of Interest	MRWG identified 119 species of commercial, recreational and ecological importance for special consideration.
5	Size	Individual zones would accommodate species' home ranges.
6	Connectivity	Zones should be spaced no more than 50-100 km apart to facilitate larval and adult exchange between zones.

3.3.1 *Criterion 1: Biogeographic Representation*

Biogeographic regions are distinct areas characterized by differences in the assemblages of species present. In the marine area of the northern Channel Islands, physical and biological differences indicate that three biogeographic regions exist, including two distinct biogeographic regions, and a unique transition zone between them (Figure 9). The explicit biogeographic boundaries between the three regions were delineated using sea surface temperature time series and bathymetry (Airame *et al*. 2003).

The Oregonian province is characterized by the cold waters of the California current and encompasses San Miguel Island, Santa Rosa Island, and the northwest side of Santa Cruz Island. It extends northward along the coast of California, Oregon, and Washington. The Californian province is characterized by warm water of the California counter current and extends south along the coast of California and Mexico. Species characteristic of the Californian province occur around Anacapa Island and the east end of Santa Cruz Island. The transition between the two biogeographic regions, which is characterized by mixed water from both biogeographic regions, supports a unique assemblage of species characteristic of south Santa Rosa Island, Santa Cruz Island, and Santa Barbara Island.

Figure 9: Biogeographic Regions and Transition Zone within the Study Area



Each of the alternatives incorporates the existing State marine zones, which span the three biogeographic regions found in the CINMS. Five marine reserves and one marine conservation area are located in the Oregonian biogeographic region, two marine reserves and one marine conservation area are located in the Californian biogeographic region, and three marine reserves are located in the transition zone between the two biogeographic regions mostly within nearshore waters. The marine zones proposed in Alternative 1 expand the existing protection to deeper water marine habitats in all of the biogeographic regions. Three marine reserves are proposed in deep water within the Oregonian biogeographic region: (1) around Richardson Rock, to the west of the Channel Islands, (2) north of San Miguel Island, and (3) south of Santa Rosa Island. Three marine reserves and one marine conservation area are proposed for deep waters of the Californian biogeographic region: (1) one small marine reserve north of Anacapa Island, (2) one small marine conservation area north of Anacapa Island, (3) one marine reserve on the northeast side of Santa Cruz Island, and (4) one marine reserve around the Footprint region, between and south of the passage between Santa Cruz and Anacapa Islands. The marine reserve around the Footprint region is a significant addition to the protection within the Californian biogeographic region. Two additional marine reserves are proposed in the transition region: (1) one marine reserve over the Santa Cruz submarine canyon south of Santa Cruz Island, and (2) one marine reserve encompassing the deep water habitats to the southeast of Santa Barbara Island. Alternative 1 provides substantial protection, with the potential to achieve goals for restoration of marine habitats and species of interest, in deep-water habitats in all biogeographic regions. One limitation of Alternative 1 is the absence of marine zones in deep-water habitats around Santa Rosa Island.

The marine zones proposed in Alternative 2 encompass those proposed in Alternative 1. The primary difference between the alternatives, in terms of biogeographic representation, is that Alternative 2 includes substantially more protection for the Oregonian biogeographic region and some additional protection for the Californian biogeographic region. In the Oregonian region, Alternative 2 includes three important differences from Alternative 1: (1) one marine reserve is proposed in deep water north of Santa Rosa Island, (2) one marine reserve is proposed in deep water south of San Miguel Island, and (3) a substantially larger marine reserve is proposed for the region south of Santa Rosa Island. In the Californian biogeographic region, there are two important differences between the alternatives: A substantially larger marine reserve and a substantially larger marine conservation area are proposed north of Anacapa Island. The biogeographic provinces are thus better represented in Alternative 2 than in Alternative 1. Although both alternatives contribute toward the Sanctuary's goals, Alternative 2 would contribute more to (1) restoring and enhancing the abundance, density, population age structure and diversity of the natural biological communities in all biogeographic regions, and (2) protecting, restoring, and maintaining functional and intact portions of natural habitats, (including deeper water habitats), populations, and ecological processes in all biogeographic regions within the Sanctuary.

3.3.2 *Criterion 2: Habitat Representation*

One goals of the NMSP is to protect, restore, and maintain functional and intact portions of natural habitats, populations, and ecological processes in the CINMS. Marine reserves are effective tools because they limit or prohibit extraction of natural resources. Marine reserves reduce, or in some cases eliminate, potential human disturbances to marine habitats, including the direct impacts of fishing gear, loss and entanglement of fishing gear, and deliberate or unintentional disturbance by divers, such as stirring up sediments and damaging or otherwise disturbing sensitive animal and plant species.

In order to protect marine species and their ecological interactions, all representative habitat types should be protected. Because species depend on habitats for survival, growth and reproduction, protecting representative marine habitats helps achieve the NMSP's goal of restoring and enhancing the abundance, density, population age structure, and diversity of the natural biological communities. Marine habitats are places where marine animals and plants live, grow and reproduce. Each habitat type is associated with an assemblage of different marine species. Habitats associated with species of interest are listed in Appendix F. Many species use several different habitat types during their life cycles. It is common for individuals to use different habitat types at different stages of their life cycles. For example, larvae may drift in the water column, juveniles may settle into shallow water, and adults may inhabit deeper water. In some cases, individuals use several different habitat types during one stage of their life cycle. Species thrive and become abundant in suitable habitats that are protected from structural damage, pollution, and other disturbances.

The SAP defined marine habitats according to the characteristics that exert strong influences on Sanctuary ecology. The SAP identified important differences between soft sediments (including mud, sand, gravel and shell) and hard sediments (including boulder, rocky reef and bedrock). For each of these sediment types, four major depth intervals were identified based on ecological characteristics: euphotic zone (0-30 m), shallow continental shelf (30-100 m), deep continental shelf (100-200 m), and the continental slope (>200 m).

The existing State marine zones include a variety of habitats in the shallow subtidal region around the northern Channel Islands (Table 2). Most of the area within the existing State marine zones is in the highly productive euphotic zone (0-30 m depth) and on the shallow continental shelf (30-100 m depth). The deep-water habitats of the Sanctuary are not well represented in the existing State marine zones, including any substantial protection for habitats on the deep continental shelf or slope in any of the biogeographic regions, except a portion of the submarine canyon south of Santa Cruz Island.

Table 2: Proposed and Cumulative Habitat Representation for Alternative 1

	Alternative 1[3]			Cumulative Total[2]
Habitats	**MR**	**MCA**	**Total New[1]**	
Total Area	138.5	1.7	140.2	242.3 nmi
Soft sediment total	88.2	1.4	89.6	139.3
Hard sediment total	3.0	-	3.1	19.2
Soft sediment (0-30 m)	-	-	-	5.8
[4]Medium sediment (0-30 m)	-	-	-	0.2
Hard sediment (0-30 m)	-	-	-	7.8
Soft sediment (30-100 m)	0.6	-	0.6	24.2
[4]Medium sediment (30-100 m)	-	-	-	0.2
Hard sediment (30-100 m)	-	-	0.3	8
Soft sediment (100-200 m)	2.8	1.1	3.8	12.9
[4]Medium sediment (100-200 m)	-	-	-	0.2
Hard sediment (100-200 m)	-	-	0.5	0.7
Soft sediment (>200 m)	84.9	0.3	85.2	96.4
Hard sediment (>200 m)	2.3	-	2.3	2.7
Submarine canyon	3.2	-	3.2	10
Unclassified sediments	43.0	0.3	43.3	73.2

[1] New area that would complement the existing State marine zones (sum of "Additional Marine Conservation Area (MCA)" and "Marine Reserve (MR)".
[2] Cumulative representation of proposed area and the existing State marine zones
[3] Alternatives 1A and 1B would add additional State and Federal waters to the existing marine zoning network. Alternative 1C would only add Federal waters, with the State of California taking subsequent action to address the remaining gaps (See Figure 7).
[4] Estimated in the Anacapa Island SMR and SMCA from side scan sonar data gathered and processed by Guy Cochrane (USGS).

Table 3 provides a description of the habitat types in existing State marine zones and within additional areas proposed for Alternatives 1 and 2.

Table 3: Description of Habitat Types in Existing and Proposed Marine Zones

Zone	Habitat Types in Existing State Marine Zones	Habitat Types in Alternative 1	Habitat Types in Alternative 2
Anacapa Island MCA	Soft and unconsolidated sediment; rocks and boulders distributed throughout the region	Low relief shell ridges on consolidated mud, sand, and gravel shelf	Low relief shell ridges on consolidated mud, sand, and gravel shelf
Anacapa Island MR	Numerous small rocky reefs and shell ridges distributed throughout the region of consolidated mud, sand, gravel and shell	Low relief shell ridges on consolidated mud, sand, and gravel shelf	Low relief shell ridges on consolidated mud, sand, and gravel shelf
Carrington Point MR	Mixed sand and rock habitat, including numerous submerged rocky ridges.	No addition proposed	Medium to high relief rocky reefs at 180 - 240 ft, unconsolidated mud, sand and gravel on continental shelf and slope
Footprint MR	No existing zone	Submerged rocky feature that is characterized by boulder and cobble at 230-300 m	Submerged rocky feature that is characterized by boulder and cobble at 230-300 m
Gull Island MR	Mixed sand and rocky reefs	Offshore and south of Morris Point, mixed sand and medium relief rocky reef; steep wall of Santa Cruz Submarine Canyon	Offshore and south of Morris Point, mixed sand and medium relief rocky reef; steep wall of Santa Cruz Submarine Canyon
Harris Point MR	Expansive rocky bottom mixed with sand	Area southeast of Wilson Rock likely rocky between 45 – 200 ft.; steep continental slope	Area southeast of Wilson Rock likely rocky between 45 – 200 ft.; steep continental slope
Judith Rock MR	Mixed rock and sand with moderate relief	No addition proposed	Unconsolidated mud, sand and gravel
Richardson Rock MR	Mixed sand and rock	High relief rocky habitat; 350 – 700 ft	High relief rocky habitat; 350 – 700 ft
Santa Barbara Island MR	Mixed sand and rocky reef	High relief deep continental shelf and slope	High relief deep continental shelf and slope
Scorpion MR	Unconsolidated mud, sand and gravel; possible submerged rocky outcrops and pinnacles	Unconsolidated mud, sand and gravel; possible submerged rocky outcrops and pinnacles	Unconsolidated mud, sand and gravel; possible submerged rocky outcrops and pinnacles
South Point MR	Mixed rocky reef with sand; nearshore shelf drops off to sandy plateaus at approximately 70 ft; two deeper reefs occur at 90 and 120 ft	Unconsolidated mud, sand and gravel on the continental shelf and Slope	Unconsolidated mud, sand and gravel on the continental shelf and slope; some mid-relief rocky substrate may be found on the offshore bank
Skunk Point MR	Unconsolidated sand with some scattered rocky ridges	No addition proposed	No addition proposed
Painted Cave MCA	Important cultural and natural feature	No addition proposed	No addition proposed

MR = marine reserve. MCA=marine conservation area. Primary source for existing marine zones: CDFG (2002); Primary source for proposed marine zones: Guy Cochrane (USGS), Merit McCrea (UCSB), Minerals Management Service (1987)

Alternative 1 includes a variety of different habitat types, including rocky reef, unconsolidated mud, sand and gravel, and submarine canyon (Table 4). Sixty percent (85.2 nmi^2) of the habitat proposed for protection in Alternative 1 (140.2 nmi^2) is classified as soft sediment on the continental slope (>200 m). Unconsolidated mud, sand, shell and gravel are found in the Scorpion Rock MR and North Anacapa MR and MCA. Submerged rocky features are located in the Richardson Rock MR, Harris Point MR, and the Footprint. The area within the South Point MR and Gull Island MR includes mixed sand and medium relief rocky substrate. The Gull Island MR also includes the steep walls of the Santa Cruz submarine canyon. High relief deep continental shelf and slope habitats are included in the Santa Barbara Island MR.

Soft sediment on the continental slope (>200 m) is well replicated in Alternative 1. This alternative includes 2 medium-sized patches and 5 large patches of soft sediment on the continental slope. Although there are 6 patches of soft sediment on the deep continental shelf (100-200 m), the patches are quite small (<1 nmi^2). Habitat patches of hard substrate within all depth intervals are not replicated sufficiently in Alternative 1. Whereas the SAP recommended 3-5 patches of each habitat type, Alternative 1 includes two or fewer replicates of hard substrate at all depths and most of the patches are small (<1 nmi^2).

Table 4: Proposed and Cumulative Habitat Representation for Alternative 1A

	Total New Proposed			Cumulative Total[2]
Habitats	**MR**	**MCA**	**Total New[1]**	
Total Area	138.5	1.7	140.2	242.3 nmi
Soft sediment total	88.2	1.4	89.6	139.3
Hard sediment total	3.0	-	3.1	19.2
Soft sediment (0-30 m)	-	-	-	5.8
[3]Medium sediment (0-30 m)	-	-	-	0.2
Hard sediment (0-30 m)	-	-	-	7.8
Soft sediment (30-100 m)	0.6	-	0.6	24.2
[3]Medium sediment (30-100 m)	-	-	-	0.2
Hard sediment (30-100 m)	-	-	0.3	8
Soft sediment (100-200 m)	2.8	1.1	3.8	12.9
[3]Medium sediment (100-200 m)	-	-	-	0.2
Hard sediment (100-200 m)	-	-	0.5	0.7
Soft sediment (>200 m)	84.9	0.3	85.2	96.4
Hard sediment (>200 m)	2.3	-	2.3	2.7
Submarine canyon	3.2	-	3.2	10
Unclassified sediments	43.0	0.3	43.3	73.2

[1] New proposed area that would complement the existing State marine zones (sum of "Additional Marine Conservation Area (MCA)" and "Marine Reserve (MR)".
[2] Cumulative representation of proposed area and the existing State marine zones
[3] Estimated in the Anacapa Island SMR & SMCA from side scan sonar data gathered and processed by Guy Cochrane (USGS).

Alternative 2 includes the habitats described in Alternative 1 with several important additions (Table 5). Alternative 2 is 47 nmi^2 larger than Alternative 1, with the primary differences at Carrington Point, Judith Rock, South Point, and Anacapa Island.

Unique features of Alternative 2 are:

- Medium to high relief rocky reefs and unconsolidated mud, sand and gravel in the Carrington Point MR;
- Greater area (+8.8 nmi^2) of low relief shell ridges on consolidated mud, sand and gravel on the deep continental shelf and slope habitat in the Anacapa Island MR and SMCA;
- Greater area (+8.0 nmi^2) of unconsolidated mud, sand, and gravel on the continental shelf and slope, some mid-relief rocky substrate on the offshore bank in the South Point MR; and
- Unconsolidated mud, sand and gravel habitats in the Judith Rock MR.

Table 5: Proposed and Cumulative Habitat Representation for Alternative 2 (all units nmi^2)

	Total New Proposed			Cumulative Total[2]
Habitats (depth)	**MR**	**MCA**	**Total New [1]**	
Total Area	182	5.2	187.2	289.3
Soft sediment totals	104.4	4.9	109.4	159.1
Hard sediment totals	3.0	0.0	3.1	19.2
Soft sediment (0-30 m)	-	-	-	5.8
[3]Medium sediment (0-30 m)	-	-	-	0.2
Hard sediment (0-30 m)	-	-	-	7.8
Soft sediment (30-100 m)	1.2	-	1.2	24.8
[3]Medium sediment (30-100 m)	-	-	-	0.2
Hard sediment (30-100 m)	-	-	0.3	8
Soft sediment (100-200 m)	5.5	1.1	6.6	15.7
[3]Medium sediment (100-200 m)	-	-	-	0.2
Hard sediment (100-200 m)	-	-	0.5	0.7
Soft sediment (>200 m)	97.8	3.8	101.6	112.8
Hard sediment (>200 m)	2.3	-	2.3	2.7
Submarine canyon	4.2	0	4.2	10
Unclassified sediments	70.2	0.3	70.6	100.5

[1] New area that would complement the existing State marine zones (sum of "Marine Conservation Area (MCA)" and "Marine Reserve (MR)")

[2] Cumulative representation of proposed area and the existing State marine zones

[3] Estimated in the Anacapa Island SMR & SMCA from side scan sonar data gathered and processed by Guy Cochrane (USGS).

3.3.3 Criterion 3: Habitat Replication

Replication of habitats in multiple marine reserves is needed to fulfill the NMSP's goals to (1) protect, restore, and maintain functional and intact portions of natural habitats, and (2) provide, for research and education, undisturbed reference areas that include the full spectrum of habitats within the Sanctuary. In order to ensure that the protected habitats are "functional" and "intact," a viable alternative must offer the lowest possible risk of disturbance to the protected habitats. An alternative with only one patch of any particular type of habitat would not necessarily fulfill the NMSP's goals because a single patch is more vulnerable to the adverse effects of natural and human disturbances than multiple patches. Unpredictable disturbances are certain to affect portions of the project area at different times (Allison *et al.* 2003). An alternative that protects multiple patches of the same type of habitat in multiple marine zones throughout the project area reduces the risk of simultaneous disturbance to all patches. The SAP recommended that each habitat type be protected within 3-5 replicate marine reserves.

Four major reasons for replication are:

- To provide stepping-stones for dispersal of marine species;
- To insure against local environmental disaster (e.g. oil spills or other catastrophes) that can significantly impact an individual, small marine reserve;
- To provide independent experimental replicates for scientific study of marine reserve effects; and
- To evaluate the effects of human influences on populations and communities outside marine reserves (use of marine reserves as reference sites).

Ideally, 3-5 replicates containing sufficient representation of each habitat type should be placed in the network within each biogeographical region and for each habitat to serve these goals. For large biogeographical regions, fulfilling the critical stepping stone role may require even more replicates.

In addition to its role for risk reduction, habitat replication is needed to provide sufficient information about each habitat and associated species to inform our understanding of the ecological consequences of the marine zones. The scientific method requires that scientists rely on statistical probability to describe and understand ecological processes. When marine reserves are established, scientists can monitor ecological processes within and around the marine zones to understand the ecological consequences of the zones. Observations from a single zone are not as powerful because the patterns observed may be attributed either to zonal effects or an array of other influences that are unique to the particular location. Observations from at least 3-5 marine reserves with similar biophysical features provide sufficient replication to more reliably measure the actual effects of the marine zones.

Estimates of the numbers and size classes of habitat patches in the proposed marine zones are listed in Table 6. Soft sediment on the deep continental slope and shelf are well replicated in Alternatives 1 and 2. Shallow marine habitats (<30 m) are not increased in the alternatives, but are already well represented in the existing State marine zones. Small patches (<1 nmi^2) of all habitat types (>30 m depth) are included in both alternatives. However, larger patches (>1 nmi^2) within the size range recommended by the SAP are not sufficiently replicated for most habitat types.

Soft sediment on the deep continental shelf (100-200 m) and slope (>200 m) is well replicated in marine zones in Alternative 1A (Table 6). This alternative includes 5 large-sized patches, 2 medium patches and 1 small patch of soft sediment on the deep continental slope. Although Alternative 1A contains a total of 7 patches of soft sediment on the deep continental shelf, the majority of those patches are quite small (< 1 nmi^2). A total of 3 soft sediment patches are included in the shallow continental shelf, but they are all small (< 1 nmi^2). Habitat patches of hard substrate within all depth intervals are not replicated sufficiently in Alternative 1. Most depth intervals include two or fewer replicates of hard substrate, and the majority of those patches are small (< 1 nmi^2). Data within the Richardson Rock MR and part of the Harris Point MR were unclassified (MMS 1987). Anecdotal data suggests additional hard substrate in Richardson Rock MR and Carrington Point MR (M. McRae, personal communication).

Soft sediment on the deep continental shelf and slope is also well replicated in marine zones in Alternative 2. This alternative includes 4 medium-sized patches of soft sediment on the deep continental shelf and 4 medium patches and 7 large patches of soft sediment on the continental slope. Although there are 4 patches of soft sediment on the shallow continental shelf (30-100 m), the patches are quite small (<1 nmi^2). Similar to Alternative 1A, habitat patches of hard substrates within all depth intervals are not replicated sufficiently in Alternative 2. Alternative 2 includes two or fewer replicates of hard substrate at all depths and most of the patches are small (<1 nmi^2).

Alternative 2 differs from Alternative 1 on the following points:

- Additional (+1) small patch of soft sediment on the shallow continental shelf (30-100 m);
- Additional (+2) small and medium patches of soft sediment on the deep continental shelf (100-200 m);
- Additional (+4) medium and large patches of soft sediment on the continental slope (>200 m);
- Additional (+3) patches of unclassified sediment; and
- Additional rocky substrate in Carrington Point MR.

Alternative 2 includes all of the marine zones proposed in Alternatives 1A, 1B, and 1C and their potential ecological benefits. In addition, Alternative 2 includes the following unique biophysical characteristics:

- Medium to high relief rocky reefs in Carrington Point MR support numerous rockfish species, including bocaccio, vermilion, canary, yellowtail, and olive rockfish;
- Judith Rock MR includes various species of interest including sea cucumber, spot prawn, thornyhead, sablefish, sardine, anchovy, mackerel and thresher shark;
- Additional area (8.8 nmi^2) over the continental shelf and slope north of Anacapa Island supports benthic species, such as sea cucumber, ridgeback and spot prawns and halibut, and pelagic species such as squid, sardine, anchovy, mackerel, tunas, billfish, swordfish, and various sharks; and
- Additional area (8.0 nmi^2) south of Santa Rosa Island at South Point includes benthic species, such as sea cucumber, spot prawn, halibut, thornyhead, and sablefish, and pelagic species such as squid, white seabass, sardine, anchovy, mackerel, and thresher shark.

Table 6: Number and Size Class Of Habitat Patches in Proposed Marine Zones for Alternatives 1 and 2 (based on data from the Minerals Management Service, 1987)

	Patch Size Alternative 1			**Patch Size Alternative 2**		
Habitats Depths	**< 1 nmi^2**	**1-5 nmi^2**	**>5 nmi^2**	**< 1 nmi^2**	**1-5 nmi^2**	**>5 nmi^2**
Soft sediments (0-30 m)						
Soft sediments (30-100 m)	3			4		
Soft sediments (100-200 m)	6	1		5	4	
Soft sediments (> 200 m)	1	2	5		4	7
Hard sediments (0-30 m)						
Hard sediments (30-100 m)	2			2		
Hard sediments (100-200 m)	1			1		
Hard sediments (> 200)	1	1		1	1	
Unclassified sediments	2		2	1		4

3.3.4 Criterion 4: Species of Interest

One stated goal of NOAA's action is to restore and enhance the abundance, density, population age structure, and diversity of natural biological communities. Natural biological communities within the Sanctuary include a broad spectrum of different species with a variety of natural history characteristics. The abundance, density, and diversity of natural biological communities depend, in large part, on the availability of suitable habitats. The SAP recommended setting aside portions of representative marine habitats in order to protect the broad spectrum of species of interest.

The MRWG, with assistance from the SAP, identified 119 species of particular interest (Appendix F), including: (1) species of economic and recreational importance, (2) keystone or dominant species (Power *et al.* 1996; Power and Mills 1995; Paine 1966, 1969), (3) candidate, proposed, or species listed under the Endangered Species Act, (4) species that have exhibited long-term or rapid declines in harvest and/or size frequencies, (5) habitat-forming species, (6) indicator or sensitive species, and (7) important prey species. The list generally excludes species that are: (1) incidental (species only occasionally found in the CINMS), (2) at the edge of their range, or (3) highly migratory.

It is difficult to model ecological changes for species of interest in marine reserves, in part, because of complex ecological linkages within marine systems. However, sufficient information has been published to illustrate general trends for species abundance, size, biomass, and diversity in marine reserves.

The existing State marine zones protect a variety of species of interest, including marine algae, seagrasses, invertebrates, and fishes. Forests of giant kelp, which support numerous associated species, are protected within the North Anacapa Island SMR, Gull Island SMR, Carrington Point SMR, and South Point SMR. Other algae, including *Laminaria* and *Eisenia*, are found in the South Point SMR and Judith Rock SMR. Eelgrass and surfgrass beds, which serve important roles as nursery habitat for young invertebrates and fishes, are protected in North Anacapa Island SMCA, Scorpion SMR, Skunk Point SMR, and Carrington Point SMR. Mixed rocky reef and sand habitats protected in the North Anacapa Island SMR provide suitable habitat for California spiny lobster, California sheephead and giant seabass. Red abalone, red and purple urchins have been observed in the mixed rock and sand habitats protected in the Harris Point SMR and South Point SMR. Sandy sea floor in the Skunk Point SMR, North Anacapa Island SMR and SMCA, and Scorpion Rock SMR is suitable habitat for halibut and other flatfishes. Breeding seabirds, including the endangered California Brown Pelican and the threatened Xantus's Murrelet, forage for small pelagic invertebrates and fishes in waters protected in the North Anacapa Island SMR and SMCA, and Santa Barbara Island SMR. Harris Point SMR also serves an important role to support breeding seabirds on Prince Island, which is entirely within the SMR, and the waters around the island offer a steady food supply for nesting birds. Overfished cowcod and

endangered white abalone are protected within the Santa Barbara Island SMR and the Cowcod Conservation Area. Marine mammals commonly haul out onshore at Painted Cave SMCA, Harris Point SMR, Judith Rock SMR, and Santa Barbara SMR. The variety of habitat types and associated species in State marine zones generally provide a broad representation of the biodiversity of the northern Channel Islands (Caselle personal communication).

The proposed extensions of the State marine zones into deeper waters under both Alternatives 1 and 2 are expected to help protect, restore and enhance populations of key species of interest. Potential contributions to biodiversity conservation are the proposed marine reserves at Richardson Rock, Harris Point, Gull Island, the Footprint, and Santa Barbara Island. Medium to high relief rocky reefs in Richardson Rock MR support numerous groundfish species, including yellowtail, olive, and vermilion rockfish and lingcod. Because of the distance to port and the frequent foul weather in the vicinity of Richardson Rock, these groundfish populations have not been subjected to intense fishing pressure. Richardson Rock therefore provides an opportunity to protect a relatively intact natural biological community. The open waters north of Harris Point are important feeding grounds for marine mammals that haul out on the shores of San Miguel Island and breeding seabirds on Prince Island. During the breeding season, radio-tagged Cassin's Auklets concentrated their feeding efforts on krill and small pelagic fishes in the open waters north of Harris Point (Adams 2003). The submerged rocky reefs around Gull Island provide another important opportunity to protect and restore depleted populations of abalone and various rockfish species, including blue and vermilion rockfish, and bocaccio. Many individual rockfish observed in the vicinity of Gull Island are the 8-year class from an important recruitment event in 1999 (McRae personal communication).

3.3.5 Criterion 5: Size[19]

Size of both the individual zones and the overall network is an important consideration in order to achieve the NMSP's goals to: (1) protect, restore and enhance the abundance, density, population age structure, and diversity of the natural biological communities, and (2) provide undisturbed reference areas where local populations exhibit a more natural abundance, density, diversity, and age structure. To provide any significant protection for a species of interest, the size of individual zones must be large enough to encompass the typical movements of many individuals.

The SAP that advised the MRWG reviewed the existing literature and synthesized existing information on resources in the Channel Islands region to develop a recommendation on reserve size to support the MRWG's consensus goals for marine reserve design. The SAP recommended

19 Background text for "MPA Size" excerpted from the Master Plan Framework for the California Marine Life Protection Act Initiative adopted by the California Fish and Game Commission on August 22, 2005. http://www.dfg.ca.gov/mrd/mlpa/pdfs/mpf082205.pdf

protecting at least 30%, and possibly as much as 50%, of each of the representative habitats in each bioregion of the CINMS to achieve the goals. The SAP concluded that reserve networks must incorporate reserves of a variety of sizes to meet multiple goals for conservation and fisheries.

Alternative 1 adds to the existing State marine zones 138.6 nmi^2 in 8 marine reserves and 1 marine conservation area (Table 7). The area of the total network, which includes the proposed marine zones in addition to the existing marine zoning network, would be 240.4 nmi^2. The individual sizes of marine reserves range from 1.1 nmi^2 at Skunk Point MR to 54.9 nmi^2 at Richardson Rock MR and the average area of individual reserves is 21.1 nmi^2. It should be noted that Alternatives 1A and 1B would add additional State and Federal waters to the existing marine zoning network. Alternative 1C would only add Federal waters, with the State of California taking subsequent action to address the remaining gaps. The average width (short axis) across marine zones in Alternative 1 is 3.1 nmi^2 with a range of 1.0 nmi^2 at Anacapa Island MR and MCA to 6.8 nmi^2 at Richardson Rock MR (Table 7). The proposed reserve at Richardson Rock is within the optimal range (5.4-10.8 nmi^2); four reserves, including the Footprint, Gull Island, Harris Point, and Santa Barbara Island, are within the recommended range (2.7-5.4 nmi^2); and four marine zones, including South Point MR, Scorpion MR, and Anacapa MR and MCA are below the recommended range. The regions north and west of San Miguel Island, southwest of Santa Cruz Island, around the Footprint region, and southeast of Santa Barbara Island are well represented in marine zones. The regions around Santa Rosa Island, and on the north sides of Santa Cruz and Anacapa Islands, are not well represented in marine zones. With one exception at the Anacapa Island MCA, the length (long axis) of marine zones proposed in Alternative 1 is consistent with the guidelines provided by the California Marine Life Protection Act Science Advisory Team.

Alternative 2 adds to the existing State marine zones 188.1 nmi^2 in 10 marine reserves and 1 marine conservation area (Table 7). The area of the total network, which includes the proposed marine zones in addition to the existing marine zoning network, would be 289.0 nmi^2. The individual sizes of marine reserves in Alternative 2 range from 1.1 nmi^2 at Skunk Point MR to 67.1 nmi^2 at Richardson Rock MR and the average area of individual reserves is 25.2 nmi^2.

Alternative 2 includes all of the area in Alternative 1 and the following unique features:

- Carrington Point MR (14.7 nmi^2);
- Judith Rock MR (3.2 nmi^2);
- Additional area (12.3 nmi^2) in Richardson Rock MR;
- Additional area (8.0 nmi^2) in South Point MR;
- Additional area (5.8 nmi^2) in the Anacapa Islands MR; and
- Additional area (3.6 nmi^2) in the Anacapa Island MCA.

Table 7: Comparison of Alternatives by Size (nmi^2)

Name	No Action (existing State zones)	Alternative 1[3]			Alternative 2		
		Add'l State Waters	Federal waters	Total Network[4]	Add'l State Waters	Federal waters	Total Network[4]
Anacapa Island MR[1]	8.9		2.6	11.5		8.4	16.9
Carrington Point MR[2]	9.6			9.6	4.1	10.6	24.3
Footprint MR		4.6	15.6	20.2	4.6	15.7	20.3
Gull Island MR	11.5	4.1	10.4	26.0	4.1	10.8	26.4
Harris Point MR	11.4	7.8	17.8	37.0	7.8	18.6	37.8
Judith Rock MR	3.5			3.5		3.2	6.7
Richardson Rock MR	23.9	8.3	23.0	54.9	8.3	35.3	67.1
Santa Barbara I. MR	9.9		33.5	42.9		33.5	42.8
Scorpion MR	7.0		6.7	13.9		6.9	14.1
Skunk Point MR	1.1			1.1			1.1
South Point MR	8.4	2.0	0.9	11.3	2.0	8.9	19.3
Anacapa Island MCA	5.6		1.7	7.3		5.3	10.8
Painted Cave MCA	1.3			1.3			1.3
Min Area MRs	1.1	2.0	0.9	1.0	2.0	3.2	1.1
Max Area MRs	23.9	8.3	33.5	54.9	8.3	35.3	67.1
Avg Area MRs	9.5	5.3	13.8	21.1	5.1	15.2	25.2
Avg Area MCAs	3.4		1.7	4.3		5.3	6.1
Total Area MRs	95.0	26.7	110.5	231.8	30.9	151.9	276.9
Total Area MCAs	6.9	0.0	1.7	8.6		5.3	12.1
Total Area marine zones	101.9	26.7	112.2	240.4	30.9	157.2	289.0

[1] *Marine Reserve*
[2] *Marine Conservation Area*
[3] *Alternatives 1A and 1B would add additional State and Federal waters to the existing marine zoning network. Alternative 1C would only add Federal waters, with the State of California taking subsequent action to address the remaining gaps (See Figure 7).*
[4] *Total network is the area of the proposed marine zones in addition to the existing marine zoning network.*
Note: Area estimated in a Geographic Information System with files projected in Albers, NAD83. Units are square nautical miles (nmi^2).

Movement patterns vary greatly among species. Some are completely immobile or move only a few meters. Others forage widely. The more mobile the individuals, the larger the individual zone must be to afford protection. Therefore, minimum zone size constraints are set by the more mobile species of interest. Because some of California's coastal species are known to move hundreds of miles, marine zones of any modest size are unlikely to provide complete protection for those species.

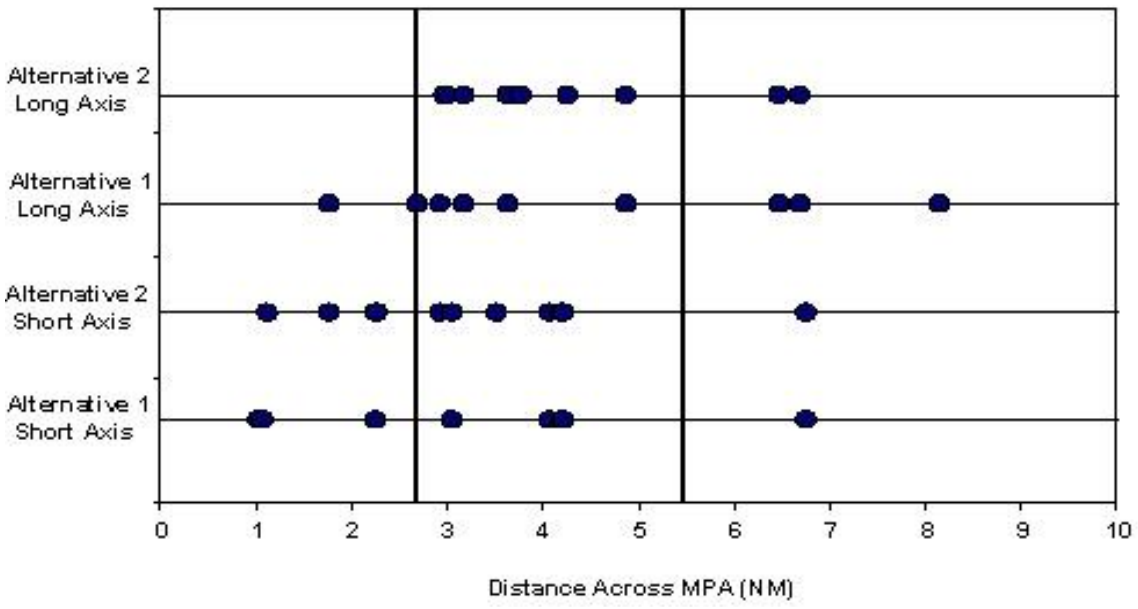
Individual adult home range sizes must be combined with knowledge of how individuals are distributed relative to one another (e.g., in exclusive versus overlapping neighborhoods) to determine how many individuals will be protected within a specific marine zone design. Tagging studies indicate that net movements of many of California's nearshore bottom-dwelling fish species, particularly reef-associated species, are on the order of 5-20 km (2.7-10.8 nmi^2) or less over the course of a year. Current data suggest that marine zones spanning less than about 5-10 km (2.7-5.4 nmi^2) in width may leave many individuals of important species poorly protected. Larger marine zones, spanning 10-20 km (5.4-10.8 nmi^2) of coastline, are probably a better choice given current data on adult fish movement patterns. Even with marine zones of this larger size, pelagic species with very large home ranges will likely receive little protection unless the network as a whole affords significant reductions in mortality during the cumulative periods that individuals spend in different marine zones, or unless other ecological benefits are conferred (e.g., protection of feeding grounds, reduction in bycatch). Table 7 shows the size of the existing State marine zones and the size of the proposed zones under alternatives 1 and 2. Table 8 shows the number of proposed zones that fall above, within or below the guidelines for zonal width along the zones short and long axes.

Less is known about the net movements of most of the deeper water benthic and pelagic fishes, especially those associated with soft-bottom habitat, but it is reasonable to predict that the range of movements will be similar or greater than those of nearshore species. One cause of migration in demersal fishes is the changing resource/habitat requirements of individuals as they grow. Thus, individual ranges encompass the movement of an individual among habitats throughout its lifetime. Marine zones that include several different and adjacent habitat types will more likely protect an individual over its lifetime. Some species also move between shallow and deeper habitat, and, therefore, marine zones that extend offshore are more likely to accommodate such movement and protect these individuals.

The average width (short axis) across marine zones in Alternative 2 is 3.3 nmi with a range from 1.1 nmi at Judith Rock MR to 6.8 nmi at Richardson Rock MR (Figure 10). The proposed reserve at Richardson Rock is within the optimal range (5.4-10.8 nmi); six reserves, including the Carrington Point, Footprint, Gull Island, Harris Point, Santa Barbara Island, and South Point, are within the recommended range (2.7-5.4 nmi); and four marine zones, including Judith Rock MR, Scorpion MR, and Anacapa MR and MCA are below the recommended range. The length (long axis) of marine zones proposed in Alternative 2 is fully within the guidelines provided by

the Scientific Advisory Team. Alternative 2 provides representation of all regions throughout the northern Channel Islands with the exception of northwest Santa Rosa Island.

Figure 10: Distances Across the Short and Long Axes of Marine Zones in Alternatives 1 and 2



Key differences between Alternative 2 and Alternative 1 are:

- Proposed reserve at Carrington Point in Alternative 2 is within the recommended range of zone widths;
- Additional area at South Point MR in Alternative 2 is within the recommended range of zone widths (2.7-5.4 nmi^2); and
- Proposed reserve at Judith Rock in Alternative 2 is below the recommended range of zone widths.

In summary, zonal widths above 10.8 nmi^2 are excellent for biodiversity conservation; 5.4-10.8 nmi^2 are good; 2.7-5.4 nmi^2 are fair; and widths below 2.7 nmi^2 are likely to be inadequate (Table 8).

Table 8: Number of Proposed Zones That Fall Above, Within or Below the Guidelines for Zonal Width along the Zones Short and Long Axes

	Alt 1 Short Axis	Alt 2 Short Axis	Alt 1 Long Axis	Alt 2 Long Axis
Below guidelines (<2.7 nmi^2)	4	4	1	0
Within guidelines (2.7-5.4 nmi^2)	4	6	5	8
Above guidelines (>5.4 nmi^2)	1	1	3	3

3.3.6 Criterion 6: Connectivity[20]

The exchange of larvae among marine reserves is a fundamental biological rationale for establishing marine reserve networks. Larval exchange has at least three primary objectives: to ensure that populations within marine reserves are not jeopardized by their reliance on replenishment from less protected populations outside marine zones; to ensure exchange and persistence of genetic traits of protected populations (e.g., fast growth, longevity); and to establish reference sites that support populations and communities within marine zones that are independent from those outside marine zones, to the extent possible. The objectives are consistent with the goals developed by the Sanctuary to (1) protect, restore, and enhance the abundance, density, population age structure, and diversity of the natural biological communities, (2) protect, restore, and maintain functional and intact populations and ecological processes, and (3) provide undisturbed reference areas where local populations exhibit a more natural abundance, density, diversity, and age structure.

Movement out of, into, and between marine zones by juveniles, larvae or spores of marine species depends on their dispersal distance. Important determinants of dispersal distance are the length of the planktonic period, oceanography and current regimes, larval behavior, and environmental conditions (e.g., temperature and sources of entrainment). Like adult movement patterns, the dispersal of juveniles, larvae and eggs varies enormously among species. Some barely move from their natal site. Others disperse vast distances. Marine zones will only be connected through the dispersal of young if they are close enough together to allow movement from one zone to another. Any given spacing of marine zones will undoubtedly provide

[20] Background text for "MPA Spacing" excerpted from the Master Plan Framework for the California Marine Life Protection Act Initiative adopted by the California Fish and Game Commission on August 22, 2005. http://www.dfg.ca.gov/mrd/mlpa/pdfs/mpf082205.pdf

connectivity for some species and not for others. The challenge is minimizing the number of key or threatened species that are left isolated by widely spaced marine zones.

Based on emerging genetic data from species around the world, larval movement of 50-100 km (27-54 nmi^2) appears common in marine invertebrates (Palumbi 2004; Kinlan and Gaines 2003). For fishes, larval neighborhoods based on genetic data appear generally larger, ranging up to 100-200 km (54-108 nmi^2). For marine birds and mammals, dispersal of juveniles of hundreds of km is not unusual, but for some of these species, return of juveniles to natal areas can maintain fine-scale population structure. For marine zones to be within dispersal range for most commercial or recreational groundfish or invertebrate species, they will need to be spaced on the order of no more that 50-100 km (27-54 nmi) apart. Otherwise, a large fraction of coastal species will gain no benefits from connections between marine zones. Although dispersal data appear to be valid for a wide range of species, there are only a small number of coastal marine species in California that allow these estimates of larval neighborhoods to be made with confidence. Nonetheless, it is the distribution of dispersal distances across species that drives network design rather than the specific patterns for any particular species.

If the distance between suitable habitat patches in adjacent marine zones exceeds the average dispersal of young invertebrates and fishes, then the marine zones do not function as an ecological network. Distances between protected habitats of the same type in adjacent marine zones were estimated for Alternatives 1 and 2. For example, it is possible to estimate the distance, for Alternative 2, between unclassified sediments (100-200 m depth) in Harris Point MR and Carrington Point MR, but the same estimate is not possible for Alternative 1 because no substrate is protected at 100-200 m depth around Carrington Point in Alternative 1. The nearest protected area (100-200 m depth) along the north side of the Channel Islands is Scorpion MR. The patterns of spacing for each alternative suggest the potential connectivity and/or independence of marine zones. The existing State marine zones in the nearshore also protect suitable habitats that are, in many cases, contiguous with proposed offshore marine zones. The distances between protected habitats of the same type were estimated from marine zones proposed in alternatives 1 and 2 to existing State marine zones or proposed marine zones, whichever was closer.

The average distance between protected habitats of the same type in adjacent marine zones in Alternative 1 is 22.7 nmi, well within the guidelines recommended by the Scientific Advisory Panel. There are 32 possible connections between proposed protected habitats in Alternative 1 (Figure 11). Although Alternative 1 does not include any suitable protected deepwater habitat at Carrington Point, the distance between Harris Point MR and Scorpion MR is approximately 36 nmi, within the range recommended for zonal spacing. Therefore, the proposed marine zones on the north side of the Channel Islands may serve as an interconnected network. Because of its remote location, Santa Barbara Island MR is likely to have the least ecological connection to other marine zones around the northern Channel Islands.

Out of the 32 possible connections between protected habitats in Alternative 1, two connections exceed the recommended zonal spacing range. They include soft sediments on the deep continental shelf (100-200 m) and slope (>200 m), protected within South Point MR and Santa Barbara Island MR. These habitat patches are likely to be too far from the patches for effective ecological exchange. However, there is potential for exchange of larvae between Santa Barbara Island MR and three of the other marine zones proposed in Alternative 1, including Gull Island MR, the Footprint MR, and Anacapa Island MR. Of some concern is the limited number of connections (1 or 2) in Alternative 1 between protected patches of rocky substrate at all depth intervals.

The average distance between protected habitats of the same type in adjacent marine zones in Alternative 2 is 18.4 nmi, well within the guidelines recommended by the Scientific Advisory Team. There are 42 possible connections between proposed protected habitats in Alternative 2 (Figure 12). In contrast to Alternative 1, this alternative includes deepwater habitat at Carrington Point, reducing the distance between protected deepwater habitats on the north side of the Channel Islands. Smaller distances between protected habitats lead to greater potential ecological connectivity among marine zones. Additional habitat protected in the Judith Rock MR and South Point MR increases potential connectivity along the south side of the northern Channel Islands. Similar to Alternative 1, the remote location of Santa Barbara Island MR may reduce ecological connections to other marine zones around the northern Channel Islands. The distance between two habitats, soft sediments on the deep continental shelf (100-200 m) and slope (>200 m), protected within South Point MR and Santa Barbara Island MR is likely to be too far for effective ecological exchange. However, there is potential for exchange of larvae between Santa Barbara Island MR and three of the other marine zones proposed in Alternative 1, including Gull Island MR, the Footprint MR, and Anacapa Island MR. Of concern is the limited number of connections (1 or 2) between protected patches of rocky substrate at all depth intervals in Alternative 2.

Figure 11: Distance (in Nautical Miles) between Protected Habitats Proposed in Alternative 1.

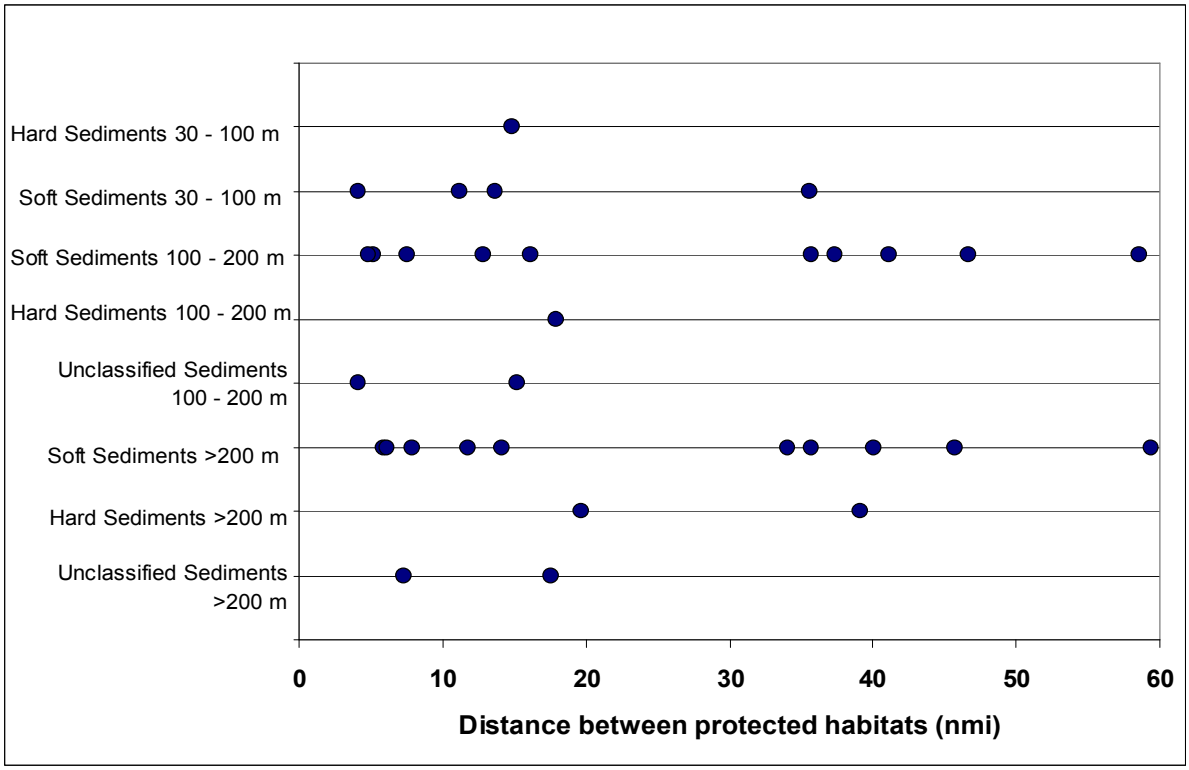
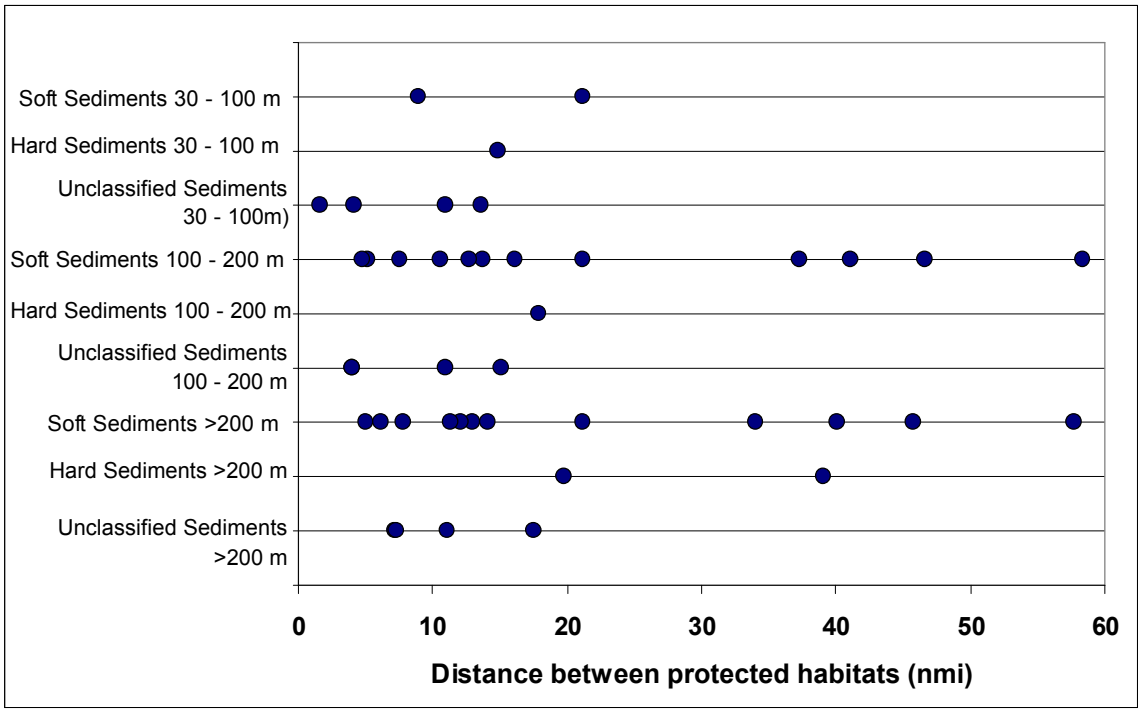


Figure 12: Distance (in nautical miles) between Protected Habitats Proposed in Alternative 2.



4.0 AFFECTED ENVIRONMENT

This section briefly describes the affected environment within the CINMS project area. A detailed characterization of the ecology of the Sanctuary and associated human uses can be found in four documents:

- California Department of Fish and Game (CDFG 2002). Final 2002 Environmental Document. Marine Protected Areas in the National Oceanic and Atmospheric Administration's Channel Islands National Marine Sanctuary. Volume I and II. October. http://www.dfg.ca.gov/mrd/ci_ceqa/index.html
- NOAA National Centers for Coastal Ocean Science (NCCOS 2005). A Biogeographic Assessment of the Channel Islands National Marine Sanctuary & Surrounding Areas: A Review of Boundary Expansion Alternatives for NOAA's National Marine Sanctuary Program. Prepared by NCCOS's Biogeography Team in cooperation with the National Marine Sanctuary Program. Silver Spring, MD. http://ccma.nos.noaa.gov/ecosystems/sanctuaries/chanisl_nms.html
- National Oceanic and Atmospheric Administration (NOAA 2006). National Marine Sanctuary Program. Section 3.0, "Affected Environment," Volume 2, /Channel Islands// National Marine Sanctuary Draft Management Plan / Draft Environmental Impact Statement/. Silver Spring, MD. http://www.cinms.nos.noaa.gov/manplan/overview.html
- Leeworthy, Wiley and Stone (2005). *Socioeconomic Impact Analysis of Marine Reserve Alternatives for the Channel Islands National Marine Sanctuary.* National Oceanic and Atmospheric Administration, National Ocean Service, Special Projects, Silver Spring, Maryland. October 7. http://www.cinms.nos.noaa.gov/marineres/mrec.html

The material and information in these documents are incorporated by reference where possible. More recent data is also included where applicable to update the information contained in the above-referenced documents. These documents show that the CINMS is a key component of the greater ecology of southern California (NCCOS 2005; McGinnis 2006, 2000; NPS 2003).

4.1 Overview

Long- and short-term environmental fluctuations have major effects on the abundances of birds, plankton, kelp and other marine organisms. The influence of environmental fluctuations on marine ecosystems of the area is described in NOAA (2006) and CDFG (2002). Some well-known environmental fluctuations are those precipitated by El Niño events, which change the patterns of Pacific Ocean currents and affect global weather every few years (Larkin and Harrison 2001). An El Niño event leads to the intrusion of warm water into high latitudes and major changes in the distribution and abundance of many species (Hayward 2000).

As described in Section 2.0, there has been a general decline in the abundance of many species and habitats since the designation of the CINMS. Some of the causes of decline include overfishing, pollution, climate variability, habitat destruction, and the introduction of non-native invasive species (McGinnis 2006). Marine scientists describe ecosystem change in the SCB at every level of the food web (NOAA 2006; CDFG 2002). The decline in seabirds noted above is a particular concern, since the presence of birds are important indicators of the health of an ecosystem (Sekercioglu, Daily and Ehrlich 2004).

The decline in primary and secondary levels of ecological productivity of the SCB began before the designation of the Sanctuary in 1980 (McGowan *et al.* 1998). The 1977 regime shift reduced upwelling of nutrient rich water. As noted above, there has been a decline in kelp biomass, macrozooplankton, many species of birds and invertebrates, and marine bird biomass (Schwing *et al.* 2002; Bograd *et al.* 2000). One consequence has been that the maintenance of community structure and patterns of species diversity have changed since the designation of the Sanctuary (Benson and Trites 2002; McGowan *et al.* 1998; Hayward *et al.* 1996).

4.2 Ecological Environment

4.2.1 *Physical Environment*

The physical oceanography of the SCB is a dynamic process resulting from the interaction of large-scale ocean currents, climate, local geography, and the unique basin and ridge topography of the ocean bottom in the SCB. A comprehensive characterization of the physical processes of the SCB is depicted in Harms and Winant (1998). Much of the uniqueness and marine ecosystem diversity of the SCB is due to the mixing of water masses from the south-flowing cold California Current and the north-flowing warm Southern California Countercurrent around the complex bathymetry of the northern Channel Islands (NCCOS 2005).

4.2.2 *Biological Environment*

4.2.2.1 Biogeographical Regions

The marine area associated with the CINMS includes three biogeographic regions: (1) the colder Oregonian province, (2) the warmer California province, and (3) the transition zone between the two. Point Conception is often identified as marking the general boundary between the Oregonian and Californian provinces (NCCOS 2005; Murray and Bray 1993; Murray and Littler 1981; Horn and Allen 1978). Changes in the ecology of the provinces are influenced by hydrographic conditions of the SCB and ocean-climate variability (NCCOS 2005; McGowan *et al.* 1998; Murray and Bray 1993). The transition zone between the two provinces is dynamic, where persistent thermoclines may shift tens of miles in response to annual to interannual

variability caused by events such as El Niño-Southern Oscillation or ENSO (McGowan *et al.* 1998).

The Oregonian province is characterized by the cold waters of the California Current and encompasses San Miguel Island, Santa Rosa Island, and the northwest side of Santa Cruz Island. It extends northward along the coast of California, Oregon, and Washington. The Californian province is characterized by warm water of the California Counter Current and extends south along the coast of California and Mexico. Species characteristic of the Californian province occur around Anacapa Island and the east end of Santa Cruz Island. The transition between the two biogeographic regions, which is characterized by mixed water from both biogeographic regions, supports a unique assemblage of species characteristic of south Santa Rosa Island, Santa Cruz Island, and Santa Barbara Island (Airame *et al*. 2003).

4.2.3 *Habitats and Associated Marine Life*

The CINMS contains many important and varied physical and geological features including a complex of plateaus, continental slope, gyres, banks, submarine canyons and rocky reefs. A more detailed discussion of the habitat types and associated species is found in the CINMS Draft Management Plan/DEIS (NOAA 2006), CDFG (2002), and Leet *et al.* (2001). The primary habitats found within the CINMS include kelp forests, surfgrass and eelgrass beds, rocky and sandy intertidal, rocky and sandy nearshore subtidal, deep-water benthic, and pelagic habitats. A brief description of major habitats of the CINMS follows.

4.2.3.1 The Photic Zone

This portion of the water column is the upper sunlight zone of the sea, usually down to 30 m depth. It is an important part of the marine ecosystem because it is where photosynthesis takes place and is a nursery area for many species of marine life. Smith and Kaufmann (1994) show a long-term deficit in the supply of food necessary to meet the metabolic demands of the sediment community. The long-term increase in sea surface and upper water column temperatures and physical stratification in the system has resulted in a lower rate of supply of nutrients to the euphotic zone. This has lead to a decrease in productivity and a general decline of zooplankton and other species (e.g., larval fish production, seabirds, kelp production and a shift in benthic, intertidal community structure).

4.2.3.2 Kelp Forests

Kelp forests in the Sanctuary are highly productive habitats that provide food, attachment sites, and shelter for myriad invertebrates and fishes (Davis 2005). Locations supporting kelp generally have been consistent through time, but the extent of these beds has varied considerably based on environmental conditions such as sea water temperature and presence or absence of

natural predation. Starting in the late 1970s, Tegner et al. (1996, 1997), Dayton et al. (1992), and Tegner and Dayton (1991) show that kelp forests have suffered declined for a range of reasons. Tegner et al. (1997) show a two-thirds reduction in standing biomass since 1957 in southern California kelp forests. This trend in the decline in kelp ecosystems began before the low-nutrient regime of 1977 (McGowan et al. 1998). In the past several years, the oceanographic environment has been conducive for kelp growth. Relatively cool summer sea surface temperatures followed by mild, dry winters with relatively few large swells have supported strong recruitment and a general increase in canopy area in southern California (MLPA 2004).

4.2.3.3 Surfgrass and Eelgrass

Surfgrass and eelgrass beds are also highly productive and complex microhabitats that support a wide variety of marine species. These marine areas are important nursery areas. The largest beds of eelgrass in the Sanctuary occur at Smugglers Cove, Canada del Agua, and Prisoners Harbor on Santa Cruz Island and at Bechers Bay on Santa Rosa Island.

4.2.3.4 Intertidal

The intertidal zone comprises a variety of coastal habitats that are periodically covered and uncovered by waves and tides. Intertidal habitat within the CINMS is composed of approximately 94.5 miles of rocky coastline interspersed with approximately 47 miles of sandy beaches (CDFG 2002). A wide variety of sedentary invertebrates, including barnacles, limpets, and mussels compete for space with plants in the intertidal zone. This zone also provides important habitat for fish, seabirds, seal and sea lions.

4.2.3.5 Nearshore Subtidal

Nearshore subtidal habitats include mud, sand, gravel, cobble, and bedrock substrates. Nearshore subtidal rocky habitats at the Islands are widespread, especially high relief volcanic reefs with walls, ledges, caves, and pinnacles between 0-30 m depth. Typical shallow subtidal areas in the Sanctuary contain assemblages of plants, invertebrates, and fishes, with giant kelp dominating. However, many shallow reefs overgrazed by sea urchins and known as "urchin barrens" have less giant kelp and greatly reduced species diversity. Many sandy nearshore habitats in the Sanctuary have relatively steep slopes composed of coarse shelly debris. Stable sand habitats with fine grain sediments are generally limited to sheltered coves at canyon mouths, such as those found around Santa Cruz Island.

4.2.3.6 Deep-Water Benthic

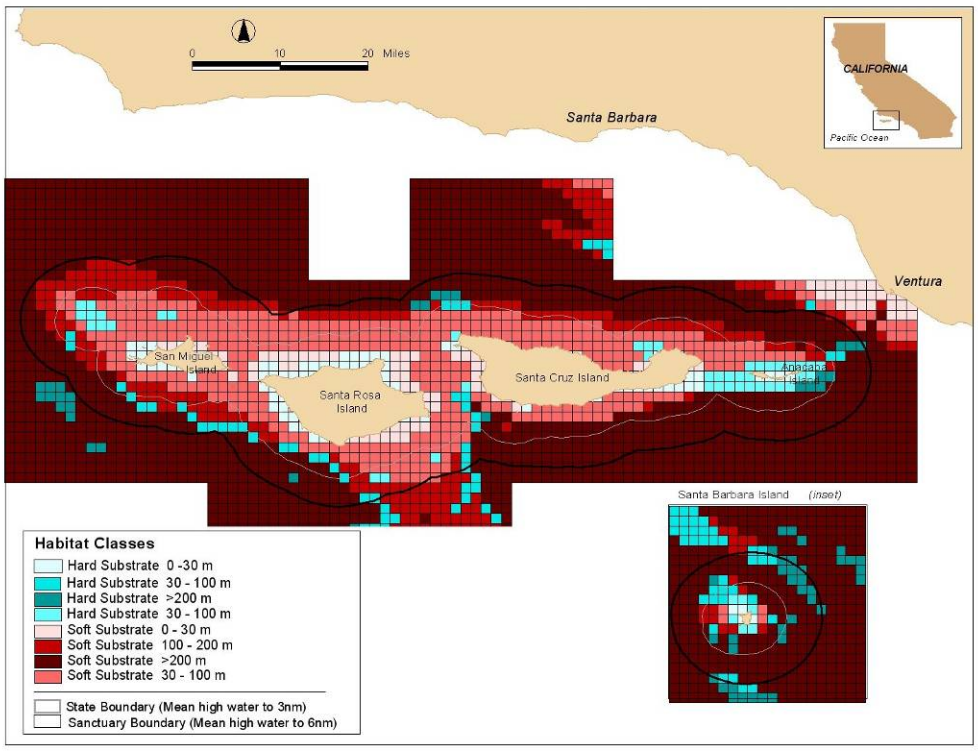
Beyond nearshore subtidal depths are deep-water habitats extending from 100-200 m depth. Well over 90 percent of deep-water benthic habitats in the Sanctuary consist of fine sands in

shallower portions, grading into silt and clay-dominated sediments in deeper portions (Thompson *et al.* 1993; Science Applications International Corporation 1986). In addition, deep rock bottoms are often located offshore from major headlands and Islands, and on the highest parts of undersea ridges, banks, and pinnacles. High relief pinnacles and ridges occur in some areas, such as off the northwest end of San Miguel Island.

4.2.3.7 Pelagic Habitats

Water column, or pelagic, habitats consist of discrete portions of ocean waters categorized by variation among multiple factors, such as light penetration, temperature, oxygen concentration, and density. Water column habitats within the majority of the Sanctuary do not extend deeper than the mesopelagic zone (from approximately 200 – 1000 m depth), though the southern reaches of the CINMS boundary near the mouth of Santa Cruz Canyon (a submarine canyon between and offshore from southeastern Santa Rosa Island and southwestern Santa Cruz Island) approach bathypelagic depths (from approximately 1000 m to 3500 m). Figure 13 depicts the habitat types of the CINMS.

Figure 13: Habitat Types of the CINMS



Appendix F: Species of Interest shows the associations of the species with these habitats, and their management status (e.g., if the species abundance is in decline).

4.2.4 *Plant And Animal Species*

The CINMS supports a great diversity of marine species, many of which are extremely rare and afforded special protection by Federal and State law. A comprehensive characterization of marine life of the marine area is described in CDFG (2002) and Leet *et al.* (2001). A brief summary of major plant and animal species follows:

4.2.4.1 Plankton

Plankton, microscopic marine plants (phytoplankton) and animals (zooplankton) form the base of the food web. Many species of plankton inhabit the CINMS and marine life is highly dependent on their growth and productivity. Their numbers, biomass, and production vary greatly both spatially and temporally.

Since the late 1970s, macrozooplankton volume in the California Current has declined over 70 percent, in concert with increasing sea surface temperatures (McGowan *et al.* 1998; Roemmich and McGowan 1995a,b). Reduced macrozooplankton has a major impact at higher trophic levels by changing the nature of the food supply. Long-term decreases in zooplankton in the SCB and California Current System have drawn considerable attention, since zooplankton are fundamental to the health of the entire ecosystem (Sagarin *et al.* 1999).

4.2.4.2 Marine Plants

Marine plants of the CINMS are made up of algae and seagrasses. Diversity of marine plants is greater in the SCB and the Channel Islands than along coastal central California. In the SCB, there are at least 492 species of algae and 4 species of seagrasses known to occur of the 673 species described for California (Murray and Bray 1993; Abbott and Hollenberg 1976). Giant kelp, surfgrass and eelgrass are marine plants that provide important habitat and nursery areas for marine life.

4.2.4.3 Fishes and Invertebrates

The CINMS supports a wide variety of invertebrates due to its transitional location between cold and warm biogeographic provinces and diversity of substrates. The total number of species may well be in excess of 5,000, not including microinvertebrates (Straughan and Klink 1980; Smith and Carlton 1975). Marine invertebrates may be benthic (bottom-dwellers) or pelagic, and may range in size from little known microscopic forms (micro-invertebrates) to the more commonly known larger organisms (macro-invertebrates). Select invertebrates in the CINMS include

multiple species of corals, prawns, spiny lobster, crabs, sea urchins, sea cucumbers, sea star, abalone, nudibranchs, scallops, mussels, squid, clams, barnacles, snails, salps, tunicates, jellyfish, sea slugs, and anemones. White abalone is protected by the Endangered Species Act (ESA).

About 481 species of fish inhabit the SCB (Cross and Allen 1993). Select fishes commonly found in the CINMS include: tuna (various species), anchovy (northern), bass (various species), cabezon, California sheephead, California halibut, garibaldi, rockfish (various species), sardine (Pacific), shark (various species), surfperch (various species), and white seabass.

4.2.4.4 Sea Turtles

Four species of sea turtles have been reported in the offshore southern California region: green, loggerhead, olive Ridley, and leatherback (NOAA 2006). Most information on sea turtle distribution in southern California is based on stranding data. This stranding data indicates that for the Channel Islands area all four species of sea turtle may be found within the CINMS at any time of year (NOAA 2006). All sea turtles are protected by the ESA.

4.2.4.5 Seabirds

Over 195 species of birds use open water, shore, or island habitats in the SCB (Baird 1990). The Channel Islands region is located along the Pacific Flyway, a major migratory route for birds, and acts as a stopover during both north (April through May) and south (September through December) migrations. The months of June and July are peak months for transient shorebirds (Lehman 1994). The diversity of both onshore and offshore habitats contributes to the high species diversity in the region. Sandy beaches provide foraging and resting habitat for a number of shorebirds including Black-Bellied Plover, Willet, Whimbrel, Long-billed Curlew, gulls, and sanderlings. The upland potions of the beach provide kelp deposits that attract invertebrates where Black and Ruddy Turnstones, dowitchers, and other shorebird species forage. Several bird species within the CINMS region have special status (of concern, threatened or endangered) under Federal or State law. The CINMS provides important habitat for eight seabirds that have special status under Federal or State law: Ashy storm-petrel, Black storm-petrel, California brown pelican, California least tern, Double-crested cormorant, Rhinoceros auklet, Western snowy plover, and Xantus's murrelet.

Evidence suggests that the abundance of many species of oceanic birds has declined steadily since 1988 (Veit *et al.* 1996, 1997). Veit *et al.* (1996) show that the decline in bird biomass reflects considerable biological change within the system of the California Current. Veit *et al.* (1996, 1997) indicate that ocean warming and climatic events change pelagic bird abundance within the California current system. Surveys of overall bird abundance remained below the levels recorded off southern California during the late 1970s (Tyler *et al.* 1993) and the late

1980s (Viet *et al.* 1996). There has been no observation of a recovery of the sooty shearwater, a trans-equatorial migrant that dominated avifauna in the late 1980s. Overall, cold-water species have declined by 71% between the beginning (1987-1990) and the end (1995-1998) of the California Cooperative Fisheries Investigation (CalCOFI) surveys (Hyrenbach and Viet 1999).

4.2.4.6 Marine Mammals

There are three marine mammal groups in the CINMS: 1) whales, dolphins and porpoises (cetaceans); 2) seals and sea lions (pinnipeds); and 3) the southern sea otter. All marine mammals are protected under the Marine Mammal Protection Act of 1972 (MMPA). Additionally, some marine mammals are protected under the Federal and State ESA. At least 33 species of cetaceans have been reported in the CINMS region (Leatherwood *et al.* 1987; Leatherwood *et al.* 1982). Common species found in the CINMS include: long-beaked common dolphin, short-beaked common dolphin, Bottlenose dolphin, Pacific white-sided dolphin, Northern right whale dolphin, Risso's dolphin, California gray whale, Blue whale, and Humpback whale.

Historically, seven species of pinnipeds have been found throughout or in part of the CINMS: the California sea lion (common), northern fur seal (uncommon), northern elephant seal (common), Pacific harbor seal (common), Guadalupe fur seal (rare), Steller sea lions (extremely rare), and ribbon seal (extremely rare). The productive waters and relatively undisturbed environment of the CINMS provide vital habitat for these pinniped species, offering important feeding areas, breeding sites, and haul outs. Finally, sea otters were common in the Channel Islands until prolonged periods of hunting led to local extinction at the Islands and severe depletion along the mainland California coast. From 1987 to 1990, the USFWS, which has primary jurisdiction over sea otters, translocated 139 otters to San Nicolas Island, though as of 2003 only 33 animals were reported (Sanders 2003). Following the translocation, rare sightings of sea otters in the CINMS have been reported.

4.3 Socioeconomic Environment

The CINMS attracts many commercial and recreational users. The northern CINMS is accessible from Santa Barbara, Ventura, Port Hueneme, and Channel Islands Harbors as well as ports in Los Angeles County (primarily San Pedro and Terminal Island). Human use of the CINMS is not limited to regional residents; almost 20 percent of those who use California's coastal areas for recreation are interstate or international visitors (California Resources Agency 1997).

In coastal southern California, population growth has risen sharply over the last twenty years. Base on the 2000 U.S. Census, the population of southern California is nearly 20 million, including a combined population of over 1.1 million for Santa Barbara and Ventura. This

represents a regional increase in population of approximately 43% since 1980. As the numbers of people increase, so do the number of CINMS users involved in a wide variety of activities.

This section briefly describes socioeconomic information on the human activities within the CINMS.

4.3.1 *A Socioeconomic Overview*

A detailed characterization of the socioeconomic uses of the marine area is found in Leeworthy, Wiley and Stone (2005).[21] Figure 14 shows a map of the seven-county area defined as the socioeconomic impact area. All seven counties are impacted by commercial fishing activities in the CINMS and five counties (i.e., Santa Barbara, Ventura, Los Angeles, Orange and San Diego) are impacted by recreational activities in the CINMS. In Leeworthy and Wiley (2003), impacts of recreational activities were limited to the three-county area of Santa Barbara, Ventura and Los Angeles counties. However, in updating recreational fishing activity data from CDFG logbooks, it was found that some activity in the CINMS originates out of Orange and San Diego counties.

The seven-county impact area had a 2000 population of over 16.98 million. Between 1990 and 2000, the population of the project area grew at a slower pace than the entire State of California or the U.S (Table 9). The seven-county area had a much higher population density and higher poverty rate than either the State of California or the U.S. The higher population densities are mostly influenced by the inclusion of Los Angeles and Orange counties, which have extremely high population densities, while the relatively high poverty rate is due to Los Angeles County. For per capita income, the seven-county area is higher than the U.S. but lower than the State of California.

[21] Leeworthy, Wiley and Stone (2005) is available at http://channelislands.noaa.gov/marineres/PDF/mrec_05.pdf

Figure 14: Counties of Impact

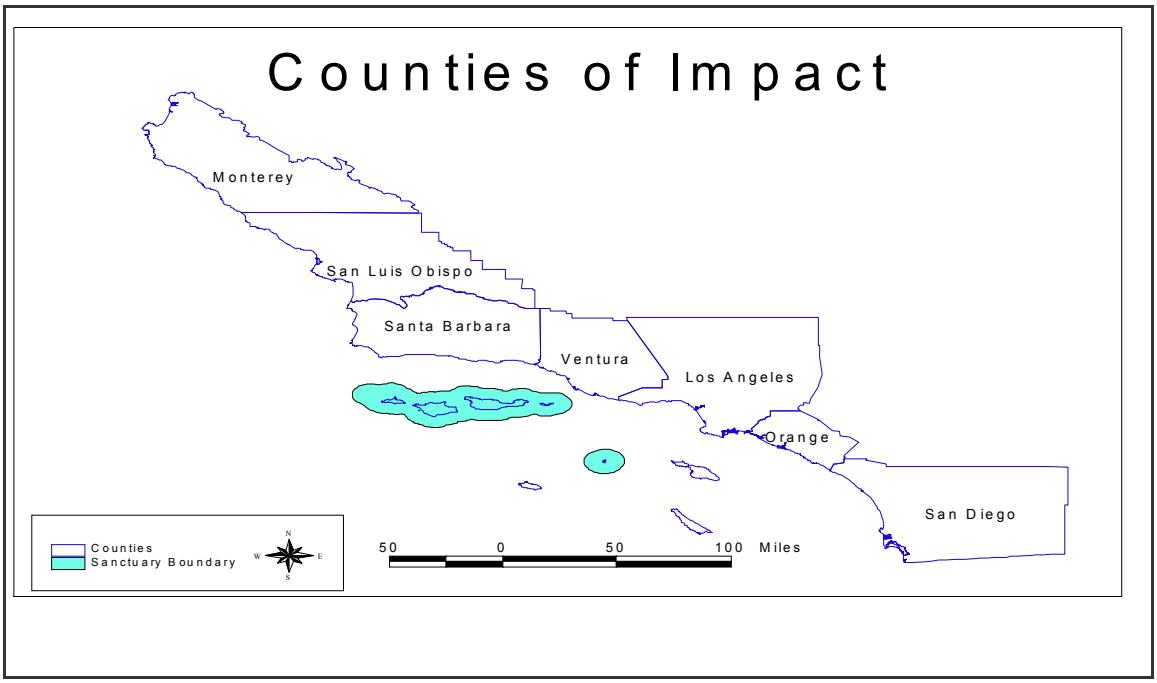


Table 9: Selected Socioeconomic Measures for Description of Impact Areas

	2000 Population	Population Change 1990-2000	2000 Population Density[1]	1999 Per Capita Income	1997 Persons Below Poverty
County					
Monterey	401,762	13.0%	120.9	$29,393	15.4%
San Luis Obispo	246,681	13.6%	74.7	$25,888	12.9%
Santa Barbara	399,347	8.0%	145.9	$30,218	14.6%
Ventura	753,197	12.6%	408.2	$29,639	10.3%
Los Angeles	9,519,338	7.4%	2344.1	$28,276	20.5%
Orange	2,846,289	18.1%	3607.5	$33,805	11.0%
San Diego	2,813,833	12.6%	670.0	$29,489	14.2%
All Counties	16,980,447	10.4%	838.2	$28,932	17.0%
California	33,871,648	13.6%	217.2	$29,856	16.0%
U.S.	281,421,906	13.1%	79.6	$28,546	13.3%

[1] Number of people per square mile

Source: U.S. Department of Commerce, Bureau of the Census, State and County Quickfacts (http://quickfacts.census.gov)

The baseline relationship between the local economies (county economies) and the use of the CINMS is depicted in Table 10, which shows personal income and employment by county for the seven-county impact area. Personal income is presented from two perspectives, by place of work and by place of residence. This is an important distinction because many county economies are less dependent on sources of income from work- related activities in the county, i.e., they derived their incomes from sources outside the county. Sources of incomes from outside the county include retirement pensions, dividends and interest from investments and from work in other counties (commuters). All seven counties in the impact areas have larger personal incomes by place of residence than by place of work.

Table 10: Personal Income and Employment by County 2002

County	Personal Income By Work 000's $	Personal Income By Residence 000's $	Employment Number Full and Part time Jobs
Monterey	$9,355,753	$13,091,490	235,299
San Luis Obispo	$4,765,471	$7,598,506	147,468
Santa Barbara	$9,510,574	$13,701,154	254,600
Ventura	$17,215,448	$27,006,291	420,712
Los Angeles	$254,950,305	$300,898,080	5,554,695
Orange	$88,310,525	$112,266,897	1,901,499
San Diego	$79,407,259	$101,292,563	1,806,321
Region Total	**$463,515,335**	**$575,854,981**	**10,320,594**

Economic impacts were estimated for each activity in the CINMS at the baseline level of activity, for each of the 7 counties in the impact area. For the baseline, all activities in the CINMS generated just over $100 million in personal income (Table 11). The estimate of employment (number of full and part-time jobs) is about 3,300 (Table 12). However, the estimates are underestimates due to a lack of information on the amount of non-consumptive recreation from private household boats. Including private household non-consumptive recreation would probably result in estimates of between $110 and $120 million in income and between 4 and 4.5 thousand jobs that depend on the uses of the CINMS.

Tables 11 and 12 show the estimates for personal income and employment generated from each activity in each county. These estimates are for the baseline, i.e., the estimated amount of activity that can be sustained in the future. The local economy for percentage comparisons is the latest year available (2002). Directly under each estimate is the percent of the total personal income or employment that a given activity accounts for in each county's economy. Across all activities, the estimate of personal income impact of about $101.8 million was less than two one-hundredths of one percent (a small fraction of one percent) of the entire seven-county area. If all

the activities in the CINMS were prohibited, it would not have significant impact on the total economy of the seven-county region. Here the use of "significant impact" addresses the relationship between the activities to the entire economy of the region. If all the consumptive activities in the CINMS were prohibited, the economic impact would fall just short of the $100 million mark, above which a benefit-cost analysis is required by Presidential Executive Order 12866.

Table 11: Local/Regional Economic Dependence on CINMS: Baseline Personal Income (2002)*

County	Commercial Fishing	Consumptive Recreation	Total Consumptive	Non-Consumptive Recreation[1]	All Activities
Monterey	$6,728,959	$0	$6,728,959	$0	$6,728,959
%[2]	0.0514	0.0000	0.0514	0.0000	0.0514
San Luis Obispo	$76,970	$18,111	$95,081	$0	$95,081
%	0.0010	0.0002	0.0013	0.0000	0.0013
Santa Barbara	$9,198,223	$2,661,635	$11,859,858	$1,175,291	$13,035,149
%	0.0671	0.0194	0.0866	0.0086	0.0951
Ventura	$35,829,050	$22,071,373	$57,900,423	$2,488,506	$60,388,929
%	0.1327	0.0817	0.2144	0.0092	0.2236
Los Angeles	$10,328,981	$1,522,518	$11,851,499	$68,424	$11,919,923
%	0.0034	0.0005	0.0039	0.0000	0.0040
Orange	$13,005	$88,591	$101,596	$0	$101,596
%	0.0000	0.0001	0.0001	0.0000	0.0001
San Diego	$9,474,771	$54,329	$9,529,100	$0	$9,529,100
%	0.0094	0.00005	0.0094	0.0000	0.0094
All Counties	$71,649,948	$26,416,557	$98,066,505	$3,732,222	$101,798,727
%	0.0124	0.0046	0.0170	0.0006	0.0177

** The data for this table is based on different averages of years for different species groups. For some species groups the data used was for 1996-2003 averages, while others used 2000-2003 average, and for some species groups 2000 was used (for those with declining trends).*

1. Non-Consumptive recreation and All Activities are under estimated because no information was available for non-consumptive recreation using private household boats to access the CINMS.

2. Percents are the percent of the total economy of each county, or for all counties, the percent of the regional totals for all seven counties. For the total economy, year 2002 was used (latest year available).

Table 11 and Table 12 also show that none of the seven counties in the seven-county impact area is significantly impacted by the activities in the CINMS. The methodology used in the analysis is described further in Leeworthy, Wiley and Stone (2005). The estimates in Table 11 and Table 12 reflect socioeconomic impacts to all direct, indirect and induced incomes related to commercial and recreational fishing. The highest impact is in Ventura County, which depends on activities in the CINMS for about one quarter of one percent of its income and about one half of one percent of the county's employment.

Table 12: Local/Regional Economic Dependence on CINMS - Baseline Employment (2002)

County	Commercial Fishing	Consumptive Recreation	Total Consumptive	Non-Consumptive Recreation[1]	All Activities
Monterey	199	0	199	0	199
%[2]	0.0846	0.0000	0.0846	0.0000	0.0846
San Luis Obispo	3	0.9	3.9	0	3.9
%	0.0020	0.0006	0.0026	0.0000	0.0026
Santa Barbara	299	118.9	417.9	62	479.7834081
%	0.1174	0.0467	0.1641	0.0243	0.1884
Ventura	1,090	944	2,034	135	2,168
%	0.2591	0.2243	0.4833	0.0320	0.5153
Los Angeles	273	67.6	340.6	4	344.1874439
%	0.0049	0.0012	0.0061	0.0001	0.0062
Orange	0	4.5	4.5	0	4.5
%	0.0000	0.0002	0.0002	0.0000	0.0002
San Diego	92	2.8	94.8	0	94.8
%	0.0051	0.0002	0.0052	0.0000	0.0052
All Counties	**1,956**	**1,138**	**3,094**	**200**	**3,294**
%	**0.0190**	**0.0110**	**0.0300**	**0.0019**	**0.0319**

** The data for this table is based on different averages of years for different species groups. For some species groups the data used was for 1996-2003 averages, while others used 2000-2003 average, and for some species groups 2000 was used (for those with declining trends).*

1. Non-Consumptive recreation and All Activities are under estimated because no information was available for non-consumptive recreation using private household boats to access the CINMS.
2. Percents are the percent of the total economy of each county, or for all counties, the percent of the regional totals for all seven counties. For the total economy, year 2002 was used (latest year available).

4.3.2 *Recreational Activities*

Recreational and tourist-related activities occur throughout the CINMS. These activities are typically more concentrated close to the Islands and on the eastern half of the CINMS. Sportfishing, diving, whale watching, pleasure boating, kayaking, surfing, and sightseeing are all popular pastimes within the CINMS.[22] Table 13 depicts the baseline person-days of recreation in the CINMS for both consumptive and non-consumptive activities.

Table 13: Baseline Person Days of Recreation Activity in the CINMS*

	Person-days (number)	**Person-days (percent)**
Consumptive Activities		
Charter/Party Boat Fishing	150,872	33.7%
Charter/Party Boat Consumptive Diving	35,977	8.0%
Private Boat Fishing	214,015	47.8%
Private Boat Consumptive Diving	47,190	10.5%
Total Consumptive	448,054	100.0%
Non-Consumptive Activities		
Whale Watching	25,984	61.9%
Non-Consumptive Diving	10,776	25.7%
Sailing	4,015	9.6%
Kayaking/Island Sightseeing	1,233	2.9%
Total Non-Consumptive	42,008	100.0%

** For charter boat fishing, estimates were based on 2003 CDFG logbooks. For all other fishing activity, data is based on 1999 estimates.*

Baseline person-days of recreation activity were determined by a survey of all charter and party boat operations active in the CINMS. Private boat fishing and consumptive diving data were compiled from a variety of sources (see Leeworthy, Wiley and Stone 2005). The data were presented to the MRWG which included representatives from the recreational fishing and diving communities. In the baseline, the recreation industry included a total of 490,062 person-days of consumptive and non-consumptive recreation. Consumptive recreation was 91.4 percent of all recreation activity in the CINMS. The "for hire" industry accounted for almost 46.7 percent of

22 The National Park Service bans use of motorized personal watercraft within one nmi of the Islands.

all the person-days of recreation activity, which is important because the estimates of use from this industry were based on a census, not a sample, of all operators who operate in the CINMS.

Table 14 and Table 15 provide additional detail on consumptive and non-consumptive recreational activities.

Table 14: Baseline Level of Consumptive Recreation Activity - Study Area Total*

	Charter Boat Fishing	Charter Boat Diving	Private Boat Fishing	Private Boat Diving
Person days				
	150,872	35,977	214,015	47,190
Market Impact				
Direct Sales	$19,632,128	$5,786,598	$20,177,334	$3,020,161
Direct Wages and Salaries	$7,443,728	$2,113,480	$8,001,923	$1,130,245
Direct Employment	457	131	334	50
Total Income	$10,630,288	$3,057,483	$11,155,937	$1,572,849
Total Employment	525	151	403	59
Non-market impact				
Consumer's Surplus	$5,242,348	$1,250,111	$7,724,656	$1,703,276
Profit[1]	$447,585	$76,584	n/a	n/a

** For charter boat fishing, estimates were based on 2003 CDFG logbooks. For all other fishing activity, data is based on 1999 estimates.*

[1]Profit is used as a proxy for producer's surplus.

Table 15 Baseline Level of Non-Consumptive Recreation Activity - Study Area Total*

	Whale Watching	Non-Consumptive Diving	Sailing	Kayaking/ Sightseeing
Person days				
	25,984	10,776	4,015	1,233
Market Impact				
Direct Sales	$4,288,380	$1,840,581	$711,267	$257,487
Direct Wages and Salaries	$1,561,168	$669,425	$258,440	$93,189
Direct Employment	104	45	18	7
Total Income	$2,255,682	$967,704	$373,781	$135,056
Total Employment	119	52	20	8
Non-market impact				
Consumer's Surplus	$902,867	$374,425	$139,496	$42,844
Profit[1]	$275,878	$195,922	$137,119	$2,672

** For charter boat fishing, estimates were based on 2003 CDFG logbooks. For all other fishing activity, data is based on 1999 estimates.*
[1]Profit is used as a proxy for producer's surplus.

4.3.2.1 Consumptive Recreational Fishing and Consumptive Diving

During the MRWG process, literature and studies related to fishing in Southern California were reviewed, with one study for all of California party boat fishing (Hanemann, Wegge and Strand 1991; Thomson and Crooke 1991; Rowe, Morey, and Ross 1985; Wegge, Hanemann and Strand 1983; NOAA Fisheries 1980). Consumptive diving and non-consumptive activity information was supplemented with a visitor's study for Santa Barbara County (Santa Barbara County Conference & Visitors Bureau and Film Commission 1999) for lodging, food, and beverage expenditure and a study on diving in Northwest Florida was used to develop basic estimates for some dive related costs (Bell, Bonn and Leeworthy 1998). Also, from the charter/party operations, the boat fee per person-day by county was derived. From all this information, expenditure profiles were constructed for these activities. Because the focus was on mostly regional studies, the expenditure profiles do not differ by county except for the charter/party boat fees category. The expenditure profiles used for charter/party boat and private boat fishing were taken from Gentner, Price and Steinback (2001).

Table 16 shows the expenditure profiles developed for each activity/boat mode. Low food, beverage and lodging costs indicate a low percentage of users being overnight visitors or dominated by local users. In 1999, coastal residents accounted for 86.7% of charter/party boat trips and 96.86% of private household boat trips for fishing in Southern California (MRFSS 1999; NOAA Fisheries 1980). Not all the profiles had consistent categories - sometimes food and beverage were reported separately and sometimes they were aggregated together. When reported separately, the separated categories in the impact analysis were used.

Employment related to private boat fishing and diving occurs through the expenditures paid by those engaged in the activity. This includes fuel, food, beverages, lodging, transportation, launch fees, among other expenditures. For each industry, there is an assumed ratio of sales and employment. Additionally, there is a multiplier effect, which accounts for additional employment of businesses supplying these businesses. For a complete explanation, see Leeworthy, Wiley and Stone (2005).

Table 16: Expenditure Profiles for Recreation Activities in the CINMS (1999 $)

	Expenditures Per Person-day (1999 $)			
	Fishing - Charter/Party Boat	**Fishing - Private Boat**	**Diving - Charter/Party Boat**	**Diving - Private Boat**
Expenditure				
Boat Fees[1]	$47.62 - 60.74	n/a	$40.21 - 92.56	n/a
Boat Fuel	Not applicable (n/a)	$12.74	n/a	$19.00
Food, Bev, Lodging	n/a	n/a	$82.00	$11.00
Food	$15.47	$7.60	n/a	n/a
Lodging	$8.65	$1.20	n/a	n/a
Transportation	n/a	n/a	$10.00	$9.00
Private Transportation	$16.64	$8.90	n/a	n/a
Public Transportation	$33.07	$1.89	n/a	n/a
Equipment/Equip. Rental	$6.01	$0.91	n/a	$5.00
Miscellaneous	n/a	n/a	$15.00	$10.50
Access/Boat Launch Fees	$1.18	$1.52	n/a	n/a
Air Refills	n/a	n/a	n/a	$7.00
Bait/Ice	$0.52	$6.77	n/a	$2.50
Total[2]	$129.16-$142.28	$41.53	$132.21-$184.56	$64.00

	Whale Watching - Charter/Party Boat	**Non-Consumptive Diving**	**Sailing - Charter/Party Boat**	**Kayaking/Island Sightseeing**
Expenditure				
Lodging	$53.00	$53.00	$53.00	$53.00
Eating & Drinking	$29.00	$29.00	$29.00	$29.00
Transportation	$10.00	$10.00	$10.00	$10.00
Charter Boat Fee[1]	$53.43-60.19	$40.56-81.78	$61.99-177.61	$50.77-104.67
Miscellaneous	$15.00	$15.00	$15.00	$15.00
Total[2]	$160.43-167.19	$147.56-188.78	$168.99-284.61	$157.77-211.67

1. Boat fees used were actual by county and activity from the Kolstad survey. They are:

	SB	*Ventura*	*LA*
Charter/Party Boat Fishing	*$60.74*	*$47.62*	*$59.95*
Charter/Party Boat Diving	*$40.21*	*$64.50*	*$92.56*
Whale Watching	*$53.43*	*$60.19*	*$n/a*
Non-Consumptive Diving	*$40.56*	*$81.78*	*$48.48*
Sailing	*n/a*	*$61.99*	*$177.61*
Kayaking/Island Sightseeing	*$104.67*	*$50.77*	*n/a*

2. The total varies because we used the actual charter/party boat fee by activity

In 1999, sportfishing and consumptive diving activity in the CINMS generated approximately $24 million in income and supported 654 full and part-time jobs in Santa Barbara, Ventura and Los Angeles counties (Leeworthy and Wiley 2003). Recreational fishing is typically done with hook-and-line, nets and spearguns and may be conducted from shore, from vessels, or using SCUBA equipment (consumptive diving). Both recreational and consumptive diving (including SCUBA and free-diving) in the CINMS take place primarily from private and chartered commercial passenger fishing vessels (CPFVs).

Recreational fishers have access to nearshore and offshore areas, targeting bottom and mid-water fish species, primarily in the eastern half of the CINMS. Types of fish landed on CPFVs include kelp bass, mackerel, California sheephead, halfmoon, and whitefish. Species commonly targeted by consumptive divers, who travel from all over the world to dive in the CINMS, include many rockfish species and kelp bass, halibut, yellowtail and white seabass, as well as lobster and rock scallops. Offshore fishing often focuses on such species as yellowtail, tuna, white seabass, barracuda, marlin, and mako shark.

4.3.2.2 Wildlife Viewing

A national survey on recreation and the environment (conducted in 1999) estimated that more than 31.3 million people participated in some form of coastal and marine wildlife viewing or nature-based recreation in the U.S. (NOAA 2003), while over 6.3 million participated in California (Leeworthy 2001). California ranked second only to Florida in terms of the overall number of participants engaged in marine recreation (over 22 million participants in Florida versus about 18 million in California). Most of the activities captured in this survey either directly or indirectly involved watching wildlife (visiting beaches, diving/snorkeling, kayaking/canoeing, photographing scenery).

Wildlife viewing in the CINMS, especially whale watching, is popular due to the high frequency of sightings and diversity of marine life. Day trips are offered from several area landings including Santa Barbara, Ventura and Channel Islands harbors. In 1999, eight whale watch operations accounted for almost 26,000 person-days of activity and about $1.5 million in revenue from CINMS activity (Leeworthy and Wiley 2003).

4.3.2.3 Non-Consumptive Diving

The CINMS is considered to be one of the most sought after diving locations in the world. There is great interest in non-consumptive diving in the CINMS due to the diversity and beauty of the marine habitat, shipwrecks, and other underwater historical sites. Of the over 140 wrecks in the Channel Islands National Park and CINMS, 21 of these have been located and are popular dive sites. In 1999, seven charter operators accounted for almost 11,000 person-days of non-

consumptive diving in the CINMS and earned approximately $685,000 in revenue (Leeworthy and Wiley 2003).

4.3.2.4 Boating, Sailing, Kayaking, and Surfing

Due to numerous protected anchorages and scenic coastlines, the CINMS is a sought-after destination for both sail and power boating. The northern Channel Islands are within reach of several ports for single or multiple day trips. Channel Islands, Ventura, and Santa Barbara Harbors contain over 5,000 slips used by recreational, commercial, and research vessels. Numerous vessels also traverse the region while in transit to other ports.

Due to abundant marine life and the presence of large sea caves and rock formations, the CINMS is considered a destination of interest for sea kayakers. Several regional operations offer sea kayaking excursions in the CINMS. Users can also take kayaks out to the islands on commercial or private vessels, and spend single or multiple days kayaking.

In 1999, eight for-hire operators provided over 4000 person-days of sailing in the CINMS, and four businesses provided over 1200 person-days of kayaking/and sightseeing in the CINMS. The kayaking data include trips associated with charter/party operations. The analysis does not include non-consumptive activity undertaken with private household boats. These operators received about $390,000 in revenue from this activity, which in turn generated over $797,000 in income and supported 24 full and part-time jobs in Ventura and Los Angeles counties (Leeworthy and Wiley 2003).

Surfing occurs year-round within the CINMS, but is generally most popular during the summer months. The number of surfers visiting the CINMS has risen steadily over the past several years, with the most popular destinations being closer to mainland ports.

4.3.3 *Commercial Activities*

The CINMS is an important area for commercial activities. A characterization of commercial activities associated with the CINMS marine area may be found in the CINMS Draft Management Plan/DEIS (NOAA 2006).

4.3.3.1 Fishing

The baseline ex vessel value of landings by port and the percent of total port landings accounted for by catch from the CINMS is shown in Table 17. Ports in Santa Barbara, Ventura Harbor, Port Hueneme, and Channel Islands/Oxnard are the most dependent on catch from the CINMS. Details by species/species groups for ex vessel value of landings from the CINMS and the income generated by those landings can be found in Leeworthy, Wiley and Stone (2005).

Commercial fishing gear used in the CINMS includes nets, traps, lines, and dive equipment. The majority of target species are caught in nearshore kelp and rocky reef areas, which are also important habitat and production areas for other marine life. Key exploited species include squid, sea urchin, spiny lobster, prawn[23], nearshore and offshore finfishes (e.g., rockfishes and California sheephead), coastal pelagic species (e.g., anchovy, sardine, and mackerel), flatfishes (e.g., California halibut, starry flounder, and sanddabs), rock crab, sea cucumber, and tuna. Live fish trapping for rockfish, California sheephead, California scorpionfish and other shallow water species occurs primarily near the coast of the CINMS. In addition, trap gear is used to take shrimp and prawns, California spiny lobster, and three types of rock crab (red, brown and yellow). Other fisheries include shark drift netting, squid seining, urchin diving, and diving or trawling for sea cucumbers. Most of California's commercial dive sea cucumber catch is from the northern Channel Islands (Leet *et al.* 2001). Abalone, once one of the most valuable fisheries in the CINMS (over $2.5 million harvested between 1988 and 1997 according to Leeworthy and Wiley 2003) and State, was closed to harvest by the State legislature in 1997. There is a small but increasing fishery for turban snails and whelks, which is not currently regulated.

Market squid, sea urchin, spiny lobster, and halibut are some of the most economically valuable commercial fisheries landed in the CINMS, with urchin and squid exceeding the market value of all other species. Table 18 shows the commercial fishing average annual ex vessel value for the period 1996-2003. Table 18 also depicts the relative supply of selected CINMS commercial species.

[23] Prawn fisheries in the CINMS area include trawl and trap fishing for spot prawns and trawl fishing for ridgeback prawn. The California Fish and Game Commission closed the spot prawn trawl fishery in 2002.

Table 17: Commercial Fishing - Study Area Totals Ex Vessel Value by Port

Port	Value	%[1]
1. Moss Landing	$873	0.01
2. Morro Bay	$24,450	1.16
3. Avila/Port San Luis	$10,744	0.86
4. Santa Barbara	$4,533,549	60.95
5. Ventura Harbor	$2,926,906	60.25
6. Channel Islands	$1,892,045	47.45
7. Port Hueneme	$7,116,801	69.25
8. San Pedro	$840,497	7.34
9. Terminal Island	$725,340	5.41
10. Avalon & Other LA	$13,472	1.01
11. Newport Beach	$6,235	0.65
12. San Diego	$16,143	0.64

[1] Percents are the amount of ex vessel value as a percent of the total ex vessel value of landings at the Port (1996-2003 Average Annual Value), for all species groups, except Prawn, Rockfish and Tuna, which were valued using 2003 value of landings and CA Sheephead that was valued using the 2000-2003 average value of landings. Recent Trends in Vessels Operating in the CINMS and Dependence on CINMS.

In 1999, there were 737 permitted vessels operating and reporting catch from the CINMS (Leeworthy and Wiley 2003). In 2000, the number of permitted vessels reporting catch in the CINMS declined to 543, and in 2001 declined to 448 (Table 19). There are many permitted vessels that report catching small amounts of catch in the CINMS. In 1999, 18 percent of the permitted vessels accounted for 82 percent of the total ex vessel value of landings from the CINMS (Leeworthy and Wiley 2003). In 2003, 23 percent of the permitted vessels accounted for 78 percent of the total ex vessel value of landing from the CINMS. In 2003, 90 vessels (20.4%) reported catching less than $1,000 worth of total landings from the CINMS and 179 vessels (40.59%) reported catching less than $5,000 worth of landings from the CINMS (Table 20).

Table 18: Commercial Fishing, Marine Reserves Study Area Totals - Avg Ex Vessel Value 1996-2003

	Value	Percent	$ (Excl Kelp)	% (Excl Kelp)
Species/Species Group				
Squid	10,788,355	44.52	10,788,355	59.14
Kelp	5,991,367	24.72	0	0.00
Urchins	4,320,544	17.83	4,320,544	23.68
Spiny Lobster	1,024,536	4.23	1,024,536	5.62
Prawn [1]	210,978	0.87	210,978	1.16
Rockfish [1]	152,892	0.63	152,892	0.84
Crab	414,732	1.71	414,732	2.27
Tuna [1]	3,085	0.01	3,085	0.02
Wetfish	474,251	1.96	474,251	2.60
CA Sheephead [2]	155,290	0.64	155,290	0.85
Flatfishes	218,328	0.90	218,328	1.20
Sea Cucumbers	222,007	0.92	222,007	1.22
Sculpin & Bass	93,203	0.38	93,203	0.51
Shark	34,397	0.14	34,397	0.19
sub-total (counted)	**24,103,965**	**99.47**	**18,112,598**	**99.29**
Others Not Included				
Abalone [3]	0	0.00	0	0.000
Swordfish	50,087	0.21	50,087	0.275
Roundfish	32,736	0.14	32,736	0.179
Others	22,493	0.09	22,493	0.123
Yellowtail	8,066	0.03	8,066	0.044
Shrimp	3,505	0.01	3,505	0.019
Mussels & Snails	5,819	0.02	5,819	0.032
Salmon	5,119	0.02	5,119	0.028
Rays & Skates	993	0.00	993	0.005
Surf Perch	412	0.00	412	0.002
Grenadiers	106	0.00	106	0.001
Octopus	105	0.00	105	0.001
sub-total (not counted)	**129,441**	**0.53**	**129,441**	**0.710**
sub-total, excluding Abalone	**129,441**	**0.53**	**129,441**	**0.710**
Total All Species/Species Groups	**24,233,406**	**100.00**	**18,242,039**	**100.000**
Total All Species/Species Groups excluding Abalone	**24,233,406**	**100.00**	**18,242,039**	**100.000**

1. Prawn, Rockfish and Tuna values are 2003 values due to steep declining trends.
2. CA Sheephead value is the 2000-2003 average.
3. Abalone value is the 2000-2003 average since Abalone harvest has been prohibited since 1997.

Dependence on CINMS, measured as percent of total fishing revenues from the CINMS, has declined since 2000. In 2000, the vessels reporting catch from the CINMS caught over 79 percent of the total value of their landings from California from the CINMS (Table 19).

Table 19: Commercial Fishing Revenue from CINMS, 2000-2003

Year	Number of Operations[1]	Value from CINMS ($)	Value from ALL CA ($)	% of Value from CINMS
2000	543	21,627,775	27,257,770	79.35
2001	448	13,000,830	36,493,318	35.63
2002	458	12,074,375	35,029,852	34.47
2003	441	17,274,785	36,230,249	47.69
2000-2003 Average	473	15,994,441	33,752,797	47.39

1. Number of Fishing Operations = number of different vessel identification numbers in the CDFG trip ticket database.

This percentage declined to less than 36 percent in 2001 and rose again to over 47 percent in 2002 and 2003. In 2000, 47.7 percent of vessels that reported catch from the CINMS depended on the CINMS for 100 percent of their total fishing revenues. The percentage has steadily declined from 2000 to 2003, and in 2003, only about 15 percent of vessels reported catching 100 percent of their fishing revenues from the CINMS.

Table 20: All Species in CINMS - 22 Block Definition, 2003

Value	Number of Fishing Operations	Percent of Fishing Operations	Sum of 2003 Ex Vessel Value	Percent of 2003 Ex Vessel Value
GT $0	441	100.00	17,276,739	100.00
GE $500,000	3	0.68	1,617,339	9.36
GE $100,000	43	9.75	9,272,657	53.67
GE $50,000	102	23.13	13,488,582	78.07
GE $20,000	175	39.68	16,026,395	92.76
LT $20,000	266	60.32	1,250,344	7.24
LT $10,000	223	50.57	596,145	3.45
LT $5,000	179	40.59	271,006	1.57
LT $1,000	90	20.41	38,316	0.22

4.3.3.2 Kelp Harvesting

For over 50 years, giant kelp harvesting occurred near Point Conception, San Miguel Island, Santa Rosa Island and near Point Mugu and was, prior to 2005, another of the CINMS's most valuable harvested species. In 1999, kelp harvested from the CINMS had a processed value of about $6 million (Leeworthy and Wiley 2003). Commercial kelp harvesting ended in 2005 for economic reasons. The total demand for kelp products, which were produced in San Diego, declined (Glantz of ISP Alginates personal communications). Before 2005 and the closure of the San Diego operation, the surface canopy of kelp forests was formerly harvested several times annually in State waters (Kimura and Foster 1984; CDFG 2002). The kelp canopy serves as important habitat for juvenile fishes (Carr 1989), and many species of invertebrates (Watanabe 1984; Coyer 1979). Since all kelp was harvested within State waters, the previous impact estimated on kelp harvesting in existing State marine zones was overestimated (Leeworthy, Wiley and Stone 2005: 1).

4.3.4 *Department of Defense/Homeland Security Activities*

The US military maintains a strong presence in the greater CINMS marine area. The US Air Force and US Navy, individually and together, conduct training exercises, and support military testing and evaluation projects for aircraft, ship, and missile programs. Both support commercial space launch missions as well. The Vandenberg Air Force Base (VAFB), Point Mugu Sea Range and Port Hueneme coastal and marine areas are the primary locations for these military activities.

VAFB, located in western Santa Barbara County, is headquarters for the US Air Force's 30th Space Wing. The Air Force's primary missions at VAFB are to launch and track satellites in space, test and evaluate America's intercontinental ballistic missile systems and provide aircraft operations in the Western Range. VAFB also supports commercial space launch ventures and supports aircraft and helicopter training and testing.

In addition to mainland facilities, Point Mugu encompasses a 36,000 square mile Sea Range that supports five categories of tests to evaluate sea, land and air weapons systems: 1) air-to-air testing; 2) air-to-surface testing; 3) surface-to-air testing; 4) surface-to-surface testing; and 5) subsurface-to-surface testing. In addition, the Sea Range supports fleet training exercises, small-scale amphibious warfare training and special warfare training.

The US Coast Guard (USCG), which operates a Marine Safety Detachment and Coastal Patrol Boat at Santa Barbara, California and a Station and Coastal Patrol Boat at Oxnard, California, conducts several activities in the CINMS region, such as search-and-rescue, migrant and drug interdiction, fisheries enforcement, marine environmental protection, marine mammal protection

and monitoring and inspection of all international vessels experiencing mechanical difficulty and distress.

4.3.5 *Research Activities*

Collaboration in research activities is a central programmatic focus of the CINMS. The CINMS is the subject of extensive scientific interest as numerous academic and professional researchers conduct research activities that have led to project specific articles, academic papers, and other products. The CINMS includes key reference sites for scientific investigations. The designation of marine reserves within State waters (CDFG 2002) is an important part of the collaborative research that is occurring in the CINMS.

Research activities fall under the following general categories: physical and biological science research; socioeconomic, cultural, and historic research; and political science research. The CINMS staff are important participants and collaborators in marine science and socioeconomic research. Research activities that pertain to the CINMS's physical and biological setting are the most extensive.

Abeles *et al.* (2003) provide a comprehensive assessment of major physical and biological science research activities in the CINMS to date, with a focus on studies that include a long-term monitoring component. Abeles *et al.* (2003) categorize 42 research projects in the CINMS according to ecological levels of classification: population studies (marine plants, marine invertebrates, marine fish, marine birds, marine mammals), community studies, environment studies, and ecosystem studies.

Other research and data collection supported by the CINMS and partners include participation in annual ocean and coastal conferences and meetings, and assistance in biological surveys, including a current baseline population study on Xantus's murrelets.

The CINMS Research Vessel Shearwater is used primarily for research, and serves as a host for educational field trips and emergency response in and around the CINMS. The Shearwater also includes wet and dry labs that allow on-board processing of samples and data. Extensive dive operations are supported by onboard facilities and equipment.

4.3.5.1 Biological Monitoring Programs

A characterization of existing monitoring programs is depicted in Abeles *et al.* (2003). These monitoring programs are developed and implemented by the CDFG, NOAA's Southwest Fisheries Science Center, Channel Islands National Park, the University of California, Santa Barbara (UCSB) Marine Science Institute, and a number of other scientific organizations.

Additional information on the monitoring programs is provided in the CINMS Draft Management Plan (NOAA 2006).

A variety of economically and ecologically important species are studied, such as sea urchin, abalone, sea bass, rockfish, seabirds, pinnipeds, and humpback and blue whales. Several programs monitor marine communities on sandy beaches and lagoons, rocky intertidal habitats, kelp forests, subtidal rocky reefs, soft bottom habitats, and in the open ocean. Research programs that monitor community dynamics generally include surveys of the common species that occur in a particular habitat. Several research programs attempt to monitor ecosystem dynamics, including both physical and biological variables.

4.3.5.2 Socioeconomic, Cultural, and Historic Research

A complete characterization of socioeconomic, cultural, and historic research associated with the CINMS is found in the CINMS Draft Management Plan/DEIS (NOAA 2006). Research activities that pertain to the CINMS's human setting include socioeconomic studies of industries and individuals linked to the CINMS, as well as studies of maritime and historic resources. Socioeconomic studies of consumptive and non-consumptive use of the CINMS have not been as extensive as other research projects that focus on physical science. However, since the CDFG and NMSP initiated the Channel Islands Marine Reserve Process, several socioeconomic studies have been completed and a socioeconomic monitoring program is being developed and implemented.

Maritime heritage resource research is focused on studies of Native American artifacts, paleontological remains, or historic studies of shipwrecks, aircraft wrecks, and material associated with wharves, piers and landings. The CINMS (NMSP), and major partners, such as the Channel Islands National Park (CINP), the Santa Barbara Maritime Museum, the State of California, Coastal Maritime Archaeology Resources (CMAR), and the Chumash Maritime Association, conduct the majority CINMS maritime heritage activities and research.

4.3.6 *Educational Activities*

Educational activities are a central programmatic focus of the CINMS (NOAA 2006). The CINMS plays an important role in public and formal marine science education activities for all ages, from K-12 to adults. CINMS educational activities have reached a wide variety of audiences on a local, regional, national, and international scale. CINMS educational activities are focused in two strategic areas: 1) community involvement, partnerships, and community program development and 2) educational products and services.

Community involvement is an essential component of the CINMS Education and Outreach Program. It is achieved in large part through the Channel Islands Naturalist Corps, which is a

volunteer corps of naturalists trained to provide interpretation about the CINMS and Channel Islands National Park on a variety of passenger vessels, such as whale watch and dive boats, as well as at outreach and special events. Community involvement in educational activities is also achieved through the SAC and, in particular, their Sanctuary Education Team. This team is made up of community members who work to address CINMS education needs, and to keep local educational institutions informed about CINMS educational opportunities. Sanctuary Advisory Council members at large are charged with keeping their constituents educated about the CINMS. Community involvement in educational activities is also achieved through participation in CINMS events and programs.

The CINMS and partners have developed and implemented numerous interactive educational programs including training programs, workshops, special events, and school programs. The CINMS Education staff present workshops and programs at a variety of regional and national conferences each year, such as the Southwest Marine Educators Association, California Science Teachers Association and National Marine Educators Association. Training programs and teacher workshops teach educators about marine science using the CINMS as subject matter, and many are linked to CINMS products such as curriculum packages and CD-ROMs. Other workshops target a broader segment of the community, such as the Marine Wildlife Viewing Workshop that is open to all members of the public interested in responsible wildlife viewing practices. Each year, the CINMS (NMSP) sponsors a variety of public educational cruises targeting varying audiences including local residents, tourists, school children and community groups. These cruises provide field experiences in the CINMS and may include activities such as: intertidal and sandy beach monitoring, floating labs, students on research vessels posing questions to divers below using live video and audio feed, kayaking, diving, and wildlife viewing. CINMS staff and volunteers facilitate hands-on activities such as oceanography experiments, fish identification, marine mammal and seabird identification, fish surveys, and wildlife viewing to encourage an understanding and stewardship for CINMS resources. The CINMS and its partners also support marine science programs in local schools such as Los Marineros and the Channel Islands Argonauts.

Educational activities are also provided at community programs such as whale festivals, harbor festivals, boat shows, and dive industry events that are held in the region. Additional information on education activities in the CINMS can be found at the "Marine and Coastal Educational Resources Directory."[24]

4.4 Management

Numerous Federal and State regulations and laws apply to the CINMS, and a complete characterization of Federal and State regulations may be found in the CINMS Draft Management

[24] Available at http://www.coastal.ca.gov/publiced/directory/resdirectory/rdindex.html

Plan/DEIS (NOAA 2006). Appendix E describes Federal and State regulations associated with fisheries management and plans within the CINMS. Section 3.0 of this FEIS also provides information on the existing Cow Cod Conservation Area and the California Rockfish Conservation Area within the CINMS. With respect to the proposed action and regulations, Section 6 describes NOAA compliance with specific Federal and State regulatory requirements.

5.0 ENVIRONMENTAL IMPACTS

This section describes the ecological and socioeconomic impacts associated with NOAA's action and the remaining alternatives (Sections 5.1 and 5.2). It also presents considerations for managing the proposed network of marine zones under each of the alternatives (Section 5.3).

5.1 Ecological Impacts

This FEIS analyzes the impacts of networks of marine zones in the CINMS. For the purposes of this analysis, adverse impacts are defined as those impacts that are counter to the goals identified for this action, such as achieving a natural assemblage of living resources and enhancing natural biological communities. It is recognized in the scientific literature that declines in abundance of certain species is an expected outcome of this type of zone designation, but this is not considered in all cases to be an adverse ecological impact. For example, certain commercially targeted species, such as spiny lobster, may increase in abundance, while the abundance of their prey, such as purple urchins, may decrease.

In general, the NMSP expects that adverse ecological impacts are unlikely within the marine zones because the regulations would prohibit or limit take of Sanctuary resources and also avoid disturbance to marine habitats that sometimes occurs when those resources are taken. There may be some potential negative impacts on surrounding resources resulting from the displacement of fishing activity from the marine zones to adjacent areas. If fishing is concentrated in areas adjacent to marine zones, habitat alteration from gear impacts may increase in those areas. It remains to be seen whether the impact will be mitigated or exacerbated by existing fishing regulations and spillover of targeted species into adjacent areas. However, vessel distribution and socioeconomic analyses indicate that currently relatively little activity occurs within the proposed marine zones. Hence, little fishing activity congestion is expected as a result of implementing either spatial Alternative 1 or 2.

This section describes the impacts to the CINMS ecosystem the NMSP expects will occur as a result of NOAA's action. The impacts of this action and the remaining alternatives are described both individually and cumulatively in the following manner:

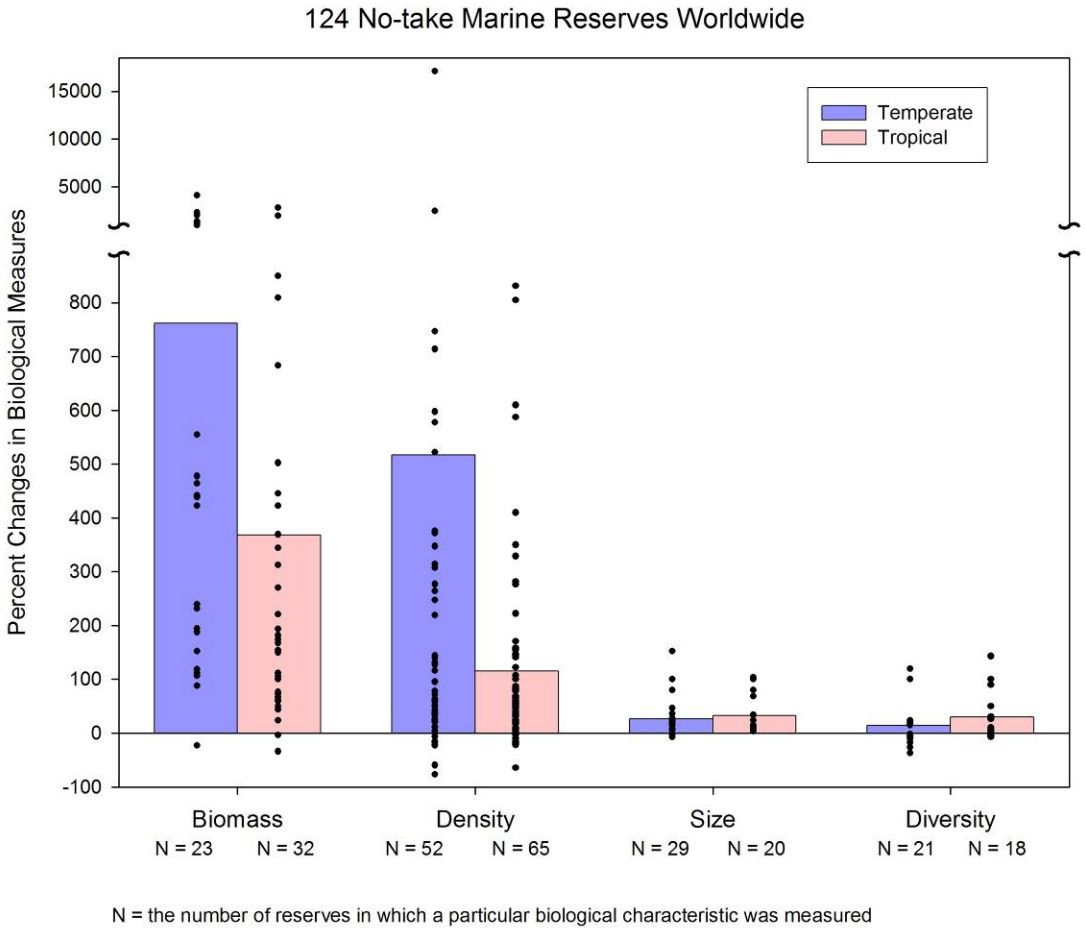
- Analysis of the ecological impacts of marine reserves in general;
- Analysis of the ecological impacts of the no action alternative;
- Analysis of the ecological impacts of Alternatives 1 and 2; and
- Analysis of the cumulative ecological impacts.

5.1.1 *Ecological Consequences Of Marine Reserves In General*

No-take marine reserves are likely to have significant positive ecological consequences for species of interest, particularly those that are targeted by commercial or recreational fisheries. Meta-analyses of the ecological impacts of numerous marine reserves indicates substantial increases in the biomass, abundance, body size, and diversity of focal species (Palumbi 2004; Halpern 2003). Similar ecological benefits have been observed for some species, including cowcod, bocaccio, kelp bass, California sheephead, spiny lobster, warty sea cucumber, and red urchin, protected in marine reserves (or de facto marine reserves) in the Channel Islands region (Schroeder and Love 2002; Caselle unpublished data). Halpern (2003) reviewed 56 studies of 80 reserves that were protected from at least one form of fishing. He derived aggregate measures of reserve performance, by combining responses of all the organisms studied for each of four variables: abundance, total biomass, average body size, and species diversity. Across all reserves, abundance (measured as density) approximately doubled. Biomass, or the weight of all organisms combined, increased 2.5 times in reserves as compared to fished areas. Average body size of organisms protected in marine reserves increased by approximately 30%. The increase in size contributes to greater reproductive potential (Béné and Tewfik 2003). In addition to changes in biomass, abundance, size, and reproductive potential, the number of species in each sample increased by 30%. These ecological effects were expressed in both temperate and tropical regions (Halpern 2003).

Over the last five years, many peer-reviewed research articles have further highlighted the effects of marine reserves on temperate marine ecosystems, such as the Channel Islands. A more recent meta-analysis of 124 no-take marine reserves indicates that temperate water ecosystems show similar responses to protection as tropical water ecosystems (PISCO unpublished data). Many species show greater biomass, density and size in marine reserves when compared to non-protected areas (Figure 15). In particular, biomass and density of species in marine reserves located in temperate waters were relatively greater than that observed in tropical ecosystems.

Figure 15: Meta-Analysis of the Ecological Effects of 124 No-Take Marine Reserves



In the analysis for Figure 15, the percent change was calculated as the ratio of a biological measure either inside to outside of a given marine reserve or after to before establishment of the marine reserve. The bars show the average percent change across all reserves in the biological characteristic. The dots represent all of the individual data points, one data point per reserve.

In regions of high nutrient input due to upwelling, ecological changes have been detected rapidly (within 1 year) (Witman and Smith 2003; Fisher and Frank 2002). Responses documented by Halpern (2003) occurred, on average, 3-5 years after reserves were established. Ecological effects of marine reserves were detected regardless of reserve size (Halpern 2003). Abundance,

size, biomass and diversity of targeted species increased in small as well as large reserves. However, there are usually greater absolute differences for larger reserves (Halpern 2003).

5.1.1.1 Effects on Targeted Species

Marine scientists have documented the ecological consequences of marine reserves for numerous species in California, including some of the species of interest identified by the MRWG and the SAP (Airame 2000). Studies of marine reserves in California provide some insight into the potential ecological consequences of marine reserves and other protected areas in the CINMS.

Paddack and Estes (2000) found mean densities for a variety of rockfish and other species 12-35% greater (all species combined) within three central California reserves (Hopkins Marine Life Refuge, Point Lobos Ecological Reserve, and Big Creek Marine Resources Protection Act Ecological Reserve) than adjacent fished areas. In their study, average densities for kelp rockfish, gopher rockfish, cabezon, and lingcod were 31%, 83%, 22% and 100% greater inside the marine reserves than outside, respectively. California sheephead were much more abundant within one reserve in the study, but very infrequent or not seen at all in other areas.

Paddack and Estes (2000) also reported mean sizes for all rockfish species combined in their study. In two of the three reserves, mean size was greater and in the third reserve (which had been established the least amount of time) mean size was nearly equal. On average, over all three reserves, mean size of rockfishes was about 14% greater within the reserves than outside. Table 21 below shows average densities and sizes of targeted species in marine reserves in California as compared to fished areas nearby.

Table 21: Average Densities and Sizes of Targeted Species in Marine Reserves within the State Of California as Compared to Fished Areas Nearby

Species	Status	Average Density	Average Size
California sheephead	Targeted	More abundant within range	
Kelp rockfish	Targeted	31% greater	14% larger
Gopher rockfish	Targeted	83% greater	14% larger
Cabezon	Targeted	22% greater	14% larger
Lingcod	Targeted	100% greater	

Data from Paddack and Estes (2000) from Hopkins Marine Life Refuge, Pt. Lobos Ecological Reserve, and Big Creek Marine Resources Protection Act Ecological Reserve.

Increases in abundance and density of targeted species also have been detected in marine reserves in the Channel Islands. Limited data were available from surveys inside and outside the Catalina Marine Science Center Reserve. The densities of sheephead and kelp bass were 48% and 29% greater, respectively, inside the reserve compared to outside (Caselle unpublished data).[25] In 2000-2001, the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) compared sites inside the Anacapa Island Ecological Reserve Natural Area with one site outside the reserve at Middle Anacapa Island (Caselle unpublished data). For estimates of density, the site inside the reserve with similar habitat was compared to the site outside the reserve, whereas all sites were used for estimates of average size. Sheephead and kelp bass densities were 137% and 103% greater, respectively, inside the marine reserve compared to outside. Sheephead and kelp bass average sizes were 13% and 9% greater, respectively, inside the marine reserve compared to outside.

The National Park Service compared relative densities and sizes of invertebrate species inside the Anacapa Ecological Reserve Natural Area and areas nearby (Kushner unpublished data). In all cases, data was analyzed from particular sites only if the focal species were present in more than 2 out of the most recent 10 years of data. In this analysis, average spiny lobster and warty sea cucumber densities were 592% and 141% greater inside the reserve, respectively. In contrast, average red urchin densities were 13% less inside the reserve. Although red urchins were less dense inside the reserve, individual urchins were significantly larger inside the reserve. Red urchins were approximately 60% larger inside the reserve compared to areas outside. In addition, while nearly 60% of red urchins were larger than the minimum legal commercial size inside the marine reserve on average, only about 11% were outside. Table 22 shows average densities and sizes of targeted species in marine reserves within the Channel Islands as compared to fished areas nearby.

Schroeder and Love (2002) compared rockfish density within a de-facto marine reserve (an oil platform where fishing does not occur), an area allowing only recreational fishing, and an unprotected area (where both recreational and commercial fishing are allowed) in the Channel Islands region. Rockfish density was an order of magnitude less within the recreational fishing area than in the unprotected area. Community composition also was significantly different. Cowcod densities were 8 and 32 times greater in the de facto reserve than in the recreational area or unprotected area, respectively. Similarly, bocaccio densities within the de facto reserve were 18 and 408 times greater than in the recreational area or unprotected area, respectively. The authors conclude that recreational fishing in a marine conservation area can have measurable negative effects on targeted species' abundances and densities.

[25] Dr. Jennifer Caselle (University of California Santa Barbara) is a marine scientist who assisted in designing and conducts biological monitoring of the State marine zones since 2003.

Table 22: Average Densities and Sizes of Targeted Species in Marine Reserves within the Channel Islands

Species	Status	Average Density	Average Size
Cowcod[1]	Targeted	32 and 8 times greater	
Bocaccio[1]	Targeted	408 and 18 times greater	
Kelp bass[2]	Targeted	103% greater	9% larger
Kelp bass[3]	Targeted	29% greater	
California sheephead[2]	Targeted	137% greater	13% larger
California sheephead[3]	Targeted	48% greater	
Spiny lobster[4]	Targeted	592% greater	
Warty sea cucumber[4]	Targeted	141% greater	
Red urchin[4]	Targeted	13% less	60% were larger than legal size

[1] *Data from Schroeder and Love (2002) showing the density of populations in a de-facto reserve (Platform Gail) as compared to a recreational fishing area and an unprotected area.*
[2] *Data provided by PISCO from the Anacapa Ecological Reserve Natural Area.*
[3] *Data provided by PISCO from the Catalina Marine Science Center reserve.*
[4] *Data provided by NPS from the Anacapa Ecological Reserve Natural Area.*

5.1.1.2 Effects on Non-targeted or Non-fished Species

Establishing a reserve is not likely to affect the abundance, density and size distribution of non-targeted species if they are not impacted directly (e.g., bycatch) by fishing. However, establishing a reserve may impact non-targeted species if strong ecological linkages (e.g., predation or competition) exist between non-targeted species and others that are fished. The range of ecological responses of non-targeted species to protection within reserves demonstrates the importance of indirect effects.

In 2000-2001, PISCO investigated the differences between non-targeted species in the Anacapa Ecological Reserve Natural Area and fished areas nearby. Table 23 depicts the average densities and sizes of unfished species in the reserve. Rock wrasse, garibaldi, and black surfperch densities were 173%, 79%, and 398% greater inside the reserve at Anacapa Island compared to outside, respectively. Rock wrasse average size was 3% greater inside the reserve compared to outside, respectively. Garibaldi and black surfperch average sizes, however, were 4% and 24% smaller inside the reserve compared to outside, respectively. The research highlights the possibility of varying effects of marine reserves on non-targeted species.

National Park Service data (Kushner unpublished data) were examined to compare relative densities and sizes of non-targeted invertebrate species inside the Anacapa Ecological Reserve Natural Area with areas nearby. Average purple urchin, bat star, and giant-spined star densities were 91%, 66%, and 77% less inside the reserve, respectively. Although densities of purple urchins were less within the reserve, these individuals were on average larger (26%) than those found outside the reserve.

Table 23: Average Densities and Sizes of Unfished Species in the Anacapa Ecological Reserve Natural Area As Compared To Fished Areas Nearby

Species	Status	Average Density	Average Size
Rock wrasse[1]	Unfished	173% more	3% larger
Garibaldi[1]	Unfished	79% more	4% smaller
Black surfperch[1]	Unfished	398% more	24% smaller
Purple urchin[2]	Unfished	91% less	26% larger
Bat star[2]	Unfished	66% less	
Giant-spined star[2]	Unfished	77% less	

[1] *Data provided by PISCO.*
[2] *Data provided by NPS.*

The differences between ecological responses in the reserve as compared to surrounding waters indicate that indirect effects of reserves may impact non-targeted species, sometimes in unexpected ways. Declines in abundance, density, or size of non-targeted species within a reserve may result from increases of one or several predators, which then exert predation pressure, causing the non-targeted species to decline. Conversely, increases in abundance or density of non-targeted species within a reserve may be a result of reduced competition for resources as food production within the reserve increases over time.

Complex indirect interactions, resulting from fishing and the subsequent establishment of a no-take marine reserve, have been documented in the Channel Islands region. Historically, lobsters and other predators kept sea urchin populations in the Channel Islands at low levels and kelp forests flourished. However, lobster fishing has occurred in the Channel Islands region for over 100 years (Leet *et al.* 2001). Over time, commercial and recreational fisheries for lobster

reduced the population size and average length of individual lobsters.[26] Reduced populations of smaller lobsters were less effective predators on urchins and, as a result, urchin populations increased. Intense grazing by purple urchins (which were not fished) caused dramatic declines in kelp growth, leading to the formation of bare rocky reefs covered with urchins (known as urchin barrens). It is believed that reduced growth of kelp during El Niño events, combined with the effects of grazing by urchins, contributed to massive reductions in the areas covered by kelp forests. At some point during the past 20 years, each kelp forest monitoring site (supported by the National Park Service) in fished areas of the Channel Islands became an urchin barren for a period of time and urchin barrens have persisted at some sites (Behrens and Lafferty 2004).

In contrast, kelp forests protected in the Anacapa Ecological Reserve Natural Area were resilient during a period of twenty years since the reserve was established (Behrens and Lafferty 2004). In spite of natural perturbations, such as El Niño, kelp forests persisted in the reserve. The kelp forest may have persisted in the reserve, in part, because the grazing pressure by urchins was reduced as natural predators, such as large lobsters, returned. As noted above, lobsters were 6 times more abundant and larger in the Anacapa Ecological Reserve Natural Area than in surrounding waters.

The time to detect ecological changes in marine reserves and the magnitude of those changes depends, in part, on the intensity of historical fishing effort in the region (Coté *et al.* 2001). Changes will occur rapidly in areas that recently experienced high fishing intensity, provided that some individuals of the targeted species remain or a source of larvae is nearby. In the Channel Islands region, ecological changes are expected to occur more rapidly in the eastern islands (Anacapa and Santa Cruz Islands), where commercial and recreational fishing has been concentrated for a long period of time in the nearshore areas designated by the State as marine reserves (CDFG 2002). Ecological responses are likely to be more subtle around the western islands (Santa Rosa and San Miguel Islands), where the intensity of recreational fishing has been lower. Exceptions may be certain commercial fisheries, including sea urchin, crab, and rockfish, that are concentrated around the western Channel Islands. In addition, ecological responses are likely to be more rapid in shallow waters near shore, where fishing is concentrated in the highly productive euphotic zone. Ecological responses may be more subtle in deep waters offshore where fishing effort is limited by access. Species that are not fished or very lightly fished are not expected to show significant changes in abundance and size as a result of reserve establishment.

5.1.1.3 Effects on Apex Predators

If apex species are removed from the ecosystem by fishing, the interaction between these apex predators and other species within the protected areas will be diminished or eliminated. Estimates of the biomass of apex predators already removed from the world's oceans are

[26] Tegner and Levin (1983) quantified the same trend from landings at the San Diego Pier.

approximately 90% (Myers and Worm 2003). Such removal of apex predators may shift ecological systems from top-down (predator) control to bottom-up (production) control. Generally, removal of apex predators from an ecosystem leads to cascading ecological effects through lower trophic levels.

Marine reserves provide some additional protection for pelagic species while they are within reserves, potentially contributing to overall survival and persistence of these populations. Potential effects of marine reserves on pelagic species are discussed in Section 3.1.2.2. Protection of species such as thresher and mako sharks, tuna, billfish, sardine, anchovy, and mackerel while within marine reserves may have positive ecological impacts. Further, some species, such as halibut, lingcod and kelp bass, are primarily associated with benthic habitats, but they often move into the pelagic zone to look for food. These species may be captured in midwater by some types of fishing gear, including hook and line. Halibut, lingcod, and kelp bass are apex predators, whose removal from the ecosystem may have important ecological consequences for benthic and midwater communities.

5.1.2 *Ecological Impacts of the No Action Alternative*

As mentioned above, many species and habitat types are currently protected from take under the State marine zones and other regulatory actions. Under the no action alternative, the NMSP expects many of the trends (both positive and negative) discussed in Section 4.0 to continue into the future. In particular, the long term decline in the overall health of the SCB and decline in several targeted species is expected. Furthermore, increases in coastal population, demands for seafood products, and demands for recreational opportunities result in greater stresses on the CINMS (McGinnis 2006; Kildow 2004). Without additional comprehensive protection in deeper water habitats there would be no reference sites to help gauge impacts and better understand the dynamics of the CINMS.

5.1.3 *Ecological Impacts of Alternative 1A and 1B*[27]

The proposed marine zones in Alternatives 1A and 1B are expected to have positive ecological impacts by protecting (from fishing or other forms of take) marine habitats and species and their ecological interactions and processes. The impacts of Alternatives 1A and 1B are expected to be similar to the description of the impacts of marine reserves in general identified above. While difficult to quantify in absolute terms, the NMSP expects to realize more benefits with Alternatives 1A and 1B as compared to the no action alternative. The ecological impacts of Alternatives 1A and 1B would occur over larger areas as compared to the impacts of the no

[27] Because the marine zones proposed for the Federal waters in Alternatives 1A and 1B are identical, the ecological impacts identified in this section are the same for each alternative.

action alternative (only having the State marine zones). Negative ecological impacts are unlikely in marine zones that prohibit or limit take of natural biological populations and also thus avoid disturbance to marine habitats.

Alternatives 1A and 1B include proposed marine zones in each of the biogeographic regions, including the Oregonian Province, the Californian Province and the transition region between them. Unique suites of physical and oceanographic characteristics and unique assemblages of species define each biogeographic region. By protecting a portion of each biogeographic region, Alternatives 1A and 1B are likely to contribute to increased abundance, individual size, biomass, and diversity of the majority of targeted species within the study region. Species of interest depend on marine habitats for shelter, spawning sites, nursery areas, and foraging sites. Protection of marine habitats in the existing State marine protected areas and fishery closures, essential fish habitat and Alternative 1A would contribute to protection, restoration and maintenance of abundance, density, age structure and diversity of natural biological populations in the Channel Islands region. The proposed marine zones in Alternatives 1A and 1B would not fully mitigate some potentially negative impacts to marine habitats, such as anchoring and ghost fishing gear.

Areas of particular ecological importance in the essential fish habitat and Alternative 1A and 1B are:

- Medium to high relief rocky reefs around Richardson Rock support numerous groundfish species, including yellowtail, olive, and vermilion rockfish and lingcod;
- Submerged rocky reefs around Gull Island support depleted populations of abalone and rockfish, including blue and vermilion rockfish, bocaccio and various Sebastomas spp;
- The Footprint supports depleted populations of numerous rockfish species, including bank and gilleye rockfish, cowcod, lingcod, thornyhead, and sablefish.

Alternatives 1A and 1B include pelagic habitats that are not protected within the essential fish habitat measures. These pelagic habitats are used by highly migratory species, including sharks, tunas, billfish, and swordfish, and coastal pelagic species, including sardines, anchovy and mackerel (Worm *et al.* 2003). Some species that are typically associated with benthic habitats, such as lingcod, halibut, and kelp bass, also use midwater habitats for foraging. Protecting pelagic habitats will allow the natural ecological processes between these apex predators and their pelagic or benthic prey.

Habitat replication in protected marine zones is important to increase the likelihood that habitats and associated species will be protected in a dynamic and unpredictable environment. Alternatives 1A and 1B include excellent replication of soft sediments in more than 3-5 protected zones on the continental shelf and slope. Species associated with soft sediments, such as halibut, sole, and flounder, are likely to thrive in the proposed marine zones and if one or more protected populations is impacted by a localized disturbance, other protected populations would likely

persist. The replication of protected marine habitats may offer increased ecological resilience for associated species. Neither alternative provides ideal replication of rocky habitats at all depth intervals. Low (or no) replication of protected rocky habitats would leave species associated with these habitats, such as rockfish, lingcod, and lobster, vulnerable to unpredictable disturbances and environmental fluctuations.

To provide any significant protection for a species of interest, the size of individual zones must be large enough to encompass the typical movements of many individuals. Current data on adult fish movement patterns suggest that marine zones spanning 5-20 km (2.6-10.5 nmi) of coastline are likely to contribute to the protection of these species. Marine zones spanning less than 5 km (2.6 nmi) in width may leave many individuals of important species poorly protected. The average width (short axis) across marine zones in Alternatives 1A and 1B is 3.1 nmi with a range of 1.0 nmi at Anacapa Island MR and MCA to 6.8 nmi at Richardson Rock MR. The regions around Santa Rosa Island, south side of San Miguel Island and the north sides of Santa Cruz and Anacapa Islands, are not well represented in marine zones proposed in Alternatives 1A and 1B. Species with short-distance adult dispersal, such as cabezon, white croaker, and numerous rockfish species including cowcod, black and yellow, brown, calico, china, copper, flag, gopher, glass, greenblotched, greenspotted, kelp, olive, vermilion, and yelloweye rockfish, are likely to benefit from protection within moderate to small marine zones. However, species with moderate to long-distance adult dispersal, such as longspine thornyhead, lingcod, canary rockfish, white seabass, and shiner surfperch, are likely to move outside of protected zones into areas where they are vulnerable to fishing.

In order to function as an ecological network, the spacing between marine protected habitats must be consistent with the potential for larval dispersal. It is important to consider the distances between similar types of protected habitats because species tend to be associated with particular habitat characteristics. For marine zones to be within dispersal range for most commercial or recreational groundfish or invertebrate species, they will need to be spaced on the order of no more that 50-100 km (26.3-52.5 nmi) apart. There is a large (35 nmi) gap between marine zones proposed in Alternatives 1A and 1B, between Harris Point MR (San Miguel Island) and Scorpion MR (Santa Cruz Island). Because of its remote location, Santa Barbara Island MR is likely to have the least ecological connection to other marine zones around the northern Channel Islands. The distance between South Point MR and Santa Barbara Island MR is likely to be too far for effective ecological exchange. However, there is potential for exchange of larvae between Santa Barbara Island MR and three of the other marine zones proposed in Alternatives 1A and 1B , including Gull Island MR, the Footprint MR, and Anacapa Island MR. The limited number of connections (1 or 2) in Alternative 1 between protected patches of rocky substrate at all depth intervals may limit the ecological connectivity among marine zones proposed in this alternative.

5.1.4 *Ecological Impacts of Alternative 1C*

Many of the ecological impacts identified for Alternatives 1A and 1B apply to Alternative 1C. However, because the boundaries of the proposed marine zones in Alternative 1C would terminate at the existing State-Federal waters boundary (3 nmi from shore), Alternative 1C would result in gaps of unprotected waters between most of the proposed Federal marine zones and the existing State marine zones (most of the existing State marine zones do not come all the way to State-Federal waters boundary). Such gaps would represent areas that provide no additional protection to certain species and habitats (See Figure 6 for a depiction of gaps).

Alternative 1C gaps exist at Richardson Rock, Harris Point, South Point, Gull Island, Scorpion, and the Footprint. With Alternative IC, the gaps comprise about 25 nmi^2 and reduce the total area of Alternative 1A and 1B from 241.1 nmi^2 to about 213 nmi^2. About 5% of the alternative's hard sediment habitats occur within the gaps, which include rocky reefs and canyons. These habitats occur within deeper waters of the continental shelf and slope. Further, although Alternatives 1A and 1B contains less than 1 nmi^2 of hard sediments within the deep continental shelf, a majority falls within the gaps that occur at Richardson Rock and the Footprint. These submerged rocky reefs areas provide habitat for various groundfish species, including yellowtail, olive, vermilion, and blue rockfish, lingcod, boccaccio, and abalone.

Conversely, most of the soft sediment habitats contained within the gaps occur in the Sanctuary's continental shelf and continental slope habitats. About 8% of Alternative 1A and 1B's soft sediment habitats occur within the gaps. Species typically found within the Sanctuary associated with soft sediments include halibut, sole, and flounder.

Although many species are primarily associated with a single habitat, they may utilize a variety of different habitat types during their life history stages. It is common for individuals to use different habitat types at different stages of their life cycles. For example, larvae may drift in the water column, juveniles may settle into shallow water, and adults may inhabit deeper water. In some cases, individuals use several different habitat types during one stage of their life cycle and can move between shallow and deeper habitats, which span their home ranges.

Marine zones that provide continuous protection across a range of shallow to deep water habitats may result in greater ecosystem protection. Marine zones that extend offshore and provide continuous spatial protection are more likely to accommodate individual movement and protect individuals over their lifetime. They reduce the probability of mortality resulting from species moving across gaps that contain habitats within their home ranges and across life history stages. Hence, gaps may reduce the connectivity of Alternative 1C, and expose species to extractive and incidental mortality, resulting in reduced ecological benefits relative to the more contiguous network design that supports marine life protection offered by the other Alternatives. However, in a January 2, 2007 letter to NOAA, the Secretary of the California Resources Agency stated

that the CDFG and the FGC would as soon as possible initiate the regulatory process to close the gaps associated with Alternative 1C by bringing the boundaries of a number of the existing State marine zones up to the State-Federal jurisdictional line; that process is supposed to be initiated in May 2007 with a final decision hearing in August 2007.

5.1.5 *Ecological Impacts of Alternative 2*

Alternative 2 shares all of the ecological impacts identified above for Alternatives 1A and 1B. However, because the marine zone network proposed for Alternative 2 is larger than the network proposed for Alternatives 1A and 1B, there are additional ecological impacts. Such impacts include:

Alternative 2 is likely to result in proportionally greater ecological benefits when compared to both Alternative 1 and the no action alternative;

Alternative 2 includes more protection for each biogeographic region, with particularly good representation of the highly productive Oregonian biogeographic region. Species characteristic of the Oregonian biogeographic region are likely to benefit more from protection within marine zones proposed in Alternative 2 than those proposed in Alternatives 1A and 1B.

Alternative 2 includes the following unique biophysical characteristics that are not included in the proposed essential fish habitat or Alternatives 1A and 1B:

- Medium to high relief rocky reefs in Carrington Point MR will likely protect numerous rockfish species, including bocaccio, vermilion, canary, yellowtail, and olive rockfish;
- Unconsolidated mud, sand and gravel habitats at Judith Rock MR will likely protect various species of interest including sea cucumber, spot prawn, thornyhead, sablefish, sardine, anchovy, mackerel and thresher shark;
- Additional area over the continental shelf and slope north of Anacapa Island will likely protect benthic species, such as sea cucumber, ridgeback and spot prawns and halibut, and pelagic species such as squid, sardine, anchovy, mackerel, tunas, billfish, swordfish, and various sharks; and
- Additional area south of Santa Rosa Island at South Point will likely protect benthic species, such as sea cucumber, spot prawn, halibut, thornyhead, and sablefish, and pelagic species such as squid, white seabass, sardine, anchovy, mackerel, and thresher shark.

The average width (short axis) across marine zones in Alternative 2 is 3.3 nmi with a range from 1.1 nmi at Judith Rock MR to 6.8 nmi at Richardson Rock MR. The regions on the south side of San Miguel Island and the north sides of Santa Cruz and Anacapa islands are not well represented in marine zones proposed in Alternative 2.

The addition of a marine reserve at Carrington Point (Santa Rosa Island) and the extension of the South Point MR (Santa Rosa Island) increase the likelihood that the proposed marine zones in Alternative 2 will function as an ecological network.

5.1.6 *Cumulative Ecological Effects*

This section discusses and analyzes the cumulative ecological impacts of the proposed action when viewed in the context of other influences on the ecosystem. As noted above, fished species are most likely to be impacted by the proposed action. Past, present, and foreseeable future impacts (both human-caused and natural) that affect fishery resources need to be considered for a full evaluation of potential ecological consequences of the proposed action. Regulatory actions that influence the amount, timing, and location of fishing in the area may complement and contribute to the Sanctuary's goals for this proposed action. The proposed rule published by NOAA dated May 19, 2006 (71 FR 29096) will implement the most recent management plan review for the CINMS. The rule was considered in the analysis, but was determined not to have adverse or beneficial impacts on the users being impacted by this action. Thus, it is not a factor in this cumulative effects analysis.

In addition to the State marine zones in the CINMS, other spatial closures implemented by NMFS, PFMC and other agencies with various objectives are located within the project area. Refer to Appendix F for a list of fishery management measures in the region. Not all of the measures listed in Appendix F are relevant for a cumulative effects analysis, however, because many are applicable to the larger region and are made less relevant by the more stringent regulations that affect the Sanctuary analyzed in this section. For the purposes of this analysis, the following measures are considered:

- Trawl "Rockfish Conservation Area" (RCA), non-trawl RCA, and Recreational RCA
- The Cowcod Conservation Area;
- Amendment 19 to the Groundfish FMP (Designation of Essential Fish Habitat (EFH) and Habitat Area of Particular Concern (HAPC))
- Proposition 132 – Gill net Restriction;
- Temporal seabird and marine mammal closures; and
- Marine Life Protection Act (MLPA).

The first groundfish RCAs were established in 2002 by the PFMC and NMFS. The purpose of these fishery closures is to protect overfished shelf rockfish species. The following eight species of West Coast groundfish were declared overfished by NMFS, and protected within the Rockfish Conservation Areas: Cowcod, canary rockfish (northern and central California), darkblotched rockfish, Pacific ocean perch, lingcod, bocaccio, widow rockfish, and yelloweye rockfish.

The locations of the RCA boundaries are set in order to minimize opportunities for vessels to incidentally take overfished rockfish by eliminating fishing in areas where and times when those overfished species are likely to co-occur with other groundfish. The current RCAs prohibit trawling for rockfish, halibut, sea cucumbers, and ridgeback prawn from shoreline out to 150 fathoms (0 - 274 m) around the Channel Islands. Commercial fishing for rockfish with gear other than trawls is prohibited between 60 – 150 fathoms (110 – 274 m). Recreational fishing for rockfish is prohibited in the entire EEZ in January and February and between 60 fathoms (110 m) and the EEZ March thru December.

It is important to note that the depths of the RCAs have changed over time. Initially, the non-trawl closure extended from 20 – 150 fathoms (37 – 274 m). In 2004, the upper limit of the closed area was lowered to 60 fathoms (110 m). The RCAs are reviewed frequently by the PFMC and NMFS and the extent of the closures is likely to change again in the future. The closures may be removed entirely if and when the PFMC considers overfished rockfish species have recovered sufficiently to withstand continued fishing pressure.

Two "Cowcod Conservation Areas" (CCAs) were implemented in 2001 to protect cowcod. These areas are located off southern California, and are referred to as the Western CCA and Eastern CCA. The outer boundaries are defined by coordinates defining two polygons and extend inshore to 20 fathoms (37 m). The Western CCA overlaps the region surrounding Santa Barbara Island. Fishing for cowcod, lingcod, greenlings, California scorpionfish, California sheephead, cabezon, and ocean whitefish is prohibited within the CCA. The recovery of cowcod is estimated at approximately 90 years.

In 2006, NMFS adopted Amendment 19 to the Pacific Coast Groundfish Fishery Management Plan (FMP). Amendment 19 provides for a program to describe and protect essential fish habitat (EFH)[28] for Pacific Coast Groundfish. The regulations seek to minimize to the extent practicable adverse impacts from fishing to EFH. NMFS implemented regulations to prohibit bottom contact gear[29] in the existing State marine zones and the proposed marine zones described in Alternative 1C.

Sensitive habitats, such as kelp, sea grass, rocky reefs and submarine features, were further designated as "habitat areas of particular concern" (HAPC). HAPCs are areas within EFH that are ecologically important, sensitive, stressed or rare habitats or places. The designation of

[28] Essential Fish Habitat is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (16 U.S.C. 1802 (10)).

[29] Bottom Contact Gear is defined as fishing gear designed or modified to make contact with the bottom. This includes, but is not limited to, beam trawl, bottom trawl, dredge, fixed gear, set net, demersal seine, dinglebar gear, and other gear (including experimental gear) designed or modified to make contact with the bottom. Gear used to harvest bottom dwelling organisms (e.g. by hand, rakes, and knives) are also considered bottom contact gear for purposes of this subpart.

HAPCs could allow the PFMC and NMFS to focus their attention on conservation priorities during review of proposals and give the fish species within a HAPC an extra buffer against adverse impacts. NMFS designated the existing State marine zones and the proposed marine zones described in Alternative 1C as HAPCs.

The proposed action partially supplements the fishery closures described above. The designation of marine reserves in or near areas protected by fishery closures adds another layer of protection, further ensuring that no fishing will occur on targeted species in the fishery closures and the adjacent areas protected by the marine reserves. Protection of the water column and all biophysical characteristics of marine reserves likely will enhance the recovery of targeted species protected by fishery closures by eliminating bycatch, and by increasing protection of habitats. Synergistic effects may result from protection by marine reserves of species and ecological processes consistent and adjacent to fishery closures.

The spatial overlap between proposed marine zones in the preferred alternative and the various fishery closures ranges between 0 and 100 percent for individual proposed marine zones (Table 24). Synergistic effects are likely to occur in areas where the proposed marine zones and fishery closures are spatially consistent.

Table 24: Estimated Percent Spatial Overlap of Existing and Proposed Marine Zones with the Various Fishery Closures

	Fishery Closures in Existing State Marine Zones		Fishery Closures in Alternative 1A		Fishery Closures in Alternative 1B		Fishery Closures in Alternative 1C		Fishery Closures in Alternative 2	
Location	**RCA[1]/ CCA[2]**	**HAPC[3]**	**RCA/ CCA**	**HAPC[3]**	**RCA/ CCA**	**HAPC[3]**	**RCA/ CCA**	**HAPC[3]**	**RCA/ CCA**	**HAPC[3]**
Anacapa Island MCA[4]	6.3	100	28.7	100	100	100	100	100	51.9	67.6
Anacapa Island MR[5]	20.8	100	39.0	100	100	100	100	100	58.3	68.3
Carrington Point MR	0	100	0	100	0	100	0	100	10.3	39.5
Footprint MR	No Existing Zone	No Existing Zone	14.7	100	14.7	100	10	100	14.6	100
Gull Island MR	30.1	100	15.0	100	3.0	100	0	100	14.7	100
Harris Point MR	0	100	8.9	100	12.9	100	17.7	100	8.7	100
Judith Rock MR	33.3	100	33.2	100	0.0	100	0	100	45.5	51.9
Richardson Rock MR	9.9	100	32.7	100	50.1	100	59.7	100	40.7	81.8
Santa Barbara Island MR	19.7[1]/ 100[2]	100	4.9[1]/ 100[2]	100	0.5[1]/ 100[2]	100	0.5[1]/ 100[2]	100	4.9[1]/ 100[2]	100
Scorpion MR	35.9	100	67.7	100	100	100	100	100	68.1	100
South Point MR	35.1	100	36.2	100	39.2	100	4.8	100	22.8	58.6
Skunk Point MR	0	100	0	100	0	100	0	100	0	100
Painted Cave MCA	0	100	0	100	0	100	0	100	0	100

[1]*Rockfish Conservation Area (60 – 150 fathoms)*
[2]*Cowcod Conservation Area (20 fathoms out to boundary defined by geographic coordinates)*
[3]*Habitat Areas of Particular Concern. Designated by PFMC and NOAA Fisheries.*
[4] *Marine Conservation Area*
[5] *Marine Reserve*

Proposition 132, known as the Marine Resources Protection Act, was a public initiative passed in 1990 that prohibits the use of gillnets in portions of State waters south of Point Arguello, California. The prohibition encompasses one mile around the Channel Islands, including a

portion of the State marine zones. The proposed action supplements the closures by establishing mostly no-take zones that further protect species from human disturbance.

The U.S. Department of the Interior's Fish and Wildlife Service and Channel Islands National Park have seasonal area closures to protect nesting birds and marine mammals. In accordance with regulations and the delegated authority provided in Title 36, Code of Federal Regulations ("36 CFR"), Chapter 1, Parts 1-7, authorized by Title 16 United States Code, Section 3, the Channel Islands National Park imposes seasonal closures to protect nesting birds and marine mammals. In addition, the U.S. Fish and Wildlife Service in the Department of the Interior and the NOAA Fisheries Service in the Department of Commerce share responsibility for administration of the Endangered Species Act and the Marine Mammal Protection Act (CDFG 2002, NOAA 2006). The proposed action would supplement these closures by establishing mostly no-take zones that further protect species from human disturbance.

The Marine Life Protection Act (MLPA) Initiative was adopted by the FGC in 2005 to improve the array of MPAs existing in State waters. The MLPA initiative calls for a plan to establish networks of MPAs to protect the diversity and abundance of marine life and the integrity of marine ecosystems.

The proposed action complements and augments the MLPA. The MLPA and the proposed action both outline an ecosystem-based management approach to protect marine populations, habitats, and ecological linkages in the SCB.

California's Marine Life Management Act (MLMA) was passed in 1999 and outlined significant changes in the philosophy and implementation of marine management. It shifted management from a single-species approach, focused on economically important species, to an ecosystem-based approach. The MLMA acknowledges the need to protect all species and their habitats to manage and conserve marine living resources. The MLMA outlines a precautionary approach to management in that it assumes regulatory action before significant impacts occur on marine species or habitats. The proposed action would complement the MLMA. The proposed action could be considered one component of the ecosystem-based management approach mandated in the MLMA.

Historical spot prawn trawling within the Sanctuary most commonly occurred along the northern extent of the sanctuary in deeper waters. In 2003 the PFMC adopted a spot prawn trawling closure to address concerns of potential damage to high relief habitat from roller gear and from overall bycatch, particular finfishes, relative to spot prawn catch. Both alternatives are spatially consistent with portions of the historical trawling grounds. The proposed action would likely increase protection of spot prawn and bocaccio populations and habitats in the Sanctuary because other extractive activities that may target those species, such as spot prawn traps, are prohibited within the marine zone bounds.

5.2 Socioeconomic Impacts

This section provides a summary of the socioeconomic impacts of the alternatives using socioeconomic information gathered through 2003. Included in this section is a brief summary of the potential costs and benefits from the alternatives. This section does not, however, provide detailed comprehensive analyses of the consumptive and non-consumptive uses of the CINMS. More detailed analyses and documentation of the approach, methods, data and comparative analyses with respect to designated marine reserves in State waters is available in CDFG (2002) and for the whole CINMS in Leeworthy, Wiley and Stone (2005). These documents are incorporated by reference in this FEIS.

The socioeconomic impacts described for Alternatives 1A and 1B below are relatively identical. Alternative 1C would result in unprotected gaps between the Federal and State marine zones until the FGC closes the gaps. However, the socioeconomic impacts are only nominally different from those described for Alternatives 1A and 1B. As such, the socioeconomic impacts of all three sub-alternatives analyzed below are referred to as "Alternative 1".

5.2.1 *Methodology Used in This Socioeconomic Analysis*

5.2.1.1 Step 1 Analyses

The socioeconomic analyses are based on a two-step approach. Step 1 analyses describe the potential impacts of each alternative and a comparison of impacts of alternatives for commercial fisheries, and for consumptive recreational and commercial (e.g., charter) activities (Leeworthy and Wiley 2005). The analyses also provide an aggregate consumptive impact assessment. The Step 1 analyses add all the activities displaced from marine reserve and conservation areas, with the worst-case and conservative assumption that all is lost, i.e., there is no mitigation or off-sets through behavioral responses.

The Step 1 analyses describe maximum potential loss of income for consumptive activities for the additional State waters, for Federal waters, and in the total of new reserves and conservation areas. Leeworthy, Wiley and Stone (2005) provide analyses of the existing State reserves and the cumulative impacts for each alternative.

The data used in this analysis are the best available at the time of the analysis. It is important to note that adding additional recent data in the analysis would not necessarily provide better estimates of potential impacts. The data and results of the analysis were reviewed and approved by the fishermen's data review committee, and by commercial fishing organizations. Economic impacts were assessed for over 40 alternatives for the commercial fishers during the MRWG process, and several additional alternatives were reviewed during the Federal phase of the process.

The analyses in this FEIS include summaries of the comprehensive analysis found in Leeworthy, Wiley and Stone (2005). The assessment of socioeconomic impact in this analysis is based on the best available information. Although some of the information is several years old, this information was the only spatially distributed data available for this analysis. Thus, the maximum potential loss estimates in this FEIS are likely to be over-estimates as compared to what would be found using 2000-2003 data. The distributions represent a historical average of areas fished over four to five year periods, and the information was provided by fishers. More recent trends show that for some species, the 2000-2003 averages are better measures of what could be sustainable than the 1996-1999 average used in prior analyses. Economic impacts were updated based on these new assessments of what is sustainable, and can be found in Leeworthy, Wiley and Stone (2005).

The methodology and analysis of estimating potential socioeconomic impacts to commercial and recreational fishing support services and businesses are included as multiplier effects and are explained in detail in Leeworthy, Wiley and Stone (2005). The values of support services and businesses associated with commercial and recreational fishing are included in Tables 28, 29, 33, and 34. The impacts on support services and businesses associated with commercial fisheries are included in Table 33 and 34 below. Table 35 includes multiplier impacts for income and employment for recreational fishing.

Under NEPA guidelines, NOAA is required to consider cumulative impacts which include the impacts of the State marine reserves in the analysis. The analysis includes a consideration of cumulative impacts, which include impacts to kelp harvesting in the existing State marine zones. It is important to note that there is no impact to kelp harvesting in the Federal water marine zones.

Substitution/relocation, replenishment effects, the effects of other regulations, the current and future status of fishing stocks, and the benefits of marine reserves are not addressed in the Step 1 analyses. The Step 1 analyses therefore generally represent the expected maximum potential loss. However, although it is unlikely, in cases where significant congestion effects occur due to displacement and relocation of fishing effort, actual losses could exceed estimates of maximum potential loss.

Given the two alternatives, 14 species/species groups, two jurisdictions (State and Federal waters), 12 ports of landing and seven counties in the impact area, the Step 1 analyses include many tables with a great deal of detail in Leeworthy, Wiley and Stone (2005). Note that there is a disproportional impact by jurisdiction (State versus Federal waters) since density of recreational and commercial activity increases as one moves towards the islands.

5.2.1.2 Step 2 Analyses

Step 2 analyses qualitatively describe factors that contribute to potential costs and, when possible, the benefits of the establishment of marine reserves within the project area (Leeworthy and Wiley 2005). It is impossible to forecast all of the human and ecological responses and their interactions that may result from a designation of a network of marine reserves in State and Federal waters of the CINMS. All the benefits and costs of marine reserves cannot be quantified, and so a formal benefit-cost analysis was not conducted by Leeworthy, Wiley and Stone (2005). Instead, a "benefit-cost framework" is used; all potential benefits and costs are listed and quantified where possible in Leeworthy, Wiley and Stone (2005). Those benefits and costs that cannot be quantified are qualitatively discussed in the analyses.

In the Step 2 analysis, the potential short and long-term impacts, using an ecological-economic model, are noted in qualitative terms. It is not possible to estimate the net outcomes of how the ecological and economic processes will play out. The Step 2 analysis is more comprehensive, but also much less quantitative since all the benefits and costs of marine reserves cannot be quantified. The theoretical model used in this analysis suggests that the Step 1 estimates of "maximum potential loss" could be both under and over estimates of the impact. Final outcomes would be subject to a variety of ecological and economic responses that are difficult to predict. A complete characterization of the factors considered in the Step 2 analysis is found in Leeworthy, Wiley and Stone (2005).

5.2.1.3 The Study Area

Overall, Leeworthy, Wiley and Stone (2005) profile the potential costs to commercial and recreational fishers and non-consumptive users for each county within the seven-county study area. Figure 16 shows a map of the seven-county area defined as the area of socioeconomic impact. All seven counties are impacted by commercial fishing activities, and five counties (i.e., Santa Barbara, Ventura, Los Angeles, Orange and San Diego) are impacted by recreational activities.

Figure 16: Counties of Impact

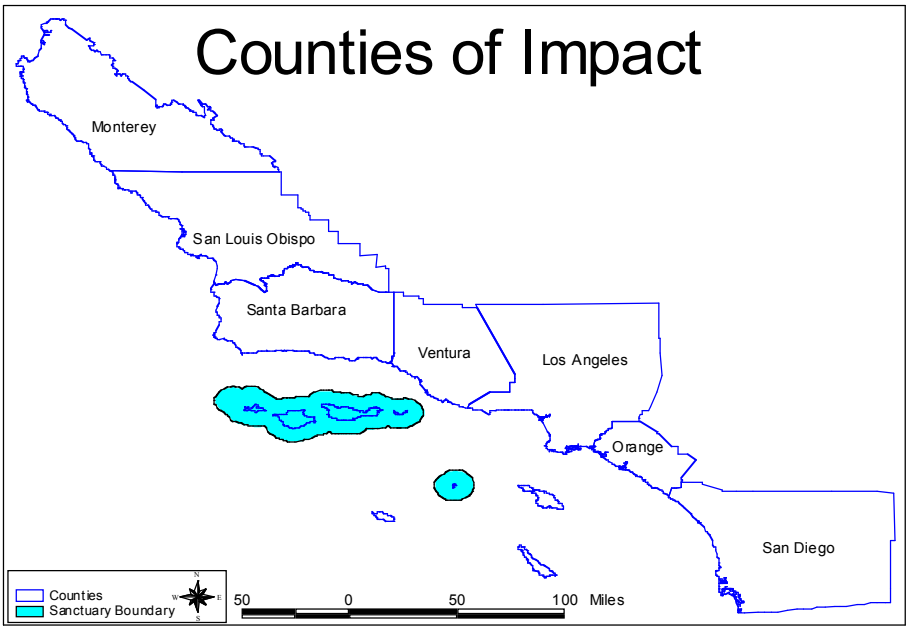


Table 24 depicts: 1) an aggregate for the average ex vessel value of the commercial fisheries in the CINMS for years 1996-2003 for 10 species/species groups; 2) the 2003 ex vessel value for rockfish, tuna and prawn, and the 2000-2003 average for CA Sheephead; and 3) consumptive and non consumptive recreational activities including person days of activities, total income generated by the activity in the seven county economy and the number of full and part time jobs. These estimates serve as the baseline from which the impacts of marine reserves and conservation areas are assessed. In the baseline, the top 14 species/species groups accounted for 99.47 percent of the commercial landings from the CINMS. Abalone fishing was halted in 1997, so for the baseline, abalone ex vessel value is zero. The economic baseline estimate for the Leeworthy and Wiley (2004) study is depicted in Table 25.

Table 24 Baseline Local/Regional Economic Dependence on CINMS (1996-2003)

Measurement	Kelp & Commercial Fishing	Consumptive Recreation	Total Consumptive Activities	Non-consumptive Recreation	All Activities
Ex Vessel Revenue[1]	$24,233,406	N/A	N/A	N/A	N/A
Person-days[2]	N/A	448,054	448,054	42,008	490,062
Income[3]	$71,649,959	$26,416,557	$98,066,505	$3,738,223	$101,804,728
Employment[4]	1,956	1,138	3,094	223	3,317

[1] *Includes revenue to fishermen plus processed value of kelp from ISP Alginates.*
[2] *Measure of recreation activity. One person doing an activity for any part of a day or a whole day.*
[3] *Total income generated by activity in seven-county local/regional economy, including multiplier impacts.*
[4] *Number of full and part time jobs generated in seven-county local/regional economy, including multiplier impacts.*

5.2.2 *Impacts To Commercial Fishing*

There is very little difference between Alternatives 1 and 2. The new proposed areas of Alternative 1 potentially impact 1.18% of ex vessel value of catch in the CINMS, while Alternative 2 potentially impacts 1.63% of ex vessel value in the CINMS. Estimated potential impacts, measured in terms of income and employment in the local county economies, also show slightly higher impacts for Alternative 2 (Table 25).

The analysis utilized multipliers created specifically for the commercial fishing industry. The multipliers were obtained from the Fishery Economic Assessment Model (FEAM). The FEAM was developed under contract to the PFMC, and is based on input-output models detailing inter-industry relationships. The FEAM was designed for regional economic analysis and processing of the commercial fishery landings taking place within each county where the port is located.

Table 25: Commercial Fishing & Kelp - Summary of Impacts by Alternative (Step 1 Analysis)

Alternative	Additional State	1%	Federal	%	Total New Proposal	%	Existing State	%	Cumulative Total	%
Ex Vessel Revenue [2]										
1	$159,955	0.66	$123,725	0.51	$283,680	1.18	$2,729,295	11.32	$3,012,975	12.5
2	$195,851	0.81	$196,732	0.82	$392,584	1.63	$2,729,295	11.32	$3,121,879	12.95
Income[3]										
1	$499,787	0.7	$439,661	0.61	$939,448	1.31	$8,544,396	11.93	$9,483,844	13.24
2	$658,443	0.92	$649,618	0.91	$1,308,061	1.83	$8,544,396	11.93	$9,852,457	13.75
Employment [4]										
1	15	0.77	13	0.66	28	1.43	246	12.58	274	14.01
2	20	1.02	19	0.97	39	1.99	246	12.58	285	14.57

1. *Percents are the percent of total baseline.*
2. *Ex vessel revenue received by fishermen and processed value of kelp, Baseline is equal to $24,103,965.*
3. *Income is total income, including multiplier impacts. Baseline is equal to $71,649,948.*
4. *Employment is total employment, including multiplier impacts. Baseline is 1,956 full and part-time jobs.*

5.2.2.1 Alternative 1 – Step 1 Analysis (Commercial Fishing)

This regulatory alternative potentially impacts about $283,700 in ex vessel value of catch or 1.18% of the annual ex vessel value of catch from the CINMS. There are zero additional impacts to kelp harvesters/processors under this alternative. In terms of absolute annual dollar amounts or ex vessel revenue, the largest potential impacts are on harvesters of squid, wetfish, urchins, prawn and rockfish; and the smallest impacts are on harvesters of California Sheephead, tuna, sea cucumbers, and sharks (Table 26). Ex vessel value is what the fishermen receive as revenue for their catch and only represents one category or portion of the total impact. Other categories include income and employment, among others.

As shown in Table 27, this regulatory alternative affects less than one percent of the ex vessel value of all catch landed at each port, except Port Hueneme (1.15%) and Channel Islands (1.04%).

The potential losses in annual ex vessel revenue translate into a maximum potential loss of about $939,000 in annual income and 28 full and part-time jobs in the seven-county regional economy. These amounts are tiny fractions of the seven-county regional economy (0.0002% for income and 0.0003% for employment; see Table 28 and Table 29).

Impact by Jurisdiction

There is a disproportional impact by jurisdiction (Additional State versus Federal waters) since, for most species/species groups, density of commercial fishing activity increases as one moves towards the islands. Additional State waters accounted for 20.39% of the Alternative 1 MPA area, while the remaining 79.61% is in Federal waters. However, 56.39% of the maximum potential loss for new MPAs in Alternative 1 occurs in State waters, compared with 43.61 % in Federal waters.

Although Alternative 1 only potentially impacts 1.18% of the annual ex vessel value of catch and harvest of kelp in the CINMS, the existing State MPAs potentially impact 11.32% of the annual ex vessel value of catch and harvest of kelp. Cumulatively, about $3 million in ex vessel value of catch and harvest of kelp or 12.5% of the total ex vessel value of catch and harvest of kelp in the CINMS is potentially lost. In terms of absolute amount of annual dollars lost, the largest impacts are to harvesters of squid, urchins, spiny lobsters and wetfish, while the smallest losses are to harvesters of tuna, shark and sculpin and bass. In terms of percentage of total ex vessel value of catch or harvest of kelp, the greatest potential impacts are on rockfish (23.93%), prawn (20.44%), and wetfish (19.04%), while the smallest impact was on kelp (5.48%). According to ISP Alginates, the impacts on kelp harvesting from existing State reserves have not occurred, and since ISP Alginates is closing operations, there will be no future impact. If kelp is removed from the analysis, the potential impact is reduced by $328,588 to $2,400,727 for the existing State reserves and a total cumulative impact of $2,684,406 or 14.8% of the total commercial fishing harvest in the CINMS ($2,684,406 / $18,112,598) without kelp.

The impact on ports and harbors is estimated to be concentrated in the ports in Santa Barbara, Ventura Harbor, Channel Islands, San Pedro and Terminal Island. In terms of percent of all ex vessel value of catch landed at the ports, the ports of Santa Barbara would be impacted the most (9.91%) followed by Port Hueneme (9.65%), Ventura Harbor (8.37%) and Channel Islands (7.85%). Only an estimated 1.04% of San Pedro's ex vessel value of landings would be potentially impacted and only 0.77% of Terminal Island's ex vessel value of landings would be potentially impacted (Table 27).

Cumulative Impacts

The potential cumulative losses in annual ex vessel revenue translate into a maximum potential cumulative loss of about $9.5 million in annual income and 274 full and part-time jobs in the seven-county regional economy. These amounts are tiny fractions of the seven-county regional economy (0.0016% for income and 0.0027% for employment; see Table 28 and Table 29).

Among counties, Ventura County would be the county with the largest potential impact. Ventura County would potentially cumulatively lose about $5.1 million in annual income and about 156

full and part-time jobs. Again, these amounts are tiny fractions of one percent of the Ventura County economy (0.0189% of income and 0.037% of employment).

Table 26: Commercial Fishing – Alternative 1 Study Area Totals, Ex Vessel Value by Species Groups

Species/ Species Group	Add'l State Value	%	Federal Value	%	Total: New Value	%	Existing St. Value	%	Total: Cumulative Value	%
Squid	70,603	0.65	42,362	0.39	112,965	1.05	1,355,606	12.57	1,468,572	13.61
Kelp	0	0.00	0	0.00	0	0.00	328,568	5.48	328,568	5.48
Urchins	38,247	0.89	0	0.00	38,247	0.89	656,403	15.19	694,650	16.08
Spiny Lobster	8,474	0.83	0	0.00	8,474	0.83	167,242	16.32	175,716	17.15
Prawn	19,694	9.33	16,995	8.06	36,689	17.39	6,431	3.05	43,120	20.44
Rockfish	7,250	4.74	9,054	5.92	16,304	10.66	20,278	13.26	36,582	23.93
Crab	1,767	0.43	0	0.00	1,767	0.43	58,924	14.21	60,692	14.63
Tuna	39	1.27	304	9.86	343	11.13	50	1.62	393	12.75
Wetfish	9,603	2.02	45,114	9.51	54,717	11.54	35,564	7.50	90,281	19.04
CA Sheephead	195	0.13	0	0.00	195	0.13	26,645	17.16	26,840	17.28
Flatfishes	1,157	0.53	3,826	1.75	4,983	2.28	23,760	10.88	28,743	13.17
Sea Cucumbers	690	0.31	0	0.00	690	0.31	37,030	16.68	37,720	16.99
Sculpin & Bass	1,891	2.03	5,300	5.69	7,191	7.72	8,360	8.97	15,551	16.69
Shark	345	1.00	770	2.24	1,115	3.24	4,431	12.88	5,546	16.12
Total	159,955	0.66	123,725	0.51	283,680	1.18	2,729,295	11.32	3,012,974	12.50

Table 27: Commercial Fishing - Alternative 1 Study Area Totals, Ex Vessel Value by Port

Port	Additional St Value	%[1]	Federal Value	%[1]	Total: New Value	%[1]	Existing St Value	%[1]	Total: Cumulative Value	%[1]
1. Moss Landing	$10	0.00	$20	0.00	$30	0.00	$98	0.00	$128	0.00
2. Morro Bay	$1,801	0.09	$1,557	0.07	$3,358	0.16	$1,460	0.07	$4,817	0.23
3. Avila/Port San Luis	$103	0.01	$91	0.01	$195	0.02	$1,561	0.12	$1,756	0.14
4. Santa Barbara	$42,955	0.58	$10,111	0.14	$53,066	0.71	$684,042	9.20	$737,108	9.91
5. Ventura Harbor	$24,255	0.50	$17,848	0.37	$42,104	0.87	$364,564	7.50	$406,668	8.37
6. Channel Islands	$26,072	0.65	$15,597	0.39	$41,669	1.04	$271,390	6.81	$313,059	7.85
7. Port Hueneme	$52,329	0.51	$65,951	0.64	$118,280	1.15	$873,265	8.50	$991,545	9.65
8. San Pedro	$6,232	0.05	$6,098	0.05	$12,330	0.11	$106,625	0.93	$118,955	1.04
9. Terminal Island	$5,307	0.04	$5,655	0.04	$10,962	0.08	$91,824	0.68	$102,786	0.77
10. Avalon & Other LA	$317	0.02	$333	0.02	$650	0.05	$1,845	0.14	$2,495	0.19
11. Newport Beach	$448	0.05	$386	0.04	$834	0.09	$374	0.04	$1,208	0.13
12. San Diego	$87	0.00	$79	0.00	$166	0.01	$2,677	0.11	$2,842	0.11

1. Percents are the amount of ex vessel value as a percent of the total ex vessel value of landings at the Port (1996-2003 Average Annual Value), for all species groups, except Prawn, Rockfish and Tuna, which were valued using 2003 value of landings and CA Sheephead that was valued using the 2000-2003 average value of landings.

Table 28: Commercial Fishing - Alternative 1 Study Area Totals, Total Income by County

County		Additional St	Federal	Total: New	Existing St	Total: Cumulative
Monterey		$44,045	$26,433	$70,477	$845,526	$916,003
	%	0.0003	0.0002	0.0005	0.0065	0.0070
San Luis Obispo		$4,305	$3,675	$7,981	$6,412	$14,393
	%	0.0001	0.0000	0.0001	0.0001	0.0002
Santa Barbara		$82,763	$12,207	$94,970	$1,387,502	$1,482,473
	%	0.0006	0.0001	0.0007	0.0101	0.0108
Ventura		$296,062	$336,617	$632,678	$4,483,234	$5,115,913
	%	0.0011	0.0012	0.0023	0.0166	0.0189
Los Angeles		$71,559	$59,808	$131,366	$1,298,161	$1,429,528
	%	0.0000	0.0000	0.0000	0.0004	0.0005
Orange		$900	$783	$1,683	$811	$2,494
	%	0.0000	0.0000	0.0000	0.0000	0.0000
San Diego		$153	$139	$292	$522,749	$523,041
	%	0.0000	0.0000	0.0000	0.0005	0.0005
All 7 Counties		$499,787	$439,661	$939,448	$8,544,396	$9,483,844
	%	0.0001	0.0001	0.0002	0.0015	0.0016

Table 29: Commercial Fishing Impacts of Alternative 1 on Total Employment by County

County		Additional St	Federal	Total: New	Existing St	Total: Cumulative
Monterey		1	1	2	25	27
	%	0.0006	0.0003	0.0009	0.0106	0.0115
San Luis Obispo		0	0	0	0	1
	%	0.0001	0.0001	0.0002	0.0002	0.0004
Santa Barbara		3	0	3	45	48
	%	0.0011	0.0002	0.0012	0.0177	0.0189
Ventura		9	10	19	136	156
	%	0.0021	0.0024	0.0046	0.0324	0.0370
Los Angeles		2	2	3	34	38
	%	0.0000	0.0000	0.0001	0.0006	0.0007
Orange		0	0	0	0	0
	%	0.0000	0.0000	0.0000	0.0000	0.0000
San Diego		0	0	0	5	5
	%	0.0000	0.0000	0.0000	0.0003	0.0003
All Counties		15	13	28	246	274
	%	0.0001	0.0001	0.0003	0.0024	0.0027

5.2.2.2 Alternative 1 – Step 2 Analysis (Commercial Fishing)

In Step 1 analysis, this regulatory alternative impacted an additional 1.18% of the ex vessel value of catch in the CINMS. If wetfish can be caught when they move outside the additional protected areas, the Step 1 impacts would be reduced to below one percent (0.95%) of the total ex value of commercial catch in the CINMS. Squid is also a coastal pelagic species. It is a possibility that squid could simply be caught when they move out of the protected areas and thus there would be no loss. If squid could be caught when they move out of the closed areas without loss of catch, this would further reduce the Step 1 losses from this alternative to less than one half of one percent (0.48%) of the total ex vessel value of catch from the CINMS. If it is assumed that 50% of squid could be caught when they move outside the closed areas, the impact of Step 1 would be reduced to about 0.7% of the total value of catch from the CINMS. The Sanchirico and Wilen (2001) model and the Sanchirico (2005) model suggest that there would be some losses to the commercial fisheries in the short-term, but less than the maximum potential losses estimated in Step 1. This conclusion might be muted to some extent for rockfish due to the Rockfish Conservation Areas and the Groundfish depth contour closures. These areas cover a large proportion of area both inside and outside the CINMS. This limits the possibility of commercial fishermen offsetting any losses from the marine reserves from remaining open areas, since there are few remaining open areas.

In the Step 1 analysis, the estimated impact to the prawn industry is $38,689 or about 13% of the $283,680 estimated total impacts across all commercial industries. Note, the prawn catch includes two separate fisheries for ridgeback and spot prawn. The trawl closure for spot prawns was implemented primarily due to concerns of habitat damage and overall levels of bycatch, particular finfishes, relative to the spot prawn catch. Statewide spot trawl landings were in a declining period in the early 2000's, and landings in the late 1990's had reached unprecedented high levels due to increased trawling effort. The fishery realized its highest catch ever in 1998. The decline in spot prawn catch stopped in 2003, and catch increased in each of the next two years.

In summary, because fishers should be able to offset many of the potential losses by shifting their efforts to remaining open areas, it can be expected that there will be short-term losses to the commercial fisheries from this alternative, but that they will be less than what was estimated in the Step 1 analyses.

In the long-term, if replenishment effects are greater than crowding or congestion effects, this alternative's long-term cost could be transformed into long-term benefits. Squid and wetfish, which are coastal pelagic species, account for a majority of the impact on the commercial fisheries from the added MPAs. It is not clear to what extent the added marine protected areas serve as sinks or sources for these species. In general, the results of Sanchirico (2005) suggest that marine reserves, under the current fishery management regime, would likely have net

benefits to the commercial fisheries. However, it is not clear that these general results will apply for this alternative. Overall, the impacts are small from this alternative and net cost or benefits to commercial fisheries are likely to be negligible, particularly when compared to the typical impacts from other factors such as changes to regional fishery regulations and increases in the cost of fuel.

Cumulative Impacts

In Step 1 analysis, the impact of this regulatory alternative was estimated to have a potentially cumulative impact of 12.5% of the total ex vessel value of catch from the CINMS. If wetfish can be caught when they move outside the additional protected areas, the Step 1 impacts would be reduced to 12.1% of the total ex value of commercial catch in the CINMS. If squid could also be caught when they move out of the closed areas without loss of catch, this would further reduce the Step 1 losses from this alternative to 6% of the total ex vessel value of catch from the CINMS. If it is assumed that 50% of squid could be caught when they move outside the closed areas, the impact of Step 1 would be reduced to about 9.1% of the total value of catch from the CINMS. In the short-term, therefore, less impact than estimated in Step 1 can be expected. The Sanchirico and Wilen (2001) model and the Sanchirico (2005) model suggest there will be short-term costs to the commercial fisheries, but less than the maximum potential costs.

In the long-term, whether replenishment effects are greater than crowding or congestion effects will determine if this alternative's long-term cost can be transformed into long-term benefits. The results of Sanchirico (2005) suggest that marine reserves, under the current fishery management regime, would likely have net benefits to the commercial fisheries. However, if commercial fishers do not accept these results, there could be increased social costs in terms of additional administrative activities and lawsuits, and increased costs of enforcement due to low compliance with the regulations. Both ecological and socioeconomic monitoring and education and outreach efforts may help to mitigate or avoid these social costs.

Other regulations can work towards mitigating, offsetting, avoiding costs, or increasing the costs. Some regulations are known to have short-term costs with long-term benefits to the fishermen. But because many fisheries are open access, fishermen that suffer the short-term costs (make an investment) are not guaranteed that they will receive the benefits (the return on investment).

Several issues are summarized in Table 30 to address potential cumulative impacts which shows that a time dimension is separated by the category of short-term (1 to 5 years) and long-term (5 to 20 years) impacts (Leeworthy and Wiley 2005). For the short-term, the net assessment for commercial fishing and kelp ranges between neutral impacts to an increase in costs beyond Step 1. The most important factors influencing this assessment are the current status of stocks (neutral except for rockfish and spot prawn), regulated inefficiency (which may decrease costs) and the SAP's recommendation that catch and/or effort be held constant in the remaining open

areas is not implemented (increases cost). The SAP recommended the effort displaced by marine reserves should exit the fisheries, i.e., the assumption of the Step 1 analysis. However, there is uncertainty about whether such catch and effort recommendations will be included in current and future fishery management plans. If not, the problem of crowding and congestion may result in increased costs (beyond Step 1 costs) in the short-term. In addition, the social costs of not accepting regulations, which might result in increased enforcement costs, may increase costs beyond those estimated in Step 1.

For the long-term, assuming replenishment effects (benefits), substitution/relocation (decrease costs), cowcod closure (benefits) and regulated inefficiency (may decrease costs) leads to a conclusion that impacts in Step 1 were likely overestimated and that there are reasonable possibilities of net benefits.

The proposed rule published by NOAA to implement the most recent management plan review for the CINMS (71 FR 29096) was also considered, but was determined not to have adverse or beneficial impacts on the users being impacted by this action, and thus it is not a factor in this cumulative effects analysis.

Table 30: Commercial Fishing and Kelp - Impacts Relative to Step 1 Analysis

Factors	Short-term	Long-term
1. Status of Fishing Stocks	O to l (rockfish)	O to l (rockfish)
2. Replenishment Effects	o	n
3. Substitution/Relcoation	o	o
4. Crowding/Congestion Effects	l	l
5. Quality Increases in Marine Reserves	O	O
6. Other Regulations		
a) Regulated Inefficiency	o	o
b) Proposition 132 (Gillnet Restriction)	O	O
c) Allocations to Other User Groups	l	l
d) Cowcod Closure	l	n
e) Opening up some Cowcod Closure Areas	o	o
f) MLPA - Closed Areas	O	O
g) MLMA Fishery Management Plans	O	O
h) ITQs currently not being considered	O to o	O to o
I) Existing Area Closures	O	O
j) Temporal Closures	l	l
k) Economic Conditions and Outside and Internal Forces	l	l
l) Rockfish Conservation Areas	O to o	o to l
m) Groundfish Closures	O to o	o to l
n) Spot Prawn Trawling Prohibition	O to o	o to l
7. Pelagic Species	o	o
8. Phasing	o	o
All Factors	O to l	o to n

O = Neutral Impact
l = Increase in costs from Step 1
o = Decrease in costs from Step 1
n = No costs from Step 1 - instead, benefits

Many fishery regulations are what economists describe as regulated inefficiency. Sometimes inefficiencies are imposed to more equitably spread out the benefits of a fishery by forcing all involved to adopt more economically inefficient methods of harvest. But in the commercial fisheries, fish is mostly a food product that competes with many food products. Over the long run, pressure builds and market forces work to the detriment of those that produce inefficiently. These are forces beyond the control of fishermen or fishery managers. Regulations that make the fisheries inefficient will lead towards a status quo (without marine reserves) downward path in the regulated activity. This would mean that the baseline estimates in Step 1 are overestimates of potential costs. The weekend closure of the squid fishery is a good example of regulated inefficiency. For a complete listing of existing fishery regulations please see Appendix E.

Management measures are often taken to prevent the collapse of a fishery. The cowcod closures and the Nearshore Fishery Management Plan for rockfish are good examples. The efforts here are on rebuilding stocks. The cowcod closure falls into that category of a regulation that requires investment to get a future return. The impacts that are estimated in Step 1 are in addition to the impacts already felt from the cowcod closure. There is no additional impact beyond what was estimated. The cowcod closure is not seen as a factor making the impact of the marine reserves greater than what was estimated in Step 1. If the cowcod closure works, it should be a long-term mitigating and offsetting factor making the estimates of impact overestimates in the long-term. Opening up the cowcod closure areas in the future will offset the losses to those pursuing species restricted by the cowcod closure. In the short-term, the Step 1 analyses overstate the costs when the cowcod closure, Nearshore Fishery Management Plan and Market Squid Fishery Management Plan are considered.

The existing State marine zones in the CINMS went into effect on April 9, 2003. In establishing additional zones outside the CINMS, it will be important to recognize the impact that these areas will have on consumptive users. In the Step 1 analysis, the additional impacts, from extending the existing State marine zones in the CINMS to additional State waters and Federal waters (this regulatory action), were evaluated and then the cumulative impact was evaluated.

The MLMA requires the establishment of FMPs, such as the Nearshore FMP and the Market Squid FMP. The Market Squid FMP calls for a limited entry program and a reduction in current capacity, thus the projected losses in the Step 1 analysis are likely overestimated. Until other fisheries management plans are finalized, cumulative impacts cannot be assessed.

One example of fishery management is the use of individual transferable quotas (ITQs). ITQs address the fundamental problems of open access, and common property resources. They allow users to benefit from investments in the fisheries. Issues of equity and efficiency can be addressed in initial assignments of quotas. ITQs likely would result in much greater initial reductions in capacity, income and employment in the commercial fisheries. But over the long-term this approach would most likely yield sustainable commercial fisheries that would have the

best chance of competing with other food products. The development of ITQs could lead to very high offsets of losses estimated in the baseline Step 1 analysis. However, to date there appear to be no serious efforts in this direction.

How ITQs would affect the recreational fishing community is unknown without addressing the details of one of the key first steps, allocation of a given allowable catch between the commercial and recreational fisheries. The usual approach is historical proportions. There is usually a dearth of data and analysis to support an economic approach, i.e., one that maximizes the value of the use of the resources. If ITQs were implemented in the commercial fisheries, the estimates of impact from marine reserves would be overestimates since implementation of the ITQs may result in much lower capacity in the fisheries.

Existing area and temporal closures also need to be addressed. The U.S. Department of the Interior's Fish and Wildlife Service and Channel Islands National Park have seasonal area closures to protect nesting birds. Regulations may have some additional impacts from what was estimated. Those regulations that were already in effect in areas that will now be marine reserves will mean no additional impact than was already estimated in Step 1, i.e., they were already accounted for in the Step 1 analysis. For those areas outside the marine reserves, the impacts would be in addition just as in other area closures discussed above.

5.2.2.3 Alternative 2 - Step 1 Analysis (Commercial Fishing)

This regulatory alternative potentially impacts about $392,600 in ex vessel value of catch or 1.63% of the annual ex vessel value of catch from the CINMS. There are zero additional impacts to kelp harvesters/processors under this alternative. In terms of absolute annual dollar amounts or ex vessel revenue, the largest potential impacts are on harvesters of squid, prawn, wetfish and urchins; and the smallest impacts are on harvesters of CA Sheephead, tuna, sea cucumbers, and sharks (Table 31). This regulatory alternative affects less than one percent of the ex vessel value of all catch landed at each port, except Port Hueneme (1.56%), Channel Islands (1.61%), and Ventura Harbor (1.43%) (Table 32).

The potential losses in annual ex vessel revenue translate into a maximum potential loss of about $1.3 million in annual income and 39 full and part-time jobs in the seven-county regional economy. These amounts are tiny fractions of the seven-county regional economy (0.0002% for income and 0.0004% for employment; see Table 33 and Table 34).

Impact by Jurisdiction

Even though there is an almost equivalent amount of ex vessel revenue potentially lost from both the additional State waters and Federal waters, there is a disproportional impact by jurisdiction (additional State versus Federal waters) since, for most species/species groups, density of

commercial fishing activity increases as one moves towards the islands. Additional State waters accounted for 17.58% of the Alternative 2 MPA area, while the remaining 82.42% is in Federal waters. However, 49.89% of the maximum potential loss for new MPAs in Alternative 2 occurs in State waters, compared with 50.11 % in Federal waters.

Although Alternative 2 only potentially impacts 1.63% of the annual ex vessel value of catch and harvest of kelp in the CINMS, the existing State MPAs potentially impact 11.32% of the annual ex vessel value of catch and harvest (including kelp). Cumulatively, about $3.1 million in ex vessel value of catch and harvest (including kelp) or 12.95% of the total ex vessel value of catch and harvest (including kelp) in the CINMS is potentially lost. In terms of absolute amount of annual dollars lost, the largest impacts are to harvesters of squid, urchins, kelp, spiny lobsters and wetfish, while the smallest losses are to harvesters of tuna, shark, and sculpin & bass. In terms of percentage of total ex vessel value of catch or harvest (including kelp), the greatest potential impacts are on prawn (37.13%), rockfish (23.93%), sculpin & bass (21.03%), and wetfish (19.53%), while the smallest impact was on kelp (5.48%). Again, according to ISP Alginates, the impacts on kelp harvesting from existing State reserves have not occurred, and since ISP Alginates is closing operations, there will be no future impact. If kelp is removed from the analysis, the potential impact is reduced by $328,588 to $2,400,727 for the existing State reserves and a total cumulative impact of $2,793,310 or 15.42% of the total commercial fishing harvest in the CINMS ($2,793,310 / $18,112,598) without kelp.

The impact on ports and harbors is estimated to be concentrated in the ports in Santa Barbara, Ventura Harbor, Channel Islands, San Pedro and Terminal Island. In terms of percent of all ex vessel value of catch landed at the ports, Port Hueneme would be impacted the most (10.05%) followed by the ports of Santa Barbara (9.97%), Ventura Harbor (8.93%) and Channel Islands (8.41%). Only an estimated 1.08% of San Pedro's ex vessel value of landings would be potentially impacted and only 0.80% of Terminal Island's ex vessel value of landings would be potentially impacted (Table 32).

Cumulative Impacts

The potential cumulative losses in annual ex vessel revenue translate into a maximum potential cumulative loss of about $9.85 million in annual income and 285 full and part-time jobs in the seven-county regional economy. These amounts are tiny fractions of the seven-county regional economy (0.0017% for income and 0.0028% for employment; see Table 33 and Table 34).

Among counties, Ventura County would be the county with the largest potential cumulative impact. Ventura County would potentially lose about $5.37 million in annual income and about 163 full and part-time jobs. Again, these amounts are tiny fractions of one percent of the Ventura County economy (0.0199% of income and 0.0388% of employment).

Table 31: Commercial Fishing - Alternative 2 Study Area Totals, Ex Vessel Value by Species Groups

Species/ Species Group	Additional State		Federal		Total: New		Existing State		Total: Cumulative	
	Value	%	Value	%	Value	%	Value	%	Value	%
Squid	105,904	0.98	70,602	0.65	176,506	1.64	1,355,606	12.57	1,532,113	14.20
Kelp	0	0.00	0	0.00	0	0.00	328,568	5.48	328,568	5.48
Urchins	29,511	0.68	2,205	0.05	31,716	0.73	656,403	15.19	688,119	15.93
Spiny Lobster	7,840	0.77	0	0.00	7,840	0.77	167,242	16.32	175,082	17.09
Prawn	19,694	9.33	52,202	24.74	71,896	34.08	6,431	3.05	78,327	37.13
Rockfish	6,651	4.35	9,652	6.31	16,304	10.66	20,278	13.26	36,582	23.93
Crab	5,740	1.38	0	0.00	5,740	1.38	58,924	14.21	64,665	15.59
Tuna	44	1.41	355	11.51	399	12.92	50	1.62	449	14.54
Wetfish	11,180	2.36	45,901	9.68	57,081	12.04	35,564	7.50	92,645	19.53
CA Sheephead	195	0.13	0	0.00	195	0.13	26,645	17.16	26,840	17.28
Flatfishes	4,260	1.95	6,140	2.81	10,400	4.76	23,760	10.88	34,160	15.65
Sea Cucumbers	1,614	0.73	0	0.00	1,614	0.73	37,030	16.68	38,644	17.41
Sculpin & Bass	2,797	3.00	8,441	9.06	11,237	12.06	8,360	8.97	19,598	21.03
Shark	421	1.22	1,235	3.59	1,656	4.81	4,431	12.88	6,087	17.70
Total	**195,851**	**0.81**	**196,732**	**0.82**	**392,584**	**1.63**	**2,729,295**	**11.32**	**3,121,878**	**12.95**

Table 32: Commercial Fishing - Alternative 2 Study Area Totals, Ex Vessel Value by Port

	Additional State		Federal		Total: New		Existing State		Total: Cumulative	
Port	**Value**	**%[1]**	**Value**	**%[1]**	**Value**	**%[1]**	**Value**	**%[1]**	**Value**	**%[1]**
Moss Landing	$20	0.00	$29	0.00	$49	0.00	$98	0.00	$146	0.00
Morro Bay	$1,803	0.09	$4,638	0.22	$6,441	0.31	$1,460	0.07	$7,901	0.38
Avila/Port San Luis	$91	0.01	$99	0.01	$189	0.02	$1,561	0.12	$1,750	0.14
Santa Barbara	$40,272	0.54	$17,308	0.23	$57,580	0.77	$684,042	9.20	$741,623	9.97
Ventura Harbor	$34,341	0.71	$34,976	0.72	$69,317	1.43	$364,564	7.50	$433,882	8.93
Channel Islands	$26,674	0.67	$37,475	0.94	$64,149	1.61	$271,390	6.81	$335,540	8.41
Port Hueneme	$75,613	0.74	$84,239	0.82	$159,852	1.56	$873,265	8.50	$1,033,117	10.05
San Pedro	$8,750	0.08	$8,719	0.08	$17,469	0.15	$106,625	0.93	$124,094	1.08
Terminal Island	$7,403	0.06	$7,594	0.06	$14,997	0.11	$91,824	0.68	$106,822	0.80
Avalon & Other LA	$305	0.02	$414	0.03	$719	0.05	$1,845	0.14	$2,564	0.19
Newport Beach	$445	0.05	$1,156	0.12	$1,601	0.17	$374	0.04	$1,975	0.21
San Diego	$81	0.00	$91	0.00	$172	0.01	$2,677	0.11	$2,848	0.11

Table 33: Commercial Fishing - Alternative 2 Study Area Totals, Total Income by County

County	Additional State	Federal	Total: New	Existing State	Total: Cumulative
Monterey	$66,061	$44,047	$110,108	$845,526	$955,634
%	0.0005	0.0003	0.0008	0.0065	0.0073
San Luis Obispo	$4,283	$10,769	$15,053	$6,412	$21,465
%	0.0001	0.0001	0.0002	0.0001	0.0003
Santa Barbara	$79,751	$24,932	$104,683	$1,387,502	$1,492,185
%	0.0006	0.0002	0.0008	0.0101	0.0109
Ventura	$403,168	$479,773	$882,940	$4,483,234	$5,366,175
%	0.0015	0.0018	0.0033	0.0166	0.0199
Los Angeles	$104,142	$87,609	$191,751	$1,298,161	$1,489,912
%	0.0000	0.0000	0.0001	0.0004	0.0005
Orange	$893	$2,325	$3,219	$811	$4,030
%	0.0000	0.0000	0.0000	0.0000	0.0000
San Diego	$144	$164	$307	$522,749	$523,056
%	0.0000	0.0000	0.0000	0.0005	0.0005
All 7 Counties	**$658,443**	**$649,618**	**$1,308,061**	**$8,544,396**	**$9,852,457**
%	**0.0001**	**0.0001**	**0.0002**	**0.0015**	**0.0017**

Table 34: Commercial Fishing Impacts of Alternative 2 on Total Employment by County

County	Additional State	Federal	Total: New	Existing State	Total: Cumulative
Monterey	2	1	3	25	28
%	0.0008	0.0006	0.0014	0.0106	0.0120
San Luis Obispo	0	0	1	0	1
%	0.0001	0.0003	0.0004	0.0002	0.0005
Santa Barbara	3	1	3	45	48
%	0.0010	0.0003	0.0013	0.0177	0.0190
Ventura	12	15	27	136	163
%	0.0029	0.0035	0.0064	0.0324	0.0388
Los Angeles	3	2	5	34	39
%	0.0000	0.0000	0.0001	0.0006	0.0007
Orange	0	0	0	0	0
%	0.0000	0.0000	0.0000	0.0000	0.0000
San Diego	0	0	0	5	5
%	0.0000	0.0000	0.0000	0.0003	0.0003
All 7 Counties	**20**	**19**	**39**	**246**	**285**
%	**0.0002**	**0.0002**	**0.0004**	**0.0024**	**0.0028**

5.2.2.4 Alternative 2 – Step 2 Analysis (Commercial Fishing)

In Step 1 analysis, this regulatory alternative impacted an additional 1.63% of the ex vessel value of catch in the CINMS. If wetfish can be caught when they move outside the additional protected areas, the Step 1 impacts would be reduced to 1.39% of the total ex value of commercial catch in the CINMS. If squid could be caught when they move out of the closed areas without loss of catch, this would further reduce the Step 1 losses from this alternative to less than one percent (0.66%) of the total ex vessel value of catch from the CINMS. If it is assumed that 50% of squid could be caught when they move outside the closed areas, the impact of Step 1 would be reduced to about 1.0% of the total value of catch from the CINMS. The Sanchirico and Wilen (2001) model and the Sanchirico (2005) model suggest that there would be some losses to the commercial fisheries in the short-term, but less than the maximum potential losses estimated in Step 1. This conclusion might be muted to some extent for rockfish due to the Rockfish Conservation Areas and the Groundfish depth contour closures. These areas cover a large proportion of area both inside and outside the CINMS. This limits the possibility of commercial fishermen offsetting any losses from the marine reserves from remaining open areas, since there are few remaining open areas. However, this fishery is in steep decline in the

CINMS and throughout the State of California and without serious action this fishery is likely to virtually disappear for many years.

In the Step 1 analysis, the estimated impact to the prawn industry is $71,896 or about 34% of the $392,584 estimated total impacts across all commercial fisheries. Prawn catch both in the CINMS and the State of California has been in decline since 2000. This fishery was in steep decline prior to the spot prawn trawling prohibition that took effect in 2003. Trap fishing is replacing trawling and so it is not clear if prawn catch will increase as fishermen adjust to the new regulations. If they do and catch increases, the short-term impacts could be greater than estimated in Step 1 for this fishery.

On net, short-term losses to the commercial fisheries from this alternative can be expected, but they should be less than estimated in Step 1 analyses. In the long-term, whether replenishment effects are greater than crowding or congestion effects will determine if this alternative's long-term cost can be transformed into long-term benefits. As noted above, squid and wetfish, which are coastal pelagic species, account for a majority of the impact on the commercial fisheries from the added MPAs. It is not clear to what extent the added areas serve as sinks or sources for these species. In general, the results of Sanchirico (2005) suggest that marine reserves, under the current fishery management regime, would likely have net benefits to the commercial fisheries. However, it is not clear that these general results will apply for this alternative. But overall the impacts are small from this alternative and net cost or benefits to commercial fisheries are likely to be small.

Cumulative Impacts

In Step 1 analysis, the impact of this regulatory alternative was estimated to have potentially cumulative impacts of 12.95% of the total ex vessel value of catch from the CINMS. If wetfish can be caught when they move outside the additional protected areas, the Step 1 impacts would be reduced to 12.6% of the total ex value of commercial catch in the CINMS. If squid could also be caught when they move out of the closed areas without loss of catch, this would further reduce the Step 1 losses from this alternative to 6.2% of the total ex vessel value of catch from the CINMS. If it is assumed that 50% of squid could be caught when they move outside the closed areas, the impact of Step 1 would be reduced to about 9.4% of the total value of catch from the CINMS. In the short-term, less impact than estimated in Step 1 is expected. The Sanchirico and Wilen (2001) model and the Sanchirico (2005) models suggest there will be short-term costs to the commercial fisheries, but less than the maximum potential costs.

In the long-term, whether replenishment effects are greater than crowding or congestion effects will determine if this alternative's long-term cost can be transformed into long-term benefits. The results of Sanchirico (2005) suggest that marine reserves, under the current fishery management regime, would likely have net benefits to the commercial fisheries. However, if

commercial fishermen do not accept these results, there could be increased social costs in terms of additional administrative activities and lawsuits, and increased costs of enforcement due to low compliance with the regulations. Both ecological and socioeconomic monitoring and education and outreach efforts may be required to mitigate or avoid these social costs.

For discussion of the effects of other regulations that can work towards mitigating, offsetting, avoiding costs, or increasing the costs, refer to section 5.2.2.2.

5.2.3 *Impacts To The Recreation Industry*

There is more of a difference between Alternatives 1 and 2 for consumptive recreational activities than for commercial fisheries. Alternative 2 potentially impacts an additional 1.4% of all consumptive recreation activity in the CINMS than Alternative 1 (Table 35).

Table 35: Summary of Consumptive Recreation Impacts by Alternative (Step 1 Analysis)

Alternative	Additional State	%[1]	Federal	%	Total New Proposal	%	Existing State	%	Cumulative Total	%
Person-Days [2]										
1	7,361	1.6	15,005	3.3	22,365	5	61,651	13.8	84,016	18.8
2	7,562	1.7	21,075	4.7	28,637	6.4	61,651	13.8	90,288	20.2
Income[3]										
1	$452,604	1.7	$935,292	3.5	$1,387,895	5.3	$3,275,128	12.4	$4,663,023	17.7
2	$465,200	1.8	$1,318,509	5	$1,783,709	6.8	$3,275,128	12.4	$5,058,837	19.2
Employment[4]										
1	20	1.8	42	3.7	62	5.4	138	12.1	200	17.6
2	21	1.8	59	5.2	79	6.9	138	12.1	217	19.1

1. *Percents are of total baseline.*
2. *Person-days of consumptive recreation activity is equal to 448,054.*
3. *Income is total income, including multiplier impacts. Baseline is equal to $26,416,557.*
4. *Employment is total employment, including multiplier impacts. Baseline is 1,138 full and part-time jobs.*

5.2.3.1 Alternative 1 - Step 1 Analysis (Recreational Consumptive Activities)

This regulatory alternative displaces about five percent (5.0%) of the annual person-days of consumptive recreation in the CINMS. The estimated maximum potential loss associated with this displacement is about $1.4 million in annual income and about 61 full and part-time jobs in the local county economies. Annual consumer's surplus loss to displaced consumptive recreators is estimated to be about $793,000. Charter/party boat operations could potentially lose

about $34,000 in annual profits (Table 37). The magnitude of impact varies by activity; however, fishing incurs a higher maximum potential loss than consumptive diving in the new MPAs. The activity that is most impacted is charter/party boat fishing, with a maximum potential loss of 10,490 person-days (6.95% of this activity in the CINMS), followed by private boat fishing with 9,625 person-days, charter/party boat diving with 1,423 person-days and private boat diving with 827 person-days (Table 37). In terms of income generated by the activity, charter/party boat fishing has a maximum potential loss of about $736,000, followed by private boat fishing with $501,000, charter/party boat diving with $122,000 and private boat diving with $28,000.

Zone Types

One of the new zones in Alternative 1, Anacapa Island, is a marine conservation area. This zone allows for the commercial and recreational take of lobster and recreational take of pelagic finfish. Although recreational fishing or consumptive diving data by species was not collected, the Recreational Fisheries Information Network (RecFIN) fishing location add-on to the Marine Recreational Fishery Statistics Survey (MRFSS) was used to estimate the proportion of recreational pelagic finfish by CDFG fish block. Using this proportion to eliminate pelagic finfish from the analysis, the model only takes into account prohibited species of finfish for this zone. Unfortunately, the sample did not include data for recreational taking of lobsters. As a result, this analysis may be an overestimate of actual maximum potential impact.

Impact by Jurisdiction

There is a disproportional impact by jurisdiction (additional State versus Federal waters) since density of recreational activity increases as one moves towards the islands. Additional State waters accounted for 20.39% of the Alternative 1 MPA area, while the remaining 79.61% is in Federal waters. However, 33% of the maximum potential loss for new MPAs in Alternative 1 occurs in State waters, compared with 67% in Federal waters.

Cumulative Impacts

While the current regulatory action only impacts about 5% of the annual activity and other associated socioeconomic impact measurements estimated here, the existing State MPAs impact 13.8% of the annual person-days of consumptive recreation in the CINMS. Displacement from the existing State MPAs has an estimated maximum potential annual loss of about $3.275 million in income and 138 full and part-time jobs in the local county economies. This is an additional percentage impact of about 12.4% of income and 12.1% of employment generated.

Consumer's surplus[30] losses from displacement from the existing State MPAs are estimated to be about $2.2 million and annual lost profits to charter/party boat operations are estimated to be about $58,000 (11% of all charter/party boat operation profits from activities in the CINMS). The estimated cumulative impact of the current regulatory action for this alternative is estimated to have an annual maximum potential loss of about 84,000 person-days of consumptive recreation, which is about 18.8% of all consumptive recreation in the CINMS. This displacement has an associated income impact of about $4.66 million and 200 full and part-time jobs in the local county economies (17.7% and 17.5% of all the income and employment generated by consumptive recreation in the CINMS, respectively). Cumulative annual maximum potential loss in consumer's surplus is estimated to be about $3 million, while annual lost profits to charter/party boat operations is estimated to be about $92,000 annually or 17.6% of the total annual profits of the charter/party boat operations from activity in the CINMS (Table 36).

Table 36: Summary of Consumptive Recreation Activities, Alternative (Step 1 Analysis)

	Additional State		Federal		Total: New Proposed		Existing State		Cumulative Total	
Person-days	7,361	1.6	15,005	3.3	22,365	5.0	61,651	13.8	84,016	18.8
Market Impact										
Direct Sales	$832,585	1.7	$1,718,897	3.5	$2,551,482	5.2	$6,037,997	12.4	$8,589,479	17.7
Direct Wages and Salaries	$319,563	1.7	$660,289	3.5	$979,852	5.2	$2,322,681	12.4	$3,302,533	17.7
Direct Employment	17.0	1.8	35.7	3.7	52.7	5.4	117.6	12.1	170.3	17.5
Total Income	$452,604	1.7	$935,292	3.5	$1,387,895	5.3	$3,275,128	12.4	$4,663,023	17.7
Total Employment	19.9	1.7	41.6	3.7	61.5	5.4	138.1	12.1	199.6	17.5
Non-Market Impact										
Consumer's Surplus	$260,869	1.6	$532,300	3.4	$793,168	5.0	$2,170,769	13.7	$2,963,937	18.7
Profit[1]	$10,693	2.0	$23,457	4.5	$34,151	6.5	$57,876	11.0	$92,027	17.6

[1] Profit is used as a proxy for producer's surplus. Producer Surplus is the amount received by producers of a good or service over and above what they would be willing to supply the service, which includes the cost of production plus a normal return on investment.

[30] Consumer Surplus is the amount that a person is willing to pay for a good or service over and above what they actually have to pay for a good or service. The value received is a surplus or net benefit. And, for natural resources, for which no one owns the resources and can't charge a price for use of the resources, consumer's surplus is referred to as a nonmarket economic value since the goods and services from the natural resources are not traded in markets. Consumer's surplus is applicable to both use and nonuse or passive use value.

Table 37: Consumptive Recreation, Maximum Potential Loss - Alternative 1

	Charter Boat Fishing		Charter Boat Diving		Private Boat Fishing		Private Boat Diving	
	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area
Additional State								
Person-days	3,121	2.07%	673	1.87%	3,226	1.51%	340	0.72%
Market Impact								
Direct Sales	$ 405,231	2.06%	$ 101,462	1.75%	$ 304,140	1.51%	$ 21,752	0.72%
Direct Wages and Salaries	$ 153,671	2.06%	$ 37,136	1.76%	$ 120,616	1.51%	$ 8,140	0.72%
Direct Employment	9.4	2.06%	2	1.68%	5.0	1.50%	0.4	0.81%
Total Income	$ 219,443	2.06%	$ 53,675	1.76%	$ 168,158	1.51%	$ 11,328	0.72%
Total Employment	10.8	2.06%	3	1.69%	6.1	1.50%	0.5	0.76%
Non-Market Impact								
Consumer's Surplus	$ 112,659	2.07%	$ 24,309	1.87%	$ 112,091	1.51%	$ 11,810	0.72%
Profit1	$ 9,260	2.07%	$ 1,434	1.87%	n/a	n/a	n/a	n/a
Federal								
Person-days	7,369	4.88%	750	2.08%	6,399	2.99%	487	1.03%
Market Impact								
Direct Sales	$ 954,719	4.86%	$ 129,720	2.24%	$ 603,298	2.99%	$ 31,160	1.03%
Direct Wages and Salaries	$ 362,097	4.86%	$ 47,275	2.24%	$ 239,256	2.99%	$ 11,661	1.03%
Direct Employment	22.2	4.86%	3	2.30%	10	2.99%	0.5	1.01%
Total Income	$ 517,050	4.86%	$ 68,455	2.24%	$ 333,560	2.99%	$ 16,228	1.03%
Total Employment	25.5	4.85%	3	2.28%	12.1	2.99%	0.6	1.02%
Non-Market Impact								
Consumer's Surplus	$ 265,979	4.88%	$ 27,057	2.08%	$ 222,346	2.99%	$ 16,917	1.03%
Profit1	$ 21,862	4.88%	$ 1,596	2.08%	n/a	n/a	n/a	n/a
Total New								
Person-days	10,490	6.95%	1,423	3.96%	9,625	4.50%	827	1.75%
Market Impact								
Direct Sales	$ 1,359,950	6.93%	$ 231,182	4.00%	$ 907,438	4.50%	$ 52,912	1.75%
Direct Wages and Salaries	$ 515,768	6.93%	$ 84,411	3.99%	$ 359,872	4.50%	$ 19,801	1.75%
Direct Employment	32	6.91%	5	3.98%	15	4.49%	1	1.81%
Total Income	$ 736,493	6.93%	$ 122,130	3.99%	$ 501,718	4.50%	$ 27,556	1.75%
Total Employment	36	6.91%	6	3.97%	18	4.50%	1	1.78%
Non-Market Impact								
Consumer's Surplus	$ 378,638	6.95%	$ 51,366	3.96%	$ 334,438	4.50%	$ 28,727	1.75%
Profit1	$ 31,121	6.95%	$ 3,029	3.96%	n/a	n/a	n/a	n/a
Existing State								
Person-days	15,167	10.05%	6,051	16.82%	28,320	13.23%	12,113	25.67%
Market Impact								
Direct Sales	$ 1,982,725	10.10%	$ 610,031	10.54%	$ 2,670,013	13.23%	$ 775,228	25.67%
Direct Wages and Salaries	$ 751,541	10.10%	$ 222,151	10.51%	$ 1,058,873	13.23%	$ 290,116	25.67%
Direct Employment	46	10.13%	14	11.03%	44	13.24%	13	25.60%
Total Income	$ 1,073,389	10.10%	$ 321,779	10.52%	$ 1,476,236	13.23%	$ 403,725	25.67%
Total Employment	53.2	10.12%	17	10.95%	53.3	13.24%	15	25.61%
Non-Market Impact								
Consumer's Surplus	$ 547,449	10.05%	$ 218,392	16.82%	$ 984,039	13.23%	$ 420,889	25.67%
Profit1	$ 44,996	10.05%	$ 12,880	16.82%	n/a	n/a	n/a	n/a
Cumulative Total								
Person-days	25,658	17.01%	7,474	20.77%	37,945	17.73%	12,940	27.42%
Market Impact								
Direct Sales	$ 3,342,675	17.03%	$ 841,213	14.54%	$ 3,577,451	17.73%	$ 828,140	27.42%
Direct Wages and Salaries	$ 1,267,309	17.03%	$ 306,562	14.51%	$ 1,418,745	17.73%	$ 309,917	27.42%
Direct Employment	78	17.04%	20	15.01%	59	17.73%	14	27.42%
Total Income	$ 1,809,882	17.03%	$ 443,908	14.52%	$ 1,977,953	17.73%	$ 431,281	27.42%
Total Employment	89	17.03%	23	14.91%	71	17.73%	16	27.40%
Non-Market Impact								
Consumer's Surplus	$ 926,087	17.01%	$ 269,758	20.77%	$ 1,318,477	17.73%	$ 449,616	27.42%
Profit1	$ 76,117	17.01%	$ 15,909	20.77%	n/a	n/a	n/a	n/a

1. Profit is used as a proxy for producer's surplus.

5.2.3.2 Alternative 1 – Step 2 Analysis (Recreational Consumptive Activities)

This regulatory alternative was estimated to potentially impact an additional 5% of the consumptive recreational activities in the CINMS. This alternative is weighted towards adding to the existing State marine reserves more than to marine conservation areas. Still, 5% of all consumptive recreation is a relatively low amount of activity and there would be a fairly high probability that adequate substitute areas could be found and significantly mitigate the short-term impacts. There may be little loss in total activity and the associated impacts on the local county economies; however, there will be some loss in consumer's surplus, but much less than estimated in Step 1 analysis. The main costs in the short-term will most likely come from added search costs in locating substitute sites.

In the long-term, losses would be further mitigated once adequate substitute sites are located. The size of the displacements is not large enough to result in significant crowding or congestion effects. This conclusion must be tempered with respect to rockfish, since the Rockfish Conservation Areas and Groundfish Closure areas cover so much of the CINMS that there are few places to find adequate substitutes. Recent regulations have relaxed some of the restrictions on the recreational fisheries and allow more recreational fishing. These actions will allow greater opportunities for recreational fishermen to find adequate substitute sites and mitigate any losses. There is a possibility under this alternative for there to be benefits from "edge effects" and/or spillover/replenishment effects from marine reserves. Of course, whether there are net benefits to consumptive recreation users depends on the complex mix of ecological and socioeconomic responses. If there are losses, it can be expected that they will be much smaller than estimated in Step 1 analysis and there is a possibility of net long-term gains to consumptive recreation.

Cumulative Impacts

In Step 1 analysis, this regulatory alternative potentially impacts 18.8% of all person-days of consumptive recreation activity in the CINMS. Most of the impact is attributed to the existing State MPAs. Additional costs of substituting to other sites could be expected, but much less than estimated in Step 1 analysis. Much of the cost may involve additional search costs of locating good substitute sites. Economists usually assume that there would be some loss in consumer's surplus, since those engaged in consumptive recreation are forced to make choices to go to new sites. The fact that they chose these sites to begin with is evidence that they valued these sites more highly. Some losses in the short-term can be expected, but much less than estimated in Step 1.

In the long-term, there is more time to learn about substitute sites and increase success in fishing and other consumptive activities. In addition, if there are "edge effects" or spillover/ replenishment effects that have been noted elsewhere from the more complete network of

existing and newly proposed MPA extensions, there is a possibility of net economic benefits to consumptive recreation. But as in the case of the commercial fisheries this conclusion will depend on the net interaction between the biophysical system and the human system. The human system includes fishery management. As was noted by Sanchirico (2005), in analysis of how the commercial fisheries might be impacted by marine reserves, some of the same conclusions are relevant. Currently, there is little discussion of management that would maximize the economic value of the fisheries and allocating fisheries based on their highest economic use. Marine reserves may provide long-term benefits to recreational fisheries and other consumptive recreation.

For discussion of the effects of other regulations that can work towards mitigating, offsetting, avoiding costs, or increasing the costs, refer to section 5.2.2.2.

In the Step 2 analyses of this section, the effect of possible mitigating factors on estimated Step 1 losses to consumptive users is investigated. Although these issues are addressed quantitatively where possible, the discussion is largely qualitative because it is generally not possible to quantify mitigating factors and benefits (Table 38). Even though substitution and the long-term benefits from replenishment effects were discussed in a previous section, for this section, these two important mitigating factors are revisited with a more pointed discussion about how they relate to recreation. Unlike the commercial fisheries, there is very little in the literature that addresses recreational fishing or other consumptive recreation and the impact of marine reserves once recreational behavior is modeled. The Sanchirico and Wilen (2001) and Sanchirico (2004 and 2005) studies have not attempted to model a bioeconomic model of recreational fishing in a spatial context. Random Utility Models (RUMs), now commonly used to model recreational behavior, do model spatial decision-making based on the relative cost of accessing sites and site attributes. The main focus of RUMs is to model substitution across sites, so the models are well suited to address the issue of marine reserves ex post. Review of the literature did not uncover any analyses of marine reserves and recreational behavior, especially any that could be used to speculate on a range of outcomes ex ante, as is required here. Table 38 provides a review of the impacts to recreational consumptive activities.

Table 38: Recreational Consumptive Activities - Impacts Relative to Step 1 Analysis

Factors	Short-term	Long-term
1. Status of Fishing Stocks	O	O to o
2. Replenishment Effects	o	n
3. Substitution/Relcoation	O to o	O to o
4. Crowding/Congestion Effects	l	l
5. Quality Increases in Marine Reserves	O	O
6. Other Regulations		
a) Regulated Inefficiency	o	o
b) Proposition 132 (Gillnet Restriction)	l	l
c) Allocations to Other User Groups	l	l
d) Cowcod Closure	l	o
e) Opening up some Cowcod Closure Areas	o	o
f) MLPA - Closed Areas	O	O
g) MLMA Fishery Management Plans	O	O
h) ITQs currently not being considered	O	O
I) Existing Area Closures	O to o	O to o
j) Temporal Closures	l	l
k) Economic Conditions and Outside and Internal Forces	l	l
l) Rockfish Conservation Areas	O to o	o to l
m) Groundfish Closures	O to o	o to l
n) Spot Prawn Trawling Prohibition	O to o	o to l
7. Pelagic Species	o	o
8. Phasing	o	o
All Factors	O to l	o to n

O = Neutral Impact
l = Increase in costs from Step 1
o = Decrease in costs from Step 1
n = No costs from Step 1 - instead, benefits

5.2.3.3 Alternative 2 - Step 1 Analysis (Recreational Consumptive Activities)

This regulatory alternative displaces about 6.4% of the annual person-days of consumptive recreation in the CINMS. The estimated maximum potential loss associated with this displacement is about $1.8 million in annual income and about 79 full and part-time jobs in the local county economies. Annual consumer's surplus loss to displaced consumptive recreators is estimated to be about $1 million. Charter/party boat operations could potentially lose about $45,000 in annual profits (Table 39). The magnitude of impact varies by activity; however, the maximum potential loss for fishing activities is more than twice as high than for diving activities. The activity that is most impacted is charter/party boat fishing, with a maximum potential loss of 14,007 person-days (9.28% of this activity in the CINMS), followed by private boat fishing with 12,149 person-days, charter/party boat diving with 1,613 person-days and private boat diving with 869 person days (Table 40). In terms of income generated by the activity, charter/party boat fishing has a maximum potential loss of about $983,000, followed by private boat fishing with $633,000, charter/party boat diving with $138,000 and private boat diving with $29,000.

Zone Types

One of the new zones in Alternative 2, Anacapa Island, is a marine conservation area. This type of zone allows for the commercial and recreational take of lobster and recreational take of pelagic finfish. Although recreational fishing or consumptive diving data by species was not collected, the RecFIN fishing location add-on to the MRFSS was used to estimate the proportion of recreational pelagic finfish by CDFG fish block. Using this proportion to eliminate pelagic finfish from the analysis, the model only takes into account prohibited species of finfish for these reserves. Unfortunately, the sample did not include data for recreational taking of lobsters. As a result, this analysis may be an overestimate of actual maximum potential impact.

Impact by Jurisdiction

There is a disproportional impact by jurisdiction (additional State versus Federal waters) since density of recreational activity increases as one moves towards the islands. Additional State waters accounted for 17.58% of the Alternative 2 MPA area, while the remaining 82.42% is in Federal waters. However, 26% of the maximum potential loss for new MPAs in Alternative 2 occurs in State waters, compared with 74% in Federal waters.

While the current regulatory action only impacts about 6.4% of the annual activity and other associated socioeconomic impact measurements estimated here, the existing State MPAs impact 13.8% of the annual person-days of consumptive recreation in the CINMS. Displacement from the existing State MPAs has an estimated maximum potential annual loss of about $3.275 million in income and 138 full and part-time jobs in the local county economies. This is an additional percentage impact of about 12.4% of income and 12.1% of employment generated.

Consumer's surplus losses from displacement from the existing State MPAs are estimated to be about $2.2 million and annual lost profits to charter/party boat operations are estimated to be about $58,000 (11% of all charter/party boat operation profits from activities in the CINMS). The estimated cumulative impact of the current regulatory action for this alternative is estimated to have an annual maximum potential loss of about 90,300 person-days of consumptive recreation, which is about 20.2% of all consumptive recreation in the CINMS. This displacement has an associated income impact of about $5 million and 217 full and part-time jobs in the local county economies (19.2% and 19.1% of all the income and employment generated by consumptive recreation in the CINMS, respectively). Cumulative annual maximum potential loss in consumer's surplus is estimated to be about $3.2 million, while annual lost profits to charter/party boat operations is estimated to be about $103,000 annually or 19.6% of the total annual profits of the charter/party boat operations from activity in the CINMS (Table 39).

Table 39: Consumptive Recreation Activities - Alternative 2 (Step 1 Analysis)

	Additional State		Federal		Total: New Proposed		Existing State		Cumulative Total	
Person-days	7,562	1.7	21,075	4.7	28,637	6.4	61,651	13.8	90,288	20.2
Market Impact										
Direct Sales	$855,662	1.8	$2,422,169	5.0	$3,277,831	6.7	$6,037,997	12.4	$9,315,828	19.2
Direct Wages and Salaries	$328,466	1.8	$930,955	5.0	$1,259,421	6.7	$2,322,681	12.4	$3,582,102	19.2
Direct Employment	17.5	1.8	50.5	5.2	68.0	7.0	117.6	12.1	185.6	19.1
Total Income	$465,200	1.8	$1,318,509	5.0	$1,783,709	6.8	$3,275,128	12.4	$5,058,837	19.2
Total Employment	20.5	1.8	58.9	5.2	79.3	7.0	138.1	12.1	217.4	19.1
Non-Market Impact										
Consumer's Surplus	$267,987	1.7	$748,105	4.7	$1,016,093	6.4	$2,170,769	13.7	$3,186,861	20.1
Profit[1]	$10,973	2.1	$34,012	6.5	$44,986	8.6	$57,876	11.0	$102,862	19.6

[1] *Profit is used as a proxy for producer's surplus.*

Table 40: Consumptive Recreation - Maximum Potential Loss (Alternative 2)

	Charter Boat Fishing		Charter Boat Diving		Private Boat Fishing		Private Boat Diving	
	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area
Additional State								
Person-days	3,204	2.12%	690	1.92%	3,337	1.56%	331	0.70%
Market Impact								
Direct Sales	$ 416,159	2.12%	$ 103,725	1.79%	$ 314,605	1.56%	$ 21,173	0.70%
Direct Wages and Salaries	$ 157,809	2.12%	$ 37,967	1.80%	$ 124,766	1.56%	$ 7,924	0.70%
Direct Employment	9.7	2.12%	2	1.76%	5.2	1.56%	0.3	0.60%
Total Income	$ 225,356	2.12%	$ 54,875	1.79%	$ 173,944	1.56%	$ 11,027	0.70%
Total Employment	11.2	2.12%	3	1.75%	6.3	1.55%	0.4	0.68%
Non-Market Impact								
Consumer's Surplus	$ 115,636	2.12%	$ 24,908	1.92%	$ 115,948	1.56%	$ 11,495	0.70%
Profit1	$ 9,504	2.12%	$ 1,469	1.92%	n/a	n/a	n/a	n/a
Federal								
Person-days	10,803	7.16%	923	2.56%	8,812	4.12%	538	1.14%
Market Impact								
Direct Sales	$ 1,398,939	7.13%	$ 157,999	2.73%	$ 830,792	4.12%	$ 34,439	1.14%
Direct Wages and Salaries	$ 530,594	7.13%	$ 57,998	2.74%	$ 329,475	4.12%	$ 12,888	1.14%
Direct Employment	32.5	7.11%	4	2.83%	14	4.10%	0.6	1.21%
Total Income	$ 757,642	7.13%	$ 83,592	2.73%	$ 459,341	4.12%	$ 17,935	1.14%
Total Employment	37.4	7.11%	4	2.81%	16.6	4.11%	0.7	1.19%
Non-Market Impact								
Consumer's Surplus	$ 389,917	7.16%	$ 33,301	2.56%	$ 306,190	4.12%	$ 18,698	1.14%
Profit1	$ 32,048	7.16%	$ 1,964	2.56%	n/a	n/a	n/a	n/a
Total New								
Person-days	14,007	9.28%	1,613	4.48%	12,149	5.68%	869	1.84%
Market Impact								
Direct Sales	$ 1,815,098	9.25%	$ 261,724	4.52%	$1,145,397	5.68%	$ 55,612	1.84%
Direct Wages and Salaries	$ 688,403	9.25%	$ 95,965	4.54%	$ 454,241	5.68%	$ 20,812	1.84%
Direct Employment	42	9.23%	6	4.59%	19	5.66%	1	1.81%
Total Income	$ 982,998	9.25%	$ 138,466	4.53%	$ 633,284	5.68%	$ 28,962	1.84%
Total Employment	49	9.23%	7	4.56%	23	5.66%	1	1.87%
Non-Market Impact								
Consumer's Surplus	$ 505,553	9.28%	$ 58,209	4.48%	$ 422,138	5.68%	$ 30,193	1.84%
Profit1	$ 41,553	9.28%	$ 3,433	4.48%	n/a	n/a	n/a	n/a
Existing State								
Person-days	15,167	10.05%	6,051	16.82%	28,320	13.23%	12,113	25.67%
Market Impact								
Direct Sales	$ 1,982,725	10.10%	$ 610,031	10.54%	$2,670,013	13.23%	$ 775,228	25.67%
Direct Wages and Salaries	$ 751,541	10.10%	$ 222,151	10.51%	$1,058,873	13.23%	$ 290,116	25.67%
Direct Employment	46	10.13%	14	11.03%	44	13.24%	13	25.60%
Total Income	$ 1,073,389	10.10%	$ 321,779	10.52%	$1,476,236	13.23%	$ 403,725	25.67%
Total Employment	53.2	10.12%	17	10.95%	53.3	13.24%	15	25.61%
Non-Market Impact								
Consumer's Surplus	$ 547,449	10.05%	$ 218,392	16.82%	$ 984,039	13.23%	$ 420,889	25.67%
Profit1	$ 44,996	10.05%	$ 12,880	16.82%	n/a	n/a	n/a	n/a
Cumulative Total								
Person-days	29,174	19.34%	7,663	21.30%	40,469	18.91%	12,982	27.51%
Market Impact								
Direct Sales	$ 3,797,823	19.34%	$ 871,755	15.07%	$3,815,410	18.91%	$ 830,840	27.51%
Direct Wages and Salaries	$ 1,439,944	19.34%	$ 318,116	15.05%	$1,513,114	18.91%	$ 310,928	27.51%
Direct Employment	89	19.36%	20	15.62%	63	18.90%	14	27.42%
Total Income	$ 2,056,387	19.34%	$ 460,245	15.05%	$2,109,520	18.91%	$ 432,687	27.51%
Total Employment	102	19.35%	23	15.51%	76	18.90%	16	27.48%
Non-Market Impact								
Consumer's Surplus	$ 1,053,001	19.34%	$ 276,601	21.30%	$1,406,177	18.91%	$ 451,082	27.51%
Profit1	$ 86,549	19.34%	$ 16,313	21.30%	n/a	n/a	n/a	n/a

1. Profit is used as a proxy for producer's surplus.

5.2.3.4 Alternative 2 – Step 2 Analysis (Consumptive Recreational Activities)

This regulatory alternative was estimated to potentially impact an additional 6.4% of the consumptive recreational activities in the CINMS. When compared to Alternative 1, this alternative has the greatest potential impact because of its increased size. Alternative 2 is more heavily weighted towards adding to the existing State marine reserves than to marine conservation areas, and, therefore, displaces significantly more consumptive recreation than Alternative 1. Still, 6.4% of all consumptive recreation is a relatively low amount of activity and there would be a fairly high probability that adequate substitute areas could be found and significantly mitigate the short-term impacts. There may be little loss in total activity and the associated impacts on the local county economies; however, there will be some loss in consumer's surplus, but much less than estimated in Step 1 analysis. The main costs in the short-term would most likely come from added search costs in locating substitute sites.

In the long-term, losses would be further mitigated once adequate substitute sites are located. The size of the displacements is not large enough to result in crowding or congestion effects. This conclusion must be tempered with respect to rockfish, since the Rockfish Conservation Areas and Groundfish Closure areas cover so much of the CINMS that there are few places to find adequate substitutes. Recent regulations have relaxed some of the restrictions on the recreational fisheries and allow more recreational fishing. These actions will allow greater opportunities for recreational fishermen to find adequate substitute sites and mitigate any losses. There is a higher probability under this alternative than Alternative 1 for there to be benefits from "edge effects" and/or spillover/replenishment effects from marine reserves. Of course, whether there are net benefits to consumptive recreation users still depends on the complex mix of ecological and socioeconomic responses. If there are losses, it can be expected that they will be much smaller than estimated in Step 1 analysis and there is a possibility of net long-term gains to consumptive recreation.

Cumulative Impacts

In step 1 analysis, this regulatory alternative potentially impacts 20.2% of all person-days of consumptive recreation activity in the CINMS. Most of the impact is attributed to the existing State MPAs. One might expect additional costs of substituting to other sites, but much less than estimated in Step 1 analysis. Much of the cost may involve additional search costs of locating good substitute sites. Economists usually assume that there would be some loss in consumer's surplus, since those engaged in consumptive recreation are forced to make choices to go to new sites. The fact that they chose these sites to begin with is evidence that they valued these sites more highly. Some losses in the short-term are expected, but much less than estimated in Step 1.

In the long-term, there is more time to learn about substitute sites and increase success in fishing and other consumptive activities. In addition, if there are "edge effects" or spillover/

replenishment effects that have been noted elsewhere from the more complete network of existing and newly proposed MPA extensions, there is a possibility of net economic benefits to consumptive recreation. But as in the case of the commercial fisheries this conclusion will depend on the net interaction between the biophysical system and the human system. The human system includes fishery management. As was noted by Sanchirico (2005), in analysis of how the commercial fisheries might be impacted by marine reserves, some of the same conclusions are relevant. If rational fishery management is not applied there are likely benefits from marine reserves. Rational fishery management here might be focused on allocation issues between commercial and recreational fisheries. Currently, there is little discussion of management that would maximize the economic value of the fisheries and allocating fisheries based on their highest economic use. Marine reserves may provide long-term benefits to recreational fisheries and other consumptive recreation.

For discussion of the effects of other regulations that can work towards mitigating, offsetting, avoiding costs, or increasing the costs, refer to sections 5.2.2.2 and 5.2.2.4.

5.2.4 *Total of All Consumptive Activities*

Alternative 1 has an estimated additional potential impact of about $2.3 million in lost income compared to almost $3.1 million in additional lost income by Alternative 2. Alternative 1 potentially impacts 1.40% of all the income generated by consumptive activities in the CINMS compared to 2.01% for Alternative 2. Results are similar for employment (Table 41).

Table 41: All Recreational and Commercial Consumptive Activities - Summary of Impacts by Alternative (Step 1 Analysis)

Alternative	Additional State waters	1%	Federal waters	%	Total New Proposal	%	Existing State MPAs	%	Cumulative Total	%
Income[2]										
1	$952,391	0.97	$1,374,953	1.4	$2,327,343	2.37	$11,819,524	12.1	$14,146,867	14.4
2	$1,123,643	1.15	$1,968,127	2.01	$3,091,770	3.15	$11,819,524	12.1	$14,911,294	15.2
Employment[3]										
1	35	1.1	55	1.8	90	2.9	384	12.4	474	15.3
2	41	1.3	78	2.5	119	3.8	384	12.4	503	16.3

1. Percents are the percent of total baseline.
2. Income is total income, including multiplier impacts. Baseline is equal to $26,416,557.
3. Employment is total employment, including multiplier impacts. Baseline is 1,138 full and part-time jobs.

5.2.5 *Non-Consumptive Recreational Activities*

In addition to benefits derived from replenishment effects, the establishment of marine reserve systems is expected to result in benefits to non-consumptive recreational users (e.g., wildlife viewers, divers). These increased benefits take the form of increases in diversity of wildlife, viewing opportunities from increased abundance of fish and invertebrates, etc. Benefits may also be derived from the decrease in the density of users or in the reduction in conflicts with consumptive users. There is no data currently available to directly estimate the magnitude of these benefits. In light of this fact a simulation is conducted for each alternative using a range of increases in quality and of elasticities. Quality elasticities show the percentage change in consumer's surplus for a percentage change in quality. In a paper by Freeman (1995), 13 studies were summarized on marine recreation, which contained enough information to calculate quality elasticities. Catch rate was the quality variable in all the studies in Freeman (1995). In a paper by Bockstael, *et al*. (1989) there was enough information to calculate quality elasticities for swimming, boating and fishing in the Chesapeake Bay. See Appendix G in Leeworthy, Wiley and Stone (2005) for the derivation of these elasticities. Using the range of quality elasticities and the assumption of a 10, 50, and 100 percent increase in quality, benefit estimates were calculated for each alternative. To avoid skewed results from outliers, the highest and lowest elasticities were dropped from this range.

For each alternative, four tables are provided. The first three tables report baseline 1999 activity within each alternative and their corresponding economic impact. More detailed tables are included in Appendix C of Leeworthy, Wiley and Stone (2005) for the baseline. The fourth table presents a range of potential impacts using a range of quality increases and quality elasticities. Quality increases are expected to grow over time. Elasticities also have a time dimension and in the short-term are smaller (less behavioral response to quality) and larger over the long-term (greater behavioral response). The number in the upper left corner of the tables reflects the smallest changes and the lower right corner of the tables yield the largest potential changes.

One other important point to bear in mind is that data was only available for charter/party boat non-consumptive recreation. This section does not take into account private boat non-consumptive use, for which there was no data available. Therefore estimates of aggregate benefits presented here will tend to underestimate true benefits due to the exclusion of private boat non-consumptive use in the calculations. A two-year study is now underway to quantify the amount of use, the economic value of use (both market and nonmarket economic value) and how these values change using a random utility model. The study also will attempt to relate uses to quality attributes so quality elasticities can be estimated.

It is also important to point out that in the 'benefits transfer/policy analysis simulation" four different measurements are addressed: 1) Consumer's surplus, 2) Income generated in the local county economies, 3) Employment generated in the local county economies and 4) Person-days

of activity. The quality elasticities are directly applicable to consumer's surplus. In a paper by Smith and Kaoru (1990) about 200 recreation value studies were summarized in a Meta analysis. One of the measures reported was the own price elasticity of demand. The range of own price elasticities were about the same as the range of quality elasticities, so this range of elasticities was used on all four concepts.

In the years 1999-2000, it is estimated that 6.3 million people age 16 or older from U.S. households participated in either bird watching, viewing other wildlife, viewing scenery or doing photography in the marine environment of California. They spent over 120.2 million days in these activities (Leeworthy 2001B and Leeworthy and Wiley 2001C). As a comparison, the same study estimated 2.7 million participants that participated in 20.3 million days of saltwater recreational fishing. Given the above estimates, the private boat non-consumptive use of the CINMS may be quite large.

5.2.5.1 Alternative 1 – Step 2 Analysis (Non-Consumptive Recreational Activities)

The baseline activity occurring in the newly protected areas amounts to 956 person-days or 2.3% of all non-consumptive recreation from charter/party/guide operations in the CINMS. This is still a relatively small addition because most non-consumptive recreation in the CINMS takes place in State waters closer to the islands. The aggregate economic impact on income associated with this activity is estimated to be about $84,300, which supports about 4 full or part-time jobs (Table 42). In terms of person-days of activity, non-consumptive diving was the lead activity with 439 person-days followed by whale watching with 433 person-days and sailing with 84 person-days (Table 43). There were no kayaking/sightseeing activities conducted in the new MPAs for this alternative. Whale watching is the most significant activity in Federal water portions of the proposed protected areas accounting for about 37 of the person-days of non-consumptive recreation in the proposed new MPA areas.

The results of the "benefits transfer/policy analysis simulation" to estimate a range on the possible benefits of the additional MPAs are summarized in Table 44. In terms of person-days of activity, the added activity could range from a low of just four person-days for a 10 percent increase in quality and a quality elasticity of 0.04 to a high of 4,301 additional person-days for a quality increase of 100 and a quality elasticity of 4.5. The estimated range of potential increases in income generated in the local county economies is between $337 and about $380,000. Consumer's surplus to non-consumptive recreators is estimated to range from $138 to $155,000.

Cumulative Impact

The existing State MPAs account for most of the potential improvement for non-consumptive recreators. Across all MPAs, 7,554 person-days of non-consumptive recreation took place in the 1999 baseline year. This was 18% of all the non-consumptive recreation by access to the

CINMS by charter/party boat and guide services. It was estimated that this activity generated about $679,000 in income and about 36 full and part-time jobs in the local county economies. This activity also generated about $89,000 in profits to charter/party boat and guide service operations and an estimated consumer's surplus to the non-consumptive recreators of $272,700 (Table 45).

The results of the "benefits transfer/policy analysis simulation" to estimate a range on the possible benefits of the additional and existing MPAs are summarized in Table 45. In terms of person-days of activity, the added activity could range from a low of just 30 person-days for a 10% increase in quality and a quality elasticity of 0.04 to a high of 33,994 additional person-days for a quality increase of 100% and a quality elasticity of 4.5. The estimated range of potential increases in income generated in the local county economies is between $2,717 and about $3 million. Consumer's surplus to non-consumptive recreators is estimated to range from $1,091 to $1.2 million.

Table 42: Summary of Non-Consumptive Recreation Activities (Economic Impact, Alternative 1)

	Additional State		Federal		Total: New Proposed		Existing State		Cumulative Total	
Person-days	313	0.7%	643	1.5%	956	2.3%	6,598	15.7%	7,554	18.0%
Market Impact										
Direct Sales	$ 50,288	0.7%	$ 110,055	1.6%	$ 160,343	2.3%	$ 1,130,945	15.9%	$ 1,291,288	18.2%
Direct Wages and Salaries	$ 18,313	0.7%	$ 40,025	1.6%	$ 58,338	2.3%	$ 411,290	15.9%	$ 469,628	18.2%
Direct Employment	1.1	0.6%	2.6	1.5%	3.7	2.1%	27.9	16.0%	31.6	18.2%
Total Income	$ 26,455	0.7%	$ 57,861	1.6%	$ 84,316	2.3%	$ 594,579	15.9%	$ 678,895	18.2%
Total Employment	1.3	0.6%	3.0	1.5%	4.2	2.1%	31.9	16.0%	36.1	18.1%
Non-Market Impact										
Consumer's Surplus	$ 11,291	0.7%	$ 23,205	1.5%	$ 34,496	2.3%	$ 238,166	15.7%	$ 272,662	18.0%
Profit1	$ 4,626	0.8%	$ 7,956	1.3%	$ 12,582	2.1%	$ 76,791	12.6%	$ 89,373	14.6%

1. Profit is used as a proxy for producer's surplus.

Table 43: Non-Consumptive Recreation (Economic Impact, Alternative 1)

	Whale Watching		NC Diving		Sailing		Kayaking/Sightseeing	
	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area
Additional State								
Person-days	82	0.32%	207	1.92%	24	0.61%	-	0.00%
Market Impact								
Direct Sales	$ 13,572	0.32%	$ 33,369	1.81%	$ 3,347	0.47%	$ -	0.00%
Direct Wages and Salaries	$ 4,940	0.32%	$ 12,155	1.82%	$ 1,218	0.47%	$ -	0.00%
Direct Employment	0.3	0.29%	0.8	1.77%	-	0.00%	-	0.00%
Total Income	$ 7,138	0.32%	$ 17,557	1.81%	$ 1,760	0.47%	$ -	0.00%
Total Employment	0.4	0.29%	0.9	1.74%	-	0.00%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 2,958	0.32%	$ 7,456	1.92%	$ 877	0.61%	$ -	0.00%
Profit1	$ 870	0.32%	$ 3,756	1.92%	$ 830	0.61%	$ -	0.00%
Federal								
Person-days	351	1.35%	233	2.16%	59	1.48%	-	0.00%
Market Impact								
Direct Sales	$ 58,484	1.36%	$ 41,530	2.26%	$ 10,041	1.41%	$ -	0.00%
Direct Wages and Salaries	$ 21,285	1.36%	$ 15,087	2.25%	$ 3,653	1.41%	$ -	0.00%
Direct Employment	1.4	1.34%	1.0	2.21%	0	1.13%	-	0.00%
Total Income	$ 30,759	1.36%	$ 21,823	2.26%	$ 5,280	1.41%	$ -	0.00%
Total Employment	1.6	1.34%	1.2	2.22%	0.2	0.99%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 12,659	1.35%	$ 8,402	2.16%	$ 2,145	1.48%	$ -	0.00%
Profit1	$ 3,724	1.35%	$ 4,232	2.16%	$ 2,029	1.48%	$ -	0.00%
Total New								
Person-days	433	1.67%	439	4.08%	84	2.09%	-	0.00%
Market Impact								
Direct Sales	$ 72,056	1.68%	$ 74,899	4.07%	$ 13,388	1.88%	$ -	0.00%
Direct Wages and Salaries	$ 26,225	1.68%	$ 27,242	4.07%	$ 4,871	1.88%	$ -	0.00%
Direct Employment	2	1.63%	2	3.97%	0	1.13%	-	0.00%
Total Income	$ 37,897	1.68%	$ 39,380	4.07%	$ 7,040	1.88%	$ -	0.00%
Total Employment	2	1.64%	2	3.96%	0	0.99%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 15,617	1.67%	$ 15,858	4.08%	$ 3,022	2.09%	$ -	0.00%
Profit1	$ 4,594	1.67%	$ 7,988	4.08%	$ 2,859	2.09%	$ -	0.00%
Existing State								
Person-days	3,878	14.92%	1,959	18.18%	403	10.04%	358	29.07%
Market Impact								
Direct Sales	$ 644,785	15.04%	$ 342,379	18.60%	$ 68,922	9.69%	$ 74,859	29.07%
Direct Wages and Salaries	$ 234,683	15.03%	$ 124,448	18.59%	$ 25,066	9.70%	$ 27,093	29.07%
Direct Employment	16	15.07%	9	18.76%	1.7	9.60%	2.0	29.85%
Total Income	$ 339,123	15.03%	$ 179,956	18.60%	$ 36,236	9.69%	$ 39,265	29.07%
Total Employment	18.0	15.05%	10	18.74%	2.0	9.65%	2.3	29.61%
Non-Market Impact								
Consumer's Surplus	$ 139,971	14.92%	$ 70,708	18.18%	$ 14,549	10.04%	$ 12,938	29.07%
Profit1	$ 41,173	14.92%	$ 35,618	18.18%	$ 13,767	10.04%	$ 777	29.07%
Cumulative Total								
Person-days	4,311	16.59%	2,398	22.26%	487	12.13%	358	29.07%
Market Impact								
Direct Sales	$ 716,841	16.72%	$ 417,278	22.67%	$ 82,310	11.57%	$ 74,859	29.07%
Direct Wages and Salaries	$ 260,908	16.71%	$ 151,690	22.66%	$ 29,937	11.58%	$ 27,093	29.07%
Direct Employment	17	16.70%	10	22.74%	2	10.73%	2	29.85%
Total Income	$ 377,019	16.71%	$ 219,336	22.67%	$ 43,275	11.58%	$ 39,265	29.07%
Total Employment	20	16.69%	12	22.71%	2	10.64%	2	29.61%
Non-Market Impact								
Consumer's Surplus	$ 155,588	16.59%	$ 86,566	22.26%	$ 17,571	12.13%	$ 12,938	29.07%
Profit1	$ 45,767	16.59%	$ 43,606	22.26%	$ 16,627	12.13%	$ 777	29.07%

1. Profit is used as a proxy for producer's surplus.

Table 44: Potential Benefits to Non-Consumptive Users from Alternative 1 (Step 2 Analysis)

Increase in Quality	Economic Measure	Elasticity of 0.04	Elasticity of 1.0	Elasticity of 4.5
10%				
	Consumer's Surplus	$ 138	$ 3,450	$ 15,523
	Income	$ 337	$ 8,432	$ 37,942
	Employment	0.017	0.42	1.89
	Person-days	4	96	430
50%				
	Consumer's Surplus	$ 690	$ 17,248	$ 77,616
	Income	$ 1,686	$ 42,158	$ 189,711
	Employment	0.084	2.10	9.45
	Person-days	19	478	2,150
100%				
	Consumer's Surplus	$ 1,380	$ 34,496	$ 155,233
	Income	$ 3,373	$ 84,316	$ 379,422
	Employment	0.168	4.20	18.90
	Person-days	38	956	4,301

1. Benefits are the aggregate amounts across all non-consumptive activities for Alternative 1

Table 45: Potential Benefits to Non-Consumptive Users from Alternative 1 (Cumulative, Step 2 Analysis)

Increase in Quality	Economic Measure	Elasticity of 0.04	Elasticity of 1.0	Elasticity of 4.5
10%				
	Consumer's Surplus	$ 1,091	$ 27,266	$ 122,698
	Income	$ 2,716	$ 67,889	$ 305,503
	Employment	0.144	3.61	16.22
	Person-days	30	755	3,399
50%				
	Consumer's Surplus	$ 5,453	$ 136,331	$ 613,490
	Income	$ 13,578	$ 339,447	$ 1,527,513
	Employment	0.721	18.03	81.11
	Person-days	151	3,777	16,997
100%				
	Consumer's Surplus	$ 10,906	$ 272,662	$ 1,226,980
	Income	$ 27,156	$ 678,895	$ 3,055,025
	Employment	1.442	36.05	162.23
	Person-days	302	7,554	33,994

1. Benefits are the aggregate amounts across all non-consumptive activities for Alternative 1.

5.2.5.2 Alternative 2 – Step 2 Analysis (Non-Consumptive Recreational Activities)

This regulatory alternative adds the most protected area that could potentially benefit non-consumptive recreators among all alternatives. The baseline activity occurring in the newly protected areas amounts to 2,136 person-days or 5.1% of all non-consumptive recreation from charter/party/guide operations in the CINMS. This is still a relatively small addition because most non-consumptive recreation in the CINMS takes place in State waters closer to the islands. The aggregate economic impact on income associated with this activity is estimated to be about $187,000, which supports about 10 full or part-time jobs (Table 46). In terms of person-days of activity, whale watching was by far the lead activity with 1,514 person-days followed by non-consumptive diving with 534 person-days and sailing with 88 person-days (Table 47). There were no kayaking/sightseeing activities conducted in the new MPAs of this alternative. Whale watching is the most significant activity in Federal water portions of the proposed protected areas, accounting for about 59 of the person-days of non-consumptive recreation in the proposed new MPA areas.

The results of "benefits transfer/policy analysis simulation" to estimate a range on the possible benefits of the additional MPAs are summarized in Table 48. In terms of person-days of activity, the added activity could range from a low of just nine person-days for a 10% increase in quality and a quality elasticity of 0.04 to a high of 9,614 additional person-days for a quality increase of 100% and a quality elasticity of 4.5. The estimated range of potential increases in income generated in the local county economies is between $748 and about $841,000. Consumer's surplus to non-consumptive recreators is estimated to range from $308 to $347,000.

Cumulative Impact

The existing State MPAs account for most of the potential improvement for non-consumptive recreators. Across all MPAs, 8,735 person-days of non-consumptive recreation took place in the 1999 baseline year. This was 20.8% of all the non-consumptive recreation by access to the CINMS by charter/party boat and guide services. It was estimated that this activity generated about $781,000 in income and about 42 full and part-time jobs in the local county economies. This activity also generated about $102,600 in profits to charter/party boat and guide service operations and an estimated consumer's surplus to the non-consumptive recreators of $315,300 (Table 49).

The results of the "benefits transfer/policy analysis simulation" to estimate a range on the possible benefits of the additional and existing MPAs are summarized in Table 49. In terms of person-days of activity, the added activity could range from a low of just 35 person-days for a 10% increase in quality and a quality elasticity of 0.04 to a high of 39,307 additional person-days for a quality increase of 100% and a quality elasticity of 4.5. The estimated range of potential increases in income generated in the local county economies is between $3,126 and about $3.5 million. Consumer's surplus to non-consumptive recreators is estimated to range from $1,261 to $1.4 million.

Table 46: Summary: Recreation Non-Consumptive Activities (Economic Impact, Alternative 2)

	Additional State		Federal		Total: New Proposed		Existing State		Cumulative Total	
Person-days	493	1.2%	1,643	3.9%	2,136	5.1%	6,598	15.7%	8,735	20.8%
Market Impact										
Direct Sales	$ 80,237	1.1%	$ 275,149	3.9%	$ 355,386	5.0%	$ 1,130,945	15.9%	$ 1,486,331	20.9%
Direct Wages and Salaries	$ 29,222	1.1%	$ 100,127	3.9%	$ 129,349	5.0%	$ 411,290	15.9%	$ 540,639	20.9%
Direct Employment	1.9	1.1%	6.7	3.9%	8.6	4.9%	27.9	16.0%	36.5	21.0%
Total Income	$ 42,213	1.1%	$ 144,700	3.9%	$ 186,913	5.0%	$ 594,579	15.9%	$ 781,492	20.9%
Total Employment	2.2	1.1%	7.7	3.8%	9.9	5.0%	31.9	16.0%	41.7	21.0%
Non-Market Impact										
Consumer's Surplus	$ 17,799	1.2%	$ 59,312	3.9%	$ 77,111	5.1%	$ 238,166	15.7%	$ 315,277	20.8%
Profit1	$ 6,638	1.1%	$ 19,155	3.1%	$ 25,793	4.2%	$ 76,791	12.6%	$ 102,584	16.8%

1. Profit is used as a proxy for producer's surplus.

Table 47: Non-Consumptive Recreation - Economic Impact (Alternative 2)

	Whale Watching		NC Diving		Sailing		Kayaking/Sightseeing	
	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area
Additional State								
Person-days	260	1.00%	213	1.98%	20	0.49%	-	0.00%
Market Impact								
Direct Sales	$ 42,529	0.99%	$ 34,361	1.87%	$ 3,347	0.47%	$ -	0.00%
Direct Wages and Salaries	$ 15,487	0.99%	$ 12,517	1.87%	$ 1,218	0.47%	$ -	0.00%
Direct Employment	1.0	0.96%	0.8	1.77%	0.1	0.56%	-	0.00%
Total Income	$ 22,374	0.99%	$ 18,080	1.87%	$ 1,760	0.47%	$ -	0.00%
Total Employment	1.2	0.96%	1.0	1.84%	0.1	0.50%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 9,388	1.00%	$ 7,696	1.98%	$ 715	0.49%	$ -	0.00%
Profit1	$ 2,762	1.00%	$ 3,877	1.98%	$ 676	0.49%	$ -	0.00%
Federal								
Person-days	1,254	4.83%	321	2.98%	68	1.69%	-	0.00%
Market Impact								
Direct Sales	$ 205,505	4.79%	$ 57,653	3.13%	$ 11,991	1.69%	$ -	0.00%
Direct Wages and Salaries	$ 74,829	4.79%	$ 20,941	3.13%	$ 4,357	1.69%	$ -	0.00%
Direct Employment	5.0	4.80%	1.4	3.09%	0	1.69%	-	0.00%
Total Income	$ 108,106	4.79%	$ 30,293	3.13%	$ 6,302	1.69%	$ -	0.00%
Total Employment	5.7	4.78%	1.6	3.09%	0.4	1.73%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 45,274	4.83%	$ 11,588	2.98%	$ 2,450	1.69%	$ -	0.00%
Profit1	$ 13,318	4.83%	$ 5,837	2.98%	$ 2,318	1.69%	$ -	0.00%
Total New								
Person-days	1,514	5.83%	534	4.96%	88	2.18%	-	0.00%
Market Impact								
Direct Sales	$ 248,034	5.78%	$ 92,014	5.00%	$ 15,338	2.16%	$ -	0.00%
Direct Wages and Salaries	$ 90,316	5.79%	$ 33,458	5.00%	$ 5,575	2.16%	$ -	0.00%
Direct Employment	6	5.76%	2	4.86%	0	2.26%	-	0.00%
Total Income	$ 130,480	5.78%	$ 48,372	5.00%	$ 8,062	2.16%	$ -	0.00%
Total Employment	7	5.74%	3	4.93%	0	2.23%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 54,662	5.83%	$ 19,283	4.96%	$ 3,165	2.18%	$ -	0.00%
Profit1	$ 16,079	5.83%	$ 9,714	4.96%	$ 2,995	2.18%	$ -	0.00%
Existing State								
Person-days	3,878	14.92%	1,959	18.18%	403	10.04%	358	29.07%
Market Impact								
Direct Sales	$ 644,785	15.04%	$ 342,379	18.60%	$ 68,922	9.69%	$ 74,859	29.07%
Direct Wages and Salaries	$ 234,683	15.03%	$ 124,448	18.59%	$ 25,066	9.70%	$ 27,093	29.07%
Direct Employment	16	15.07%	9	18.76%	1.7	9.60%	2.0	29.85%
Total Income	$ 339,123	15.03%	$ 179,956	18.60%	$ 36,236	9.69%	$ 39,265	29.07%
Total Employment	18.0	15.05%	10	18.74%	2.0	9.65%	2.3	29.61%
Non-Market Impact								
Consumer's Surplus	$ 139,971	14.92%	$ 70,708	18.18%	$ 14,549	10.04%	$ 12,938	29.07%
Profit1	$ 41,173	14.92%	$ 35,618	18.18%	$ 13,767	10.04%	$ 777	29.07%
Cumulative Total								
Person-days	5,392	20.75%	2,493	23.14%	491	12.22%	358	29.07%
Market Impact								
Direct Sales	$ 892,819	20.82%	$ 434,393	23.60%	$ 84,260	11.85%	$ 74,859	29.07%
Direct Wages and Salaries	$ 324,999	20.82%	$ 157,906	23.59%	$ 30,641	11.86%	$ 27,093	29.07%
Direct Employment	22	20.83%	11	23.62%	2	11.86%	2	29.85%
Total Income	$ 469,602	20.82%	$ 228,328	23.59%	$ 44,297	11.85%	$ 39,265	29.07%
Total Employment	25	20.80%	12	23.67%	2	11.88%	2	29.61%
Non-Market Impact								
Consumer's Surplus	$ 194,633	20.75%	$ 89,991	23.14%	$ 17,714	12.22%	$ 12,938	29.07%
Profit1	$ 57,252	20.75%	$ 45,332	23.14%	$ 16,762	12.22%	$ 777	29.07%

1. Profit is used as a proxy for producer's surplus.

Table 48: Potential Benefits to Non-Consumptive Users from Alternative 2 (Step 2 Analysis)

Increase in Quality	Economic Measure	Elasticity of 0.04	Elasticity of 1.0	Elasticity of 4.5
10%				
	Consumer's Surplus	$ 308	$ 7,711	$ 34,700
	Income	$ 748	$ 18,691	$ 84,111
	Employment	0.039	0.99	4.43
	Person-days	9	214	961
50%				
	Consumer's Surplus	$ 1,542	$ 38,555	$ 173,499
	Income	$ 3,738	$ 93,457	$ 420,554
	Employment	0.197	4.93	22.16
	Person-days	43	1,068	4,807
100%				
	Consumer's Surplus	$ 3,084	$ 77,111	$ 346,997
	Income	$ 7,477	$ 186,913	$ 841,109
	Employment	0.394	9.85	44.33
	Person-days	85	2,136	9,614

1. Benefits are the aggregate amounts across all non-consumptive activities for Alternative 2

Table 49: Potential Benefits to Non-Consumptive Users from Alternative 2, Cumulative (Step 2 Analysis)

Increase in Quality	Economic Measure	Elasticity of 0.04	Elasticity of 1.0	Elasticity of 4.5
10%				
	Consumer's Surplus	$ 1,261	$ 31,528	$ 141,874
	Income	$ 3,126	$ 78,149	$ 351,671
	Employment	0.167	4.17	18.77
	Person-days	35	873	3,931
50%				
	Consumer's Surplus	$ 6,306	$ 157,638	$ 709,372
	Income	$ 15,630	$ 390,746	$ 1,758,356
	Employment	0.834	20.85	93.83
	Person-days	175	4,367	19,653
100%				
	Consumer's Surplus	$ 12,611	$ 315,277	$ 1,418,745
	Income	$ 31,260	$ 781,492	$ 3,516,712
	Employment	1.668	41.70	187.65
	Person-days	349	8,735	39,307

1. Benefits are the aggregate amounts across all non-consumptive activities for Alternative 2.

5.2.6 *Other Potential Benefits and Net Assessment*

A net assessment is provided using the National Net Benefits Approach. Under this approach, only consumer's surplus and economic rent[31] values are appropriate for consideration, as in a formal benefit-cost analysis. All the costs and benefits cannot be quantified, especially not across all alternatives, as with the nonuse or passive economic use values. But with certain assumptions designed to bias the result in favor of the consumptive activities, it can be shown that, except under the most conservative assumptions for the larger reserve alternatives, the nonuse or passive economic use values would likely exceed all consumptive use values. Thus, there would be net national benefits to adopting any of the action alternatives.

[31] Economic Rent: A return on investment over and above a normal rate of return on investment. A normal rate of return on investment is that rate of return in which incentives are such that capital will neither outflow or inflow into the industry.

Table 50: Net Assessment - National Net Benefits of Marine Reserves in the CINMS

	Alternative 1	Alternative 2
Costs		
Recreation Consumptive	$2.96 million	$3.19 million
Commercial fisheries	$0	$0
Total Consumptive	$2.96 million	$3.19 million
Benefits		
Recreation Non-Consumptive		
Mid-range (50% Quality increase, elasticity 1.0)	$136,300	$157,600
Highest (100% Quality increase, elasticity 4.5)	$1.2 million	$1.4 million
Nonuse/Passive Economic Use Value		
1% of Households Willing to Pay		
Lowest ($3.12 million)	+	-
Mid-range ($5.19 million)	+	+
Highest ($10.39 million)	+	+
2% of Households Willing to Pay		
Lowest ($6.24 million)	+	+
Mid-range ($10.38 million)	+	+
Highest ($20.78 million)	+	+

Previous sections addressed the potential costs to all consumptive users (both the recreational industry and for the commercial fishery and kelp harvesters), and the potential benefits to recreational consumptive users and commercial fisheries from the replenishment effect of the marine reserves. Also discussed were the potential benefits to non-consumptive recreational users, simulating the potential benefits using a range of assumptions about future quality increases in the marine reserves and the behavioral responses (quality elasticities).

The concepts of nonuse or passive economic use values have been previously introduced. This section will conduct a policy analysis simulation. This is not a benefits transfer because there are no available studies in the literature on the passive economic use values of marine reserves anywhere in the world. This policy analysis simulation uses conservative assumptions about how many American households might be willing to pay for marine reserves in the CINMS. The policy analysis simulation is informed by using a conservative range of values from the economics literature on passive economic use value estimated for a variety of natural resources. Ranges of values are described as conservative, meaning they will generate lower bound estimates of this potential value of marine reserves in the CINMS. Key national and California

Statewide surveys are summarized to provide underlying support for the notion that people are willing to pay for marine reserves. Lastly, a rough assessment of the net national benefits of the marine reserves in the CINMS is provided. This is done by using maximum potential loss estimates for consumptive uses, which have been shown in Step 2 analysis as generally overstating losses to consumptive uses, and comparing these with lower bound conservative estimates of the number of households willing to pay and the annual amounts they might be willing to pay. Although a range of values for non-consumptive recreation is shown, they were not added to the Net Benefit Assessment.

It is not possible to provide an analysis by alternative; however, for passive economic use values to be considered valid, researchers usually apply a "scope test". The scope test checks to make sure that people's total willingness to pay for a good or service increases with the quantity and/or quality of the good or service being evaluated. It can be presumed that a larger marine reserve or a network of marine reserves that provides more resource protection will have higher passive economic use values than smaller marine reserves or a network of marine reserves that provides less resource protection.

An important conclusion of the policy analysis simulation and net benefits assessment is that, although estimates of the "actual value" of marine reserves cannot be calculated (because of a lack of information), it is likely that any of the marine reserve alternatives considered here would yield net economic benefits. The gains to the nation would be greater than the costs. The costs are the lost values from all current and future consumptive activities displaced from the marine reserves.

5.2.6.1 Nonuse or Passive Use Economic Value

As noted above, to date there are no known studies that have estimated nonuse or passive use economic values specifically for the marine reserves in the CINMS or for marine reserves anywhere else. However, Spurgeon (1992) offers two sets of identifiable factors, which will dictate the magnitude of nonuse or passive use economic values. First, nonuse economic values will be positively related to the quality, condition, and uniqueness of the ecosystem on a national or global scale. Second, the size of population, standard of education, and environmental perception of people in the country owning or having jurisdiction over the ecosystem will be positively related to nonuse or passive use economic values. Thus, nonuse or passive use economic values are determined by both supply and demand conditions. The existence of many similar sites would reduce the value. Although Spurgeon limits his scope to the people in the country owning or having jurisdiction over the ecosystem, people from all over the world may have nonuse or passive use economic values for ecosystem protection in other countries. Debt for nature protection swaps being conducted by The Nature Conservancy in South America is just one example. Legitimacy of including the values of people from other countries is more a judicial concern than an economic one. In some judicial proceedings, people from other

countries might not have legal standing over issues of resource protection and their economic values may be eliminated from inclusion in the proceedings.

To find out what is known about nonuse economic values, a literature search was conducted, and 19 studies were found in which nonuse economic values were estimated. Desvouges *et al*. (1992) contained summaries of 18 of the 19 studies. The remaining study was by Carson *et al*. (1992) on the Exxon Valdez oil spill. Sixteen of the 18 studies found in Desvouges *et al.* (1992) reported values (not adjusted for inflation) of $10 or more per household per year for a broad variety of natural resource protection efforts. Of the two studies that reported values less than $10/household/year, one reported $3.80/household/year for adding one park in Australia and $5.20/household per year for a second park (these estimates were from a national sample of Australians). The other study that estimated nonuse economic values less than $10/household/year was a study of Wisconsin residents willingness to pay for protecting bald eagles and striped shiners in the State of Wisconsin. For the bald eagle, nonuse economic values had an estimated range of $4.92 to $28.38/household/year, while for striped shiners the values ranged from $1.00 to $5.66/household/year. Total value ranged from $6.50 to $75.31/household/year.

Only two of the 18 studies summarized in Desvouges *et al*. (1992) used national samples of U.S. households; the others were limited to State or regional populations. The Exxon Valdez Oil Spill Study (Carson *et al*. 1992) used a national sample of U.S. households. An important caveat is that the sample included only English speaking households and eliminated Alaskan residents. Alaskan residents were eliminated to limit the sample to primarily nonusers of Prince William Sound (site of the oil spill) and non-English speaking households were eliminated because the researchers were not able to convert their questionnaires to other languages. The impact was that the sample represented only 90% of U.S. households.

Carson *et al*. (1992) reported $31 per household as the median willingness to pay. The payment was a lump sum payment through income taxes and covered a ten-year period. The funds would go into a trust fund to pay for equipment and other costs necessary to prevent a future accident like the Exxon Valdez in Prince William Sound. After 10 years, double hull tankers would be fully implemented and the need for the protection program would expire. Mean willingness to pay was higher and more variable to model specification than the median willingness to pay, so the authors argued that the median value was a conservative estimate. Applying the $31/household to only 90 percent of the U.S. population of households was also considered conservative since non English speaking people probably have positive nonuse economic values as do Alaskans.

5.2.6.2 Estimation of Nonuse Economic Values

Given what is known about nonuse economic values, a range of "conservative" (i.e., lower bound) estimates of nonuse or passive use economic values for the marine reserves in the CINMS can be developed. To do this requires the following assumptions and facts:

Assumptions

1. 1% of U.S. households would have some positive nonuse or passive economic use values for a network of marine reserves in the CINMS.

2. The 1% of U.S. households would be, on average, willing to pay either $3/household/year, $5/household/year, or $10/household/year for marine reserves in the CINMS.

Fact:

1. As of July 1, 1999, there were 103.9 million households in the U.S.

Using the above assumptions and the number of U.S. households in 1999, a probable lower bound set of estimates for the nonuse or passive use economic values for the network of marine reserves in the CINMS can be calculated (Table 51).

Table 51: Estimate of Nonuse or Passive Economic Values

	$3/household/year	**$5/household/year**	**$10/household/year**
Annual Amount (1)	$3.12 million	$5.19 million	$10.39 million
Annual Amount (2)	$6.23 million	$10.39 million	$20.78 million

Under the assumption that 1 percent of U.S. households would be willing to pay some amount, the annual willingness to pay for marine reserves in the CINMS would range between $3.12 million and $10.39 million, depending on the assumed willingness to pay per household. Under the assumption that 2 percent of U.S. households would be willing to pay some amount, the annual willingness to pay for marine reserves in the CINMS would range between $6.23 million and $20.78 million. It is expected that nonuse economic values would be greater the larger the area protected. But as described earlier, it would also be expected that willingness to pay is

positively related to both the characteristics of those valuing the reserves and the characteristics of what they are asked to value. Since the estimates of nonuse economic values are based on an assumed range of values (at the lowest end of the distribution of values estimated in other studies), it is not possible to compare the values of the different alternatives in dollar terms. However, following the suggestions of Spurgeon, it can be demonstrated that the characteristics of the U.S. population would support the statement that the above estimates would likely be lower bound estimates.

5.2.6.3 Scientific and Education Values

Marine reserves provide a multitude of benefits. Sobel (1996) provides a long list of these benefits. Most of these benefits have been covered in Chapters 1 and 2 and in the discussion of nonuse economic benefits above. Scientific and education values were categorized by Sobel (1996) into those things a reserve provides that increase knowledge and understanding of marine systems. Sobel (1996) provides the following lists of benefits:

Scientific

- Provides long-term monitoring sites
- Provides focus for study
- Provides continuity of knowledge in undisturbed site
- Provides opportunity to restore or maintain natural behaviors
- Reduces risks to long-term experiments
- Provides controlled natural areas for assessing anthropogenic impacts, including fishing and other impacts

Education

- Provides sites for enhanced primary and adult education
- Provides sites for high-level graduate education

These benefits cannot be quantified, but they are extremely important.

5.2.6.4 Vessel Use Analysis of Alternatives

SAMSAP

The Sanctuary Aerial Monitoring and Spatial Analysis program (SAMSAP) is used to analyze vessel use of each alternative and characterize potential congestion. SAMSAP is designed to monitor and analyze the physical and anthropogenic phenomena within the Sanctuary such as Sanctuary users, both commercial and recreational vessel traffic, by using a GIS and aerial GPS collection strategy.

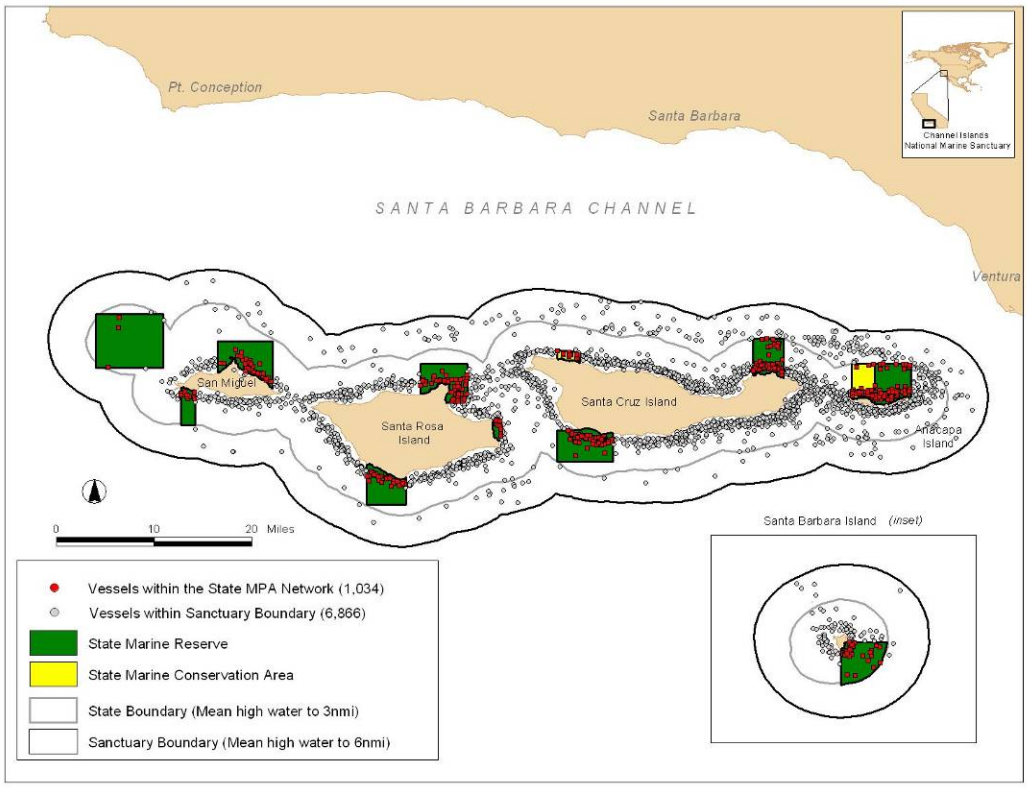
Surveys of vessel traffic and vessel type allow anthropogenic use patterns to be studied, such as displacement of fishing effort due to marine reserves. Data downloaded into the Sanctuary's GIS are used to analyze historical trends and detect correlations across data types.

The following anthropogenic use analysis utilizes vessel sightings to examine human use within CINMS and the potential impact of the NEPA alternatives. The sightings occurred between July 1997 and August 2004. Vessel types are classified into four categories: (1) consumptive, commercial (2) consumptive, recreational (3) non-consumptive, commercial (4) non-consumptive, recreational.

Vessels Within CINMS

Figure 17 shows the distribution of non-consumptive and consumptive vessels within the CINMS region. The majority of vessels were observed within CINMS' State waters as compared to CINMS' Federal waters. Of the 7,094 total observed vessels during the period of 1997-2004, 91.4% were observed in State waters and 5.4% were observed within CINMS Federal waters; 3.2% were observed outside of the CINMS boundary.

Figure 17: Vessels within CINMS, 1997 – 2004

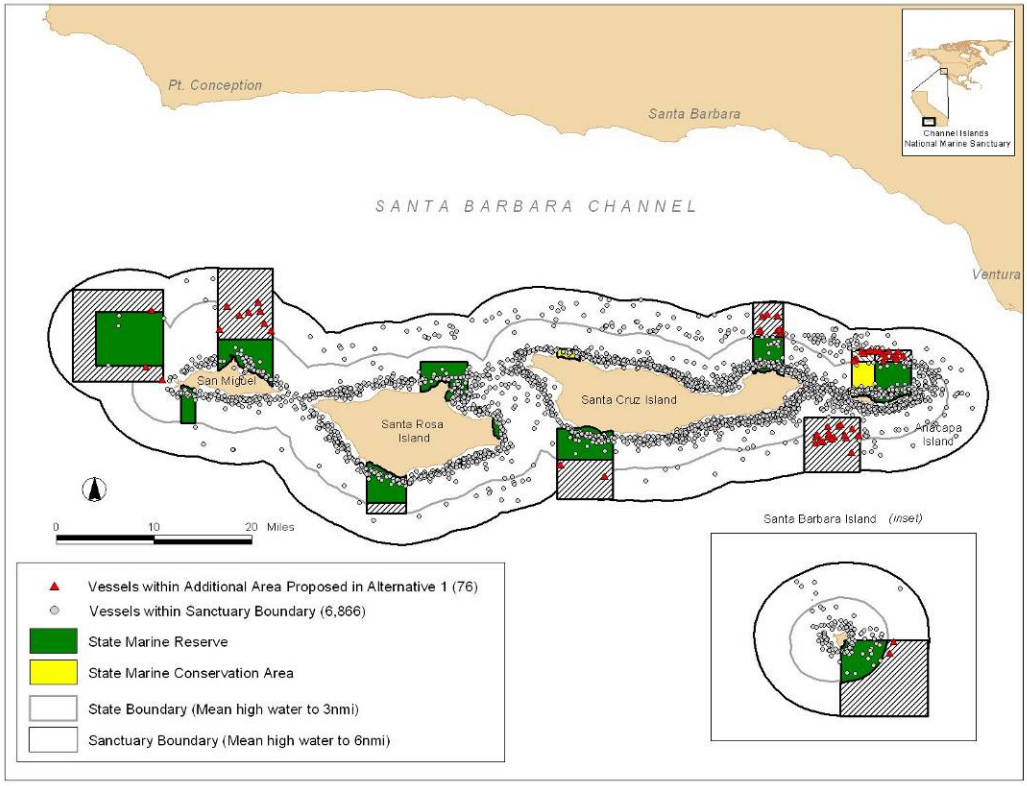


The spatial distribution of vessel sightings shows that 1,034 of sightings occurred within the existing State MPA network, comprising 15.1% of all observations made within CINMS State and Federal waters (Figure 17).

5.2.6.5 Activity In The Proposed Alternatives

Of the 6,866 vessels observed within the Sanctuary, 76 were sighted within the Federal waters of Alternative 1 (Figure 18); and 128 vessels were sighted within the Federal waters of Alternative 2. Figure 18 demonstrates the number of vessels sighted within Alternative 1. In general, these aerial surveys confirm the other socioeconomic impact analyses which predict that the incremental impacts of adding Federal waters to the marine zoning network in the CINMS under any of the action alternatives are likely to be very small in comparison to the impacts that resulted from the 2003 establishment of the existing State marine reserves, which were in themselves relatively small.

Figure 18: Vessels Within Alternative 1



5.3 Management Considerations

Management considerations help to distinguish the alternatives. The following section describes and analyzes management considerations of the alternatives, including: enforceability and consistency with other zone regulations; research and monitoring; education and outreach; and community involvement. These management considerations are summarized in Table 52 below.

Table 52: Management Considerations for the Four Alternatives

	Alternative 1A	**Alternative 1B**	**Alternative 1C**	**Alternative 2**
No need for State regulatory action to close the gaps between State and Federal zones	X	X		X
Zone boundaries are on straight lines of latitude and longitude (easier to enforce and understand)	X	X		X
Consistent or complementary boundaries with existing State zones	X	X		(partially)
Consistent boundaries with Habitat Areas of Particular Concern	X	(partially)	(partially)	(partially)
Consistent with scientific recommendations for contiguous protection	X	X		X
Allows prosecution under Federal law in State and Federal waters (high civil penalties, dedicated account, easier to prosecute because civil not criminal)	X	(partially)		X

5.3.1 *Enforceability of Regulations*

State and Federal law enforcement personnel recommend seamless and consistent marine zoning regulations for two principal reasons:

- Zone boundaries that are on straight lines of latitude and longitude are easier to enforce (the existing State marine zone boundaries are on the nearest whole minute and straight lines of latitude and longitude).
- Seamless and consistent marine zoning regulations between State and Federal waters enhance the public's understanding of the regulations and are easier to enforce.

When the spatial and regulatory gaps between the existing State marine zones and the proposed Federal marine zones in Alternative 1C are closed by the State, then the ecological and socioeconomic impacts associated with Alternative 1C are projected to be the same as the other alternatives.

There are additional enforcement considerations for regulations that are promulgated under the NMSA, including:

- Section 307 of the NMSA provides civil penalty authority for NOAA for any violation of an applicable Sanctuary regulation or permit. (The only criminal offense is interference with law enforcement officers.)
- The current maximum penalty is $130,000 per violation per day. While this is the maximum, the typical civil penalty range is $5,000-20,000, depending on the type and nature of the violation.
- A Summary Settlement schedule can be developed to enable smaller "on-the-spot" penalties for minor infractions.
- Where the Sanctuary regulations overlap with State waters, both Federal and State statutes can be enforced. NOAA and the State have executed a memorandum of understanding regarding the application of NOAA's civil penalty authority. The NMSP has invested nearly $80,000 over the last two years toward cooperative enforcement of existing Sanctuary regulations. NOAA has partnerships with other Federal and State law enforcement agencies (e.g., the US Coast Guard, CINP and CDFG) that enable more effective enforcement of CINMS regulations. NOAA has a cooperative agreement with the State of California for cross-deputizing the State's officers to enforce the NMSA.
- Section 307(j) of the NMSA provides authority for NOAA to seek injunctive relief in cases where it is determined that there is injury, or imminent risk of injury, to a Sanctuary resource.
- The civil penalty funds are deposited into a separate account and are used to further resource protection efforts for the affected national marine sanctuary, at the discretion of the Sanctuary management.

5.3.2 *Community Involvement*

Since 1998, NOAA has invested over two million dollars in implementing the community, State and Federal phases of the marine zoning process at CINMS, and in the monitoring, education, outreach, and enforcement of the existing zones.[32] Community involvement in the management of marine zones should include a range of participants, interests and regulatory authorities in a collaborative setting.

The CINMS Advisory Council (SAC) has served as a focal point for the consideration, development and implementation of the Channel Islands marine zones (see Appendix C: Meeting History). Appendix D also documents the number of meetings with State and Federal agencies during this regulatory process. The SAC meets every two months, and provides a rapid advisory response to management issues. The SAC meetings are open to the public, and include

[32] Examples of outreach products funded by the NMSP include: a Marine Protected Area Brochure, a Boating and Safety Brochure, "Protecting Your Channel Islands" brochure (provided to the State for distribution by CDFG wardens to users in the Sanctuary), Mapping and Ocean Sanctuary GIS Curriculum, "Recreation in the Sanctuary" (*Alolkoy*, Winter 2002), "Marine Reserves: Where Do You Fit In?" digital lab, and the poster "Wild for the Future", which targets K-12 students.

membership from a wide variety of community interests.[33] The SAC has a Research Activities Panel (RAP) made up of scientific advisors who continue to provide additional input and advice on research activities at CINMS, and have taken on marine reserve monitoring review as a specific task. The SAC also includes a number of special working groups that provide additional input and advice to the Sanctuary management. The SAC represents an important public forum that encourages community input in Sanctuary management and planning for marine zones.

In addition, community involvement in this NOAA regulatory process includes important collaboration and partnering with State and Federal agencies.

5.3.3 *Alternative 1A*

In Alternative 1A, the boundaries of the marine zones (and their corresponding NMSA regulations) would completely overlay the existing State marine zone boundaries from the mean high water line of the Channel Islands and extend into Federal waters. In this scenario, NOAA regulations (under the NMSA) would fully complement existing State regulations in the State waters of the marine zone network and the HAPC boundaries.

This fully complementary approach would formally engage NOAA in maintaining such management efforts in both State and Federal waters, thereby increasing the likelihood of long-term Federal assistance to network management within State waters of the CINMS. The State has relied on the NMSP to develop education and outreach products. All of the enforcement benefits under the NMSA listed above apply under this alternative.

In addition, implementing Alternative 1A would eliminate the need for a State administrative process to complete the spatial and regulatory gaps in protection between the outer boundary of the existing State zones and the proposed Federal waters zones. There would be no gaps in protection.

5.3.4 *Alternative 1B*

In Alternative 1B, the boundaries of the proposed marine zones (and their corresponding regulations) would abut the existing State marine zone boundaries, thereby including a small portion of State waters. Under this scenario, NMSP regulations would apply only within small portions of State waters beyond the existing State marine zones, thus the enforcement benefits under the NMSA listed above would not apply in the existing State zones.

In general, NOAA's formal obligations for monitoring, education and outreach would be diminished in State waters under Alternative 1B as compared to Alternative 1A.

Implementing Alternative 1B would likely either eliminate or significantly reduce the need for a State administrative process to complete the spatial and regulatory gaps in protection between

[33] Advisory Council membership includes the same sorts of members originally suggested by the CDFG for Channel Islands Marine Protected Area Monitoring Plan steering committee.

the outer boundary of the existing State zones and the proposed Federal waters zones. Completing the network in State and Federal waters would leave no gap in protection between the management jurisdictions.

5.3.5 *Alternative 1C (NOAA's Preferred Action)*

In Alternative 1C, the boundaries of the proposed marine zones would begin at the existing State-Federal waters boundary (3 nmi from shore) and extend offshore. Because some of the existing State marine zones do not extend to the State-Federal waters boundary, Alternative 1C would result in gaps of unprotected waters between five of the proposed Federal marine zones and the existing State marine zones. See Figure 6 for an illustration of these gaps. The California Fish and Game Commission is moving forward with the process to close these gaps under State authorities. By closing the gaps, the boundaries of the marine zones will be much easier to understand and enforce, and the marine zones boundaries will be consistent with Habitat Area of Particular Concern (HAPC) designations implemented by NOAA Fisheries. If NOAA implements Alternative 1C and the California Fish and Game Commission does not take action to close those gaps by fall 2007, NOAA envisions closing those gaps using the authorities of the NMSA, effectively implementing Alternative 1B.

Both the NMSP and the State recognize the importance of partnering to enhance enforcement, research and monitoring, education and outreach, community involvement, and general administration of the CINMS zone network. Through a Memorandum of Agreement (MOA), a formal Federal-State partnership to support marine zone management in Sanctuary waters is being developed. Similar MOAs have been developed by resource agencies and non-governmental organizations to protect habitats and biodiversity across political and administrative boundaries.

5.3.6 *Alternative 2*

In Alternative 2, the boundaries of the proposed marine zones (and their corresponding regulations) would completely overlay the existing State marine zone boundaries from the mean high water line of the Channel Islands and extend beyond into Federal waters. In this scenario, NOAA regulations (under the NMSA) would complement existing State regulations in the State waters of the marine zone network. However, the Federal water zones would be wider than the HAPC designations and would require an action by NOAA Fisheries to expand them to mirror the boundaries of this alternative.

To date, NOAA has invested over two million dollars in implementing the community, State and Federal Phases of the marine zoning process at CINMS, and in the monitoring, education, outreach, and enforcement of the existing zones. Alternative 2 would engage NOAA in maintaining such management efforts, thereby reducing the burden of managing the marine zones on the State, especially in enforcement, community involvement, monitoring, education and outreach.

6.0 RELATIONSHIP TO OTHER LEGAL REQUIREMENTS

6.1 National Historic Preservation Act

The National Historic Preservation Act (NHPA) (16 U.S.C. 470 et seq.) is the largest piece of Federal historic preservation legislation. It has two major components that affect the responsibilities of Federal agencies managing submerged lands. First, under Section 106 of NHPA, Federal agencies are to consider the effects of their undertakings (including the issuance of permits, the expenditure of Federal funding and Federal projects) on historic resources that are either eligible for listing or are listed on the National Register of Historic Places. Section 110 of NHPA imposes another obligation on Federal agencies that own or control historic resources. Under this Section, Federal agencies must consider historic preservation of historic resources as part of their management responsibilities.

In a letter to the California State Historic Preservation Officer, NOAA determined the proposed action is ”an undertaking” for purposes of section 106 of the NHPA but that it does not have the potential to cause effects on historic properties.

6.2 Coastal Zone Management Act- Federal Consistency

The Coastal Zone Management Act of 1972 (CZMA) (16 U.S.C. 1451 et seq.) strives to preserve, protect, develop, and where possible, restore or enhance coastal zone resources. A state with a Federally approved Coastal Zone Management Program (CZMP) is eligible for financial assistance and gains a legal mechanism to control Federal permits and activities that affect the state's coastal zone. Federal agency activities that affect any land or water use or natural resource of the coastal zone must be consistent to the maximum extent practicable with the enforceable policies of the state CZMP.

The California CZMP, as amended January 1988 (California Public Resources Code, Division 20—California Coastal Act), and the establishment therein of the California Coastal Zone, have been approved by NOAA. This gives the California Coastal Commission consistency authority to review projects undertaken by Federal agencies for consistency with the enforceable policies of the California CZMP.

On March 16, 2007, the California Coastal Commission held a public meeting on NOAA’s consistency determination pursuant to its authorities under section 307 of the Coastal Zone Management Act (16 U.S.C. § 1456). At that meeting, the Coastal Commission issued a conditional concurrence for the consistency determination by NOAA on the grounds that, if modified as described in the Commission’s conditional concurrence below, the project would be fully consistent, and thus consistent to the maximum extent practicable, with the policies of Chapter 3 of the Coastal Act. The conditional concurrence is: “In the event NOAA elects not to

implement Alternative 1A, NOAA will implement Alternative 1C, with the following additional provisions: until such time as the Resources Agency and the Fish and Game Commission designate the areas in between the existing State-designated MPAs and the 3 mile limit (i.e., the "gaps" between the existing state MPAs and the federal MPAs depicted in Alternative 1C), or the Fish and Game Commission/DFG and NOAA enter into an interagency agreement that establishes MPA protection for these "gap" areas, NOAA will expand Alternative 1C to include in its MPA designation these "gaps" between the outer boundaries of the existing state MPAs and the State-federal waters boundary (3nm from shore)."

6.3 Section 7 of the Endangered Species Act

The Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531–1544) protects species of plants and animals listed as threatened or endangered. The Secretary of the Interior and the Secretary of Commerce determine, through regulations, whether any species are endangered or threatened. The Secretaries also are required to designate critical habitat and develop and implement recovery plans for threatened and endangered species. Federal agencies must ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat.

On August 25, 2006, the NMSP sent letters to the appropriate agencies stating that the proposed action may affect, but is not likely to adversely affect, any listed species or critical habitat. The U.S. Fish and Wildlife Service concurred with this finding in a letter dated November 7, 2006. NOAA's Office of Protected Resources (Southwest Regional Office) concurrence is pending as of publication of this document.

6.4 Regulatory Flexibility Act

In accordance with the requirements of section 604(a) of the Regulatory Flexibility Act (5 U.S.C. 604(a)), NOAA has prepared a final regulatory flexibility analysis (FRFA) describing the impact of the proposed action on small businesses. The Federal Register notice containing the final rule for this action will contain a summary of the FRFA. The FRFA is also available upon request to NOAA.

6.5 Magnuson Stevens Fishery Conservation and Management Act

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801–1883), the United States claimed sovereign rights and exclusive fishery management authority over all fish, and all Continental Shelf fishery resources, within the EEZ.

In a letter dated August 25, 2006, the NMSP determined the proposed action would not adversely affect EFH. NOAA's National Marine Fisheries Service on October 10, 2006 sent a memorandum concurring with the NMSP's determination. Compliance with EFH requirements of the MSA is described further in section 5.3.

6.6 Executive Order 12898: Environmental Justice

Environmental justice is defined by the U.S. EPA as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." The proposed regulatory action would have no negative effect on the natural or physical environment or health that would affect minority or low-income populations or children when compared to the general population. In addition, the project would not increase the risk or rate of environmental hazard exposure by a minority or low-income population. Finally, the proposed regulatory action would have less than significant adverse impacts on human use of the Sanctuary. Therefore, no impacts would occur for any issue related to environmental justice.

6.7 Executive Order 13112: Invasive Species

On February 3, 1999, Executive Order (EO) 13112 was signed establishing the National Invasive Species Council. One goal of EO 13112 is for Federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. The proposed action is consistent with EO 13112, and would not result in the introduction of invasive species in Sanctuary waters.

6.8 Executive Order 13158: Marine Protected Areas

EO 13158 helps protect the significant natural and cultural resources within the marine environment for the benefit of present and future generations by strengthening and expanding the Nation's system of marine protected areas (MPAs). The purpose of EO 13158 is to: (a) strengthen the management, protection, and conservation of existing marine protected areas and establish new or expanded MPAs; (b) develop a scientifically based, comprehensive national system of MPAs representing diverse U.S. marine ecosystems, and the Nation's natural and cultural resources; and (c) avoid causing harm to MPAs through Federally conducted, approved, or funded activities. The proposed action is consistent with the purpose of this EO.

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8.0 LIST OF ACRONYMS

AA	National Oceanic and Atmospheric Administration
CalCOFI	California Cooperative Oceanic Fisheries Investigations
CCA	Cowcod Conservation Area
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CINMS	Channel Islands National Marine Sanctuary
CINP	Channel Islands National Park
CMAR	Coastal Maritime Archaeology Resources
CODAR	Coastal Ocean Dynamics Applications Radar
CPFVs	Commercial Passenger Fishing Vessels
FEIS	Final Environmental Impact Statement
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIR	Environmental Impact Report (State)
EIS	Environmental Impact Statement (Federal)
ESA	Endangered Species Act
FGC	California Fish and Game Commission
FMP Groundfish	Fishery Management Plan
FMP	Pacific Coast Groundfish Fishery Management Plan
HAPC	Habitat Areas of Particular Concern
ITQ	Individual Transferable Quota
LTER	Long-Term Ecological Research
MCA	Marine Conservation Areas
MERRP	Marine Ecological Reserves Research Program
MLMA	Marine Life Management Act (CA)
MLPA	Marine Life Protection Act (CA)
MMPA	Marine Mammal Protection Act of 1972
MPA	Marine Protected Area
MR	Marine Reserve
MRWG	Marine Reserve Working Group
MSA	Magnuson-Steven Fishery Conservation and Management Act
NCCOS	National Centers for Coastal Ocean Science
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
nmi	Nautical Mile
NMSA	National Marine Sanctuaries Act
NMSP	National Marine Sanctuary Program
PFMC	Pacific Fisheries Management Council
PISCO	Partnership for Interdisciplinary Studies of Coastal Oceans
RUMs	Random Utility Models
SAC	Sanctuary Advisory Council
SAMSAP	Sanctuary Aerial Monitoring and Spatial Analysis Program
SAP	Science Advisory Panel
SAT	Science Advisory Team
SCB	Southern California Bight
SMCA	State Marine Conservation Area
SMR	State Marine Reserve
UCSB	University of California, Santa Barbara
USCG	US Coast Guard

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APPENDIX A NOTICE OF INTENT

Commerce to issue a determination on remand consistent with the instructions set forth in the Panel's decision. The Panel instructed the DOC to provide a report within 45 days detailing how it would comply with their instructions and to complete the remand (within 60 days) not later than January 28, 2003.

The Department of Commerce issued its remand determination on January 28, 2003.

Panel Decision: The Panel, in its decision of April 28, 2003, ordered the Department to revoke the antidumping order.

Dated: May 8, 2003.

Caratina L. Alston,

U.S. Secretary, NAFTA Secretariat.

[FR Doc. 03–12883 Filed 5–21–03; 8:45 am]

BILLING CODE 3510–GT–M

DEPARTMENT OF COMMERCE

National Institute of Standards and Technology

Announcing a Meeting of the Information Security and Privacy Advisory Board

AGENCY: National Institute of Standards and Technology.

ACTION: Notice of meeting

SUMMARY: Pursuant to the Federal Advisory Committee Act, 5 U.S.C. App., notice is hereby given that the Information Security and Privacy Advisory Board (ISPAB) will meet Tuesday, June 10, 2003, from 8:30 a.m. until 5 p.m., Wednesday, June 11, 2003, from 8:30 a.m. until 5 p.m. and on Thursday, June 12, from 8:30 a.m. until 3 p.m. All sessions will be open to the public. The Advisory Board was established by the Computer Security Act of 1987 (Pub. L. 100–235) and amended by the Federal Information Security Management Act of 2002 (Pub. L. 107–347) to advise the Secretary of Commerce and the Director of NIST on security and privacy issues pertaining to federal computer systems. Details regarding the Board's activities are available at *http://csrc.nist.gov/csspab/.*

DATES: The meeting will be held on June 10, 2003, from 8:30 a.m. until 5 p.m., June 11, 2003, from 8:30 a.m. until 5 p.m., and June 12, 2003, from 8:30 a.m. until 3 p.m.

ADDRESSES: The meeting will take place at the DoubleTree Hotel and Executive Meeting Center, 1750 Rockville Pike, Rockville, Maryland.

Agenda

—Welcome and Overview
—ISPAB Work Plan Updates
—One-Day Panel on e-Authentication:
- Session 1—e-Authentication Systems for Government: Understanding the Benefits and Risks of Existing and Emerging Models
- Session 2—Security and Privacy Issues in e-Authentication

—Panel Discussion on Accuracy Requirements for the FBI's National Crime Information Center (NCIC)
—Briefing on Activities of the National Science Foundation's Trusted Computing Program
—Briefing on Information Security Professionals Certification Programs
—Agenda Development for September 2003 ISPAB Meeting
—Wrap-Up

Note that agenda items may change without notice because of possible unexpected schedule conflicts of presenters.

Public Participation: The Board agenda will include a period of time, not to exceed thirty minutes, for oral comments and questions from the public. Each speaker will be limited to five minutes. Members of the public who are interested in speaking are asked to contact the Board Secretariat at the telephone number indicated below. In addition, written statements are invited and may be submitted to the Board at any time. Written statements should be directed to the ISPAB Secretariat, Information Technology Laboratory, 100 Bureau Drive, Stop 8930, National Institute of Standards and Technology, Gaithersburg, MD 20899–8930. It would be appreciated if 35 copies of written material were submitted for distribution to the Board and attendees no later than June 9, 2003. Approximately 15 seats will be available for the public and media.

FOR FURTHER INFORMATION CONTACT: Ms. Joan Hash, Board Secretariat, Information Technology Laboratory, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8930, Gaithersburg, MD 20899–8930, telephone: (301) 975–3357.

Dated: May 15, 2003.

Arden L. Bement, Jr.,

Director.

[FR Doc. 03–12786 Filed 5–21–03; 8:45 am]

BILLING CODE 3510–CN–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

Announcement of Intent To Initiate the Process To Consider Marine Reserves in the Channel Islands National Marine Sanctuary; Intent To Prepare a Draft Environmental Impact Statement

AGENCY: Marine Sanctuaries Division (MSD), National Ocean Service (NOS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce (DOC).

ACTION: Notice.

SUMMARY: In accordance with the National Marine Sanctuaries Act, as amended, (NMSA) (16 U.S.C. 1431 et seq.), NOAA's National Marine Sanctuary Program (NMSP) is considering the establishment of a network of marine reserves within the Channel Islands National Marine Sanctuary (CINMS or Sanctuary) to maintain the natural biological communities, and to protect, and, where appropriate, restore and enhance natural habitats, populations, and ecological processes.

Marine reserves are one of a variety of resource management tools used to manage and protect marine resources. This action is being considered to complement the State of California's recent establishment of a network of marine reserves and protected areas within the State waters of the CINMS.

The NMSP will prepare an environmental impact statement which will examine a range of management and regulatory alternatives associated with consideration of marine reserves within the Sanctuary. The NMSP will conduct three public scoping meetings during the scoping period to gather information and other comments from individuals, organizations, and government agencies on the scope, types and significance of issues related to consideration of marine reserves in the Sanctuary. The dates and locations of the public scoping meetings are listed below.

DATES: Written comments must be received on or before July 23, 2003.

ADDRESSES: Written comments may be sent to the Channel Islands National Marine Sanctuary, attn. Sean Hastings, 113 Harbor Way, Suite 150, Santa Barbara, California 93109, by fax to (805) 568–1582, or by electronic mail to *reservesprocess@noaa.gov.* Comments will be available for public review at the same address.

FOR FURTHER INFORMATION CONTACT: Sean Hastings, (805) 966–7107, Ext. 472.

SUPPLEMENTARY INFORMATION: The Sanctuary was designated in September 1980, and consists of 1,252 square nautical miles of open ocean and near shore habitat approximately 25 miles off the coast of Santa Barbara, California, encompassing the waters surrounding San Miguel, Santa Rosa, Santa Cruz, Anacapa and Santa Barbara Islands from mean high tide to six nautical miles offshore. The NMSP's primary goal is the protection of the Sanctuary's natural and cultural resources contained within its boundaries. The NMSP uses a variety of non-regulatory and regulatory management measures to protect its resources. The Sanctuary is an area of national significance because of its exceptional natural beauty and marine and cultural resources.

In April 1999, the Sanctuary and the California Department of Fish and Game (CDFG) developed a joint Federal and State partnership to consider establishing marine reserves within the Sanctuary. Marine reserves are one of a variety of resource management tools used to manage and protect marine resources. The Channel Islands Marine Reserves Process was initiated in July of 1999, when the Sanctuary Advisory Council (SAC) created a multi-stakeholder Marine Reserves Working Group (MRWG) to seek agreement on the potential establishment of marine reserves within the Sanctuary. Included in the Channel Islands Marine Reserves Process were a SAC designated Science Advisory Panel and a NOAA led Socio-economic Team made up of blue ribbon scientists, academics and practitioners. Extensive scientific and socioeconomic data were collected in support of the reserves process. From July 1999 to May 2001, the MRWG met monthly to receive, weigh, and integrate advice from technical advisors and the public and to develop a recommendation for the SAC. In May 2001, the results of the Channel Islands Marine Reserves Process were forwarded to the SAC, including the MRWG consensus agreements, areas of disagreement, Science Panel advice and socio-economic analysis. A composite map with two reserve network options ranging from 12 to 29 percent of the Sanctuary was also forwarded. In June 2001, the SAC transmitted the full public record of the MRWG and the SAC to the CINMS and CDFG, and charged the agencies with crafting a final recommendation for the California Fish and Game Commission (FGC).

Sanctuary and CDFG staff continued to work with stakeholders in crafting a recommendation. On August 24, 2001 the Sanctuary and CDFG forwarded the results of the Channel Islands Reserves Process and recommended to the FGC a network of reserves and protected areas that would include approximately 25% of the Sanctuary.

The CDFG prepared environmental review documents pursuant to the California Environmental Quality Act (CEQA), which included an analysis of a range of alternative reserves networks, including identifying the Sanctuary and CDFG recommended option as the preferred alternative. On October 23, 2002, the FGC approved the preferred alternative and the establishment of a network of marine reserves and protected areas within State waters of the Sanctuary (approximately 10%). The FGC decision was made based on the culmination of the Channel Islands Marine Reserves Process and the CDFG and NOAA supported alternative for a network of marine reserves in the Sanctuary. The State's network went into effect on April 9, 2003.

The NMSP is initiating a process to consider the establishment of marine reserves within the Sanctuary to complement the State's network of reserves and protected areas. This review process will build upon the nearly four years of work to date on this matter, including the information and analyses contained in the State's CEQA environmental documents. The NMSP anticipates completion of the environmental review process and concomitant documents will require approximately eighteen to twenty-four months.

The NMSP will prepare an environmental impact statement, proposed regulations, and any proposed modifications to the Sanctuary's designation document, as warranted. The environmental impact statement will examine a range of management and regulatory alternatives associated with consideration of marine reserves within the Sanctuary. Any change to the Sanctuary's terms of designation will be pursuant to the requirements of the National Marine Sanctuaries Act, including necessary consultations with Federal and State agencies, the Pacific Fishery Management Council (PFMC), and others, and submission of the environmental impact statement, proposed regulations and any proposed changes to the designation document to Congress, the Governor of the State of California, and the public for comment. Further, the PFMC will be provided the opportunity to prepare draft Sanctuary fishing regulations for the Exclusive Economic Zone portion of the Sanctuary for any marine reserve proposal. Finally, any change to a term of designation would not apply to State waters if the Governor objects during the requisite review period.

For a complete history of the Channel Islands Marine Reserves Process and the State's Environmental Documents please see *http://www.dfg.ca.gov/mrd/channel_islands/* and/or *http://www.cinms.nos.noaa.gov/marineres/main.html*. The same information can also be obtained by contacting John Ugoretz with California Department of Fish and Game, (805) 560–6758 and/or the contact information below.

The Sanctuary is also revising its 1983 Management Plan. A Final EIS and Management Plan are expected by the end of 2003. Please see *http://www.cinms.nos.noaa.gov/marineres/manplan.html* for more information on this independent process.

Public Scoping Meetings: Dates and Locations

The NMSP will conduct three public scoping meetings to gather information and other oral or written comments from individuals, organizations, and government agencies on the scope, types and significance of issues related to consideration of marine reserves in the Sanctuary. These meetings will be conducted in a format to maximize the opportunity for all attendees to provide public comment. The dates, times and location of the meetings are as follows:

(1) Thursday, June 5, 2003, 6:30–9 p.m., Orvene S. Carpenter Community Center, 550 Park Avenue Pt. Hueneme, CA.

(2) Thursday, June 12, 2003, 6:30–9 p.m., Santa Barbara Public Library, Faulkner Gallery, 40 E. Anapamu Street, Santa Barbara, CA.

(3) Friday, July 18, 2003, 1:30–4 p.m., Four Points by Sheraton, 1050 Schooner Drive, Ventura, CA. This meeting will be held with the Sanctuary Advisory Council.

Dated: May 16, 2003.

Jamison S. Hawkins,

Acting Assistant Administrator for Ocean Services and Coastal Zone Management.

[FR Doc. 03–12815 Filed 5–21–03; 8:45 am]

BILLING CODE 3510–08–M

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 050903A]

Marine Mammals; File No. 369–1440–01

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

APPENDIX B MAILING LIST

The following officials, agencies and organizations will receive the Final Environmental Impact Statement. The Final Environmental Impact Statement may be obtained by download from https://channelislands.noaa.gov or by mail in either CD or hard copy format by contacting:

Resource Protection Coordinator,
Channel Islands National Marine Sanctuary
113 Harbor Way, Suite 150,
Santa Barbara, California, 93109

or by email at CINMSReserves.FEIS@noaa.gov
or by fax to (805) 568-1582.

Agencies and Elected Officials

United States Senate

- The Honorable Barbara Boxer
- The Honorable Diane Feinstein

United States House of Representatives

- The Honorable Lois Capps
- The Honorable Elton Gallegly

U.S Senate and House Committees

- Chair, Senate Committee on Commerce, Science, and Transportation
- Chair, House Resources Committee

Federal Agencies and Councils

- Federal Aviation Administration
  - Associate Administrator, Office of Commercial Space Transportation
- Department of the Interior
  - Director, Office of Environmental Policy and Compliance
  - U.S. Fish and Wildlife Service, Regional Director, Pacific Region
  - Minerals Management Service, Regional Director, Pacific OCS Region
  - National Park Service, Director, Pacific West Region
  - National Park Service, Superintendent, Channel Islands National Park
- Environmental Protection Agency
  - Director, Office of Ocean, Wetlands, and Watersheds
- Los Padres National Forest

- Department of State,
    - Deputy Assistant Secretary for Oceans and Fisheries
- Department of Defense,
    - Assistant Deputy Under Secretary for Defense for Environment
    - Deputy Assistant Secretary of the Navy (Environment)
    - Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health)
- United States Coast Guard
    - Commander, 11th Coast Guard District
    - Chief, Law Enforcement Division, 11th Coast Guard District
    - Commanding Officer, U.S. Coast Guard Station Channel Islands
- Regional Water Quality Control Board
- US Army Corps of Engineers, LA District
- National Oceanic and Atmospheric Administration
    - Deputy Assistant Administrator, NOAA National Marine Fisheries Service
    - NOAA Fisheries Southwest Region, Regional Administrator
    - Assistant Administrator, NOAA National Environmental Satellite, Data, and Information Service
    - Coastal Services Center
    - National Environmental Satellite, Data, and Information Service (NESDIS)
- Executive Director and Chair, Pacific Fishery Management Council

State Agencies, Commissions and Boards

- Governor, State of California
- Secretary of Resources, California Resources Agency
- State Historic Preservation Officer, California State Historical Resources Commission
- Director, California Department of Fish and Game
- Director, California Department of Parks and Recreation
- Director, California Department of Water Resources
- Executive Officer, California State Lands Commission
- Executive Director, California Fish and Game Commission
- Director, California Department of Boating and Waterways
- Director, California Department of Conservation
- Executive Director, California Coastal Commission
- Secretary, California Environmental Protection Agency
- Chair and Executive Officer, California State Water Resources Control Board
- California Assembly Committee on Natural Resources

County Government

- Santa Barbara County, Board of Supervisors
- Santa Barbara County Water Agency

- Santa Barbara County Planning and Development, Assistant Director
- San Luis Obispo County Planning Department
- Ventura County Board of Supervisors
- Ventura County Executive Officer
- Ventura County Harbor Department, Director
- Ventura County Library
- County Planning Division

Municipal Entities

- Goleta Sanitary District
- Mayor, City of Morro Bay CA
- Montecito Sanitary District
- Morro Bay Harbor, Director
- Port of Hueneme/Oxnard Harbor District, Executive Director
- Port San Luis Harbor District
- Santa Barbara City, Wastewater System Manager
- Santa Barbara City Creeks Division, Parks and Recreation Department
- San Buenaventura City, Economic Development Director
- Mayor, City of Santa Barbara CA
- Santa Barbara Harbor, Harbor Operations Manager
- Santa Barbara Public Library
- Santa Barbara Waterfront Department, Director
- Ventura Port District, General Manager
- Ventura Harbor, Harbor Master

Sanctuary Advisory Council Representatives as of September 2005

- Aschemeyer, Manny – Marine Exchange of Southern California
- Bacon, David – Wave Walker Charters
- Baird, Brian – California Resources Agency
- Baker, Lauri – Hotel Sales and Marketing, Santa Barbara
- Barsky, Kristine – California Department of Fish and Game
- Black, Dianne – County of Santa Barbara
- Boone, Amy – California Resources Agency
- Broitman, Bernardo – National Center for Ecological Analysis and Synthesis
- Brown, Maria – Gulf of the Farallones National Marine Sanctuary
- Bull, Ann – Minerals Management Service
- Cabugos, Paulette – Chumash Maritime Association
- Carey, Barbara – California Coastal Commission
- Davis, Gary – National Park Service
- Dunn, W. Scott - Adventours Outdoor Excursions

- Enriquez, Lyle – National Marine Fisheries Service
- Fien, Ronald – U.S. Coast Guard
- Galipeau, Russell – Channel Islands National Park
- Gibbs, Michelle – County of Santa Barbara
- Greene, Carolyn – Channel Islands Naturalist Corps
- Grifman, Phyllis – Sea Grant, university of Southern California
- Helms, Greg – The Ocean Conservancy
- Helvey, Mark – National Marine Fisheries Service
- Higgason, Kelley – Gulf of the Farallones National Marine Sanctuary
- Hudson, Steve – California Coastal Commission
- Kett, Eric – Sea Zen Marine Consulting (former)
- Krieger, Lyn – Ventura County Harbor Department
- Krop, Linda – Environmental Defense Center
- LaCorte, Barbara – Hope School, Santa Barbara
- Lum, Matthew - MJL Advisors, Inc.
- Luzader, John – U.S. Coast Guard
- Marshall, Jim – Commercial Fisherman, Santa Barbara CA
- McCrea, Merit – SeaHawk Sportfishing Charters (former), Santa Barbara CA
- Michel, Paul –Monterey Bay National Marine Sanctuary
- Miller, Marilyn - Ventura County Harbor Department
- Moe, Andrea – Island Packers
- Pagaling, Reggie – Chumash Maritime Association
- Piltz, Fred – Minerals Management Service
- Powell, Dan –The Essential Image Source
- Rennel, John – Smith Barney Financial Consulting
- Saunders, Rachel – Monterey Bay National Marine Sanctuary
- Schobel, Walt – U.S. Air Force
- Schwartz, Steve –Naval Air Warfare Center Weapons Division
- Spicer, William – Western Gate Publishing
- Steele, Bruce – Urchin Fisher
- Vojkovich, Marija – California Department of Fish and Game
- Warner, Robert – University of CA, Dept. of Ecology, Evolution, & Marine Biology

Sanctuary Advisory Council Working Groups (active as of 2005)

- Sanctuary Education Team
- Conservation Working Group
- Chumash Community Working Group
- Commercial Fishing Working Group
- Recreational Fishing Working Group
- Military Working Group

- Ports and Harbors Working Group

Other Private Organizations and Businesses

- Alliance of Communities for Sustainable Fisheries
- American Cetacean Society
- Beacon Foundation
- Bluewater Network
- C-PORT
- California Association of Harbor Masters and Port Captains
- California Coastal Protection Network
- California League of Conservation Voters, Santa Barbara
- California Space Authority, Inc.
- Chumash Maritime Association
- Citizens for the Carpinteria Bluffs
- Coastal Resource Information Center, Goleta CA
- Commercial Fishermen of Santa Barbara, Inc.
- Community Environmental Council, Santa Barbara
- Conception Coast Project
- Dave's Marine Fuel Service
- David and Lucile Packard Foundation
- Environmental Center of San Luis Obispo County
- Environmental Defense Center
- Friends of the Elephant Seal
- Friends of the Ellwood Coast
- Joint Oil/Fisheries Liaison Office
- Gaviota Coast Conservancy
- Get Oil Out
- Goleta Valley Land Trust
- Heal the Ocean
- Land Trust for Santa Barbara County
- League for Coastal Protection
- League of Women Voters
- Lompoc Dive Club
- Los Padres ForestWatch
- More Mesa Preservation Coalition
- Morro Coast Audubon Society
- National OCS Coalition
- National Wildlife Federation
- Nature Conservancy of California
- Natural Resources Defense Council

- North Coast Alliance, central California
- Ocean Futures Society
- Pacific Coast Federation of Fishermen's Association
- Pacific Merchant Shipping Association
- Parrotfish Productions Ltd.
- Project AWARE
- Point Conception Ground Fish Association
- Port San Luis Marine Institute
- Regional Alliance for Information Networking
- Santa Barbara Audubon Society
- Santa Barbara ChannelKeeper
- Santa Barbara County Action Network
- Santa Barbara Museum of Natural History
- Save Ellwood Shores
- Seafloor Surveys International, Inc.
- Sea Foam Enterprises
- Shoreline Preservation Fund, Santa Barbara
- Sierra Club, Los Padres Chapter
- Small Wilderness Area Preserves
- Surfrider Foundation, Santa Barbara Chapter
- Surfrider Foundation, Isla Vista Chapter
- Surfrider Foundation, Ventura Chapter
- Surfrider Foundation, San Luis Bay Chapter
- The Ocean Conservancy
- The Otter Project
- Trout Unlimited
- UCLA Institute of the Environment
- UCSB Environmental Affairs Board
- Urban Creeks Council
- USC Wrigley Institute
- Ventura County Commercial Fishermen's Association
- Ventura County Economic Development Association
- Ventura County Environmental Coalition
- Vessel Assist
- West Coast Seafood Processors Association
- WET/tv Productions
- Women's Environmental Watch

APPENDIX C MEETING HISTORY

The following table identifies the public meetings held on the consideration of marine reserves in the Channel Islands National Marine Sanctuary from 1999 to the present. "PFMC" is the Pacific Fishery Management Council; "SAC" is the Sanctuary Advisory Council; "FGC" is the California Fish and Game Commission.

Group	Meeting Dates	Major Meeting Topics
SAC	11/17/06	Process Update on the DEIS with discussion of cataloging and organizing public comments.
PFMC	11/12-17/06	PFMC considers the next steps in implementation of fishing regulations through the Magnuson-Stevens Act.
SAC, Conservation Working Group, Recreational Fishing Working Group, Research Activities Panel	9/22/06	CINMS Staff provided an overview of the DEIS including history, regulations, goals, the purpose and need for action, alternatives, environmental impacts of alternatives (ecological, socioeconomic), management considerations, next steps (comment period, public hearings, agency meetings), and when the final document can be expected. Chairs of working groups that convened meetings within the comment period provided summaries of working group comments on the DEIS. Advisory Council representatives reviewed comments.
PFMC and advisory bodies	9/10-15/06	PFMC review of CINMS Draft Environmental Impact Statement (DEIS) Regarding Fishery Closures
SAC	7/21/06	Process Update on the release of the DEIS and the Program's environmental review process to consider the establishment of marine reserves and conservation areas within the sanctuary. Review of the Advisory Council role regarding State Marine Protected Areas within CINMS.
PFMC	4/2-7/2006	PFMC considers Fishery Regulations within the Channel Islands National Marine Sanctuary
SAC	3/22/06	Process Update on the release of the DEIS, and discussion of the NOAA clearance process.
PMFC	3/5-10/06	PFMC scheduled further development of alternatives for implementing fishing regulations under the MSA to create the proposed no-take and limited take areas within the CINMS to meet sanctuary goals and objectives.
SAC	1/20/06	Progress report on the environmental review process for considering marine reserves and marine conservation areas within the Sanctuary.
PFMC	10/30/05 to 11/4/05	PFMC response to draft NMSA Fishing Regulation expected

Group	Meeting Dates	Major Meeting Topics
PFMC	9/18-23/05	PFMC and advisory bodies review NMSA Fishing Regulation (NMSA 304(a)(5)) and Supporting Materials
PFMC	6/12-17/05	PFMC presented with opportunity to draft NMSA Fishing Regulation (NMSA 304(a)(5)). NMSP provides Supporting Materials
SAC	5/20/05	Process Update on the second phase environmental review considering marine reserves and conservation areas within CINMS
SAC	5/20/05	Socioeconomic Monitoring Program • Issue background • Social Science Coordinator introduction • Status of social science data collection • Key monitoring questions • Next steps, including Advisory Council role • Advisory Council discussion and questions
PFMC and advisory bodies	4/3-8/05	Met with Groundfish Advisory Subpanel, Habitat Committee, Enforcement Consultants, Coastal Pelagic Species Advisory Subpanel, Coastal Pelagic Species Management Team, and Salmon Advisory Subpanel to provide final input for PFMC recommendations on Designation Document Consultation Letter; report to entire PFMC on letter
SAC	3/18/05	Informational status report on the environmental review process for considering marine reserves and marine conservation areas within the Sanctuary; Explanation of agency consultation process on possible changes to Sanctuary terms of designation
PFMC and advisory bodies	3/10/05	Report to PFMC on proposed changes to CINMS Designation Document
SAC	1/21/05	Progress report on the environmental review process for considering marine reserves and marine conservation areas within the Sanctuary. Status of DEIS development and agency consultation process; Update on monitoring and enforcement of existing Channel Islands Marine Protected Areas.
SAC	11/19/04	Informational status report on monitoring and enforcement of Channel Islands MPAs; Informational status report on the environmental review process for considering marine reserves and marine conservation areas within the Sanctuary
PFMC and advisory bodies	11/5/04	Met with PFMC to solicit comments on proposed timeline, alternatives, and analytical content for draft EIS
Ad Hoc Channel Islands Marine Reserve Committee	10/5-6/04	Gave CINMS staff update to ad hoc committee - environmental review process, overview of preliminary document, public input on document, next steps
SAC	9/24/04	Collected public and SAC member/working group comments on preliminary document
Enforcement Consultants	9/15/04	Met with Enforcement Consultants to give general overview of EIS and discuss the input CINMS is seeking.

Group	Meeting Dates	Major Meeting Topics
Research Working Group	9/13/04	Provided background on Channel Islands Marine Reserves Issue and Process and overview of Preliminary Document Sections.
SAC	7/23/04	Status report on monitoring and enforcement of Channel Islands MPAs; Overview of Staff Preliminary Working Draft Document for Consideration of a Network of Marine Reserves and Marine Conservation Areas within the CINMS; Discussion on SAC and Working Group process for document review and comment.
PFMC's Scientific and Statistical Committee (SSC) (Marine Reserves Subcommittee	7/19-20/04	Review of data elements and analytical methods proposed for use in marine reserves DEIS
PFMC and advisory bodies	6/17/04	Update on CINMS schedule for consideration of marine reserves in Federal waters; presentation of draft analytical document, including Alternatives 1-3
SAC	5/21/04	Valuing Marine Protected Areas: A Monitoring Protocol for Recreational Non-Consumptive Use Applied to the Channel Islands National Marine Sanctuary. Final group project report by graduate students from UCSB's Donald Bren School of Environmental Science and Management; "The Marine Stewardship Council's certification and eco-labeling program: Potential for the Channel Islands." Jim Humphreys, Regional Director-Americas; Report on monitoring and management of State MPAs within the Sanctuary; Status report on the Sanctuary's environmental review process to consider MPAs within the CINMS
PFMC's SSC	4/6/04	Met with SSC regarding marine reserves in Federal waters
SAC	3/19/04	Report on monitoring and management of State MPAs within the Sanctuary
SAC	3/19/04	Status report on the Sanctuary's environmental review process to consider MPAs within the CINMS
PFMC and advisory bodies	3/11/04	Report and solicitation of comment on marine reserves in Federal waters portion of CINMS
PFMC	9/10/03	Update on Marine Reserves Issues; Marine Reserves in the Federal Waters Portion of CINMS
PFMC	6/19/03	Planning for Federal Waters Portion of CINMS; Central California Sanctuary Processes Including Krill Ban
SAC	5/16/03	Report on Marine Enforcement Activities at the Islands; introduction of biological and socioeconomic monitoring projects; timeline for Marine Reserves Environmental Review Process
FGC	5/7/03	Update on department monitoring plan for the Channel Islands MPA's
FGC	4/3/03	Update on department monitoring plan for the Channel Islands MPA's
SAC	3/20/03	Federal Marine Reserves update
PFMC	3/12/03	Considerations for Integrating Marine Reserves with Efficient Fisheries Management

Group	Meeting Dates	Major Meeting Topics
FGC	2/6/03	Request for the Commission to reconsider establishment of the Channel Islands MPA's.
SAC	1/17/03	Update on State Marine Reserves Implementation
SAC	11/13/02	Implementation of Phase II process of Federal Reserves in January; DFG give consent for the proposed Marine Reserves
FGC	10/24/02	Public comment on Marine Reserve alternatives to protect between 12 percent and 34 percent of the sanctuary, no change to the existing system, or to include the Reserves with the Marine Life Protection Act coast-wide process.
FGC	10/ 2/02	Eric Larson reported that they have begun subtidal and non-consumptive use surveys to supplement existing data, and that discussions will continue with fishermen on their concerns with the regulations.
SAC	9/13/02	Identifying priorities for the Socio-Economic Monitoring for Marine Reserves
PFMC	9/11/02	Review of Proposal for Marine Reserves in State Waters of CINMS; Update on other Marine Reserves Processes
FGC	8/1/02	Use marine protected areas (through the Marine Life Protection Act process) as a potential tool to help replenish near shore stocks
SAC	7/12/02	Marine Reserves Regulatory Process Update
PFMC	6/20/02	Review of Proposal for Marine Reserves in State Waters of CINMS; Update on other Marine Reserves Processes
SAC	5/8/02	Marine Reserves Education Plan development, Biological & Socio-Economic Monitoring, and Enforcement Program Development
PFMC	4/9/02	Review Process for CINMS; Update on Other Marine Reserves Processes
SAC	3/15/02	Marine Reserves Regulatory Process Update
PFMC	3/13/02	Status of National Marine Sanctuary Processes Pertaining to Marine Reserves
FGC	3/7/02	Public comment on Marine Reserve alternatives
FGC	2/8/02	Public comment on Marine Reserve alternatives
SAC	1/9/02	Marine Reserves Regulatory Process and Implementation Update
PFMC	10/31/01	Status of Marine Reserves Proposals for CINMS
SAC	10/18/01	Marine Reserves Regulatory Process Update
PFMC, Ad-Hoc Marine Reserve Subcommittee, & SSC	10/1/01	Goals and analytical basis for reserve size; relationship between reserve size and existing management regime; generalization of SAP's analysis to other settings
PFMC	9/26/01	Status of Marine Reserves Proposals for CINMS
PFMC	9/11/01	Status Report on West Coast Marine Reserve Activities; Marine Reserve Proposals for CINMS
SAC	6/19/01	SAC marine reserves deliberation – forwarded recommendation to Manager
SAC Fishing Working Group	6/16/01	Fishing Working Group updates and suggestions for Marine Reserves Process
PFMC	6/11/01	Review of West Coast Marine Reserves Efforts; Marine Reserves in the CINMS

Group	Meeting Dates	Major Meeting Topics
MRWG/SAC	5/23/01	Transmission of final MRWG work to the Sanctuary Advisory Council; Marine Reserves Public Forum - Approximately 300 in attendance
Conservation Working Group	5/21/01	Conservation Working Group updates and suggestions for Marine Reserves Process
MRWG	5/16/01	Final MRWG meeting; agreements on a recommendation to the SAC
SAC Fishing Working Group	5/1401	Fishing Working Group updates and suggestions for Marine Reserves Process
MRWG	4/18/01	Developing a Preferred Reserve network option
PFMC	4/3/01	Channel Islands National Marine Sanctuary Program (CINMSP)
MRWG	3/21/01	Presentations from Science and Economic Panels and
Marine Reserves Working Group	3/21/01	Evening Public Forum – Approximately 300 in attendance
SAC	3/14/01	Sanctuary Advisory Council Marine Reserves Process update
Conservation Working Group	3/12/01	Conservation Working Group updates and suggestions for Marine Reserves Process
MRWG	2/21/01	Developed Marine Reserve Scenarios
MRWG	2/15/01	Dealt with Unresolved Issues
SAC	2/9/01	Sanctuary Advisory Council Marine Reserves Working Group update
Conservation Working Group	1/16/01	Conservation Working Group updates and suggestions for Marine Reserves Process
MRWG	1/16/01	Discussion with Science and Socioeconomic Panels
MRWG	12/14/00	Reached closure on Goals and Objectives, developed questions for technical panels
MRWG	12/9/00	Presentation from MWRG members regarding major issues
SAC	11/16/00	Marine Reserves Working Group report and update on Marine Reserves Process
MRWG	11/15/00	MRWG revised work on Goals and Objectives
Conservation Working Group	11/14/00	Conservation Working Group updates and suggestions for Marine Reserves Process
MRWG	10/18/00	MRWG revised work on goals and objectives
MRWG	10/12/00	MRWG Public Forum – Approximately 300 in attendance
MRWG	9/26-27/00	Received Socio-Economic and SAP data and recommendations; Crafted preliminary reserve scenarios
SAC	9/20/00	Sanctuary Advisory Council Marine Reserves Working Group Report
PFMC	9/12/00	Marine Reserves Phase I Considerations Report; Marine Reserves Phase II Considerations
MRWG	8/22/00	Discussed data, worked on Goals and Objectives
MRWG	7/18/00	Re-worked Goals and Objectives, SAP progress, refined overall process

Group	Meeting Dates	Major Meeting Topics
MRWG	6/22/00	Adopted Goals and Objectives (first time); Discussed data needs
MRWG	6/8/00	MRWG Development of Goals and Objectives
SAC	4/19/00	Marine Reserves SAP, Socio Economic Panel and Working Group updates
MRWG	4/13/00	Data needs discussion, set future process
PFMC	4/5/00	Staff Report on Phase I of Considerations of Marine Reserves as a Management Measure
MRWG	3/16/00	Task groups, Goals and Objectives
SAC	3/15/00	Marine Reserves Working Group and Marine Reserves Process Update
MRWG	2/23/00	Response to SAP, worked on goals and objectives
MRWG	1/20/00	MRWG Public Forum – Approximately 200 in attendance
MRWG	1/10-11/00	Joint meeting with Science and Socio economic panels, crafted goals & objectives
SAC	11/18/99	Marine Reserves SAP, Socio Economic Panel and Working Group updates
MRWG	11/10/99	Discussed revisions and finalized ground rules
MRWG	10/21/99	Adopted draft ground rules
SAC	10/5/99	Sanctuary Advisory Council Marine Reserves Update
PFMC	9/16/99	Ad-Hoc Marine Reserve Committee Report; Comments of Advisory Entities and Public; Council Direction to Committee - ACTION
SAC	7/22/99	Sanctuary Advisory Council Marine Reserves Update
MRWG	7/7/99	Introduction to the issue and proposed process
PFMC	6/22/99	Ad-Hoc Marine Reserve Committee Report; Comments of Advisory Entities and Public; Council Direction to Committee - ACTION
SAC	5/20/99	Initial Development of Marine Reserve Working Group and SAP
SAC	3/ 5/99	Sanctuary Advisory Council update on Marine Reserve issue and SAC opportunity

APPENDIX D SUMMARY OF PUBLIC SCOPING COMMENTS

The CINMS received both written and verbal comments during the public scoping period from May 22-July 23, 2003. Comments were solicited at the following public meetings:

- June 5 in Pt. Hueneme
- June 12 in Santa Barbara
- June 16-20 in Foster City, Pacific Fishery Management Council
- June 26 in Santa Barbara, Conservation Working Group, (SAC
- July 15 in Carpinteria, Business Working Group, SAC
- July 18 in Ventura, SAC

Major constituencies represented and providing comments:

- SAC members, alternates and working group members
- Pacific Fishery Management Council subpanel and committee members
- Recreational fishing organizations and individuals
- Commercial Fishing organizations and individuals
- Environmental organizations and individuals
- Congresswoman Capps' office
- State and Federal Agencies
- General Public

The following summary illustrates the range of public comments received:

- Expand marine reserve areas to complete a scientifically based network to include the variety of habitats, depth ranges and species with connectivity between reserves
- Existing fisheries management is working, do not expand State Marine Protected Areas
- Consider impacts of pollution, oil slicks, sewage, nuclear/toxic waste
- Allow pelagics to be harvested recreationally from zoned areas
- Protect pelagics in zoned areas
- Reserves provide heritage and intrinsic values, consider value to general public
- Demonstrate administrative and monitoring capabilities before considering expansion
- Consider marine parks that allow recreational fishing to test impacts of recreational fishing
- Consider broad range of alternatives and management tools, not just reserves
- Ensure management actions are enforceable/provide adequate enforcement
- Need to fund socioeconomic effects to understand fishery impacts
- Support experimental/adaptive approach
- Consider birds and marine mammals

The following is a subset of SAC comments:

- Utilize the Marine Reserves Working Group work and address areas of consensus and non-consensus. Build on the existing State environmental process documents and information

- Clearly define the purpose and need for considering additional marine reserves
- Keep the marine reserves and management plan NEPA processes separate. Time is of the essence; given four years of community process it is critical to move forward
- Reserve size will determine the scale and timing of effects, i.e., small reserves will have a smaller effect and take longer to realize versus larger reserves
- Consider the costs and benefits of phasing to the resources and economy over time
- Describe the agency's commitment and processes toward long-term management
- Consider the socioeconomic effects of the groundfish closures
- Recreational fishing impacts on resources need to be considered
- Analyze positive and negative impacts to consumptive and non-consumptive users
- Establish socioeconomic impact thresholds of significance (as required by NEPA).
- The Sanctuary is encouraged to work with agency partners and the PFMC
- The recommendation chosen by the State was developed jointly by the California DFG and the Sanctuary and should be one of the alternatives considered

The following is a summary of Pacific Fishery Management Council (PFMC) comments:

Sanctuary staff met with the PFMC, Habitat Advisory Panel, California Delegation, Science and Statistical Committee (SSC), Enforcement Advisory Group and the Groundfish Advisory Panel (GAP). The Habitat, SSC, GAP and Enforcement groups submitted written Statements that have been forwarded with the PFMC Statement.

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"The Council directed staff to forward all prepared Statements of its advisory bodies on the topic of marine reserves in the CINMS, as well as the April 24 letter from the Council to CINMS, as formal scoping comments to the CINMS. In addition, the Council directed that its Ad Hoc Marine Reserves Committee meet to review the CINMS preliminary draft environmental document, the draft CINMS management plan, and a summary of scoping comments provided by CINMS, and to provide recommendations to the Council as appropriate. Finally, the Council directed the chair of the SSC Marine Reserves Subcommittee to work with CINMS staff on providing clarification of earlier SSC comments on CINMS environmental documents. " (PFMC Website)

General comments from the PFMC sub-panels and committees:

- The State Environmental Documents are inadequate
- Clarify the processes to revise the CINMS Management Plan, amend the Designation Document and consider marine reserves under the National Marine Sanctuaries Act
- Concern that CINMS is usurping fisheries management
- The CINMS public process and SAC representation is unfair

APPENDIX E FISHERY MANAGEMENT MEASURES

The table below summarizes the existing commercial fishing prohibitions in the Southern California region as of April 7, 2005. Note that this is not a complete reproduction of all fishing regulations (e.g., quotas, size limits, in-season adjustments in allowable take and gear restrictions), and should not be used for legal compliance. For additional information on recent fishery management measures, see CDFG (http://www.dfg.ca.gov/MRD/index.html) and NMFS (http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Groundfish-Closed-Areas/RCA-Archives.cfm#CP_JUMP_31817).

Existing Commercial Fishing Prohibitions In The Southern California Region

Species	Gear Type	Season	Regulations
Abalone			Abalone may not be taken, possessed, or landed for commercial purposes.
All Groundfish (some exceptions)	All Gear Types	March 1 - April 30	Closed Season
All Groundfish (some exceptions)	Non-trawl (Fixed)	Jan 1 - Dec 31	Fishing is prohibited in waters greater than 60 fathoms and less than 150 fathoms south of Point Conception.
All Groundfish (some exceptions)	Trawl	Jan 1- Feb 28 and Nov 1-Dec 31	Fishing is prohibited in waters greater than 75 fathoms and less than 150 fathoms along the mainland, and from the shoreline to 150 fathoms around the islands.
All Groundfish (some exceptions)	Trawl	Mar 1-Oct 31	Fishing is prohibited in waters greater than 100 fathoms and less than 150 fathoms along the mainland, and from the shoreline to 150 fathoms around the islands.
Sheephead	All Gear Types	March 1-April 30	Closed Season
All Species – Marine Resources Protection Zone	Gill Nets and Trammel Nets		Prohibited in waters less than 70 fathoms or within 1 nautical mile, whichever is less, around the Channel Islands (San Miguel, Santa Rosa, Santa Cruz, Anacapa, San Nicolas, Santa Barbara, Santa Catalina, and San Clemente).
Rockfish	Gill Nets and Trammel Nets		Use Prohibited in State waters for the take of rockfish.
Rockfish & Lingcod	Gill Nets and Trammel Nets		Prohibited in waters less than 70 fathoms in depth south of Point Sal, except drift and set gill nets shall not be used in waters less than 100 fathoms in depth at Sixty-Mile Bank. Prohibition on the take of rockfish in State waters applies.
Swordfish & Shark	Drift Gill Nets	Feb 1 to April 30	Closed Season
Swordfish & Shark	Drift Gill Nets	May 1 to Aug 14	Use prohibited within 75 nautical miles of the mainland coast between the westerly extension of the CA-OR boundary and the westerly extension of the US-Mexico boundary.

Existing Commercial Fishing Prohibitions In The Southern California Region

Species	Gear Type	Season	Regulations
Swordfish & Shark	Drift Gill Nets	May 1 to July 31	Use prohibited within 6 nautical miles westerly, northerly, and easterly of the shoreline of San Miguel Island between a line extending 6 nautical miles west from Point Bennett and a line extending 6 nautical miles east from Cardwell Point and within 6 nautical miles westerly, northerly, and easterly of the shoreline of Santa Rosa Island between a line extending 6 nautical miles west from Sandy Point and a line extending 6 nautical miles east from Skunk Point.
Swordfish & Shark	Drift Gill Nets	May 1 to July 31	Use prohibited within 10 nautical miles westerly, southerly, and easterly of the shoreline of San Miguel Island between a line extending 10 nautical miles west from Point Bennett and a line extending 10 nautical miles east from Cardwell Point and within 10 nautical miles westerly, southerly, and easterly of the shoreline of Santa Rosa Island between a line extending 10 nautical miles west from Sandy Point and a line extending 10 nautical miles east from Skunk Point.
Swordfish & Shark	Drift Gill Nets	Dec 15 to Jan 31	Use prohibited in ocean waters within 25 nautical miles of the mainland coast.
Squid	Round Haul Nets	January 1-December 31	Season closed from noon Friday until noon Sunday each week.
Yellowtail, barracuda, white seabass, salmon, steelhead, striped bass, and shad	Round Haul Nets		Use prohibited to take these species.
All Species	Trawl Nets		Prohibited out to 3 miles offshore mainland coast. (Except California halibut trawl grounds, 1-3 miles offshore between Pt. Arguello and Pt. Mugu). Special restrictions apply.
Halibut	Trawl Nets	March 15 - June 15	Closed Season - California Halibut Trawl Grounds. Use prohibited in waters between one and three nautical miles from the mainland shore between Pt. Arguello and Pt. Mugu.
Pink Shrimp	Trawl Nets	November 1 - March 31	Closed Season for Pacific Ocean Shrimp.
Prawns & Shrimp	Traps		Use prohibited from Point Conception south to the Mexican border inside 50 fathoms depth.
Spot Prawn	Traps	November 1-January 31	Closed Season between line drawn due west from Pt. Arguello and US-Mexico boundary.
Spot Prawn	Trawl		Use prohibited

Existing Commercial Fishing Prohibitions In The Southern California Region			
Species	**Gear Type**	**Season**	**Regulations**
Sea urchin (Red)		Various Closures - April through October	In April, May, September and October the closed days are Friday through Sunday. In June and August the closed days are Thursday through Sunday. In July the closed days are Wednesday through Sunday.
Lobster	Traps	First Thur. after March 15th to 1st Tue. in October	Closed Season

The table below summarizes the existing recreational fishing prohibitions in the southern California region as of April 7, 2005. Note that this is not a complete reproduction of all fishing regulations (e.g., bag limits, size limits, in-season adjustments in allowable take and gear restrictions) and should not be used for legal compliance.

Existing Recreational Fishing Prohibitions in the Southern California Region		
Species	**Season**	**Regulations**
Abalone		May not be taken
Garibaldi, giant (black) sea bass, gulf and broomtail grouper, canary rockfish, cowcod rockfish, yelloweye rockfish, white shark		May not be taken
Grunion	April 1 - May 31	Closed Season
Rockfish, cabezon, greenlings, CA sheephead, ocean whitefish, and bocaccio.	January 1 - February 28	Closed Season for boat-based anglers; open year-round for divers and shore-based anglers[1].
Rockfish, cabezon, greenlings, CA sheephead, ocean whitefish, and bocaccio	March 1 – April 15	Take is prohibited in waters greater than 60 fathoms and less than 30 fathoms south of Point Conception.
Rockfish, cabezon, greenlings, CA sheephead, ocean whitefish, and bocaccio	April 16 – August 31, and November 1-December 31	Take is prohibited in waters greater than 60 fathoms south of Point Conception.
Rockfish, cabezon, greenlings, CA sheephead, ocean whitefish, and bocaccio	September 1-October 31	Take is prohibited in waters greater than 30 fathoms south of Point Conception.
CA scorpionfish (sculpin)	January 1 - September 30	Closed Season for boat-based anglers; open year-round for divers and shore-based anglers.
CA scorpionfish (sculpin)	October 1-October 31	Take is prohibited in waters greater than 30 fathoms south of Point Conception
CA scorpionfish (sculpin)	November 1-December 31	Take is prohibited in waters greater than 60 fathoms south of Point Conception

Existing Recreational Fishing Prohibitions in the Southern California Region		
Species	**Season**	**Regulations**
Lingcod	January 1-March 31, and December 1-December 31	Closed Season for boat-based anglers, divers, and shore-based anglers.
Lingcod	April 1 – April 15	Take is prohibited in waters greater than 60 fathoms and less than 30 fathoms south of Point Conception.
Lingcod	April 16 – August 31, and November 1-November 30	Take is prohibited in waters greater than 60 fathoms south of Point Conception.
Lingcod	September 1-October 31	Take is prohibited in waters greater than 30 fathoms south of Point Conception.
Lobster	First Thur. after March 15th to the Fri. before the 1st Wed. in October	Closed Season
Salmon	September 29 – April 2	Closed Season[2]

[1] Shore-based anglers and divers are exempt from depth restrictions affecting boat-based anglers fishing for rockfish, cabezon, greenlings, CA sheephead, ocean whitefish, and bocaccio.
[2] Salmon fishing seasons are set on an annual basis. The closed season shown here was for the 2004 ocean salmon fishery and may change in the future.

APPENDIX F HABITAT AND SPECIES OF INTEREST

Habitat: Hard (0-100 m)

Macrocystis pyrifera (subtidal to 40 m)
Egregia menziesi (subtidal to 20-30 m)
Egregia laevigata (subtidal to 20-30 m)
[3]*Pelagophycus porra* (30-90 m)
[3]*Laminaria farlowii* (subtidal to 50 m)
Agarum fimbriatum (subtidal to 115 m)
[4]Ostrich-Plume Hydroid (intertidal to 35 m)
Garveia annulata (subtidal to 120 m)
Obelia spp. (subtidal to 50 m)
Sertularella turgida (subtidal to 160 m)
Tubularia crocea (subtidal to 40 m)
Sertularia frucata (subtidal to 50 m)
Red Gorgonian (16-66 m)
[3]California Golden Gorgonian (subtidal to 30 m)
[3]Brown Gorgonian (subtidal to 33 m)
Colonial Sand Tube Worm (intertidal to 80 m)
Giant Acorn Barnacle (intertidal to 90 m)
Giant Starfish (intertidal to 88 m)
[4]Ochre Starfish (intertidal to 88 m)
[1]California Sea Cucumber (subtidal to 90 m)
[1]Warty Sea Cucumber (subtidal to 30 m)
[1]Red Sea Urchin (subtidal to 90 m)
Purple Sea Urchin (subtidal to 160 m)
[12]Pink Abalone (6-60 m)
[12]Red Abalone (intertidal to 180 m)
[12]White Abalone (25-66 m)
[1]Kellet's Whelk (subtidal to 70 m)
[1]Rock Scallop (subtidal to 50 m)
[13]California Spiny Lobster (subtidal to 60 m)
[13]Red Rock Shrimp (subtidal to 60 m)
[1]Spot Prawn (subtidal to 450 m)
[1]Ridgeback Shrimp (subtidal to 150 m)
[1]Red Crab (mid intertidal to 80 m)
[1]Rock Crab (intertidal to 40 m)
[1]Sheep Crab (6-124 m)
California Scorpionfish (shallow subtidal to 183 m)
[14]Pacific Ocean Perch (subtidal to 640 m)
[12]Kelp Rockfish (shallow subtidal to 58 m)
[12]Brown Rockfish (shallow subtidal to 128 m)
[12]Gopher Rockfish (subtidal to 80 m)
[12]Copper Rockfish (subtidal to 183 m)
[12]Greenspotted Rockfish (30 to 363 m)
[124]Black and Yellow Rockfish (subtidal to 37 m)
[124]Darkblotched Rockfish (25 to 904 m)
[12]Starry Rockfish (24 to 274 m)
[123]Calico Rockfish (subtidal to 256 m)
[124]Widow Rockfish (24 to 549 m)
[12]Cowcod (40 to 491 m)
[124]Black Rockfish (subtidal to 366 m)
[12]Vermillion Rockfish (6 to 436 m)
[124]Blue Rockfish (subtidal to 549m)

[123]Speckled Rockfish (60 to 150m)
[12]Boccacio (12 to 478 m)
[12]Canary Rockfish (subtidal to 439 m)
[12]Grass Rockfish (shallow subtidal to 46 m)
[124]Yelloweye Rockfish (15-549 m)
[12]Flag Rockfish (30 to 418 m)
[124]Olive Rockfish (shallow subtidal to 172 m)
[123]Treefish (9 to 30 m)
[123]Honeycomb Rockfish (30 to 270 m)
[12]Lingcod (shallow subtidal to 443 m)
[12]Cabezon (subtidal to 120 m)
[123]Giant Seabass (subtidal to 46 m)
[1]Kelp Bass (subtidal to 46 m)
[1]Ocean Whitefish (subtidal to 91 m)
[13]White Seabass (subtidal to 122 m)
[13]Halfmoon (subtidal to 40 m)
[1]Black Surfperch (subtidal to 46 m)
[1]Walleye Surfperch (subtidal to 200 m)
[1]Silver Surfperch (subtidal to 120 m)
[1]Rubberlip Surfperch (subtidal to 52 m)
Blacksmith (subtidal to 50 m)
[12]California Sheephead (subtidal to 93 m)

Habitat: Hard (100-200 m)
Agarum fimbriatum (subtidal to 115 m)
Garveia annulata (subtidal to 120 m)
Sertularella turgida (subtidal to 160 m)
Purple Sea Urchin (subtidal to 160 m)
[12]Red Abalone (intertidal to 180 m)
[1]Spot Prawn (subtidal to 450 m)
[1]Ridgeback Shrimp (subtidal to 150 m)
California Scorpionfish (shallow subtidal to 183 m)
[4]Pacific Ocean Perch (subtidal to 640 m)
[12]Brown Rockfish (shallow subtidal to 128 m)
[12]Copper Rockfish (subtidal to 183 m)
[12]Greenspotted Rockfish (30 to 363 m)
[124]Darkblotched Rockfish (25 to 904 m)
[12]Starry Rockfish (24 to 274 m)
[123]Calico Rockfish (20 to 256 m)
[124]Widow Rockfish (24 to 549 m)
[12]Cowcod (40 to 491 m)
[124]Black Rockfish (subtidal to 366 m)
[12]Vermillion Rockfish (6 to 436 m)
[124]Blue Rockfish (subtidal to 549m)
[123]Speckled Rockfish (60 to 150m)
[12]Boccacio (12 to 478 m)
[12]Canary Rockfish (subtidal to 439 m)
[124]Yelloweye Rockfish (15-549 m)
[12]Flag Rockfish (30 to 418 m)
[124]Olive Rockfish (shallow subtidal to 172 m)
[123]Honeycomb Rockfish (30 to 270 m)
[12]Lingcod (shallow subtidal to 443 m)
[12]Cabezon (subtidal to 120 m)
[13]White Seabass (subtidal to 122 m)
[1]Walleye Surfperch (subtidal to 200 m)
[1]Silver Surfperch (subtidal to 120 m)

Habitat: Hard (>200 m)
Black hydrocoral
[1]Spot Prawn (subtidal to 450 m)
[12]Greenspotted Rockfish (30 to 363 m)
[124]Darkblotched Rockfish (25 to 904 m)
[12]Starry Rockfish (24 to 274 m)
[123]Calico Rockfish (20 to 256 m)
[124]Widow Rockfish (24 to 549 m)
[12]Cowcod (40 to 491 m)
[124]Black Rockfish (subtidal to 366 m)
[12]Vermillion Rockfish (6 to 436 m)
[124]Blue Rockfish (subtidal to 549m)
[12]Boccacio (12 to 478 m)
[12]Canary Rockfish (subtidal to 439 m)
[124]Yelloweye Rockfish (15-549 m)
[12]Flag Rockfish (30 to 418 m)
[124]Olive Rockfish (shallow subtidal to 172 m)
[123]Honeycomb Rockfish (30 to 270 m)
[12]Lingcod (shallow subtidal to 443 m)
[4]Pacific Ocean Perch (subtidal to 640 m)

Habitat: Soft (0-100 m)
Zostera spp. (to 30 m)
Sertularia frucata (subtidal to 50 m)
[1]Warty Sea Cucumber (subtidal to 30 m)
[1]Red Rock Shrimp (subtidal to 60 m)
[1]Spot Prawn (subtidal to 450 m)
[1]Ridgeback Shrimp (subtidal to 150 m)
[1]Rock Crab (intertidal to 40 m)
[1]Sheep Crab (6-124 m)
[3]Leopard Shark (4-91 m)
[1]Pacific Angel Shark (3-46 m)
Soupfin Shark (subtidal to 411 m)
[3]Thornback Ray (subtidal to 50 m)
[12]Pacific Cod (12-550 m)
California Scorpionfish (shallow subtidal to 183 m)
[124]Darkblotched Rockfish (25 to 904 m)
[123]Calico Rockfish (20 to 256 m)
[124]Black Rockfish (subtidal to 366 m)
[124]Blue Rockfish (subtidal to 549m)
[12]Shortspine Thoryhead (20 to 1524 m)
[12]Lingcod (shallow subtidal to 443 m)
[4]Pacific Ocean Perch (90 to 825 m)
[1]California Halibut (shallow subtidal to 183 m)
[1]Black Surfperch (subtidal to 46 m)
[1]Walleye Surfperch (subtidal to 200 m)
[1]Silver Surfperch (subtidal to 120 m)
[1]Rubberlip Surfperch (subtidal to 52 m)
[14]Starry Flounder (subtidal to 275 m)
[1]C-O Turbot (subtidal to 383 m)

Habitat: Soft (100-200 m)
[1]Ridgeback Shrimp (subtidal to 150 m)
Soupfin Shark (subtidal to 411 m)

[1,2]Pacific Cod (12-550 m)
California Scorpionfish (shallow subtidal to 183 m)
[1,2,4]Darkblotched Rockfish (25 to 904 m)
[1,2,3]Calico Rockfish (20 to 256 m)
[1,2,4]Black Rockfish (subtidal to 366 m)
[1,2]Shortspine Thoryhead (20 to 1524 m)
[1,2]Lingcod (shallow subtidal to 443 m)
[4]Pacific Ocean Perch (90 to 825 m)
[1]California Halibut (shallow subtidal to 183 m)
[1]Walleye Surfperch (subtidal to 200 m)
[1]Silver Surfperch (subtidal to 120 m)
[14]Starry Flounder (subtidal to 275 m)
[1]C-O Turbot (subtidal to 383 m)

Habitat: Soft (>200 m)
Soupfin Shark (subtidal to 411 m)
[1,2]Pacific Cod (12-550 m)
[1,2,4]Darkblotched Rockfish (25 to 904 m)
[1,2,3]Calico Rockfish (20 to 256 m)
[1,2,4]Black Rockfish (subtidal to 366 m)
[1,2,4]Blue Rockfish (subtidal to 549m)
[1,2]Shortspine Thoryhead (20 to 1524 m)
[4]Pacific Ocean Perch (90 to 825 m)
[1,2]Lingcod (shallow subtidal to 443 m)
[1,4]Starry Flounder (subtidal to 275 m)
[1]C-O Turbot (subtidal to 383 m)

Pelagic Species
[1]Market Squid
[12]Pacific Herring
[12]Pacific Sardine
[1]Northern Anchovy (surface to 300 m)

Notes:
[1] Fished; Includes both historically and currently fished species
[2] Requires some restoration / exhibited long term or rapid decline
[3] Warmer water species
[4] Colder water species

APPENDIX G HABITAT AND ECOLOGICAL FUNCTION

The following table identifies habitat associations of ecological functions for select groundfish species within the CINMS region. Information is excerpted from Pacific Coast Groundfish FMP, ESH Draft Environmental Impact Statement (2005) and Love et al. (2002).

Species	Ecological Function	Habitat
Black, blue, olive, kelp, black-and-yellow, gopher rockfishes	Growth to maturity	High in water column, usually near kelp or pilings, deeper in winter
	Larval growth	Pelagic zone
	Juvenile growth	Pelagic zone
	Juvenile settlement	Shallow kelp beds, kelp canopy, seagrass beds, high relief rock, sand, sand-rock interface, and midwater column
Black rockfish	Growth to maturity	Crevices, sand channels among rocks or depressions in reefs
	Schooling	Mid-water over high relief rocks, boulders, pinnacles
	Foraging	Water column
	Mating	Water column, surface to 10 m depth, along rock wall
	Larval development	Pelagic zone
Blue rockfish	Growth to maturity	Kelp beds
	Foraging	Kelp beds
	Courting mates	Water column
	Larval development	Pelagic zone
Black and yellow rockfish	Growth to maturity	Sandy areas near low relief rock formations
	Larval development	Nearshore water column, surface kelp canopy and drift alga
Brown Rockfish	Feeding	Sandy low relief habitat
Bocaccio	Juvenile settlement	Rocky areas with algae and sandy areas with eelgrass or drift algae
Leopard shark	Feeding	Mud in littoral and benthic habitats
Soupfin shark	Feeding	Bottom, mid-water column, and surface;
	Birthing	Bays
Lingcod	Spawning	3-10 m below mean low low water over rocky reefs;
	Larval development	Epipelagic, upper 3 m of the water column
	Juvenile development	Sandy and rocky substrate in subtidal zone and estuaries
Pacific cod	Eggs	Coarse sand and cobble bottoms

APPENDIX H PROPOSED DETERMINATIONS AND CONSIDERATIONS

Under the NMSA, the Secretary of Commerce (delegated to NOAA) may designate any discrete area of the marine environment as a national marine sanctuary and promulgate regulations implementing the designation if the Secretary makes a set of determinations, has considered several defined factors, and consulted with several entities (16 U.S.C. 1433). The "discrete area of the marine environment" that is the subject of this action is the same area that was the subject of the determinations and considerations made when the Sanctuary was designated in 1980 and reiterated in May 2006 when NOAA released a revised draft management plan for the CINMS (see 71 FR 29148; May 19, 2006). Still, the NMSA states that terms of designation may only be modified by the same procedures by which the original designation was made (16 U.S.C. 1434(a)(4)). As such, and because this action proposes to revise the CINMS terms of designation, the determinations and considerations are given below.

Determinations Required under Section 303(a) of the NMSA

1. The designation will fulfill the purposes and policies of the NMSA.

2. The area is of special national significance due to its conservation, recreational, ecological, historical, scientific, cultural, archaeological, educational, or esthetic qualities; the communities of living marine resources it harbors; or its resource or human-use values.

Response to 1 and 2: These determinations and findings were made when the Sanctuary was designated in 1980. The Sanctuary, and its associated marine life and historical/cultural resources, possess exceptional value in all categories (conservation, recreational, ecological, historical, scientific, cultural, archaeological, educational, and esthetic qualities). The proposed changes would provide additional protection to bottom habitats, water quality, living resources, and historical/cultural resources of the Sanctuary.

3. Existing State and Federal authorities are inadequate or should be supplemented to ensure coordinated and comprehensive conservation and management of the area, including resource protection, scientific research, and public education.

4. Designation of the area as a national marine sanctuary will facilitate the objectives Stated in paragraph 3.

Response to 3 and 4: The original FEIS found that existing statutes did not provide a comprehensive management mechanism for marine waters surrounding the northern Channel Islands. The proposed changes to the terms of designation would allow existing laws relating to marine resource management and marine species protection within the Sanctuary to be supplemented in order to improve resource protection.

5. The area is of size and nature that will permit the comprehensive and coordinated conservation and management.

Response to 5: The Sanctuary's outer boundary would be modified very slightly to accommodate a few of the marine zones being established by NOAA's action. This action would increase the overall size of the Sanctuary from 1113 nmi^2 to 1138 nmi^2, a 25 nmi^2 increase. This small amount does not change the original determination that the area is of a size and nature that will permit comprehensive and coordinated management.

Considerations Required under Section 303(b)(1) of the NMSA

1. The area's natural resource and ecological qualities, including its contribution to biological productivity, maintenance of ecosystem structure, maintenance of ecologically or commercially important or threatened species or species assemblages, maintenance of critical habitat or endangered species, and the biogeographic representation of the site.

2. The area's historical, cultural, archaeological, or palentological significance.

Response to 1 and 2: The exceptional natural resource and ecological qualities of the Sanctuary are described in the original FEIS on pages 11-55, and an updated description is provided in sections 3.1, 3.2, and 3.3 of the CINMS Draft Management Plan/DEIS (NOAA 2006). The significant maritime heritage resources of the Sanctuary (i.e., historical/cultural resources) are described in section 3.4 of the CINMS Draft Management Plan/DEIS (NOAA 2006).

3. The present and potential uses of the area that depend on maintenance of the area's resources, including commercial and recreational fishing, subsistence uses, other commercial and recreational activities, and research and education.

4. The present and potential activities that may adversely affect the factors identified in subparagraphs 1, 2, and 3.

Response to 3 and 4: A description of the human uses of the Sanctuary and its surrounding areas is provided in the original FEIS on pages 59-90, and an updated description is provided in section 3.5 of the CINMS Draft Management Plan/DEIS (NOAA 2006).

5. The existing State and Federal regulatory and management authorities applicable to the area and the adequacy of those authorities to fulfill the purposes of the NMSA.

Response to 5: Management authorities and associated laws and regulations applicable to the Sanctuary are described in the original FEIS on pages F6-49, and an updated description is found in the CINMS Draft Management Plan/DEIS (NOAA 2006). Existing management authorities were considered in the final rule designating the Sanctuary in 1980 (45 FR 65198). For additional information on how NOAA considered existing management authorities for this action refer to section 4.4 of this document (marine reserves and marine conservation areas FEIS) and elsewhere in this document. Appendix E describes the existing Federal and State regulations associated with fisheries management and fishery management plans within the CINMS. The FEIS also addresses their adequacy for the purposes of the NSMA. Section 3.0 of this FEIS also

provides information on the existing Cow Cod Conservation Area and the California Rockfish Conservation Area within the CINMS.

6. The manageability of the area, including such factors as its size, its ability to be identified as a discrete ecological unit with definable boundaries, its accessibility, and its suitability for monitoring and enforcement activities.

Response to 6: The proposed changes would not substantially change the overall size, manageability, accessibility, or suitability for monitoring and enforcement activities in the Sanctuary.

7. The public benefits to be derived from sanctuary status, with emphasis on the benefits of long-term protection of nationally significant resources, vital habitats, and resources which generate tourism.

Response to 7: The public benefits from sanctuary status were described in the original 1980 FEIS and final rule designating the Sanctuary (45 FR 65198). The changes to the terms of designation proposed by this action would enhance public benefits by providing for increased protection to habitats and marine life, sensitive marine species, and historical/cultural resources of the Sanctuary while still allowing for continued public use and enjoyment, education, and research of the Sanctuary environment.

8. The negative impacts produced by management restrictions on income-generating activities such as living and nonliving resources development.

9. The socioeconomic effects of sanctuary designation.

Response to 8 and 9: An analysis of the socioeconomic impacts of proposed regulatory changes is included in Section 5.2 of this document. The socioeconomic analysis concludes that impacts of the proposed changes would be less than significant.

10. The area's scientific value and value for monitoring the resources and natural processes that occur there.

Response to 10: The area's scientific value and value for monitoring the resources and natural processes are described in the original FEIS, management plan, and final rule for designation of the Sanctuary. The changes to the terms of designation proposed by this action would enhance the area's scientific and monitoring value by allowing for increased protection to seabed habitats and features, water quality, and living resources of the Sanctuary.

11. The feasibility, where appropriate, of employing innovative management approaches to protect sanctuary resources or to manage compatible uses.

Response to 11: By allowing for the use of zoning, NOAA's action itself represents an innovative management approach to further the protection of Sanctuary resources and managing compatible uses.

12. The value of the area as an addition to the System.

Response to 12: This action would increase the overall size of the Sanctuary from 1,113 nmi^2 to 1,138 nmi^2, a 25 nmi^2 increase. This small amount added would allow the boundary of four of the marine reserves to be defined by straight lines projecting outside the current CINMS boundary, allowing for better enforcement of the marine reserves. In more general terms, the addition of the marine zones would contribute to the National Marine Sanctuary System by providing for increased protection to habitats and marine life, sensitive marine species, and historical/cultural resources of the Sanctuary while still allowing for appropriate continued public use and enjoyment, education, and research of the Sanctuary environment.

APPENDIX I RESPONSE TO COMMENTS

This appendix contains NOAA's responses to the substantive comments received on the Draft Environmental Impact Statement. NOAA has summarized the comments according to the content of the statement or question put forward in the letters, emails, and written and oral testimony at the public hearings on this action. Many commenters submitted similar enough questions or statements that they could be addressed by one response. NOAA also made several changes to this FEIS in response to the public comments, e.g., updating the socioeconomic and ecological impact analyses. Several technical or editorial comments on the DEIS were taken under consideration by NOAA and, where appropriate, applied to the FEIS. These comments are not, however, included in the substantive list below.

The list of substantive comments and responses is preceded by the table below, which identifies each commenter and the NOAA response associated with their comment. The numbers listed in the far right column of the table correspond with the list of comments and responses following the table. In several cases, because an individual made multiple comments in a single letter or testimony, there are multiple responses from NOAA.

List of Commenters and Associated NOAA Responses			
Last Name	**First Name**	**Representing**	**Comment/Response Number**
Alexander	Will	Self	1
Aronson	Ellen	Minerals Management Service	2, 74, 88, 126, 127, 128, 130, 132
Atkins	Leah	California Resources Agency	120
Bacon	Captain David	Chair, Recreational Fishing Working Group, Sanctuary Advisory Council	20, 3, 8, 4, 9, 13
Bailey	Toni	Self	1
Bailey	Kevin	Self	1
Bensen	Daniel	Self	3
Benson	Cameron	Self	1
Black	Dianne M.	Chair, Sanctuary Advisory Council	74, 75, 82, 83, 84, 85, 97, 99, 100, 101, 102, 103, 104
Broddrick	L. Ryan	Director, CA Dept. of Fish and Game	19, 121, 122, 123
Brown	Tara	Self	1
Brus	Kirk	US Army Corps of Engineers	124
Bucher	O.	Self	125
Burke	Gary	Self	3
Campbell	Bruce	Self	1
Cappozzelli	J.	Self	2
Capps	Lois	U.S. Congressional Representative	2
Charrier	JL	Self	2
Chrisman	Mike	Secretary, CA Resources	120

List of Commenters and Associated NOAA Responses			
Last Name	**First Name**	**Representing**	**Comment/Response Number**
		Agency	
Chua	Dan	Self	36, 54, 72
Clark	Steve	Self	1
Cordero	Roberta	Self	1
Couffer	Jack	Self	2
Cunningham	E. Page	Self	125
Curland	Jim	Defenders of Wildlife	1, 2
Delmue	Rod	Self	16
Dettmer	Alison	California Coastal Commission	3, 77, 78, 79, 80, 81, 106, 114-120
Diaz de Leon	Elizabeth	Ventura County Fish & Game Commissioner, 1st District	2
Edwards	Dale	Self	3, 26, 27
Fallon	Marty	Self	1
Fink	Dan	United Anglers of Southern CA	3, 33, 34, 35, 66, 67, 68
Forthman	Carol A.	American Sportfishing Association	2-8, 17, 18, 35, 36, 44, 50, 53-59, 65, 68, 69, 71-73, 111-113
Fosmark	Kathy	Alliance of Communities for Sustainable Fisheries	8, 17, 49, 50, 51
Friedman	Eric	Self	1
Galipeau, Jr.	Russell E.	Channel Islands National Park	1, 2
Greenberg	Joel	Recreational Fishing Alliance	4, 38, 39, 40, 41, 42, 43
Greer	Patrick	Self	2
Grossman	Michael	Self	3
Gwinn	Carl	Self	24
Hardy	Darren	Self	2
Harris	Jean	Self	125
Haskett	Matthew	Self	1
Helms	Greg	The Ocean Conservancy	1, 5, 24
Hepp	Fred	Self	36 , 47, 48 and 72
Hernandez	Dan	Self	3, 23
Hiestand	Nancy	Self	2
Hoeflinger	Chris	Chair, Commercial Fishing Working Group, Sanctuary Advisory Council	3, 4, 38, 57, 60, 69-73, 94-96, 133
Huggins	Marie	Self	2
Hunt	Richard	Self	1
Jain	Monica	Self	1, 2
James	Duane	Environmental Protection Agency	1
Janik	Stacey	Self	1
Janush	Randy	Self	4
Kaplan	N.	Paddlers Outrigger Canoe Club	125

List of Commenters and Associated NOAA Responses			
Last Name	**First Name**	**Representing**	**Comment/Response Number**
Katz	Carol, Dr.	Self	125
Katz, M.D.	David J.	Self	11
Kaye-Carr	Josh	Self	1
Kevany	M/M Michael	Self	2
King	Bruce	Self	125
Krop	Linda	Chair, Conservation Working Group, Sanctuary Advisory Council	1, 2, 22, 23
La Fleur	Allan	Self	52
Larson	Chris	Self	13
Lydsoy	Alan	Self	24
Macias	Rick	Self	46
Madeira	Joshua	Self	1
Mandel	Robert	Self	93
Marston	Natasha	Self	1
Matera	Stephen	Self	2
McArdle	Deborah	Self	1
McCorkle	Mike	Pacific Coast Federation of Fishermen's Associations	36 , 47, 48, 72
McDonald	Bruce	Self	1
McIsaac	Donald, Dr.	Pacific Fishery Management Council	3, 6, 7, 10, 29, 28, 94
McMullin	William	Self	2
Miller	Chris	CA Lobster and Trap Fishermen's Association	3, 15, 17, 18, 20, 21, 62-65
Moore	Rod	West Coast Seafood Processors Assoc.	4
Orrock	John	Self	1
Osborn	Bob	Self	3, 94
Pearson	Dan	Point Mugu Wildlife Center	1
Peña	Oscar	Venture Port District	37
Peña,	Oscar	Ventura Port District	3, 14, 25, 105-109
Phillips	Jeff	Self	1
Pleschner-Steele	Diane	California Wetfish Producers Assoc.	3, 4, 59, 76
Plestler	Dean	Self	1
Plotsky	Abe/Amanda	Self	2
Polefka	Shiva	Environmental Defense Center	1, 2
Potts	Randy	Self	4, 12
Powell	Dan	Self	2
Preston	Benjamin T.	Self	3
Reilly	Paul	Self	86-91
Rhoads	Robert	Self	9, 11, 26, 29, 30, 31
Robertson	Sean	Self	47, 48
Rogers	Robert	Self	1, 9, 44, 45

List of Commenters and Associated NOAA Responses			
Last Name	**First Name**	**Representing**	**Comment/Response Number**
Rossi	Mary	Self	2
Scanlon	Kevin	Self	2
Shimek	Steve	Sea Otter Project	1
Slager	Ruston	Self	2, 125
Spada	Frank	Self	2
Stone	Elizabeth/Robert	Self	2
Stopnitzky	Shanee	Self	2
Sullivan	Frank	Self	4
Sullivan	Frank	Channel Islands Anglers	3
Sullivan	Deborah	Self	2
Swanhuyser	Jesse	Self	1
Tsuneyoshi	Raynor	CA Dept. of Boating and Waterways	131
Wagner	Michael	Andria's Seafood Specialties	3, 11, 14, 51, 129
Warner	Robert, Dr.	Chair, Research Activities Panel, Sanctuary Advisory Council	1, 61, 92
Williams	Joseph/Diane	Self	2
Wilson	Daniel	Self	1
Wing	Kate	National Resources Defense Council	2, 19
Yiskis	Norman	Self	1
Young	Stephanie	Marine Conservation Biology Institute	1, 2
Youngdahl	Mike	Self	1

1. *Comment:* Collectively, the following five reasons were identified by numerous commenters in support of NOAA's Alternative 2:

- It provides the greatest amount of ecosystem protection, habitat representation, and opportunities for species recovery/restoration.
- It best recognizes the intrinsic values associated with biodiversity and ecosystem-based protection.
- It contains zones of sufficient size, space, and connectivity to maximize larval production and recruitment.
- It best fulfills the mandates of the National Marine Sanctuaries Act (NMSA) and the goals of the proposed network.
- It best achieves recommendations in the 2004 reports from the Pew Oceans Commission and US Ocean Commission.

Response: NOAA agrees that Alternative 2 would provide the greatest amount of ecosystem protection as it is the largest spatial alternative. However, NOAA believes Alternative 1 (and its sub-alternatives) provides not only a robust level of ecosystem protection, habitat representation, and opportunity for species recovery and restoration, but is consistent with the existing network established by the State of California (State) in State waters of the Sanctuary and aligned with the offshore marine zones envisioned by the State's preferred alternative in its California Environmental Quality Act (CEQA) document. Also, Alternative 1 (and its three subalternatives) is consistent with the benthic habitat protections adopted by the Pacific Fishery Management Council (PFMC) and NOAA Fisheries through the essential fish habitat (EFH) conservation areas established by NOAA under Magnuson-Stevens Act (MSA) regulations (see NOAA's final rule at 71 FR 27408; May 11, 2006). Further, NOAA believes implementation of Alternative 1 would fulfill the mandates of the NMSA, achieve the goals of the Channel Islands National Marine Sanctuary (CINMS) zoning network, and meet several of the recommendations put forward by the Pew Oceans and US Ocean Commissions.

Designation of Alternative 2 under the envisioned regulatory structure may require additional administrative actions that may delay implementation. This regulatory structure, which uses a combination of the MSA and NMSA, may require that the current EFH designation in the Sanctuary, which corresponds to the zone boundaries under Alternative 1, be re-designated to incorporate the larger zone boundaries proposed under Alternative 2. Thus, in the interest of avoiding additional administrative burden, and for the reasons stated in the paragraph above, NOAA believes Alternative 1 to be the most prudent course of action for the marine zoning network in the Sanctuary.

2. *Comment:* Approximately 30,000 commenters supported NOAA's preferred alternative in the DEIS (Alternative 1A) as the most efficient and coherent zone network for protecting Channel Islands wildlife.

Response: In the DEIS, the three sub-alternatives analyzed under Alternative 1 (1A, 1B, and 1C) provide different boundary configurations for the marine zoning network based on the extent of Federal regulatory overlap in State waters. In a January 2, 2007 letter to NOAA, the Secretary of the California Resources Agency stated that Alternative 1C was the only alternative acceptable to the State of California and that overlap by Federal regulations in State waters was never contemplated by the State.

The NMSA allows the Governor of a state for which the NMSP is making changes to a sanctuary's terms of designation to review and reject those changes with regard to state waters. Because implementation of Alternative 1A requires a change to the CINMS terms of designation (to allow regulation of fishing and other resource extraction in State, as well as Federal, waters), NOAA conducted a thorough re-evaluation of Alternatives 1A and 1C, given the Secretary of Resources' opposition to all NOAA alternatives but 1C.

As identified in the DEIS, Alternative 1C leaves small gaps between some of the State-designated marine reserves and the proposed Federal marine reserves (see section 3.2.4 of the FEIS). The January 2, 2007 letter also stated that the CDFG and the FGC would as soon as

possible initiate the process to close the gaps associated with Alternative 1C by bringing the boundaries of a number of the existing State marine zones up to the State-Federal jurisdictional line; that process has commenced. NOAA's analysis identifies that, if these gaps are closed, the differences among the three sub-alternatives are distinguished by management considerations, not ecological and socioeconomic impacts. As such, because the CDFG and the FGC are closing the gaps associated with Alternative 1C, the net ecological benefits and socioeconomic impacts between Alternatives 1A (NOAA's original preferred alternative) and 1C (the State of California's recommended alternative) will be the same. NOAA has determined, therefore, that Alternative 1C will accomplish the goals of the zoning network while respecting the position of the State. If NOAA implements Alternative 1C and the State does not act to close the gaps in a timely manner, NOAA envisions closing the gaps *via* NMSA regulations.

Furthermore, NOAA and the State strongly support a close, collaborative working relationship to implement the CINMS zoning network and will sign a formal agreement to ensure that management of the network (e.g., enforcement, education and outreach, and monitoring) is implemented in a collaborative, efficient, and effective manner.

3. *Comment:* Several commenters support the no action alternative because they believe existing regulations are sufficient to meet the goals of NOAA's action.

Response: NOAA has determined existing regulations are not sufficient to meet the goals of this action. The State of California has reached the same conclusion in adopting the State waters portions of the network and is asking NOAA for prompt action in the Federal waters zones. NOAA's analysis discusses the relationship of the action with other existing management regimes in the region (see sections 3.1 and 5.1.2 of the FEIS) and the effectiveness they have on achieving NOAA's goals for this action.

Marine zones and sound fishery management are complementary components of a comprehensive effort to sustain marine habitats and fisheries. Marine zones are considered one of many tools available to ocean managers and are not the only tool used in the project area for this action. However, certain ecosystem functions cannot be protected as well by other management measures. For example, size, season, and bag limits do not prevent bycatch of non-target species or undersized individuals nor do they fully provide for natural predator and prey interactions. Traditional single species-based management measures alone have not been sufficient to protect groundfish and other populations in the CINMS region and other parts of the world. Incidental impacts of various fishing practices may also have unintended effects that would not occur in a marine zone, particularly in a no-take reserve. This includes both direct impacts to the environment (e.g., habitat damage from trawling) and indirect ecosystem impacts (e.g., removing all large, old fish and altering the species size composition). Marine zones of the type proposed here by their nature provide relatively undisturbed habitats and act as "natural hatcheries", which leads to benefits in total production and export of young.

NOAA's action is intended to address a suite of ecological goals, including providing special protection of habitats and species for their intrinsic values. Marine zones of the type proposed here provide insurance for management uncertainty by providing areas where species can

interact in a relatively undisturbed ecosystem. Furthermore, NOAA's action under the NMSA does not duplicate existing NOAA regulations promulgated under the MSA. The regulations being issued under this action have been carefully crafted in such a way so that the regulations being issued here under the NMSA are subject to NOAA's regulations under the MSA. The NMSA allows the Governor of a state for which the NMSP is making changes to a sanctuary's terms of designation to review and reject those changes with regard to state waters. This applies to the current regime and any future changes, so that if NOAA were to amend the MSA regulations, the applicability of the NMSA regulations would expand or contract automatically to ensure complete protection with no duplication. See the final rule for a more detailed description of how this is achieved.

The specific integration of marine zones into fisheries management, including reductions in overall fleet capacity, total allowable catch, and allocation between user groups is more appropriately dealt with through the PFMC and FGC processes, which is used to establish these limits.

4. *Comment:* Several commenters support the no action alternative because they believe that any additional zones can and should be designated by the PFMC via the MSA and the State of California via State statutes.

Response: In May 2005, NOAA presented the PFMC, per section 304(a)(5) of the NMSA, with the opportunity to prepare draft NMSA fishing regulations to meet the goals of the CINMS marine zones. Section 304(a)(5) requires that the relevant Fishery Management Council be given the opportunity to prepare draft fishing regulations for within the Exclusive Economic Zone (EEZ) portion of the given sanctuary. (The EEZ portion of the CINMS is from 3 to 6 nmi offshore the northern Channel Islands.) The PFMC responded and recommended that fishing regulations for the CINMS marine zones in federal waters be implemented through the existing authorities of the MSA and the states of California, Oregon, and Washington.

Based on its review of the existing factual and scientific evidence, NOAA determined that there was a credible basis for regulations prohibiting the use of bottom-contact gear in the CINMS marine zones under the MSA. With respect to fishing throughout the remainder of the water column, however, NOAA determined that there was an insufficient factual and scientific basis to support pursuit of this aspect of the PFMC's proposal under the MSA. NOAA determined that the PFMC's recommendations did not have the specificity or record to support the use of the MSA or state laws to establish limited take or no-take zones in the water column and thereby did not fulfill the goals and objectives of the CINMS. Further, MSA regulations cannot legally address other extractive activities that could be addressed under the NMSA, such as certain scientific research activities. In response, the PFMC changed its recommendation under Amendment 19 to the Pacific Coast Groundfish Management Plan (see next paragraph) to close the existing and proposed CINMS marine zones to only bottom-contact gear.

In 2006, the PFMC approved and NMFS/NOAA adopted Amendment 19 to the Pacific Coast Groundfish Fishery Management Plan, which, among other things, identified and described EFH within the CINMS for groundfish species and designated the existing and proposed CINMS

marine zones as Habitat Areas of Particular Concern (HAPC). Amendment 19 also prohibited the use of bottom-contact gear in the CINMS HAPCs.

The final NMSA regulations for this marine zones action would prohibit only those extractive activities within the marine zones that are not prohibited by 50 CFR part 660, the NOAA regulations that govern "Fisheries off West Coast States," which includes the Amendment 19 regulations. Therefore, if an extractive activity is prohibited by those MSA regulations, it is not prohibited by the NMSA regulations. Conversely, all extractive activities not prohibited by those MSA regulations in the marine reserves are prohibited by these NMSA regulations. In the future, if NOAA were to amend the MSA regulations to prohibit additional extractive activities in the marine zones, those activities would automatically no longer be prohibited by these NMSA regulations. If, for MSA purposes, NOAA were to amend the MSA regulations to allow currently prohibited extractive activities in the marine zones, those activities would automatically be prohibited under these NMSA regulations. In either case, the MSA rulemaking action making a change would also provide the public with notice of the corresponding change in applicability of the NMSA regulations.

5. *Comment:* Ecosystem-based management should be favored over traditional fisheries management in this action, because it is more effective at meeting NOAA's purpose and need.

Response: This action to complete the CINMS marine zoning network is a form of ecosystem-based management that is being applied to meet NOAA's responsibility to protect Sanctuary resources. Sanctuary resources are defined at 15 CFR 922.3 as follows:

> *Sanctuary resource* means any living or non-living resource of a National Marine Sanctuary that contributes to the conservation, recreational, ecological, historical, research, educational, or aesthetic value of the Sanctuary, including, but not limited to, the substratum of the area of the Sanctuary, other submerged features and the surrounding seabed, carbonate rock, corals and other bottom formations, coralline algae and other marine plants and algae, marine invertebrates, brineseep biota, phytoplankton, zooplankton, fish, seabirds, sea turtles and other marine reptiles, marine mammals and historical resources.

6. *Comment:* Limit the proposed designation document changes and regulations to prohibit non-fishing activities and fishing in the water column only.

Response: Under the NMSA, when a national marine sanctuary is designated, NOAA must specify the new sanctuary's "terms of designation." The terms of designation include the boundaries of the sanctuary, the characteristics that give it value, and "the types of activities that will be subject to regulation" by NOAA. Terms of designation may only be modified by following the same procedures by which the sanctuary was designated. The types of activities subject to regulation are usually expressed in fairly general terms. This is appropriate and necessary to allow NOAA to make appropriate modifications to the regulations in the future, e.g., to allow for adaptive management. However, even minor changes must be made through a full public process, including an opportunity for the public to review the change and provide comment before it is finalized. Furthermore, NOAA must prepare all legally required analysis

for such regulatory changes, including appropriate environmental and economic impact analyses (under the National Environmental Policy Act and Regulatory Flexibility Act).

The proposed designation document amendment has been carefully crafted and comments were solicited from the PFMC, NOAA Fisheries, and other relevant resource management agencies. It is also crafted to be consistent with the deliberations made throughout this process, including the community and State phases (see the Executive Summary of this document for a summary of the process). As indicated above, the scope of authority defined in designation documents for all national marine sanctuaries is typically general, and the implementing regulations are more specific. NOAA believes this provides sufficient parameters to its authority while allowing flexibility to manage the network adaptively in the future in response to biological, ecological, and economic indicators of the network's effectiveness. Any proposed regulatory adjustment to the current network would undergo rigorous environmental review, analysis, and public input.

As indicated above, in contrast to the general scope of the terms of designation, sanctuary regulations are often very specific and are developed to implement the terms of designation by defining the human activities that are prohibited or otherwise restricted. The final regulations for this NOAA action would prohibit only those extractive activities within marine reserves that are not prohibited by 50 CFR part 660, the NOAA regulations that govern "Fisheries off West Coast States" (MSA regulations). Therefore, if an extractive activity is prohibited by MSA regulations, it is not prohibited by these final NMSA regulations. Conversely, all extractive activities not prohibited by MSA regulations are prohibited by these final NMSA regulations within marine reserves. In the future, if NOAA were to amend the MSA regulations to prohibit additional extractive activities within marine reserves, these regulations would correspondingly narrow in scope. If, for MSA purposes, NOAA were to amend the MSA regulations to allow additional extractive activities, these NMSA regulations would correspondingly expand in scope to ensure all forms of extraction are prohibited within marine reserves. In either case, the MSA rulemaking making such change would provide the public with notice of the corresponding change in applicability of the NMSA regulation.

Furthermore, NOAA has determined that limiting the scope of the regulations and terms of designation to prohibiting activities only within the water column would leave unacceptable gaps in the cover of the regulations. Certain activities, such as scientific research, would not be covered by other regulations (either State or MSA regulations) thus preventing total closure of the zones. Given this, NOAA has determined that limiting the scope of the regulations and terms of designation would not meet its purpose and need for this action.

7. *Comment:* The geographic scope of the proposed authority to regulate fishing under the NMSA, as described in the DEIS, is too broad.

Response: The proposed designation document amendment has been carefully crafted and comments solicited from the PFMC, NOAA Fisheries, and other relevant resource management agencies. It is also crafted to be consistent with the deliberations and decisions made throughout this process, including the community and State phases (see the Executive Summary of this document for a summary of the process). The scope of authority defined in designation

documents for all national marine sanctuaries is typically general, and the implementing regulations are more specific. NOAA believes this provides sufficient parameters to its authority while allowing flexibility to manage the network adaptively in the future in response to biological, ecological, and economic indicators of the network's effectiveness. Any proposed regulatory adjustment to the current network would undergo rigorous environmental review, analysis, and public input.

8. *Comment:* CINMS lacks a fisheries manager position, expert fisheries advisory bodies, an extensive stakeholder input process, and overall adequate organization for fisheries management, which will complicate existing fisheries management coordination.

Response: The CINMS marine zoning process has required close coordination among staff from the PFMC, NOAA Fisheries, CDFG, FGC and NMSP, and the constituents involved in the respective public policy forums. See Appendix D of the FEIS for a meeting history among these organizations during the CINMS marine zoning process.

In addition, the CINMS Advisory Council has provided, and will continue to provide, a robust, open, and transparent community based public forum to provide advice to NOAA on resource protection, education, and research issues, including fishing issues within the Sanctuary. The Advisory Council has representatives from all major sectors that utilize the CINMS, including commercial and recreational fishermen and the region's primary fisheries regulators, NOAA Fisheries and the CDFG. In addition, the Advisory Council's recreational fishing working group has representatives from local, regional, and national fishing organizations, including United Anglers of Southern California and the Recreational Fishing Alliance. The commercial fishing working group includes representatives from the Santa Barbara and Ventura fishing communities and fishing organizations such as the Sea Urchin Harvesters Association.

9. *Comment:* Commenter requests funding for collaborative research involving the fishing community.

Response: NOAA continues to support and fund the Channel Islands Collaborative Marine Research Program (CMRP), managed by the Channel Islands Marine Sanctuary Foundation, which involves the commercial and recreational fishing communities. To date the CMRP has funded close to $200,000 in research projects involving commercial and recreational fishermen and the scientific community. If future CINMS budgets are stable, funding for this program would continue.

10. *Comment:* NMSA fishery regulations need to be enforceable, clearly understood by the public, and meet the goals and objectives of the PFMC and NOAA.

Response: NOAA has utilized and continues to seek guidance on enforcement of NMSA regulations provided by the PFMC Enforcement Sub-committee, CDFG wardens, National Park Service (NPS) Park Rangers, the NOAA Office of Law Enforcement, and U.S. Coast Guard (USCG) officials. These enforcement experts have provided extensive input on the regulations, and this input is reflected in the final rule. Further, this NOAA action is intended to achieve

goals established for the CINMS marine zones under the NMSA, not specific PFMC fishery goals.

11. *Comment:* The various agencies are under-funded and there are not enough staff members to monitor and enforce the existing or proposed project.

Response: NOAA believes that adequate resources exist to manage, monitor, and report on the CINMS marine zones. The Channel Islands region benefits from the resources and coordinated efforts of multiple State and Federal agencies and institutions. Through formal and informal agreements, the CDFG, NOAA, the USCG, and the NPS will continue to work collaboratively to monitor, enforce, and manage the marine reserves network.

In addition to research by these agencies, other research organizations and institutions (e.g., University of California, California State Universities, and California Sea Grant Extension Program) have provided research, monitoring and evaluation programs and opportunities. Existing monitoring projects will continue to provide data on changes in the abundance of various species in the region (see http://www.dfg.ca.gov/mrd/channel_islands/ monitoring.html).

Interagency coordination will result in more efficient use of NOAA and State resources. CDFG enforcement staff cooperates with other public agencies through existing agreements and there are several enforcement agreements and funding mechanisms among the CDFG, the NPS NOAA, and the USCG.

12. *Comment:* Commenter believes there is currently not enough research for NOAA to choose Alternatives 1 or 2 and therefore supports the no action alternative.

Response: NOAA's analysis presents detailed information on the projected biological and socioeconomic impacts of its alternatives for this action and believes this adequately supports the final action.

13. *Comment:* Commenter requests installation of artificial reefs and rigs-to-reefs programs to create replacement fishing opportunities to mitigate the loss of fishing grounds.

Response: Under NOAA's action, fishing would continue to be allowed in 81% of the Sanctuary (over 800 square nmi), subject to existing state and federal fishery regulations. NOAA expects displacement impacts resulting from its action will be minimal. Therefore, NOAA does not believe there will be any significant loss of fishing grounds and, therefore, no need to develop any mitigation measures at this time. The CINMS social science program calls for monitoring displacement of fishing effort to determine if any mitigation efforts are warranted.

14. *Comment:* The action will displace fishing effort and increase impacts in other areas.

Response: Displacement from NOAA's action is expected to be minimal and less than significant (see section 5.1 of the FEIS). Ongoing monitoring, research, and evaluation after implementation will provide additional information on this issue. Should displacement impacts

prove to be significant in the future, NOAA and the State have the ability to take appropriate action under their respective authorities.

15. *Comment:* There is no dedicated source of funding at CINMS for education and outreach programs that explain fishery management measures, marine zoning, and marine access programs.

Response: A significant amount of funding from the CINMS budget is dedicated to extensive education and outreach efforts on the CINMS marine zones. Since 2000, the CINMS education and outreach program has been helping the public understand what and where the State marine reserves and marine conservation areas are within the Sanctuary, why they were established, and what we can learn from them (see the Public Awareness and Understanding action plan in section III of the CINMS draft management plan at http://www.cinms.nos.noaa.gov/manplan/overview.html). The CINMS also works closely with CDFG to match funding for marine zoning education and outreach. Education and outreach on regional fishery management measures is addressed by NOAA Fisheries, the PFMC, and the CDFG.

16. *Comment:* NOAA should consider more stringent restrictions for commercial lobster fishing and more lenient restrictions for recreational lobster fishing.

Response: Lobster fishing is regulated by the California Fish and Game Commission. The existing marine zoning network adopted by the State of California includes two marine conservation areas (Anacapa Island MCA and Painted Cave MCA) that permit recreational lobster harvest. Commercial lobster fishing is allowed in the Anacapa MCA, but not in the Painted Cave MCA.

17. *Comment:* The Final Environmental Impact Statement (FEIS) should discuss the effectiveness of other agency management actions.

Response: NOAA's draft environmental impact statement (DEIS) included a detailed discussion the relationship of NOAA's preferred action with other existing management regimes in the region (see, e.g., sections 2.2 and 3.1.2.1). The effectiveness of these regulatory regimes in achieving NOAA's goals for this action is also discussed. These sections are included in the FEIS.

18. *Comment:* The Channel Islands National Marine Sanctuary (CINMS) Advisory Council (SAC) should be reformed to better address fisheries issues. Specifically, the SAC lacks any members with expertise in fisheries economics, anthropology, geography, etc.

Response: The SAC has representatives from the California Department of Fish and Game (CDFG) and NOAA Fisheries. Representatives from these two entities, in addition to the representatives from commercial and recreational fishing interests and their associated community-based fishing working groups, provide NOAA with significant insight into fisheries issues. In addition, NOAA Fisheries and the CDFG representatives also serve as a conduit to the

PFMC and California Fish and Game Commission (FGC), respectively, which brings NOAA additional perspective on fisheries issues. Moreover, the vast majority of issues faced by the CINMS and its SAC are not related to fisheries and , therefore, require a broad and diverse SAC membership.

19. *Comment:* The "effective date" provision in the proposed regulation is unclear, burdensome, and inconsistent with the model language previously presented to the PFMC by NOAA for inclusion under the NMSA 304(a)(5) process, and therefore should not be used.

Response: The effective date clause has been omitted from the final rule.

20. *Comment*: Do not remove the Marine Reserve Working Group's (MRWG) sustainable fisheries goal of integrating marine reserves with existing fisheries management.

Response: The goals for NOAA's action are based on the NMSA. NOAA's goals for this action do attempt to address the goals put forward by the MRWG where appropriate.

21. *Comment:* The CINMS should be an "experimental station" for holistic management.

Response: NOAA manages the National Marine Sanctuary System on the principles of ecosystem-based management. This "holistic" approach attempts to incorporate all functions of the marine environment into the decision-making process at all sanctuaries, including the CINMS.

22. *Comment:* NOAA should expand its assessment of the action's economic impacts to better account for non-monetary benefits.

Response: NOAA believes the analysis of the passive (non-use) value of the marine zones is sufficient to inform its decision making on this action (see Section 5.2.6 of the FEIS for an evaluation of the passive values associated with NOAA's action).

23. *Comment:* Marine reserves are superior to marine conservation areas in meeting NOAA's purpose and need and are more consistent with the MRWG's recommendations.

Response: See section 3.1.2.2 of the FEIS for a discussion of the differences between marine reserves and marine conservation areas.

24. *Comment:* Many commenters state NOAA should implement the offshore waters of the CINMS marine zone network as the final phase of the CINMS marine reserves process that began in 1999.

Response: See section 2.0 of the FEIS for a description of the purpose of this action, which identifies complementing the existing State network as one of the goals.

25. *Comment:* NOAA should consider fishing as an important cultural resource and protect it as such.

Response: NOAA has carefully evaluated the impacts of the action on fishing communities and has determined the impacts to be minimal. See section 5.2 of the FEIS.

26. *Comment:* Commenter is concerned about the impacts of bottom trawl and long line fishing, bycatch, harvest of bait fish, pesticides and pollution in the ocean, and impacts to kelp and coastal ecosystems.

Response: Marine zones provide reference sites in which to gauge the impacts of many of the commenters' concerns relative to fished areas.

27. *Comment*: Commenter recommends increasing the number of regional field game wardens and their wages, increasing fines, and making sure catch limits are enforced.

Response: NOAA recognizes the critical role enforcement officials play in management of the marine zoning network. This recommendation, however, is outside the scope of NOAA's immediate action.

28. *Comment:* NMSA fishing regulations and designation document amendments for the CINMS marine zones should automatically expire ("sunset") at the time MSA regulations are promulgated.

Response: NOAA crafted its NMSA regulation to automatically adjust so that there is no redundancy between the NMSA regulation and the MSA regulation. See section 3.2 of the FEIS for a description of how this would operate. This automatic adjustment functions much like a sunset clause would, but without a date certain on which the regulations would no longer be effective. With regard to a sunset for the designation document, NOAA has determined that such a provision is not appropriate because terms of designation are supposed to be written generally enough to provide NOAA with the flexibility to adaptively manage and respond to unforeseen circumstances.

29. *Comment:* The proposed closures don't greatly affect commercial fisherman, but the previous closures have been devastating.

Response: NOAA's analysis takes existing fishery closures into account and acknowledges their socioeconomic and biological impacts. For this particular CINMS action, NOAA's analysis has determined that the socioeconomic impacts of new closures in the Federal waters of the network will be minimal (see section 5.2 of the FEIS for more details).

30. *Comment:* If sea urchin fishermen were offered money for their urchin permits, they might move on to a different career, but they can't transfer or sell their permits.

Response: The issue of permit transferability is beyond the scope of this action and would be handled by the CDFG and FGC, who both issue and manage these types of permits.

31. *Comment:* Pollution has a huge impact on water conditions and the resources in southern California.

Response: Marine resources in the Southern California Bight, such as kelp forest ecosystems, have declined under pressure from a variety of factors, including commercial and recreational fishing, changes in oceanographic conditions associated with El Niño and other large-scale oceanographic cycles, introduction of disease, and increased levels of pollutants. Marine reserves offer scientists and resource managers a controlled opportunity to study the influence of change (e.g., pollution) on marine ecosystems in the absence of direct human disturbance (e.g., fishing pressure).

32. *Comment:* The regional seal population negatively impacts the regional halibut population.

Response: The management of seals and halibut as individual species falls under the purview of NOAA Fisheries and the PFMC.

33. *Comment*: The DEIS was not distributed to the United Anglers of Southern California.

Response: NOAA records indicate the President of United Anglers of Southern California was sent a copy of the DEIS on Aug. 11, 2006, and was notified electronically via email of the availability of the document on the CINMS website or by requesting a copy from the CINMS.

34. *Comment:* NOAA's aerial monitoring program data does not account for existing regulations (such as the Rockfish Conservation Area) displacing fishing vessels. NOAA has, therefore, erroneously concluded that there is little fishing activity in the proposed zones.

Response: NOAA's aerial monitoring program data confirms that there is little fishing activity in the geographic area associated with NOAA's action. See section 5.2.6.4 of the FEIS for NOAA's analysis of this issue.

35. *Comment:* There are too many marine reserves and not enough marine conservation areas in NOAA's proposed action.

Response: Marine conservation areas will not achieve the purpose and goals of the action as well as marine reserves. See sections 3.1.2.2 and 5.1.1.1 of the FEIS for more discussion on the ecological value of marine reserves compared to marine conservation areas.

36. *Comment*: NOAA should implement marine parks where pelagic fishing is allowed, especially in the Footprint area.

Response: Allowing the take of pelagic species does not fully meet the goals of NOAA's action. See section 3.1.2.2 of the FEIS for a discussion on the impacts of limited take.

37. *Comment:* NOAA's action will negatively impact uses prioritized in the Local Coastal Plan, such as commercial fishing, tourism, and residential sectors, and therefore the commenter supports the no action alternative.

Response: NOAA supports healthy fisheries, economies, and harbors and believes the zoning network is likely to support Sanctuary-dependent and coastal dependent uses. The proposed marine zones are expected to promote visitation and may assist, over the long term, in the sustainability of local fisheries.

On March 16, 2007, the California Coastal Commission held a public meeting on NOAA's proposal pursuant to its authorities under section 307 of the Coastal Zone Management Act (16 U.S.C. § 1456). At that meeting, the Coastal Commission issued a conditional concurrence for the consistency determination by NOAA on the grounds that, if modified as described in the Commission's conditional concurrence below, the project would be fully consistent, and thus consistent to the maximum extent practicable, with the policies of Chapter 3 of the Coastal Act. The conditional concurrence is: "In the event NOAA elects not to implement Alternative 1a, NOAA will implement Alternative 1c, with the following additional provisions: until such time as the Resources Agency and the Fish and Game Commission designate the areas in between the existing State-designated MPAs and the 3 mile limit (i.e., the "gaps" between the existing state MPAs and the federal MPAs depicted in Alternative 1c), or the Fish and Game Commission/DFG and NOAA enter into an interagency agreement that establishes MPA protection for these "gap" areas, NOAA will expand Alternative 1c to include in its MPA designation these "gaps" between the outer boundaries of the existing state MPAs and the State-federal waters boundary (3nm from shore)."

38. *Comment*: NOAA should not reject the zone options put forward by local fishermen.

Response: NOAA conducted a preliminary analysis on all of the fishermen options and determined that they did not adequately or completely protect a full range of habitats and populations in the Sanctuary and thus do not satisfy the purpose and goals of NOAA's action. For more, see section 3.2.5 of the FEIS.

39. *Comment*: Incorporate into the FEIS all of the PFMC Science and Statistical Committee's (SSC) critique of the CINMS marine zoning process and Sanctuary documentation.

Response: The input from the SSC has been addressed in NOAA's analysis. The SSC's input can be found at http://pcouncil.org/

40. *Comment:* Include a verbatim copy of the original designation document in the FEIS and proposed rule so the public can compare the proposed amendments.

Response: The original designation document, in its entirety, and the amendments being made by this action will be included in the preamble to the final rule.

41. *Comment:* NOAA's environmental review process is not a robust stake-holder process like the PFMC process, because CDFG and the PFMC are not represented.

Response: The CDFG, PFMC, and NOAA Fisheries have been integral partners in the process to date. CDFG and NOAA Fisheries, which both have membership on the PFMC, also hold seats on the CINMS SAC.

42. *Comment:* Include discussions and consultations with the State of California, other agencies within NOAA, and the other agencies within the government in the public record.

Response: All official correspondence related to this action and all comment letters NOAA has received on this action are available on the CINMS website at http://www.cinms.nos.noaa.gov/marineres/main.html.

43. *Comment:* Include in the FEIS the journal article written by NOAA employee Mark Helvey that critiques the community-based phase of the CINMS marine zoning project.

Response: NOAA has determined this article is not integral to the decision making process for this action and should not, therefore, be included in the FEIS.

44. *Comment*: Recreational fishermen have a relatively minimal impact on the resources and should not be excluded from the CINMS marine zones.

Response: NOAA has determined that any take of marine resources within the marine reserves would compromise the goals for this action. Limited take is allowed in the Anacapa Marine Conservation areas Area in order to be consistent with the State's action, which in turn determined that the overall benefits of limited take status in the marine conservation areas (areas off Anacapa Island and Santa Cruz Island, the latter area totally in State waters) might be studied in comparison to the overall benefits of no-take status in marine reserves. Fishing is allowed throughout the rest of the Sanctuary, subject to other existing Federal and State restrictions where applicable.

45. *Comment:* Restrict sea lion populations in the CINMS region because they may be contributing to the demise of fishing.

Response: Sea lions are protected under the Marine Mammal Protection Act, which is administered by NOAA Fisheries.

46. *Comment:* The decline in many species, like abalone, is due to natural cycles and the re-introduction of sea otters, not over-fishing or excessive take by sport divers.

Response: Abalone decline has been linked to a combination of human and natural caused influences. For more see Karpov *et al*. 2000 and Moore *et al.* 2002.

47. *Comment:* The Gull Island and Footprint closures will greatly affect harpoon sword fishermen, who have limited access to these two areas due to weather, fishing seasons, and migration patterns of the fish.

Response: While any impact may seem significant for those who experience it, NOAA's economic analysis has determined that the socioeconomic impact to fisheries from NOAA's action will be minimal.

48. *Comment*: How will enforcement work with a harpooned fish that swims into a closed area?

Response: Each situation is evaluated on a case by case basis to determine whether an enforcement response is warranted, and if so, the appropriate course of action.

49. *Comment:* Commenter acknowledges the usefulness of creating an MPA for scientific study purposes, but believes there is no urgent need to do so in CINMS.

Response: For more on the need for this action, see section 2.0 of the FEIS.

50. The Pacific Fishery Management Council process is a fair, public and scientifically based process to deal with conservation and/or fishery management questions.

Response: NOAA recognizes and supports the PFMC's role in addressing fishery management issues.

51. *Comment*: The proposed closures will affect the supply of seafood locally and nationally.

Response: On page 25 of Leeworthy, Wiley, and Stone (2005), the potential impacts on supply and prices of various seafoods are assessed for potential losses as measured by consumer surplus (i.e., losses to consumers from restrictions in supply of commercial seafood). Per this analysis, none of the alternatives considered would change the amount of supply enough to have any effects on prices and thus, no loss in consumer surplus.

52. *Comment:* If an area is closed to commercial fishing it should also be closed to recreational fishing because recreational fishing has an impact on the resource too.

Response: NOAA agrees. All fishing (both commercial and recreational) in the marine reserves is prohibited. See Response 44 for information about the marine conservation area.

53. *Comment:* The simultaneous rule changes to both the CINMS management plan and designation document indicate that the NMSP intended to create the marine zones well in

advance of it having the authority to do so, indicating the process has been designed simply to justify the preconceived conclusion.

Response: This action and the CINMS management plan review process are distinct processes with separate and distinct rules and amendments to the CINMS designation document. With regard to the designation document changes and regulations for this action, NOAA has followed the processes to prepare NMSA regulations for fishing and to amend the CINMS designation document in compliance with the requirements of the NMSA. A history of the NMSA process for preparing fishing regulations and amending the Sanctuary's designation document for this action can be found on the CINMS website at http://channelislands.noaa.gov/marineres/main.html.

54. *Comment*: NOAA fails to provide scientific support for the need to impose the severe restrictions on recreational fishing.

Response: The need for NOAA's action is detailed in general in section 2.0 and specifically as it pertains to recreational fishing in section 5.1.1.1 of the FEIS.

55. *Comment:* NOAA fails to adequately address the proposals of the Pacific Fishery Management Council with regard to management under the Magnuson-Stevens Act.

Response: The PFMC's proposal that was submitted through formal consultation did not fulfill the purpose and goals of this action (see, for example, section 3.1.2.1 for more details on this process). See also, for example, the response to #4 and #17 above.

56. *Comment:* NOAA fails to consider the economic impacts on recreational fishing beyond the charter sector.

Response: In addition to the charter sector, NOAA's economic impact analysis on recreational fishing included evaluation of impacts to private boat fishing and consumptive diving (see section 5.2.3 of the FEIS).

57. *Comment*: The DEIS justifies a preconceived outcome, rather than providing the analysis of a full range of options as required by the National Environmental Policy Act.

Response: The range of alternatives is sufficient under the requirements of NEPA (see section 3.1 of the FEIS).

58. *Comment*: NOAA fails to properly follow the requirements of the NMSA in preparing regulations for fishing and modifying the CINMS terms of designation.

Response: NOAA has followed the processes to prepare NMSA regulations for fishing and to amend the CINMS designation document in compliance with the requirements of the NMSA. A history of the NMSA process for preparing fishing regulations and amending the Sanctuary's

designation document for this action can be found on the CINMS website at http://channelislands.noaa.gov/marineres/main.html.

59. *Comment*: Acknowledge in the FEIS and final rule that fishing regulations are being developed by the PFMC that relate to this action.

Response: See section 3.1.2.1 of the FEIS for a description of the correlation between the PFMC's actions and this action. See also the response to #17 above.

60. *Comment*: Does quantifying the difference between the biological benefits of marine reserves versus the biological benefits of limited take marine conservation areas advance the process of evaluating the cost benefit analysis of the project under the NEPA?

Response: NOAA has determined that marine reserves provide greater biological benefit than marine conservation areas. In addition, prohibition of all take is necessary to achieve the goals for this action. (See Response 44 regarding the one marine conservation area.) With regard to economic evaluation, NOAA's analysis has determined that the potential impacts are expected to be minimal.

61. *Comment:* Ecological response in areas that are not currently fished or lightly fished will likely be less than that response predicted for protection of more heavily fished areas in State reserves.

Response: Final outcomes of the marine zones will be subject to a variety of ecological and economic responses that are challenging to predict. As discussed, NOAA will monitor the impact of the reserves to determine the actual responses.

62. *Comment*: Conduct an analysis of alternatives for the scale of no-take reserves that could mitigate mandatory stock rebuilding timelines and examine alternatives to the size of CINMS reserves that would mitigate the size of the California Rockfish Conservation zone in the Sanctuary as an explicit trade off in stock rebuilding tactics.

Response: As stated in the FEIS, the purpose of NOAA's proposed action is to further the protection of CINMS biodiversity and to complement the existing network of marine zones established by the State. This action is not being proposed as a stock rebuilding measure.

The scale of marine zones in the Sanctuary is expected to primarily affect local populations of fish, rather than stocks that range along the entire west coast. Marine reserves that incorporate locations where overfished groundfish can be found may protect a portion of the population from fishing mortality as well as protect habitats from disturbance by fishing and other gear.

NOAA's proposed action also addresses ecological goals that do not relate to fisheries management. The NMFS and State groundfish closures are directed at rebuilding specific species of groundfish, not at a wide range of other species. In addition, the groundfish closures are based on annual assessments and could be removed if assessments improve.

63. *Comment:* Assess stock rebuilding goals and an adaptive management approach to the MPAs in the event of an oceanographic regime change that results in more stable recruitment of depleted fisheries.

Response: One of the benefits of complete no-take zones is that they provide research and reference areas. Monitoring of the CINMS zones is expected to provide information on a wide variety of ecosystem parameters (including oceanographic effects) and the effectiveness of closing these areas on Sanctuary biodiversity and habitat protection. In addition, as stated above, this action is to further the protection of biodiversity of the CINMS and to complement the existing network of marine zones established by the State and is not being proposed as a stock rebuilding measure. Any changes to groundfish conservation measures would require action by the implementing authorities, the PFMC and NOAA Fisheries.

64. *Comment*: Consider habitats that are important to overfished groundfish, including shelf and slope habitats outside the CINMS boundary as a trade off in relaxing regulations in the Cow Cod Conservation zone.

Response: NOAA's proposed action was developed through analysis of network design based on ecological criteria within the boundaries of the CINMS. Further, NOAA's proposed action is to further the protection of biodiversity and to complement the existing network of marine zones established by the State and is not being proposed as a stock rebuilding measure for an individual species of fish. Any changes to the Cow Cod Conservation zone would require action by the implementing authorities, the Pacific Fishery Management Council and National Marine Fisheries Service.

65. *Comment*: NOAA should not take on any more administrative capacity until it develops performance criteria for synthesizing and managing marine reserves monitoring data.

Response: CDFG and NOAA have a State/Federal partnership to monitor the biological and socioeconomic changes occurring inside and outside of the CINMS marine zoning network. NOAA works with a multitude of partners, such as the National Park Service and UCSB, to analyze data from a variety of research projects. The Sanctuary Advisory Council's Research Activities Panel (RAP) reviews research priorities and activities related to the marine zones and assists NOAA and the CDFG with determining the effectiveness of the zoning network. Performance criteria are included in the monitoring plans (see http://www.dfg.ca.gov/mrd/channel_islands/monitoring.html).

66. *Comment*: The Species of Interest list in the DEIS states that species at the edge of their range are excluded from the list. However, eight species on the list, including Pacific ocean perch, dark blotch rockfish, widow rockfish, black rockfish, canary rockfish, yelloweye rockfish, Pacific cod and Pacific herring, have never been caught at the Channel Islands.

Response: The CINMS occurs at a biogeographic boundary between the colder water Oregonian province to the north and the warmer water Californian province to the south. The western

portion of the Sanctuary typically lies in the colder waters of the Oregonian Province. San Miguel Island, with its influence of Oregonian province waters, may offer suitable habitat for species that are more common in central and northern California. For instance, yelloweye rockfish and widow rockfish, which are common between Alaska and northern California, have been documented to occasionally occur at San Miguel Island (Love et al. 2002).

67. *Comment:* A discrepancy exists between the fishing regulations reported in Appendix F of the DEIS and the notes regarding the status of fishing for certain species in Appendix G. For example, Appendix G lists pink, red and white abalone as fished species, while Appendix F states that abalone may not be taken.

Response: Footnote 1 in Appendix G intends to identify species that have either been historically fished and/or currently fished in the CINMS. The language has been clarified to highlight that species denoted with the footnote could indicate either a historical or current fishery.

68. *Comment:* The Sanctuary is only providing 1.7 square miles for pelagic fishing, while prohibiting fishing in approximately 130 square miles.

Response: Under NOAA's action, pelagic fishing would continue to be allowed in 81% of the Sanctuary (over 800 square nmi), subject to existing State and Federal fishery regulations.

69. *Comment:* When reserves network experiments are designed to sustain fisheries, the monitoring programs must be designed to measure the species they are designed to manage. The commenter provides several specific recommendations for such a monitoring program.

Response: Although NOAA's action is not being implemented to sustain fisheries, the zone monitoring program for the CINMS network is guided by the CDFG's Channel Islands Marine Protected Area Monitoring Plan and the Channel Islands Deep Water Monitoring Plan Development Workshop Report. The monitoring programs involve a variety of partners collecting data on species, communities and habitats that occur in the Sanctuary. Performance of the zone network will be based on analysis of trends in biological parameters, such as abundance, mean size and reproductive potential of various species. Performance may be determined by either examining biological parameters at an individual site before and after the designation of the zone or comparing biological parameters at sites inside and outside of the zones.

A multitude of partners work with NOAA and CDFG conducting monitoring activities and collecting information on a variety of species and habitats. The data collected on a comprehensive suite of species inhabiting the Sanctuary allows for an assessment of zone effectiveness on both targeted and non-targeted species as well as community-level changes as a result of prohibited activities. NOAA and the CDFG plan a major review of the monitoring program's results in spring of 2008. For more information on the monitoring program, go to http://www.dfg.ca.gov/mrd/channel_islands/monitoring.html.

70. *Comment*: There is no scientific validity of identifying the transition zone as a unique region between the Californian and Oregonian bioregions and therefore the recommendations on the number and spacing of individual zones and total size of the preferred alternative is flawed.

Response: The transition zone was identified as a unique region by the Science Advisory Panel during the MRWG process. The zone is delineated by steep persistent isotherms from satellite sea surface temperature images. It is a region with its own dynamics relative to the Oregonian and Californian subregions within CINMS. Unique species interactions occur in the transition zone because of mixing of two groups of species from the adjoining bioregions.

Marine reserves in the transition zone provide several ecological benefits. First, they may function as replicate sites that provide insurance that a single catastrophic event would most likely not impact all zones at the same time. Second, establishment of marine reserves in the transition zone enhances three of the criteria that contribute to biodiversity conservation: habitat representation, habitat replication, and connectivity between individual reserves that contribute to meeting the proposed action goals (as discussed in Section 3.3). Finally, protection of habitats and species in the transition zone is also valuable to scientists because it allows them to utilize the unique species' interactions to study marine evolution and ecology.

71. *Comment:* The DEIS describes Sanctuary resources as in decline, which is flawed and inaccurate.

Response: Section 4 Affected Environment has been updated to include a discussion of the current status and trends of those species that were historically in decline and are now showing some signs of recovery. For example, giant kelp distribution and productivity in California has increased since the 1998 El Niño event, potentially as a result of a decadal shift in climatic conditions, although not to historical levels preceding the 1980s. However, a general declining trend in the density and abundance of kelp canopy over the past 40 years has been documented in the scientific literature, particularly in southern California. The decline has been attributed to a variety of both natural and human caused disturbances. Natural disturbances include a corresponding warming trend in sea surface temperatures and the frequency of severe El Niño events. Human caused disturbances include increased turbidity, siltation, pollution and commercial and recreational fishing activities that remove animals such as California sheephead and California spiny lobster that affect species grazing on kelp.

Over the past few years, oceanographic conditions have been characterized by relatively cool summer sea temperatures and winters with relatively few large swell events. Such conditions are generally favorable for kelp resulting in stronger recruitment and an increase in canopy area of some beds in southern California. It is unknown if the increase in kelp productivity over the last few years will be sustained given the inherent inter-annual variability of the oceanographic environment. Furthermore, the effect of oceanographic conditions on kelp productivity is not uniform across all kelp beds. Certain beds in the Sanctuary that historically had an abundance of kelp remain mostly devoid of kelp and are dominated by echinoderms when studied during summer 2006 (CINMS 2007). In these locations, kelp did not respond to a change in oceanographic conditions, indicating that other factors drive productivity.

Some marine mammal populations, such as gray whales and humpback whales, appear to have increased due to additional protection under the Marine Mammal Protection Act. Also refer to section 2.2, Need for Action, for further details on the need for this action.

72. *Comment*: Many highly migratory and epipelagic species that traverse through the Sanctuary receive no benefit from site specific MPAs.

Response: Highly migratory and pelagic species may receive benefits from marine reserves even if they spend more time outside than inside marine reserves. Highly migratory and pelagic species fulfill an ecosystem role within marine reserves as predators on and forage for other species. Such species may benefit from fully protected zones if their prey is concentrated in a given area or if the zones include breeding, aggregating or resting grounds. Scientific research suggests that pelagic species gather in certain spots (usually banks or ridges), particularly during critical life cycle stages. Establishment of marine reserves in these areas is crucial, as the number and size of pelagic animals in the food web dictates what other organisms thrive or decline. In other words, direct pressure on pelagic species causes indirect pressure on other species present in the ecosystem.

73. *Comment:* The DEIS has not addressed the ecosystem benefits of existing fishery management to achieve the Sanctuary's biodiversity goals.

Response: Section 2.2 (Need for Action) of the DEIS and FEIS generally discusses the ecosystem impacts of existing fishery management measures, while section 5.1 addresses this issue in more detail.

74. *Comment:* Deepwater sponges and corals should be included as species of interest.

Response: NOAA recognizes that there are other important species, such as deepwater sponges and corals, that are not included in the Species of Interest list. This section of the DEIS was written in 2000, preceding the discovery of these deepwater species sponges and corals. As such, there remains the possibility of other species and communities yet to be discovered.

75. *Comment:* NOAA should use the best available substrate information to update Figure 11.

Response: NOAA has updated the substrate information using United States Geological Survey (USGS) high resolution data to refine description of each individual marine zone where data is available. The USGS data could not be used to re-analyze the percentage of each habitat type included in each alternative because it is not available for the entire Sanctuary. Currently, 20% of the Sanctuary has been mapped with high resolution technology.

76. *Comment:* There is a lack of information on marine zone benefits in temperate waters. Based on data from tropical reef ecosystems, marine reserves may only benefit a small group of west coast nearshore resident species.

Response: Over the last five years, many peer-reviewed research articles have highlighted the effects of marine reserves on temperate marine ecosystems. A meta-analysis of temperate water marine reserves shows that many species tend to benefit from the establishment of marine reserves as measured by biomass, density and size of individuals as well as diversity of communities within their bounds. See Section 5.1.1 of the FEIS for a discussion of marine reserve benefits in temperate marine ecosystems.

77. *Comment:* The FEIS should address the benefits of the proposed marine reserves to southern sea otter recovery.

Response: There are no formal studies on the benefits of marine reserves to southern sea otter recovery. Sea otter sightings in the zones are rare at this time. However, marine reserves are generally expected to increase the biomass of apex species within their bounds and could potentially benefit sea otters by increasing the populations of their prey, such as abalone, urchins, clams, and crabs.

78. *Comment:* Provide a detailed discussion of habitat patch replication for Alternative 1A.

Response: A discussion on habitat patch replication of Alternative 1 has been added to Section 3.3 in the FEIS.

79. *Comment:* Provide an analysis and discussion that describes the actual distances between protected habitats within an MPA for each alternative rather than the average distance.

Response: A discussion on connectivity has been added to Section 3.3, specifically, by providing a figure and discussion on the distances between individual marine zones for each alternative.

80. *Comment:* Provide more detailed information on the number and distances between patches of rocky substrate included in the MPA network

Response: The discussion on connectivity has been updated to include distances between patches of rocky substrate.

81. *Comment:* Include Alternative 2 in the analysis of management considerations and in the table summarizing the alternatives' management considerations.

Response: As stated in the DEIS, the same management considerations for Alternative 1A apply to Alternative 2. A column has been added to Table 52 of the FEIS.

82. *Comment:* In Section 5.1 of the DEIS, NOAA claims adverse ecological impacts are "unlikely." If adverse ecological impacts are defined as declines in abundance, then this term should be redefined.

Response: NOAA considers "adverse impacts" as those impacts that are counter to the goals identified for this action, such as ensuring the long-term protection of Sanctuary resources by restoring and enhancing the abundance, density, population age structure, and diversity of the natural biological communities. NOAA recognizes that declines in abundance of certain species are an expected outcome of zone designation, but does not consider this in all cases to be an adverse ecological impact. For example, certain commercially targeted species may increase in abundance (e.g., spiny lobsters) due to reduced fishing pressure while their prey items decrease (e.g., purple urchin) because of an increase in lobster predation.

83. *Comment:* Language in Section 5.1 indicates that relatively little fishing activity occurs in the proposed marine zones. The statement does not account for the fact that other regulations currently restrict fishing in these areas. The discussion should clarify this point by adding "currently" before "relatively little activity."

Response: This recommendation has been added to the FEIS.

84. *Comment:* Provide references for assertions regarding the ecological impacts of the no-action alternative made in section 5.1.2 of the DEIS.

Response: Section 5.1.2 provides references regarding current and future anthropogenic stresses on California's coastal environment.

85. *Comment:* Add a reference for the recommended distances between marine zones.

Response: References for recommended distances between marine zones have been added.

86. *Comment:* The statement in the DEIS (section 5.1.6) that the spot prawn trawling prohibition is a response to declining catch and bycatch of bocaccio is incomplete and needs clarification. The trawl closure for spot prawns was implemented primarily due to concerns of potential damage to high relief habitat from roller gear and from overall levels of bycatch, particularly finfishes, relative to spot prawn catch.

Response: As the commenter states, the trawl closure for spot prawns was implemented primarily due to concerns of potential damage to high relief habitat from roller gear and from overall levels of bycatch, particularly finfishes, relative to spot prawn catch.

87. *Comment:* It is illogical to include potential impacts from the existing Channel Islands State marine zones as this impact should have already occurred.

Response: Under NEPA guidelines NOAA is required to consider cumulative impacts which include the impacts of the State MPAs in the analysis. Please see Table 25, (*Commercial Fishing and Kelp – Summary of Impacts by Alternative Step 1 Analysis*) which clearly distinguishes the cumulative impact of the "Total New Proposal."

88. *Comment:* The kelp fishery should not be included in the analysis, since no kelp beds occur in the proposed MPAs.

Response: NOAA agrees there is no impact to kelp harvesting in the Federal water marine zones (see Table 26 of the FEIS, which indicates the ex-vessel value of kelp at 0% in the additional State and Federal water areas). However, under its NEPA guidelines (NOAA Administrative Order 216-6), NOAA is required to consider cumulative impacts, which include the impacts to kelp harvesting in the existing State marine zones (Table 26 indicates the ex-vessel value for these areas is 5.48%).

89. *Comment:* Table 26 and Table 31 are confusing because the column headers say "value" but what the tables depict is actually "impact" to the fisheries. It would help to add another column just before the last one that lists the total value of each fishery.

Response: Ex vessel value is what the fishermen receive as revenue for their catch and only represents one category or portion of the total impact, i.e., the impact to fishermen. Other categories include income, employment, etc. To use the word "impact" in the table would be misleading, because the tables contain "maximum potential loss", i.e., all ex vessel value associated with the alternative, which is not expected as the final impact, as one would expect fishers to engage in mitigating behavior. The total value of each fishery is provided in Table 18 of the FEIS.

90. *Comment:* If $24,233,406 is used as the total value of all fisheries (Table 24, Column 2), and $3,012,974 is the total potential impact (Table 26 bottom of next to last column), then the percent total impact should be 12.43, and not 12.50 as listed at the bottom of the last column in Table 26. For Table 31, a similar problem occurs.

Response: The commenter's calculations are incorrect because they used the total baseline kelp and commercial fishing as the numerator, not the total of species for which the analysts have spatial data.

91. *Comment:* In 2003 to 2005, the landings for the port of Santa Barbara for the nearshore, shelf, and slope rockfish fisheries should not be considered as having "steep" declines. Shelf rockfish landings actually increased during this period.

Response: NOAA acknowledges this comment. However, the estimate of what is sustainable for rockfish, and therefore the baseline for assessing socioeconomic impact, is still most likely an overstatement given the generally strong downward trend of the entire species group.

92. *Comment:* There isn't much fishing pressure in the proposed reserve areas, thus the economic impact of reserve establishment will be minimal.

Response: NOAA agrees.

93. *Comment:* Further closures, particularly in the Smugglers' Cove/Yellow Banks area, would result in economic harm to the sportfishing industry.

Response: There are no marine zones proposed for the Smugglers' Cove/Yellow Banks area. Furthermore, the economic analysis associated with this action predicts the overall impacts to the sportfishing industry will be minimal. See section 5.2.3 of the FEIS.

94. *Comment:* The data used in NOAA's economic analysis are dated and there are additional sources now available that should be used to update the document.

Response: The estimates from Leeworthy, Wiley, and Stone (2005) are based on the best available information. Adding one or two years of recent data does not necessarily provide a better estimate. In statistics, this would be recognized as an "outlier" influencing the estimate of the mean.

More recent trends show that for some species the 2000-2003 averages are better measures of what could be sustainable than the 1996-1999 average used in prior analyses. Economic impacts were updated based on these new assessments of what is sustainable and can be found in Leeworthy, Wiley, and Stone (2005).

Although some of the information is several years old, it is the only spatially distributed data available. The distributions represent a historical average of areas fished over four to five year time periods and were provided by fishermen. For a more detailed socioeconomic impact analysis, see Leeworthy, Wiley, and Stone (2005).

95. *Comment:* The socioeconomic analysis underestimates the impacts of the preferred alternative to commercial fishing.

Response: It can be expected that there will be short-term losses to the commercial fisheries from Alternative 1. However, overall the impacts are small and the net cost or benefits to commercial fisheries are likely to be negligible. See also response #29 above.

96. *Comment:* Please clarify how the "Baseline person days of recreation activity" were determined and re-evaluate these statistics. Discrepancies between the ratio of private and charter boat dives, and consumptive vs. non-consumptive divers seem inaccurate. Commenter questions whether trips in Santa Barbara are less expensive than in Los Angeles.

Response: Baseline person-days of recreation activity were determined by a survey of all charter and party boat operations active in the CINMS. Private boat fishing and consumptive diving data were compiled from a variety of sources (see Leeworthy, Wiley and Stone, 2005, Appendix B).

The data does not show discrepancies or relative price differences among geographic areas. In addition, the only way to re-evaluate these statistics would be to conduct another survey, which would not likely result in data that is significantly different than the data used in this analysis.

97. *Comment:* Clarify the meaning of "employment" in private boat diving.

Response: Employment related to private boat fishing and diving occurs through the expenditures paid by those engaged in the activity. This includes fuel, food, beverages, lodging, transportation, launch fees, etc. For each industry, there is an assumed ratio of sales and employment. Additionally, there is a multiplier effect, which accounts for additional employment of businesses supplying these businesses. For a complete explanation, see Leeworthy, Wiley, and Stone (2005).

98. *Comment:* The kayaking statistics seem inaccurate. Commenter claims that last year, for example, there were 7,000 kayaking days at Scorpion Anchorage, Santa Cruz Island.

Response: The kayaking statistics only include that activity associated with charter/party operations. The analysis does not include non-consumptive activity undertaken with private household boats. No institution estimates this activity. A project currently underway in the Socioeconomic Research & Monitoring Program for the CINMS is tracking the amount of this activity.

99. *Comment:* Make the tables easier to understand, and if appropriate presented as figures instead. If the numbers are estimates, add confidence intervals. If differences are significant, that should be noted with the level of significance. Clarify the time period and area in which the data was gathered.

Response: Figures would not provide the level of detail required to provide all of the necessary information. None of the estimates were derived through a stochastic process and therefore confidence intervals are not calculable. The time period is stated clearly in the text.

100. *Comment:* Commenter states that the negative perception toward Channel Islands MPAs by recreational fishermen has resulted in diminished recreational fishing effort and, consequently, lower revenues for businesses that serve recreational fishing interests in Santa Barbara and Ventura Counties.

Response: Scientifically credible data on perceptions held by recreational fishermen does not exist. The commenter's assertions cannot be confirmed or denied by NOAA.

101. *Comment:* Add an expenditure that represents guiding fees for kayaking, e.g., a day kayaking trip is approximately $180.00 (including boat fee).

Response: Kayaking fees are included in the analysis. See page 31 of Leeworthy, Wiley, and Stone (2005) for all recreation expenditure information.

102. *Comment:* Add data from the National Economics Project, National Park Service, and Chris LaFranchi.

Response: The commenter did not provide NOAA with sufficient information to provide a response.

103. *Comment*: The impacts shown are partially an artifact of the proposed zoned areas being temporarily closed by fisheries management measures. Recommend noting that current EFH rules may change.

Response: In the Step 2 analysis, other regulations are discussed and how they might impact the estimates presented in the Step 1 analysis, which includes "maximum potential loss".

104. *Comment:* To protect the fisheries dependent infrastructure of Ventura Harbor, integrate into the NOAA action goals for sustainable fisheries, maintenance of long-term socioeconomic viability, and minimization of short-term socioeconomic loses to all uses and dependent parties.

Response: The goals for NOAA's action are guided by the NMSA and are clearly stated in section 2.0 of the FEIS.

105. *Comment:* Regulatory agencies should promote collaboration between competing interests to accomplish mutual fisheries goals.

Response: The SAC/MRWG process and State/Federal partnership and coordination with the PFMC have promoted collaboration between all interested parties. NOAA's goals for this action are not fisheries-specific.

106. *Comment:* Multiplier effects for the local community and the state economy must be factored into socioeconomic data for a fisheries management plan to be effective.

Response: NOAA's socioeconomic analysis includes indirect impacts to fisheries-related support services and businesses (multiplier effects). This methodology is detailed in Leeworthy, Wiley, and Stone (2005) on pages 13-16 for commercial fishing and 28-29 for the recreation industry. The analysis utilized multipliers created specifically for the commercial fishing industry. The multipliers were obtained from the Fishery Economic Assessment Model (FEAM). The FEAM was developed under contract to the PFMC, and is based on input-output models detailing inter-industry relationships. The FEAM was designed for regional economic analysis and processing of the commercial fishery landings taking place within the county where the port is located.

107. *Comment:* Ex-Vessel value reported in Table 19 suggests that current regulations have effectively reduced the number of commercial fishing operators and show lower catch volumes. These trends translate into less fish harvested in the region. The percentage of vessels reporting catch from CINMS has declined from 79% in 2000 to an average of 47% in subsequent years.

Response: Table 19 shows a decline in vessels reporting catch from CINMS from 79 percent in 2000 down to 34 percent in 2002, followed by an increase between 2002 and 2003.

108. *Comment:* Commenter indicates there is a decrease of 86% in the cumulative ex-vessel value for the Ventura Harbor when comparing the study area totals for ex-vessel value by port in Table 17 (*Commercial Fishing: Study Area Totals Ex Vessel Value by Port)* to Table 27 *(Commercial Fishing – Alternative 1 Study Area Totals, Ex Vessel Value by Port)*

Response: The two tables are not showing the same estimate. Table 17 shows the study area total, while Table 27 shows the total in Alternative 1. The estimate in Table 17 did not "decrease" to the estimate in Table 27.

109. *Comment:* Ventura County has the highest economic dependency on activities in the CINMS, relative to all counties in the study area, as shown in Table 11 (*Local/Regional Economic Dependence on CINMS Baseline Personal Income)*.

Response: While any impact may seem significant for those who experience it, the table also shows that the baseline personal income associated with all activities in CINMS for Ventura County is less than one quarter of one percent of personal income for the county.

110. *Comment:* Ensure that non-consumptive activities are sustainable in the CINMS by balancing and promoting collaboration between competing interests.

Response: NOAA believes that the CINMS Advisory Council provides an ideal forum for "competing" interests to discuss their respective issues regarding use of the Sanctuary and to provide input and advice on such matters to the CINMS superintendent.

111. *Comment:* Provide the sources of data for analysis of charter/party and private boating impacts.

Response: The source of the information is Leeworthy, Wiley, and Stone (2005) and is cited at the beginning of sections 4.3.1 and 5.2. In Leeworthy, Wiley, and Stone (2005), Appendix C documents all data used in the assessment for the recreation industry. A cumulative analysis of impacts, including the State areas of closure, is provided.

112. *Comment:* The socioeconomic analysis fails to adequately address displacement and impacts on recreational access, ignores the cumulative impact of existing State and Federal closures, and projects unverified supply benefits.

Response: In the Step 2 analysis, the potential short and long-term impacts to a fisherman's ability to relocate fishing activity to areas outside marine zones is noted in qualitative terms using an ecological-economic model. It is not possible to estimate the net outcomes of how the ecological and economic processes will play out. For example, replenishment effects from the closed areas could off-set the impacts of displacement or vice versa. The possibility of long-term losses to the recreational fishing industry by restricted access is acknowledged. Several ecological and socioeconomic monitoring efforts are underway, while others are planned. Monitoring will help determine what actual outcomes will occur, and the major stakeholders were involved in developing the priority monitoring items.

113. *Comment:* Please update Table 11 (*Local/Regional Economic Dependence on CINMS: Baseline Personal Income)* and Table 12 (*Local/Regional Economic Dependence on CINMS – Baseline Employment)* and the text explanations to reflect socioeconomic impacts to all direct and indirect incomes related to commercial and recreational fishing.

Response: The estimates in Tables 11 and 12 do reflect socioeconomic impacts to all direct, indirect, and induced incomes related to commercial and recreational fishing. This methodology is detailed in Leeworthy, Wiley and Stone (2005) on pages 13-16 for commercial fishing and 28-29 for the recreation industry.

114. *Comment:* Include Leeworthy, Wiley, and Stone (2005) as an appendix to the Final EIS.

Response: Leeworthy, Wiley, and Stone (2005) includes the sources of all the economic data used in determining the economic impacts. This report is available at http://channelislands.noaa.gov/marineres/main.html. As such, to avoid bulk, it will not be added to the FEIS as an appendix.

115. *Comment:* The references and data that analyze the value and employment associated with "Total Consumptive Activities" (Table 1.3 and 1.4) ignore the additional value of businesses and services dedicated to supporting commercial and recreational fishing; recommend that the FEIS include the value of these businesses and support services in order to assess overall economic impact.

Response: The additional businesses and services dedicated to supporting commercial and recreational fishing are included in the estimates in Leeworthy, Wiley and Stone (2005) on Tables 1.3 and 1.4 through the multiplier process. This methodology is detailed on pages 13-16 for commercial fishing and 28-29 for the recreation industry.

116. *Comment:* The potential impact on ports and the potential economic costs of the percentage reductions in catch landings should be included.

Response: Throughout the analyses the percentage impacts on ex vessel value of the catch is presented. Ex vessel value of the catch is just pounds of catch times the price per pound and reflects both effects on supply and demand. There is no added value of listing percentage of pounds of catch separately.

117. *Comment:* The overall potential reductions in annual income and full and part time employment should include the values as percentages of the regional and local commercial fishing industries as well as the overall regional economy.

Response: The suggested percentages are in Table 25 of the FEIS.

118. *Comment:* Tables 27, 28, 29, 32, 33, and 34 (*Commercial Fishing Impact)* do not include the values of support services and businesses associated with commercial and recreational fishing.

Response: The impacts on ex value of the commercial fisheries are shown in Tables 27 and 32. The impacts on support services and businesses associated with commercial fisheries are included in Table 33 and 34. Table 35 includes multiplier impacts for income and employment for recreational fishing as noted in footnotes 3 and 4 of Table 35.

119. *Comment:* Provide additional details on the socioeconomic, education, and outreach options that minimize or mitigate potential increased social costs and lawsuits, and increased costs of enforcement.

Response: The State of California and NOAA have developed ecological and socioeconomic monitoring plans to gauge the effects of the marine zones. In addition, the agencies have developed interpretive enforcement education materials (e.g., brochures, signage) with affected stakeholders to better inform users of the marine zones. Effective communication of monitoring results through education and outreach and the application of interpretive enforcement tools may defray or avoid these social costs.

120. *Comment:* Partnering with the Sanctuary to manage the zoning network is very important.

Response: NOAA agrees. See the response to comment #2 for more information on this issue.

121. *Comment:* The California Department of Fish and Game supports Alternative 1C. It will work with California Fish and Game Commission to fill any spatial gaps between the existing zones and the federal water zones.

Response: NOAA acknowledges the CDFG's position on the alternatives analyzed in the DEIS. See the response to comment #2 for more information on this issue.

122. *Comment:* The California Department of Fish and Game supports the proposed CINMS designation document amendments.

Response: NOAA acknowledges the CDFG's support for the proposed changes to the CINMS designation document.

123. *Comment:* NOAA's action may reduce conflicts between seabirds and fisheries, thus complementing NOAA's Office of Spill Prevention and Response seabird restoration efforts.

Response: Although this outcome is not a direct intent of this action, NOAA supports the Office of Spill Prevention and Response's seabird restoration efforts. Seabirds may become entangled or hooked on fishing gear and their feeding and breeding behaviors disrupted by fishing activity, such as fishing at night with bright lights.

124. *Comment:* Consultation with the State of California is required under Section 106 of the National Historic Preservation Act.

Response: NOAA has complied with all required consultations, including the National Historic Preservation Act.

125. *Comment:* A number of commenters expressed general support for marine reserves, marine conservation in general, and expanding the CINMS.

Response: NOAA acknowledges these comments.

126. *Comment:* The NOAA document should define short-term losses to both recreational and commercial fisheries, why losses will be short-term, and how the temporal nature of the impacts will be measured.

Response: As described in section 5.2.2.2 of the FEIS, short-term losses are defined as impacts over the next 1-5 years and long-term impacts are defined as 5-20 years.

NOAA's socioeconomic monitoring plan calls for monitoring value of commercial fisheries catch (both inside and outside the CINMS and in State waters). Monitoring State-wide trends helps to separate out effects that have nothing to do with the CINMS marine reserves.

For the recreational fisheries, NOAA plans to monitor the following: 1) spatial use patterns and intensity of use (total number of person-days of use); 2) charter/party boats using California Department of Fish and Game (CDFG) logbooks for Charter Passenger Fishing Vessels (CPFV); 3) private boats using the new California recreational fishing statistics data; 4) socioeconomic profiles of fishermen, including expenditure profiles; 5) net value or consumer's surplus; and 6) knowledge, attitudes and perceptions of management strategies and regulations.

For more information, see the Socioeconomic Monitoring Plan at http://www.cinms.nos.noaa.gov/marineres/main.html

127. *Comment:* The expected socioeconomic impacts to the recreational and commercial fisheries and fishermen's income should be compared to that sector's total income by county and not to the total county income and regional data.

*Response***:** The FEIS details how value of catch by each species/species group and the total across all species/species group are impacted as a percent of all commercial fishing catch from the CINMS. This is also done by port and the percentages present the percent of the total ports value of catch is impacted by each alternative. See appendix tables in Leeworthy, Wiley and Stone (2005) for more information on the impacts by port and by county with the percents being the percents of the totals for each county.

For the recreation industry, greater detail is provided in Leeworthy, Wiley and Stone (2005) on the total impacts by county and percents of the total CINMS recreation impacted from the total CINMS recreation in the county.

128. *Comment***:** As the focus of the action is Santa Barbara Channel, data relevant to this area, not the State as a whole, should be used. A statement is made that "almost 20 percent of those who use California's coastal areas for recreation are interstate or international visitors . . ." Does this figure also apply to the more geographically limited Channel Islands area? Another statement is made that as numbers of people increase (referring to coastal population growth), so do the number of CINMS users. Are there any data to support this statement? Does the increase in CINMS use parallel the rates of increase elsewhere?

*Response***:** Recognizing there is a paucity of data specific to the CINMS or the specific local surrounding area of Santa Barbara, Ventura, and Los Angeles counties, NOAA used the best available data to estimate the amount of activity in the CINMS.

There were two sources of time series data for assessing trends: NOAA Fisheries' Marine Fishing Statistics Survey (MRFSS), which has now been replaced with the California Recreational Fishing Statistics Program, and the U.S. Fish and Wildlife Service's National Survey of Hunting, Fishing and Wildlife Associated Recreation. Both estimate use for Southern California. Leeworthy, Wiley, and Stone (2005) summarize trends from these two sources (pg. 27) and the trends from the two sources were not consistent. From 1993-1999, MRFSS shows a downward trend, while from 1991 – 1996 (survey is done every five years) it shows an upward trend. From 1999 – 2002, MRFSS shows an upward trend.

A 1997 California Resources Agency report, cited on page 49, estimated that for all coastal areas 20 percent of recreation is done by out of State visitors. A Santa Barbara County Conference & Visitors Bureau and Film Commission report included an estimate that 20 percent of the visitors to Santa Barbara County were foreign visitors. There are not any surveys of the visitors to the CINMS to know if the same would hold true for recreational users of the CINMS.

The statement that "as coastal population grows, so will number of CINMS users" is an extrapolation from an assessment of national trends for ocean and coastal (marine) recreation from the National Survey on Recreation and the Environment (NSRE) 2000. Year 2000 data were analyzed for demographic factors related to participation in marine recreation activities and equations used to forecast future participation for years 2005 and 2010. Generally, national participation rates (the percent of the U.S. population doing an activity) are projected to decline. However, the total number of participants is projected to increase because the population growth more than compensates for the lower participation rates. The statement presumes these same trends may hold for California or the CINMS.

129. *Comment:* There is no quantitative evidence to show that non-consumptive activities will increase in the new zones, especially because all of the non-consumptive use occurs nearshore.

Response: The establishment of the new marine zones is expected to result in benefits to non-consumptive recreational users. While there is no data currently available to directly estimate the magnitude of these benefits, NOAA conducted a benefits transfer/policy analysis simulation to quantify potential benefits. In addition, a two year study is now underway to help quantify these benefits. Non-Consumptive uses in the proposed new zones are a relatively small percentage of the total non-consumptive uses that are concentrated in the nearshore waters of the Sanctuary. See section 5.2.5 for further discussion.

130. *Comment*: It is not clear how closures will affect the marine zones or how they will benefit the intent of those closures. The DEIS indicates that the proposed action would supplement the closures by "establishing temporally permanent zones," but no details are given and the statement is confusing.

Response: The proposed action partially supplements the existing fishery closures, such as the Cowcod Conservation Area. The designation of marine reserves in or near areas protected by fishery closures adds another layer of protection, further ensuring that no fishing will occur on targeted species in the fishery closures and the adjacent areas protected by the marine reserves. Protection of the water column and all biophysical characteristics of marine reserves likely will enhance the recovery of targeted species protected by fishery closures by eliminating bycatch and further protection of habitats. Synergistic effects may result from protection by marine reserves of species and ecological processes consistent and adjacent to fishery closures.

131. *Comment*: Alternative 2 may cause negative financial impacts to coastal communities, recreational and commercial boating, and specifically, the ability of a local agency to repay existing State loans that are used for the construction and improvement of small craft harbors.

Response: The State marine zones have been in place for over three years and there is no evidence that the ability of local agencies to repay small harbor construction and improvement loans has been exacerbated due to impacts on recreational and commercial boating from the State zones. Furthermore, there is a marginal increase in the estimated "maximum potential impact" to recreational and commercial boating with the extension of marine zones from the existing State marine zones into deeper waters of the Sanctuary with either Alternative 1 or 2.

132. *Comment*: The DEIS should specifically address Environmental Justice. The Council on Environmental Quality requires this inclusion, and the counties under consideration differ in income and social structure.

Response: See Section 6.7 of the FEIS for a discussion on Environmental Justice and all other required consultations.

133. *Comment:* The commercial fishing sector developed five alternatives that have lower economic impacts to both recreational and commercial fishermen than the preferred alternative, because a balance of marine conservation areas and marine reserves was used instead of marine reserves only.

Response: Marine conservation areas, where certain fishing activity and impacts to habitat and species still occurs, would not achieve the purpose and goals of the proposed project as well as marine reserves. See section 3.1.2.2 of the FEIS. Also, see response #44 for the reason the one marine conservation area is included.


NOAA