

Environmental Assessment
for the
San Clemente Island
Integrated Natural Resources
Management Plan



February 2002

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Abstract:

This Environmental Assessment is to determine if an Environmental Impact Statement (EIS) or Finding of No Significant Impact (FONSI) should be prepared on the policy strategies proposed in the final draft of the Integrated Natural Resources Management Plan (INRMP) for San Clemente Island (Island), U.S. Naval Base Coronado, California (SCI). The footprint of the Plan is all the terrestrial lands and offshore rocks, and all in-water resources to 300 yards offshore. The purpose of this INRMP is to meet statutory requirements under the Sikes Act Improvement Act, Public Law 105-85, Div. B Title XXIX, Nov. 18, 1997, 111 Stat 2017-2019, 2020-2022. The INRMP is designed to provide for the continuation of military activities while preserving, protecting, and enhancing the natural ecosystem and biodiversity of the Island. This EA describes the proposed action and an alternative to the proposed action. The Proposed Action is to implement the 2002 INRMP for SCI and provide a net benefit to the environment while still providing for the mission of the Armed Forces using the Island to accomplish military objectives. The No-Action Alternative assumes implementation of activities described in the 1986 Landscape Management Plan for Endangered Species Recovery at San Clemente Island (Gripp and Howard 1986), the Natural Resource Management Plan for Naval Air Station, North Island and Outlying Landing Field, Imperial Beach, San Diego County (Chambers Consultants and Planners 1982) which covered SCI, several U.S. Navy Instructions that cover SCI activities, and a range of terms and conditions from a total of eighteen reasonable and prudent measures described in seven Biological Opinions (BOs) issued with regard to federally listed species as threatened or endangered under the Endangered Species Act (ESA) of 1973 (1978 Amendments), (PL 95-632; 16 USC §§ 1531 et seq.).

This INRMP will serve as a planning tool for Commander, Navy Region Southwest (CNRSW). As opportunities become available to seek funding for environmental projects or as mitigation for future activities, this Plan will serve as a priority list to better enable the Natural Resources Department to practice effective ecosystem management. This Plan is not meant as a definitive list of projects that will be automatically funded upon enactment. It provides guidance to the resource managers on strategies to employ for the next five years. The Navy will implement recommendations in the INRMP within the framework of regulatory compliance, national Navy mission obligations, anti-terrorism and force protection limitations, and funding constraints. Any requirement for the obligation of funds for projects in this INRMP shall be subject to the availability of funds appropriated by Congress, and none of the proposed projects shall be interpreted to require obligation or payment of funds in violation of any applicable federal law, including the Anti-Deficiency Act, 31 U.S.C. § 341, et seq.

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1.0 Purpose and Need

The purpose of this Environmental Assessment (EA) is to provide sufficient information and analysis to determine if an Environmental Impact Statement (EIS) or Finding of No Significant Impact (FONSI) should be prepared for the policy strategies proposed in the Final Draft of the Integrated Natural Resources Management Plan (INRMP) for San Clemente Island (SCI or Island). The footprint of the INRMP is all terrestrial lands and offshore rocks, and all in-water resources to 300 yards offshore. An EA is a procedural requirement under the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.), intended to ensure that alternatives to federal actions are considered in plans and evaluations in order to avoid activities that might significantly affect the quality of the human environment. This EA also complies with:

- Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] parts 1500—1508) July 1, 1986, and
- Naval Operations Instruction 5090.1B (OPNAVINST 5090.1B CH-2).

In November 1997, the Sikes Act, 16 U.S.C. §670a et seq., was amended to require the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. The amended legislation, the Sikes Act Improvement Act (SAIA), required for the first time that Secretaries of military department prepare and implement an INRMP for each military installation containing substantial natural resources. The INRMPs are to be based on “ecosystem management” and address conservation of natural resources in a proactive, integrated approach that results in “no net loss” of an installation’s capabilities to carry out its mission. Hence, the military mission and activities needed to support it are used as a ‘benchmark’ for understanding patterns of use of natural resources, evaluating effects, and developing natural resources management projects that better mesh the various values of the land. The implementation of the 2002 INRMP, which is the proposed action of this EA, complies with the SAIA and implementing guidance OPNAVINST 5090.1B CH-2, and Department of Defense Instruction (DoDINST) 4715.3 (Environmental Conservation Program).

The purpose and need for the proposed action—to implement an INRMP for SCI—is to develop a sound, ecosystem-based management program that meets statutory requirements under the SAIA, and various DoD and U.S. Navy instructions.

Any requirement for the obligation of funds for projects or actions evaluated in this EA shall be subject to the availability of funds appropriated by Congress, and none of the proposed projects or actions shall be interpreted to require the obligation or payment of funds in violation of any applicable federal law, including the Anti-Deficiency Act, 31 U.S.C. § 1341, *et seq.*

The principal use of military installations is to ensure the preparedness of the Armed Forces. The SAIA requires each installation to prepare and implement an INRMP that provides for the following management activities, to the extent that such activities are consistent with the use of the installation for military preparedness:

- No net loss in the capability of the installation’s lands to support the military mission of the installation.
- Enforcement of applicable natural resource laws (including regulations).
- Establishment of specific natural resource management goals and objectives and timeframes for accomplishing those goals.

- Fish and wildlife management, land management, and forest management.
- Fish and wildlife habitat enhancement or modification.
- Wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants.
- Integration of, and consistency among, the various activities conducted under the INRMP.
- Fish-and-wildlife-oriented recreation; sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources or safety and security.
- Such other activities as the DoD has determined are appropriate.

SCI and its associated offshore range complex (SCIRC) is the primary maritime training area for the ships, submarines and aviation squadrons of the U.S. Pacific Fleet, U.S. Navy Sea, Air and Land (SEALS), and the U.S. Marine Corps (Marine Corps). The INRMP sets the course for the sound integration of the U.S. Navy's mission and natural resource protection on SCI over the next five years.

This INRMP is intended to support SCI's institutional and operational mission by:

- Serving as a strategic land use and natural resource planning tool.
- Providing a framework for daily land use and resource management decision-making.
- Anticipating land use problems and conflicts.
- Communicating land use and resource guidelines.
- Providing an institutional memory.
- Benefiting federally listed species.
- Providing guidance for annual tasking that is implementable, effective, and achievable.

The INRMP integrates the military mission and natural resource components of all SCIRC plans, and meets the requirements of the SAIA and all applicable DoD, U.S. Navy, and installation regulations. It is intended to fulfill the requirements of OPNAVINST 5090.1B CH-2, the *Environmental and Natural Resources Program Manual*.

This EA identifies potential environmental consequences of the proposed action and the no-action alternatives. The primary decision will be whether to proceed with implementation of the INRMP or to continue the current program. Based on this EA, either a FONSI or a Notice of Intent to prepare an EIS will be prepared, as required by NEPA.

Concurrently with this EA, a comprehensive EIS is in the process of development that addresses existing and anticipated changes in operations and training for the entire SCIRC. While this EA addresses natural resource management choices associated with the INRMP, the EIS will directly address training impacts on the environment.

1.1 Military Mission

The mission of SCI, since the U.S. Navy obtained ownership by Presidential executive order (EO) in 1934, is to support U.S. Navy tactical training, research, development, testing, and evaluation of military preparedness by maintaining and operating facilities and providing services and material support to the U.S. Pacific Fleet. The Commander-in-Chief, U.S. Pacific Fleet is the major claimant for SCI. SCIRC is administered through Commander Navy Region Southwest (CNRSW) and Naval Base Coronado (NBC).

The Island itself is the center of the SCIRC. SCI supports the largest concentration of U.S. Naval forces in the world. It is a cornerstone of the tactical training and support of the Southern California Operations Area. Land, air, and sea ranges provide the U.S. Navy, Marine Corps, and other military services space and facilities to conduct readiness training and test and evaluate equipment. Over 20 U.S. Navy and Marine Corps commands conduct training and testing activities on and around the Island. Activities range across the entire spectrum of warfare mission areas including aviation training, air warfare, surface warfare, under sea warfare, strike warfare, submarine warfare, amphibious warfare, special warfare, RDT&E, and Joint Task Force Exercises that include other military services. Allied forces and non-DoD agencies such as the Immigration and Naturalization Service (INS) also train at SCI.

SCI is the southern-most member of an archipelago of eight islands, called the Channel Islands, off the southern California coast (Map 1-1). It is located approximately 63 miles west-northwest of San Diego and 21 miles south of the next-closest island, Santa Catalina Island. The Island's proximity to, yet relative isolation from, the mainland makes it an important asset to the U.S. Navy. Proximity to the mainland allows for less cost of transit to training sites. Isolation and restricted airspace are key to facilitating testing and training programs with minimal restrictions and maximum flexibility. The use of live fire and the ability to combine exercises as would occur under actual battle conditions also makes SCIRC a unique strategic asset. Operations and the activities that make up the operations occur in onshore, nearshore, and offshore environments. The area considered for management in the INRMP extends to 300 yards from shore as measured from the mean lower low water.

The Shore Bombardment Area (SHOBA) range is located at the southern end of SCI. It is the last range in the eastern Pacific Basin where ships can conduct Naval Gunfire Support (NGFS), which involves live fire from ships into Impact Areas (SHOBA and Impact Area boundaries may be seen on Map 2-1). SHOBA is the only location in the Pacific Ocean where U.S. Naval ships and U.S. Navy and Marine Corps Forward Observers (FOs) can be trained and qualified in NGFS, and where combined arms exercises can be conducted with NGFS. (Combined Arms exercises involve all supporting arms of the U.S. Navy, Marine Corps, Air Force, Army, and Coast Guard such as NGFS, artillery, mortars, fixed-wing aircraft, and rotary-wing aircraft, and include exercising protocols for coordination of these assets).

San Clemente Island Regional Context



Map 1-1. Regional location of San Clemente Island.

1.2 Background

The Island is home to a variety of unique and rare ecological resources on land, and some of the richest marine communities in the world in adjacent waters. It was subjected to severe overgrazing, over the course of time since Spanish discovery in 1542, by non-native, feral animals (goats, sheep, and pigs) brought to the Island by early inhabitants. Their presence resulted in the decline of numerous native species and their habitats. Due to a rigorous extirpation program, the Island has now experienced about a decade of recovery from damage done by these herbivores. There are currently 12 species listed as endangered or threatened under federal law in the footprint of the INRMP, and several others are recognized as rare or sensitive by the state or by non-governmental organizations. Intensive military training on SCI has resulted in increased concern by government regulators that fire frequency may affect habitat and cause disruption of natural processes in some parts of the Island. The integrated management of all practices that affect natural resources on SCI is essential to the conservation of those resources.

The following key issues were identified in the development of the INRMP:

- Conservation of federally listed plant and animal species and their habitats in the presence of increased military activity. Listed species include: San Clemente loggerhead

shrike (*Lanius ludovicianus mearnsi*), San Clemente sage sparrow (*Amphispiza belli clementae*), Island night lizard (*Xantusia riversiana*), white abalone (*Haliotis sorensi*), western snowy plover (*Charadrius alexandrinus nivosus*), brown pelican (*Pelecanus occidentalis californicus*), San Clemente Island Indian paintbrush (*Castilleja grisea*), San Clemente Island larkspur (*Delphinium variegatum kinkiense*), and San Clemente Island woodland star (*Lithophragma maximum*), Santa Cruz Island rock cress (*Sibara filifolia*), San Clemente Island broom (*Lotus dendroideus traskiae*), and San Clemente Island bush mallow (*Malacothamnus clementinus*).

- Conservation of other endemic plant and animals, including those on State of California endangered lists such as the Island fox (*Urocyon littoralis clementae*), or other sensitive species lists, and their habitats in the presence of increased military activity.
- Control of exotic and invasive plant species and recovery of native habitats.
- Erosion control especially along roads, in impact areas, and in areas heavily grazed by feral animals during the past century.
- Fire management in the presence of federally listed and other sensitive species, and military training that results in a high fire frequency.
- Protection of numerous cultural resources in areas identified as having a high military value.

2.0 Proposed Action and No-Action Alternative

The SAIA requires each installation to prepare and implement an INRMP that provides for the conservation and rehabilitation of natural resources and the sustainable multipurpose use of those resources. The SAIA requires that the INRMP establish specific natural resource management goals, objectives, and priorities for providing a diverse array of activities including: management of fish and wildlife populations, wetland enhancement and protection, outdoor recreation, and public access to the installation for the sustainable use of natural resources. However, all actions must:

- be consistent with the use of the installation for military preparedness;
- result in no net loss in the capability of the installation’s lands to support the military mission of the installation; and
- conform to all applicable natural resource laws.

This chapter describes the Proposed Action (SCI 2002 INRMP) and the No-Action Alternative. The No-Action Alternative assumes implementation of activities described in the 1986 Landscape Management Plan for Endangered Species Recovery at San Clemente Island (Gripp and Howard 1986), the Natural Resource Management Plan for Naval Air Station North Island (NASNI) and Outlying Landing Field, Imperial Beach, San Diego County (Chambers Consultants and Planners 1982) which covered SCI, and a range of terms and conditions from a total of 18 reasonable and prudent measures described in seven Biological Opinions (BOs) issued with regard to federally listed species as threatened or endangered under the Endangered Species Act (ESA) of 1973 (1978 Amendments), (PL 95-632; 16 USC §§ 1531 et seq.). The most far-reaching of the BOs was one evaluating the effects of fire on listed species (US Fish and Wildlife Service [USFWS] 1997 1-6-97-F-21), and a second evaluating military training impacts to the Island night lizard (USFWS 1997 1-6-97-F-58). The last Natural Resource Management Plan for SCI was completed in 1973 (USDA Soil Conservation Service 1973), and since it pre-dates many pertinent environmental laws and was written at a time when feral, non-native mammals (since removed) had devastated the Island ecosystem, has little relevance as part of a No-Action Alternative today.

The Proposed Action is to implement an updated, ecosystem-based program that provides for conservation and rehabilitation of natural resources in a manner that is consistent with the installation’s military mission. A summary of cumulative and planned strategies and projects for the 2002 SCI INRMP is included in Appendix D. These alternatives and their descriptions reflect *Navy Guidance on Preparing National Environmental Policy Act (NEPA) Documents for Integrated Natural Resources Management Plans* (U.S. Navy 1998c).

Table 2-1 compares the two alternatives in the primary NEPA-related subject areas.

Table 2-1. Comparison of approaches for the Proposed Action versus the No-Action Alternative.

Resource	Proposed Action	No-Action Alternative
Geology, Topography, Soils	Improves site approval process by providing standards, guidelines, and best management practices (BMPs) for soil erosion control.	Uses site approval process for protection.
Hydrology and Water Quality	Consolidates and summarizes regulatory requirements to aid compliance. Incorporates BMPs for soil stabilization, road construction and maintenance, nonpoint source pollution prevention, and water conservation.	SCI uses existing water quality permits and the site approval process for protection of these resources.

Resource	Proposed Action	No-Action Alternative
Air Quality	Avoidance and minimization measures for minimizing effect on air quality due to a prescribed fire management program that is expected to benefit the long-term health of the Island. Project implementation is expected to be accomplished within existing air quality levels.	Air quality is managed by CNRSW by way of existing compliance requirements and reporting.
Plant Communities Including Wetlands	Completes plant community inventory, recommends updated vegetation mapping, and establishes long-term monitoring.	Uses site approval process for protection. Vegetation maps pre-date the removal of feral grazers, and so are out-dated.
Sensitive Plant and Wildlife Populations	Consolidates management obligations to clarify, and provides a management framework for the future based on an ecosystem approach consistent with federal guidelines.	Protection is based on existing requirements of regulatory permits and USFWS Biological Opinions.
Land Use	Land use policies are proposed which protect the sustainability of both military use and natural resources on the Island. Policies also contribute to the recovery of the San Clemente loggerhead shrike and other federally protected species by developing cooperative, interagency, ecosystem management strategies that are multi-species based. Existing land use designations are clarified. No other actions are proposed which change existing land use.	Land use is managed through the site approval process and scheduling of military training and natural resource operations.
Transportation and Circulation	Project implementation is expected to be accomplished within existing traffic and circulation patterns. An improvement in air safety is expected through implementation of BMPs to avoid Bird Aircraft Strike Hazard (BASH).	Transportation and circulation is managed through the Regional Shore Infrastructure Planning process, Site Development Plans, and the site approval process.
Aesthetics	Policies implemented by the INRMP will enhance the Navy's ability to maintain the Island in natural open space. Control of exotic plants and protection of rare species will also enhance the natural aesthetics of the property.	Visual resources are not managed directly. The Island is isolated from human view and population centers due to its distance from the mainland, except for its general form from a great distance.
Public Facilities/Access/Recreation	Provides for an updated, formal Instruction which clarifies policies so that they can be better communicated and enforced. An updated Outdoor Recreation Plan is planned in cooperation with the National Park Service, consistent with a DoD MOU on partnering on this matter.	Existing program is run through Morale, Welfare, and Recreation Department.
Safety and Environmental Health	Improves air safety through management of Bird Aircraft Strike Hazard.	Airport safety from wildlife hazard is addressed through annual contracts. Other safety and environmental health concerns are addressed by separate planning processes, such as the Installation Restoration Program.
No Effect=alternative would have no impact on current status of topic; Positive Effect=alternative would produce a net benefit to topic; Negative effect=alternative could produce an undesired impact on topic.		

2.1 Proposed Action—Implement the 2002 INRMP

2.1.1 INRMP Overview/Ecosystem Management

The INRMP complies with federal guidelines regarding adoption of an ecosystem approach to land management. An inter-agency MOU on Fostering an Ecosystem Approach (1995) was signed by DoD along with 14 other agencies in an attempt to create a more consistent approach to ecosystem management among federal agencies, enhance coordination, and to encourage more regional ecosystem initiatives (CEQ *et al.* 1995). This policy was further implemented in a letter from the CNO (21 February 1996), which directed U.S. Navy commands to administer their activities in a manner that encourages cooperation in natural resource management within their regions, and consideration of long and short term consequences and integration of ecological, economic, and social factors in management of ecosystems. Implementation of this policy was designed to encourage natural resource managers to determine BMPs based on regional or physiographic delineations rather than on a featured species basis. It was designed to better assess mission impacts on an installation-specific scale, as well as on a more regional or landscape scale. DoD Instruction 4715.3 (May 3, 1996) then required that Navy installations incorporate ecosystem management as the basis for land use planning and management, and this was continued in the DoD Ecosystem Initiative (1996). This approach shall take a long-term view of human activities, including military uses, and biological resources as part of the same environment. When the SAIA was authorized by Congress in 1997, it also adopted this theme, mandating that INRMP goals “shall be to maintain or develop an ecosystem-based conservation program...” The Navy further directed (OPNAVINST 5090.1B, 9 September 1999) that ecosystem-based management shall include:

- A shift from single species to multiple species conservation.
- Formation of partnerships necessary to consider and manage ecosystems that cross boundaries.
- Use of the best available scientific information in decision-making and adaptive management techniques in natural resource management.

This San Clemente Island INRMP is a large-scale ecosystem plan that reflects the ecosystem-based approach described by federal policy, and recognition of the interconnections among the land, species, habitats, and human users of the Island. The ecosystem management mandate is accomplished, in part, by applying principles of sustainability and proper, compatible use at various scales of analysis. It is also reflected in the INRMP’s emphasis on partnerships with other agencies and the public, and its emphasis on long-term monitoring to support an adaptive management approach. The INRMP also reflects the recognition that these ecological relationships and connections can change over time. The status and condition of natural and cultural resources, the continuing need for military readiness, and the public values, budgets and technology which affect the land and its management are the primary role players in the decision process.

2.1.1.1 INRMP Development and Implementation

The development and implementation of the INRMP was and will continue to be a collaborative process, and includes a number of user groups, conservation groups, and community members. The INRMP is the product of a collaborative effort that includes representatives from the U.S. Navy, USFWS, California Department of Fish and Game (CDFG), Channel Islands National Park, and Catalina Island Conservancy. In bi-monthly meetings that began in January 2001, this primary planning team, called the SCI INRMP Working Group, shared information, debated key

issues, and reached consensus on a wide range of social, institutional, economic, and ecological issues. Earlier drafts of the INRMP were reviewed and discussed in the Working Group meetings. The INRMP was reviewed formally by USFWS and CDFG. These agencies provided formal comments and concurred with the management recommendations outlined in the INRMP once their comments were addressed. The formal comments received from these agencies, and how those comments were addressed in the INRMP, are shown in Appendix E.

This INRMP will serve as a planning tool for CNRSW. As project funding becomes available, this Plan will serve as a priority list to better enable the Natural Resources Department to practice effective ecosystem management. It will also be used as guidance for new Site Development and Master Plans, project planning, mitigation strategies, and compliance monitoring; NEPA, Coastal Zone Management Act (CZMA), and Clean Water Act (CWA) documentation; and daily resource management decisions. This Plan is not meant as a definitive list of projects that will be automatically funded upon enactment. It provides guidance to resource managers on strategies to employ for the next five years. The Navy will implement recommendations in the INRMP within the framework of regulatory compliance, national Navy mission obligations, anti-terrorism and force protection limitations, and funding constraints. Any requirement for the obligation of funds for projects in this INRMP shall be subject to the availability of funds appropriated by Congress, and none of the proposed projects shall be interpreted to require obligation or payment of funds in violation of any applicable federal law, including the Anti-Deficiency Act, 31 U.S.C. § 341, et seq.

2.1.1.2 INRMP Core Strategies

The INRMP's goal was reached as a consensus among members of the Working Group.

Goal: The Goal of this SCI INRMP is to support the military requirements of the Pacific Fleet while maintaining long-term ecosystem health. It will:

- Facilitate sustainable military readiness and foreclose no options for future requirements of the Pacific Fleet.
- Protect, maintain, and restore priority native species to reach self-sustaining levels.
- Ensure ecosystem resilience to testing and training impacts.
- Maintain the full suite of native species, emphasizing the endemics.

The Working Group agreed that the INRMP is intended to be an agent of change. In addition to addressing specific concerns, a number of key management issues were identified in the INRMP:

- 1) SCI has a finite capacity to simultaneously support operations and native or endemic plant and animal communities, and finding the balance where both are sustained is difficult.
- 2) Military values and natural resource values are both very high, and there has been no programmatic strategy for resolving when they conflict. Issues have in the past been resolved project-by-project and species-by-species, and this has resulted in time-consuming conflict resolution and short-term fixes rather than long-term solutions.
- 3) There is a lack of quantitative data on the effects that current and proposed uses have on habitats and species.
- 4) There is a need for San Clemente loggerhead shrike recovery and recovery of other precariously small populations of species protected under the Endangered Species Act (ESA) that should be balanced with habitat and ecosystem

- management that has long-term value for whole -island recovery and prevention of future species listings.
- 5) Erosion and sedimentation continue, arising from inadequately constructed or maintained roads, or from ongoing damage instigated by past overgrazing by feral goats, exterminated around 1991.
 - 6) There has been a massive historic change in vegetation composition and loss of overall cover, resulting in difficulty in defining desired future conditions for native habitats.
 - 7) Both training operations and natural resource operations require sufficient access to SHOBA to accomplish their missions. Because many operations are dangerous, training and natural resource management cannot always occur at the same time within SHOBA. Scheduling is a challenge.
 - 8) There is a need for effective control of invasive species in order to protect habitat values for endemic species.
 - 9) Wildland fire patterns may affect the ability of sensitive species to be self-sustaining.
 - 10) There is logistical and organizational difficulty in accomplishing wildland fire management objectives for natural resource protection.
 - 11) Some Island endemic populations are naturally small and have become fragmented, which may limit their recovery.
 - 12) Clarification on policy is needed regarding who should fund activities that are inherently operational versus natural resource-based for short- and long-term management.
 - 13) Resolution is needed to issues surrounding project-specific impacts and the need to minimize those impacts vs. ongoing stewardship responsibilities of the Navy.
 - 14) Necessary military operations result in impacts to the environment that require careful, active, and science-based management in order to achieve sustainable use and ecosystem health.

The Proposed Action is to modify the existing practices at SCI to develop and implement an INRMP consistent with the military use of the property and the goals and objectives established in the SAIA. It is designed to direct the management of natural resources for the next five years, and provide consideration for longer-term (beyond five years) management objectives. The management chapters (Chapters 4 and 5) propose an array of approaches needed to fully integrate natural resources and military use management in an Island context for which resources are in a very dynamic state. It lays out strategies for complying with environmental laws and conserving, managing, and restoring habitats, species, soil, and water. It then proposes an integrated inventory, monitoring, and research program that expedites sound, performance-based environmental compliance and forms the basis for adaptive management and flexibility in the application of controls on military use.

The planning chapter (Chapter 6) lays out an approach for military use sustainability on SCI, and proposes a means for establishing impact to the military mission. Also presented are an approach to integrated, sound natural resource decision criteria; collaborative planning with military, regulatory agency and private partners; and improved organizational capacity as more central to a lasting resolution of environmental conflict. Enhanced communication and effective leadership are also identified as necessary to follow the course set for achieving the Plan's goal and natural

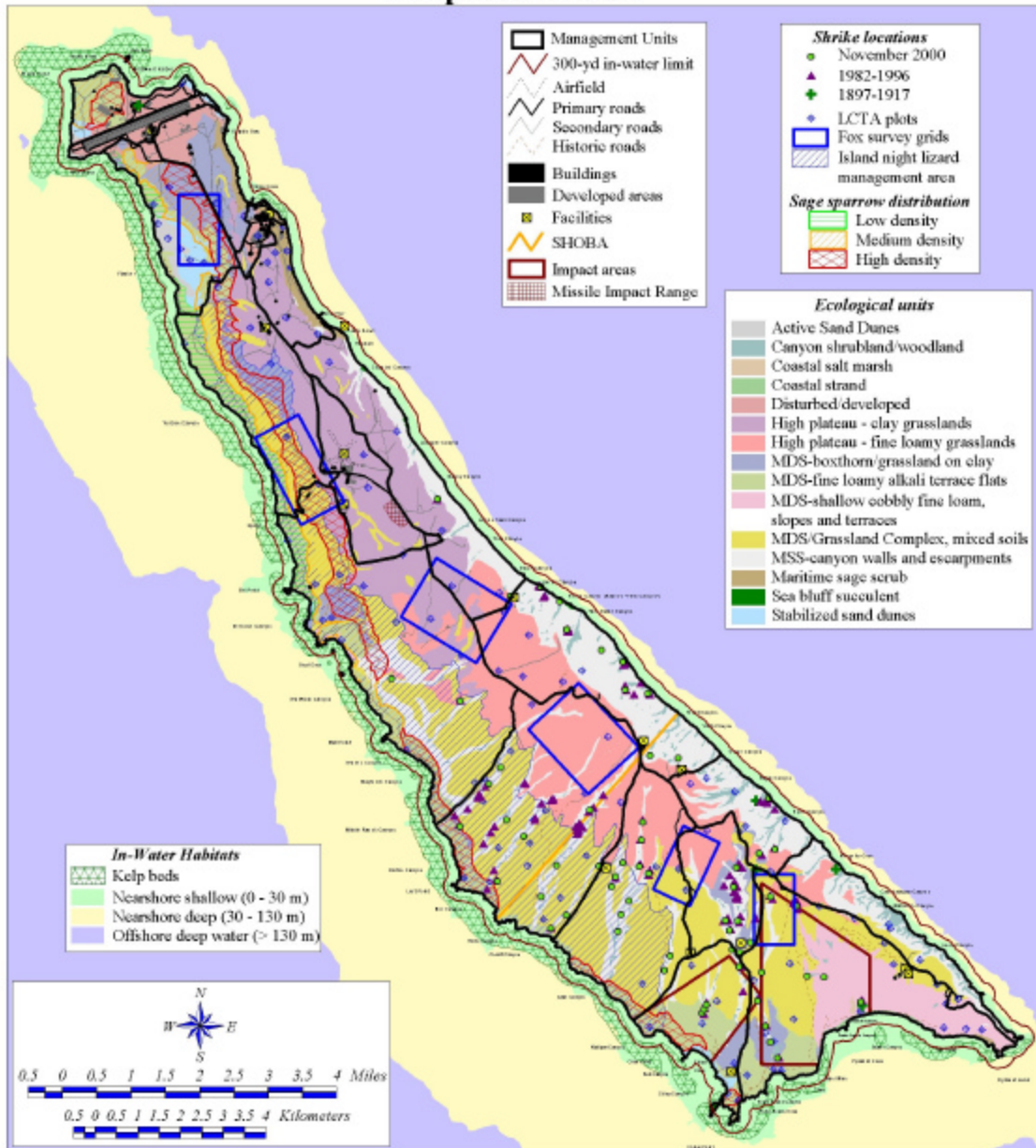
resource management that is integrated with the military mission and land use requirements. The INRMP also provides funding priorities and a timeline for implementation (Chapter 7).

Details on the elements of the INRMP that are either new practices for SCI or that expand on current practices are described in Appendix D, along with an INRMP Project Implementation Table for Budget Planning.

Map 2-1 summarizes the locations for the site-specific management actions outlined in the Proposed Action.

Any requirement for the obligation of funds for projects or actions evaluated in this EA shall be subject to the availability of funds appropriated by Congress, and none of the proposed projects or actions shall be interpreted to require the obligation or payment of funds in violation of any applicable federal law, including the Anti-Deficiency Act, 31 U.S.C. § 1341, *et seq.*

Proposed Action



Map 2-1. Locations of management actions at San Clemente Island under the Proposed Action to implement the 2002 INRMP. Only site-specific recommendations are shown. See Appendix D for detailed description.

2.2 No-Action Alternative—Continue Existing Management Strategies

The No-Action Alternative would continue implementation of certain projects such as inventories of listed species or species groups, field work documenting Island vegetation change in the Land Condition and Trend Analysis program, fox studies and nature trail signage. This Alternative would also continue implementation of the objectives and practices outlined in existing natural resource management documents. Current management includes:

- Landscape Management Plan for Endangered Species Recovery at San Clemente Island (Gripp and Howard 1986);
- Biological/Conference Opinion on Training Activities on San Clemente Island, San Diego County, California (USFWS 1997a) (This BO primarily addresses concerns with impacts of wildfire);
- Biological Opinion for Military Training Impacts to Island Night Lizard Caused by Existing and Proposed Naval Activities on San Clemente Island (USFWS 1997d);
- Biological Opinion on Strategic Environmental Research and Development Program Windfarm (USFWS 1997a) and amendment to this BO (1997b);
- Biological Opinion on Utility Pole Installation, San Clemente Island (USFWS 1997e);
- Biological Opinion on Training Area Ranges 1, 4, and 16 on San Clemente Island (USFWS 2001);
- Draft Fire Management Plan for San Clemente Island U.S. Forest Service;
- Environmental and Natural Resources Program Manual, OPNAVINST 5090.1B (USDoN 1999);
- Naval Base Coronado Instructions which apply to San Clemente Island, or Instructions which apply to SCI alone. These include:
 - NASNI Instruction 5100.2F, Animal Control 2001
 - NALFSCI Instruction 5300.1F, California Fish and Game Regulations and Predator Population Control
 - NALFSCI Instruction 5760.2D, Navy Youth and Navy Supported Youth Organizations
 - DoD Instruction 6055.6, Department of Defense Fire and Emergency Services Program
 - NALFSCI Instruction 7310.3D, Reimbursement Procedures for San Clemente Island
 - NBC Instruction 11013.3G, Project approval procedures for new construction, alterations, space assignments, equipment installations, structure modifications repairs and maintenance of class 1 (land) and Class 2 (buildings) properties
 - NASNI Instruction 11015.2, Protection of Natural and Cultural Resources on Lands Administered by NAS North Island 1981
 - NALFSCI Instruction 12300.1, Policies Governing the Handling and Employment of Weapons by Natural Resource Office
- Cooperative Agreement and MOUs

- 1978 Cooperative Agreement between Naval Base Coronado and California Department of Fish and Game allowing access of CDFG officials onto Navy land for enforcement of CDFG regulations
- Memorandum of Understanding by the National Park Service on Outdoor Recreation
- Memorandum of Understanding between the National Marine Fisheries Service Southwest Region and the Naval Air Station, North Island Regarding Management and Protection of the Marine Mammal Populations of San Clemente Island

A summary of the terms and conditions of the various USFWS BOs is in Appendix C of the INRMP. The No-Action Alternative reacts to BO conditions rather than managing as an ecosystem.

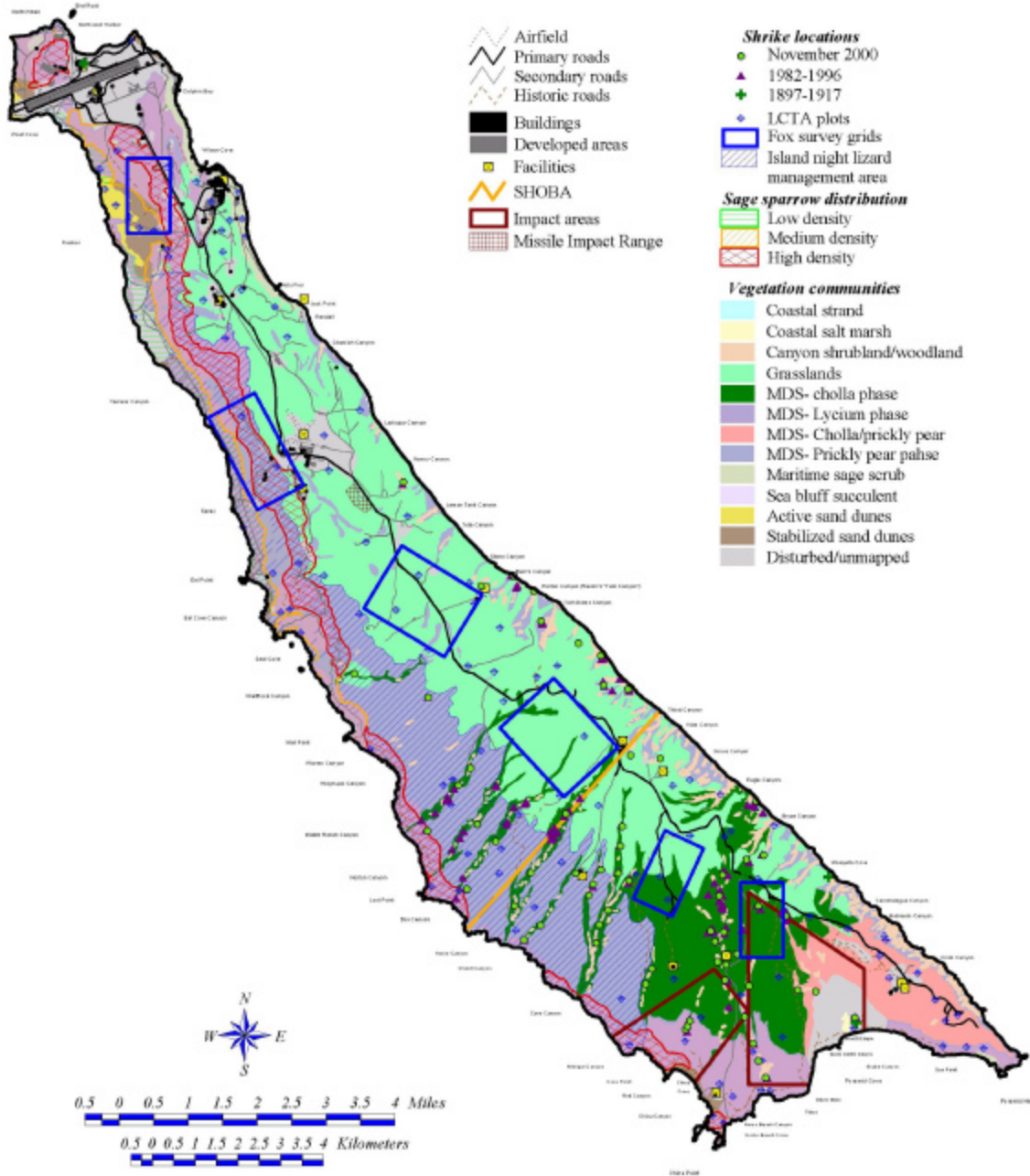
On-going practices used for management of natural resources at SCI would continue and there would be no change to the activities outlined under these documents. Additional state and federal regulations which require compliance by the Navy and that would not be changed under any alternative (e.g., Water Resources Control Board and California Water Quality Control Board Administrative Procedures, U.S. Army Corps of Engineers (USACOE) permitting, Executive Order [EO]s, etc.) are not discussed below. The No-Action Alternative contains guidelines for addressing only some of the topics addressed by the 2002 INRMP, but does not address them in an integrated fashion for the benefit of all natural resources on the Island. Current management documents designed specifically for SCI direct the Navy to institute the activities described below.

Topics not addressed under the No-Action Alternative include:

- Military mission sustainability and compatibility
- Habitat management
- Watershed management
- Ecosystem management
- Wildland fire management
- In-water activities management
- Essential Fish Habitat
- Management of endemic and other natives *not* listed under the ESA
- Bird aircraft strike hazard/wildlife hazard assessment
- Integrated baseline and long-term trend monitoring
- Water resources and water quality
- Integration of cultural resources
- Landscaping
- Public access

The tasks outlined for current management are, on the whole, already completed or outdated. Map 2-2 summarizes the locations for the site-specific management actions outlined in the No-Action Alternative. Because many recommendations are general guidelines or property-wide actions, not all recommendations are represented on this map.

No Action Alternative



Map 2-2. Current locations of natural resource management activities on San Clemente Island under the No-Action Alternative. Only site-specific recommendations are shown. See Appendix C for details.

3.0 Affected Environment

3.1 Physical/Natural Environment

3.1.1 Geology, Topography, and Soils

Landforms

SCI trends northwest and southeast. Its length is just less than 21 miles, with a width of 1.5 miles towards the northern end that broadens to over four miles towards the southern part of the island (Olmstead 1958). The Island's area is 36,206 acres, with an additional 54 acres of small offshore islands and rocks. The highest point of elevation, located slightly east of the center of the island, is 1,964 ft. Most of SCI's topographic features are preserved in the offshore bathymetry such that the island can be regarded as the tip of a 5250-ft high iceberg two-thirds submerged. The area considered for management in the INRMP ends 300 yards from shore as measured from mean low tide level.

Geology and Soil Types

The Island consists mainly of volcanic rocks extruded during the Middle Miocene, and more recently deposited sedimentary rocks overlaying this volcanic bedrock. Andesite flows dominate the bedrock structure, with younger dacites and rhyolites occurring in the central part of the island and on the west and south shores. Sedimentary limestones, siltstones, diatomites, and shales of the Middle to Upper Miocene partly overlay, and in some places are interrelated with, the upper part of the volcanic rocks (Olmstead 1958). The Marine sedimentary rocks contain diatoms, Foraminifera, and Mollusca, indicating that these materials were deposited in a marine environment of shallow to moderate depth during the Miocene age. The marine terraces are some of the most developed found along the southern California coast, and constitute a dominant Island landform. Eight have been well documented and at least 23 have been identified for the island as a whole (Muhs 1980).

In addition, sand dunes are a significant soil structure on the Island. The oldest dunes, found extensively over the north central part of the island, formed from sand deposited above marine terraces during the early Pleistocene. Active and recently stabilized dunes are the youngest sand deposits on the island. Their orientation suggests deposition from the west, yet no sand supply presently is known in this direction. These recent sand deposits, found mainly on the north end of the island, form active or recently stabilized dunes and consist of loose, well-sorted windblown sand (Olmstead 1958).

Sandy beaches are found near the northwestern end of the island, near China Point, and at Pyramid Cove. Beach deposits are found on some of the lower terraces and are frequently capped by alluvial fans up to 33-ft thick, particularly at the mouth of the main southwest draining canyons. Alluvial fan deposits are ill-sorted gravels, sands, and silts that were deposited on the lowest terraces near the mouths of the larger canyons along the southwestern and southern margins of the island. The thickness of the alluvial deposits range from 10 ft to 30 ft.

Soil formation on SCI is rapid, particularly on terraces and alluvial fans (Muhs 1982). The best evidence for this is well-developed profiles and high clay content in soils that are less than 3,000 years old. All soils on the western slopes have a distinctive silt loam surface cap or horizon that has been described by both Muhs (1980) and the Natural Resource Conservation Service (NRCS) (USDA 1982). The silt loam horizon was formed, according to Muhs (1980), from windblown

transport of airborne dust. This horizon is a thin (2—8.5 in), light colored layer with silt loam texture and judging from its unique mineralogy, is unrelated to the profile beneath. It is found on all geomorphic surfaces on the island. Eroding soils in the Mojave are most likely the main source of this dust for SCI and other Channel Islands. Soil samples taken from these areas contain all of the minerals found in the silt fraction of the silty horizon on SCI.

NRCS completed a draft soil survey for SCI in 1982 (USDA 1982). The survey identified eight series, three soil variants (soils distinctive from existing series but not widespread enough to warrant the creation of a new series), and 43 mapping units (Map 3-1, INRMP). Areas that were difficult to access were mapped only to the soil suborder level as Ustalf. This included the Pyramid Cove area, eastern escarpment, and westshore canyons.

Variation in plant communities of the island is expected to correlate primarily with a gradient of moisture availability, or evapotranspirative stress (Westman 1983). The driest soils on the island are along the west shore immediately adjacent to the coast where the boxthorn plant community is best expressed, and the very shallow loams on the southern high plateau grasslands (Map 3-2, INRMP). Clay soils at intermediate elevations have the highest water holding capacity, and support a mix of grassland on the flats and maritime desert scrub vegetation on the rockier slopes. Most westshore soils also support low total annual production of vegetation (0—1,499 lbs/acre/year), which depends upon a mix of water availability and soil fertility. The grasslands and scrub areas of the plateau are moderately productive (1,500 to 2,499 lbs/acre/year), with the exception of some of the heavy clay soils such as near the VC-3 old airfield that are the most productive soils on the island (2,500 to 3,500 lbs/acre/year).

Salinity gradients can also place controls on vegetation. Along the west shore, salt aerosols from wave action result in soil salinity levels from 3.9 to over eight mmhos/cm, high enough to affect species composition on the terraces close to shore. Plateau and upper terrace soils are essentially non-saline.

Although not well investigated, nutrient cycling on SCI is tempered compared to the mainland because of the absence of burrowing animals and low numbers of soil arthropods to turn the soil. Soil arthropods are fundamental to the breakdown of organic materials (leaves, vegetation, carcasses) and the release of nutrients for new plant growth in mainland systems. This absence no doubt has local effects on the distribution and abundance of plants, and, by extension, carrying capacities for animals that rely directly or indirectly on plant materials for energy.

Erosion

Erosion is caused by the action of water and wind wearing away the land's surface. The loss and destabilization of soil can have devastating effects on property, ecological processes, and sensitive species. Federal landowners are required to control and prevent erosion by conducting surveys and implementing conservation measures (Soil Conservation Act PL 74-46; 16 USC S.5901). Erosion due to wind occurs on SCI especially on the siltier westshore soils and in sandy locations. Soil Conservation Service (now NRCS) was under contract to the Navy in the 1980s to develop an erosion control program, but it is not clear if this was ever finalized and/or parts implemented.

Current road maintenance practices can affect erosion rates around the Island and are regulated by laws and permitting requirements. Road maintenance responsibilities come under the PWC. No standardized set of specifications is apparently in use for road maintenance. Primary roads are graded as needed about once per year, while the majority of secondary roads are not maintained. Road grading and construction material come from an existing approved quarry pit. Off road use is not permitted except in designated off-road areas or on established trails approved by the Natural Resource Office (NRO) (NASNI Instruction).

Several laws are pertinent to activities that may be impacted by erosion: the Clean Water Act (CWA), ESA, NEPA, and Soil Conservation Act. Routine maintenance activities that may affect drainages fall under the USACOE permitting authority under Section 404 of the CWA. An evaluation of off road vehicle trails used for the shrike program is currently underway in cooperation with the San Diego State Foundation (D. Pivorunas, pers. comm.).

3.1.2 Hydrology and Water Quality

Precipitation

Precipitation data from weather stations at SCI show that the island experiences dramatic fluctuations in annual rainfall even over relatively short time spans. Most rainfall that does occur falls from January—April and October—December. An exception was an unusually dry February and March 1997 in southern California leading up to the 1997—1998 El Niño winter. No rainfall was recorded at most stations on the island for those two months. Little rain falls between May and October, and fog drip at that time is likely a vital source of moisture to the ecosystem during this otherwise typically dry season.

Island location and topographic position have an important control on precipitation. The northern, higher part of the island generally receives more rainfall than the southern end of SCI. An exception to the north-south pattern of wetter to dryer on SCI occurred in December 1997 when the southern-most station recorded almost twice the rainfall amount as the next highest reading of any station on the island. This may have been due to a higher frequency of storms emanating from Baja to the south during the 1997—1998 El Niño year, instead of the more common northwesterly direction of storms reaching SCI.

The effects on island-wide precipitation from higher storm frequencies during an El Niño event are evident in the rainfall totals for the 1997—1998 water year (July 1—June 30). Precipitation increased over two-fold from the previous water year at some stations and over three-fold at a third station (16 in vs. 5 in) (Yoho *et al.* 2000). Following that event, rainfall levels appeared to return to the more typical dryer conditions.

Water Sources

SCI and the waters surrounding it are in the Southern California Bight, a recessed curve in the southwestern California coastline from Point Conception in Santa Barbara County to just south of the Mexican border. This ecological region is among the most productive and diverse in the world, home to over 500 species of fish and 1,500 species of marine invertebrates. Its diversity is due to a unique water circulation pattern in which warm equatorial waters flowing up from the south eddy nearshore along the coastline, while subarctic waters flowing south from Point Conception to create colder offshore water conditions. Hence, for marine animals the Southern California Bight represents the northern end of the range of many tropical species and the southern terminus for many temperate species.

Freshwater sources are much more limited. During normal, or above average, rainfall years, runoff collects in drainages or vernal pools on SCI. Currently, delineations of 1500 jurisdictional wetlands and waters of the U.S. are being conducted. As of August 2001, wetland delineations had been conducted at over 1400 pools. The majority of the pools surveyed in April 2001 were considered “dry” pools because they did not hold water beyond the end of April.

Water used for human consumption is barged to Wilson Cove weekly and pumped to a storage tank, where it is then made available for use at Wilson Cove and elsewhere (Gripp and Howard 1986). An unknown amount is lost through leakage. Water used outside Wilson Cove leaches into

the ground through septic tanks and eventually makes its way to the ocean. Water used in Wilson Cove is treated and eventually discharged into the ocean.

Water Quality

The waters surrounding SCI were designated an Area of Special Biological Significance (ASBS) to a 300 ft isobath or one nautical mile from shore (whichever is greater) by the State Water Resources Control Board in 1974. This designation is intended to protect the biological communities, because of their value or fragility, from an undesirable alteration in natural water quality. Natural water quality conditions must be preserved and maintained to the extent practicable (Water Resources Control Board and California RWQCB Administrative Procedures, Sept. 24, 1970, Sec. XI and Miscellaneous Rev. 7-9/1/72). CDFG is responsible for management of marine resources in these areas. No site-specific regulations have been established for this ASBS, but the following general regulations apply:

- Discharge of elevated temperature wastes in a manner that would alter water quality conditions from those occurring naturally is prohibited.
- Discharge of discrete, point-source sewage or industrial process wastes in a manner that would alter water quality conditions from those occurring naturally is prohibited.
- Discharge of waste from nonpoint sources, including but not limited to storm water runoff, silt, and urban runoff, will be controlled to the extent practical. In control programs for waste from nonpoint sources, Regional Boards will give high priority to areas tributary to ASBSs.
- The Water Quality Control Plan for Ocean Waters of California (Ocean Plan), and hence the designation of areas of special biological significance, is not applicable to vessel wastes, the control of dredging, or the disposal of dredging spoil.

Water quality protection is under the responsibility of the SWRCB and the RWQCB Los Angeles. Authority comes from the state's Porter-Cologne Water Quality Control Act and the federal CWA. With the SWRCB setting statewide water quality objectives, the RWQCB carries out specific aspects of surface and coastal water regulations. A Comprehensive Water Quality Control Plan (CWQCP) for the Los Angeles Region, adopted by the nine-member RWQCB, identifies existing and potential beneficial uses and establishes water quality objectives.

Implementation of the CWQCP occurs through the issuance of permits for waste discharges under the NPDES by the RWQCB. Regulations initially focused on controlling "point source" (end-of-pipe) discharges, such as from sewage treatment, industrial, and power plant outfalls. The Navy's General State Water Quality Certification was approved on November 2, 1998 (98C-127). The Navy's sewage treatment plant at San Clemente Island is under NPDES permit CA0110175 CI 6432 (correspondence dated July 31, 2000). In expectation of increased training a new Bachelors Enlisted Quarters (BEQ) has recently been constructed and a permit to increase sewage discharge from 25,000 gallons/day to 40,000 gallons/day is being sought.

EPA uses a tiered approach in implementing the stormwater permit program. Phase I requires NPDES permits for municipal storm sewers serving large and medium sized populations (greater than 250,000 or 100,000 people) and for storm water discharges associated with industrial activity that is already permitted. Phase II will address smaller municipalities, small construction sites, and other activities and probably will not go into effect until 2002. The Coastal Zone Reauthorization Amendment's (CZARA) requirements for management measures apply to those activities not covered by Phase I, such as construction activities on sites less than 5 acres and discharges from wholesale, retail, service, and commercial activities, including gas stations (State Water Resources Control Board 1994).

Stormwater discharge to navigable waters is prohibited unless an NPDES permit is obtained. The EPA has delegated responsibility for the NPDES program to the SWRCB. In turn, the RWQCB Los Angeles implements the program at the regional level. The CZARA requires EPA and the state to develop and implement management measures to control nonpoint pollution in coastal waters, which California has done through a procedural guidance manual produced by the California Coastal Commission (CCC) (CCC 1996). The relation of the CWA and CZARA programs is described in more detail in other sources (State Water Resources Control Board 1994; California Coastal Commission 1996).

The Navy has coverage under two storm water permits: the statewide General Industrial NPDES Storm Water Permit and the statewide General Construction NPDES Storm Water Permit. The Industrial permit requires wet and dry season monitoring and an annual report to regulators with storm water sampling results. As part of it, a Storm Water Pollution Prevention Plan and a Geographic Information System (GIS) record-keeping system is maintained. Enforcement of NPDES permits by the RWQCB is done when monitoring or another source indicates a violation of permit conditions. Cease and Desist Orders and Cleanup and Abatement Orders can be issued.

While pollution entering storm drains is usually from diffuse or nonpoint sources, the outfalls of storm drains represent a point source of discharge into SCI waters. The federal CWA, as amended in 1987 (Sec. 402[p]), and the CZARA of 1990 (Sec. 6217) are the driving regulatory forces in addressing nonpoint source pollution from storm water runoff. Stormwater discharge to navigable waters is prohibited unless an NPDES permit is obtained. The EPA has delegated responsibility for the NPDES program to the SWRCB. In turn, the RWQCB Los Angeles implements the program at the regional level. The CZARA requires EPA and the state to develop and implement management measures to control nonpoint pollution in coastal waters, which California has done through a procedural guidance manual produced by the CCC (CCC 1996). The relation of the CWA and CZARA programs is described in more detail in other sources (SWRCB 1994; CCC 1996).

3.1.3 Air Quality

Air quality is defined by ambient air concentrations of specific pollutants that the US Environmental Protection Agency has determined to be of concern to the health and welfare of the general public. The State of California Air Resources Board has also set its own, more stringent air quality standards. Some of the specific pollutants monitored include ozone (O_3), carbon monoxide (CO), respirable particulate matter (PM_{10}), nitrogen dioxide (NO_2), sulfates (SO_x), and lead. Areas in California that exceed a state standard for a particular pollutant are considered to be in “non-attainment” status for that pollutant. An area is designated in “attainment” if the state standard for a particular pollutant was not violated at any site in the area during the past three years.

SCI is in the South Coast Air Basin regulated by the South Coast Air Quality Management District (SCAQMD), with the nearest monitoring station in North Long Beach. According to the more stringent state standards, the South Coast Air Basin is currently in serious nonattainment for ozone and nonattainment for CO and PM_{10} . The federal and state air quality standards for specific pollutants are shown in Table 3-1.

Table 3-1. State and Federal Air Quality standards for air pollutants that require monitoring (California Air Resources Board, 1999).

Pollutant	Averaging Time	Primary ^a	Secondary ^b
Carbon monoxide (CO)	1-hour	40 mg/m ³ (35 ppm)	40 mg/m ³ (35 ppm)
	8-hour	10 mg/m ³ (9 ppm)	10 mg/m ³ (9 ppm)
Nitrogen dioxide (NO _x)	Annual	100 µg/m ³ (0.05 ppm)	100 µg/m ³ (0.05 ppm)
Ozone (O ₃)	1-hour	235 µg/m ³ (0.12 ppm)	235 µg/m ³ (0.12 ppm)
	8-hour	(0.08 ppm) ^c	
Particulate Matter (PM ₁₀)	24-hour	150 µg/m ³	150 µg/m ³
	Annual	50 µg/m ³	50 µg/m ³
Sulfur Dioxide (SO _x)	3-hour	--	1,300 µg/m ³ (0.5 ppm)
	24-hour	365 µg/m ³ (0.14 ppm)	--
	Annual	80 µg/m ³ (0.03 ppm)	--
Lead	Calendar quart	1.5 µg/m ³	1.5 µg/m ³

^a National Primary Standards: the levels of air quality necessary, with an adequate margin of safety to protect the public health.
^b National Secondary Standards: the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Given its location and the differences in climate, human density, and use between the Island and the rest of the SCAQMD, the “attainment” and “non-attainment” designations above do not accurately reflect air quality conditions on the Island, which is generally much better than that of the mainland. From 1994—1995, the San Diego Air Pollution Control District operated an ambient air monitoring station on SCI (Table 32) and during this period there was only one exceedance of measured pollutants. High ozone measurements were detected in April of 1995 associated with an extremely unusual wind pattern.

Table 3-2. Ambient air quality measurements at SCI, April 1994—September 1995.

Month	Ozone Federal standard=.12 ppm ¹ State standard=.09 ppm ¹		Nitrogen Dioxide Federal standard=.05 ppm ² State standard=.25 ppm ¹	
	Average Reading (ppm)*	Maximum Reading (ppm)*	Average Reading (ppm)*	Maximum Reading (ppm)*
September 1995	.04	.08	.002	.011
August 1995	.04	.06	.002	.006
July 1995	.04	.06	.002	.010
June 1995	.04	.06	.002	.013
May 1995	.04	.06	.002	.010
April 1995	.05	.10	.003	.019
March 1995	.04	.08	.002	.008
February 1995	.04	.07	.004	.041
January 1995	.04	.06	.004	.051
December 1994	.04	.07	.007	.062
November 1994	.04	.09	.006	.052
October 1994	.05	.09	.003	.019
September 1994	.04	.07	.002	.008
August 1994	.03	.07	.002	.020
July 1994	.04	.06	.000	.010
June 1994	.04	.06	.000	.020
May 1994	.04	.07	.000	.010
April 1994	.04	.08	.000	.020

Generally speaking, the air quality on the Island is considered better than on the mainland. The primary sources of NO_x emissions on SCI are the Main and Range Electronic Warfare System (REWS) power plants that produce 95% of the NO_x emissions on the Island. Additional sources include boilers, water heaters, internal combustion engines, and gas turbine engines.

Air quality at SCI can be affected by a phenomenon known as “Santa Ana” winds which come from the northeast from the deserts of inland California and the Great Basin. These winds usually occur during the fall, are warm and dry, and are characterized by very high velocity near the mainland shore. They can affect SCI by carrying out to sea air pollution usually found onshore. Satellite images show that Santa Ana winds can carry pollutants several hundred miles offshore and negatively affect air quality of the Island. Another concern is the “Catalina eddy” that can bring pollutants up the coast from the Los Angeles basin and a post-Santa Ana event where the air pollutants that were pushed offshore come slowly back to the coast. Finally, another pattern that could bring pollutants to the Island is an eastern Pacific high-pressure system that causes light winds and poorly dispersed air.

3.1.4 Biological Resources

3.1.4.1 Vegetation Communities

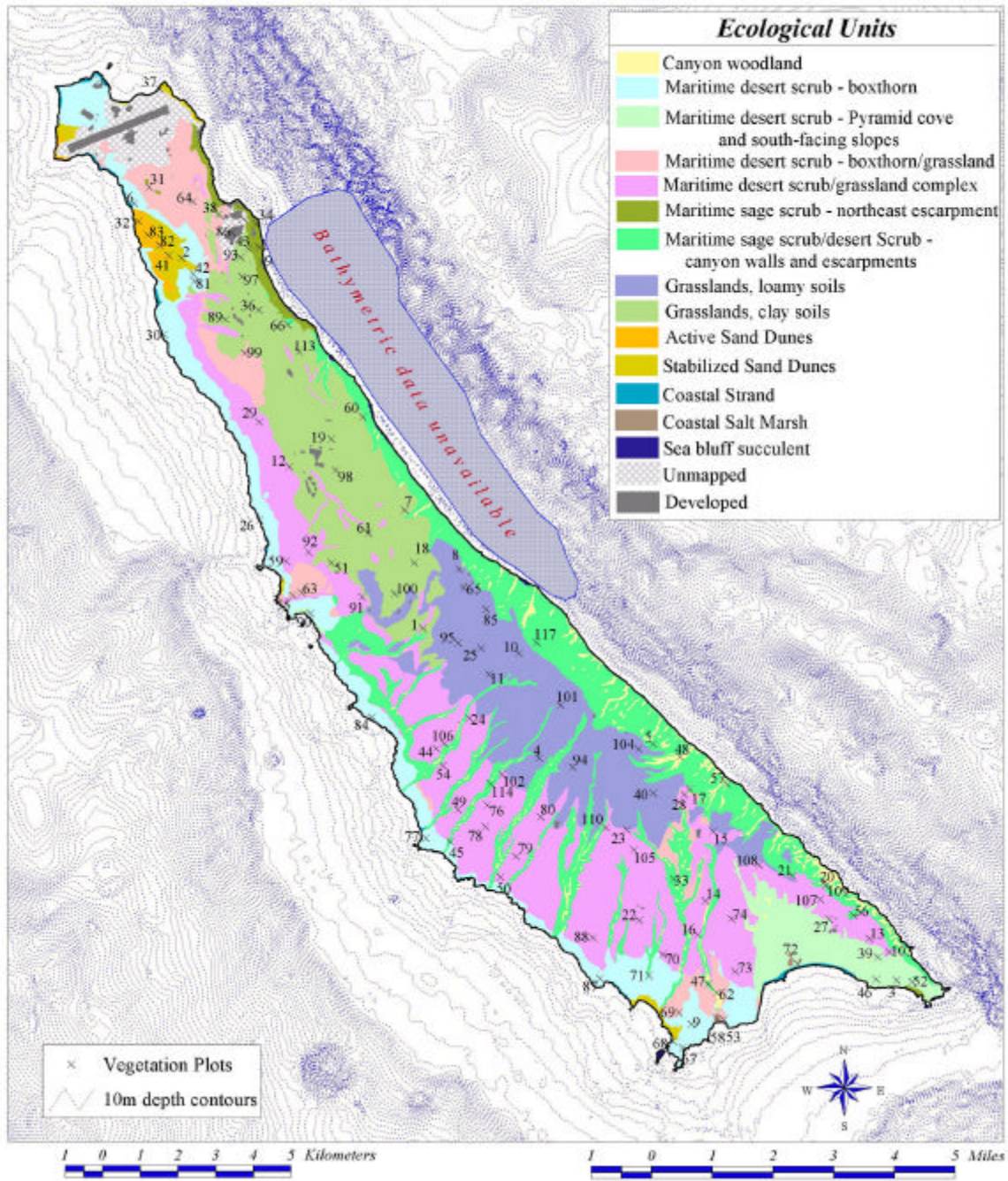
The flora of SCI is similar to that of the mainland with some important exceptions. The island is rich in endemics, most of which are relictual but some a result of divergent island evolution (Axelrod 1967). Raven (1963) noted that certain components of the flora are related to areas in northern California rather than the nearest mainland sites, while other components are more closely related to drier, more southern locales such as Baja California. The partial explanation is a much more mesic climate that predominated in California during the last glacial epoch. When a warming trend followed, a more arid flora became dominant on the mainland while the Channel Islands acted as a refuge for the northern elements because of more moist and moderate conditions. Westman (1983), on the other hand, concluded that SCI contains more floristic affinities with coastal succulent scrub of Baja California than any of the mainland coastal scrub communities in Alta California, as indicated by the prominence of fleshy stem succulents (families Cactaceae, Crassulaceae, and Euphorbiaceae).

SCI vegetation is currently mapped in thirteen categories (Map 2-2) using the Thorne classification (1976) as concluded by Sward and Cohen (1980). Table 3-3 shows the mapping units, acreages, and percentages of the island area covered by them. For the INRMP, landform, soils, and vegetation maps were brought together to define ecological units (Map 3-1). See the INRMP for descriptions.

Table 3-3. Vegetation mapping units, acreages and percentages of island area for SCI.

Vegetation Mapping Unit	Acre	Percent of Island Area
Grassland	11,831	33
Maritime Desert Scrub-Lycium Phase	5,849	16
Maritime Desert Scrub-Prickly Pear Phase	7,336	20
Maritime Desert Scrub-Cholla Phase	4,941	14
Maritime Desert Scrub-Prickly Pear/Cholla	1,514	4
Maritime Sage Scrub	386	1
Canyon Shrub/Woodland	696	2
Coastal Salt Marsh	19	0.1
Stabilized Sand Dunes	425	1
Active Sand Dunes	224	1
Sea Bluff Succulent	45	0.1
Disturbed	2,691	7
Coastal Strand	116	0.3
Rocks and Islands	54	0.1

Ecological Units for San Clemente Island



Map 3-1. Ecological Units of San Clemente Island.

3.1.4.2 Sensitive Plant and Animal Populations

Plants

SCI's isolation combined with recent degradation from introduced herbivores has resulted in the presence of numerous, declining endemic plant species. However, recent transect data suggest that much of the native vegetation has begun to recover from past declines (Kellogg and Kellogg, unpublished data). The most recent rare plant survey on SCI was completed in 1997 (Junak and Wilken 1998) during which, more than 1,700 individual populations of sensitive plants were located.

In total, SCI is home to approximately 262 native terrestrial plants, 107 exotic terrestrial plants, 10 cryptogams, 179 lichens, and 89 algae. Of these, 42 terrestrial plant species are endemic to SCI or the Channel Islands (Table 3-4). Three plant species formerly located on the island are now presumed extinct or extirpated on SCI: Channel Island tree poppy (*Dendromecon harfordi rhamnoides*), California dissanthelium (*Dissanthelium californica*), and the Santa Catalina Island desert thorn (*Lycium brevipes hassei*). Six species are listed as endangered by USFWS, all but one of which are also considered endangered by CDFG (Table 3-4). Another 22 species were formerly on the USFWS Category 2 list as species of concern, but this list is no longer maintained.

In addition, a number of woody perennials that do not neatly fit into community categories occur on SCI. Their occurrence is isolated and relictual, or in such diverse habitats that their role in a particular community is unclear. Some of these merit special monitoring or restoration planning because of their low population numbers and lack of understanding about their community role. Some may be remnants of a hardier chaparral component to Island flora that existed before the introduction of feral herbivores, similar to such plant communities on neighboring islands. Alternatively, they may simply be isolated specimens seeded by visiting birds. Examples are laurel sumac (*Malosma laurina*), island redberry (*Rhamnus pirifolia*), island ceanothus (*Ceanothus megacarpus* ssp. *insularis*), bigpod ceanothus (*Ceanothus megacarpus* ssp. *megacarpus*), chamise (*Adenostoma fasciculatum* var. *fasciculatum*), and canyon live oak (*Quercus chrysolepis*). All of these are fire adapted and require animals for dispersal of seed.

Table 3-4. Endemic plant species and plant species of concern on San Clemente Island. Plants are listed in taxonomic order according to the Jepson Manual.

Common Name	Scientific Name	USFWS, CDFG Status	CNPS Status	Global, State CNDDB Rank
SCI Endemics				
San Clemente Island larkspur	<i>Delphinium variegatum</i> ssp. <i>kinkiense</i>	FE, SE	1B	G4T1, S1.1
Thorne's royal larkspur	<i>Delphinium variegatum</i> ssp. <i>thornei</i>	FC2	1B	G4T1, S1.1
San Clemente Island buckwheat	<i>Eriogonum giganteum</i> var. <i>formosum</i>	FC2	1B	G2T2, S2.2
San Clemente Island bush mallow	<i>Malacothamnus clementinus</i>	FE, SE	1B	G1, S1.1
San Clemente Island woodland star	<i>Lithophragma maximum</i>	FE, SE	1B	G1, S1.1
San Clemente Island broom	<i>Lotus dendroides</i> var. <i>traskiae</i>	FE, SE	1B	G4T2, S2.1
San Clemente Island silver hosackia	<i>Lotus argophyllus</i> var. <i>adsurgens</i>	FC2, SE	1B	G5T1, S1.1
San Clemente Island milkvetch	<i>Astragalus nevinii</i>	FC2	1B	G2, S2.2
San Clemente Island evening primrose	<i>Camissonia guadalupensis</i> ssp. <i>clementina</i>	FC2	1B	G2T1, S1.2
San Clemente Island Indian paintbrush	<i>Castilleja grisea</i>	FE, SE	1B	G2, S2.2

Common Name	Scientific Name	USFWS, CDFG Status	CNPS Status	Global, State CNDDDB Rank
San Clemente Island bedstraw	<i>Galium catalinense</i> ssp. <i>acrispum</i>	FC2, SE	1B	G4T2, S2.2
Blair's Stephanomeria	<i>Stephanomeria blairii</i>	FC2	1B	G2, S2.2
San Clemente Island brodiaea	<i>Brodiaea kinkiense</i>	FC2	1B	G2, S2.2
San Clemente Island triteleia	<i>Triteleia clementina</i>	FC2	1B	G1, S1.2
Channel Island Endemics				
Channel Island tree poppy	<i>Dendromecon harfordii</i> var. <i>rhamnoides</i>	FC2, Presumed extirpated from SCI	1B	G4T1, S1.1
island poppy	<i>Eschscholzia ramosa</i>		4	G3, S3.3
island oak	<i>Quercus tomentella</i>		4	G3, S3.2
Santa Catalina Island buckwheat	<i>Eriogonum grande</i> var. <i>grande</i>		4	G2T2, S2.2
southern island tree mallow (malva rose)	<i>Lavatera assurgentiflora</i> ssp. <i>glabra</i>	FC2	1B	G2T2, S2.1
Santa Cruz Island rock cress	<i>Sibara filifolia</i>	FE	1B	G1, S1.1
island green dudleya	<i>Dudleya virens</i> ssp. <i>virens</i>	FC2	1B	G2T2, S2.2
island jepsonia	<i>Jepsonia malvifolia</i>	FC2	4	G4, S3.3
Santa Cruz ironwood	<i>Lyonothamnus floribundus</i> ssp. <i>asplenifolius</i>	FC2	1B	G2T2, S2.2
Christmas berry or toyon	<i>Heteromeles arbutifolia</i> var. <i>macrocarpa</i>	No official status but of local concern.		
San Miguel milkvetch	<i>Astragalus miguelensis</i>		4	G3, S3.3?
Guadalupe Island lupine	<i>Lupinus guadalupensis</i>	FC2	1B	G2, S2.2
Palmer's clover	<i>Trifolium gracilentum</i> var. <i>palmeri</i>		4	G5T3, S3.2
island big-pod ceanothus	<i>Ceanothus megacarpus</i> var. <i>insularis</i>		4	G5T3, S3.3
island redberry	<i>Rhamnus pirifolia</i>		4	G3, S3.2
San Nicolas Island lomatium	<i>Lomatium insulare</i>	FC2	1B	G2, S2.1
island morning-glory	<i>Calystegia macrostegia</i> ssp. <i>amplissima</i>	FC2	4	G4G5T3, S3.3
Nevin's gilia	<i>Gilia nevinii</i>		4	G3, S3.2
pygmy linanthus	<i>Linanthus pygmaeus</i> ssp. <i>pygmaeus</i>		1B	G4T2, S1.2
San Clemente Island phacelia	<i>Phacelia floribunda</i>	FC2	1B	G2, S1.1
seaside fiddleneck	<i>Amsinckia spectabilis</i> var. <i>nicolai</i>	No official status but of local concern. This subspecies is no longer recognized.		
Trask's cryptantha	<i>Cryptantha traskiae</i>	FC2	1B	G2, S2.2
island snapdragon	<i>Galvezia speciosa</i>	FC2	1B	G2, S2.2
Santa Catalina figwort	<i>Scrophularia villosa</i>	FC2	1B	G2, S2.2
island sagebrush	<i>Artemisia nesiotica</i>		4	G3, S3.3
San Clemente Island hazardia	<i>Hazardia cana</i>	FC2	1B	G2, S2.2
leafy malacothrix	<i>Malacothrix foliosa</i> ssp. <i>foliosa</i>		4	G4T3, S3.2
island tarplant	<i>Hemizonia clementina</i>		4	G3, S3.3
Nevin's eriophyllum	<i>Eriophyllum nevinii</i>	FC2	1B	G2, S2.3
California dissanthelium	<i>Dissanthelium californicum</i>	Presumed Extinct	1A	GH, SH
Other Natives				
aphanisma	<i>Aphanisma blitoides</i>		1B	G2, S1.1
Robinson's pepper-grass	<i>Lepidium virginicum</i> var. <i>robinsonii</i>		1B	G5T2?, S?
island apple-blossom	<i>Crossosoma californicum</i>		1B	G3, S3.2
Santa Catalina Island desert thorn	<i>Lycium brevipes</i> var. <i>hassei</i>	Presumed Extirpated from SCI	1B	G4T1, S1.1
small-flowered microseris	<i>Microseris douglasii</i> ssp. <i>platycarpha</i>		4	G4T3, S3.2

Animals

In total, approximately 233 birds, 2 reptiles, 12 mammals (6 native), 24 marine mammals, 31 fish, and at least 75 species of invertebrates have been observed on SCI. The Island contains numerous endemic and sensitive animal species. Because of the Island's isolation and relatively small area, populations of many animals are smaller than they would be on the mainland and consequently are extremely vulnerable to disturbance. Seven federally endangered and four federally threatened animal species are located on the Island (Table 3-5). An additional three species are recognized by CDFG as endangered or threatened including the island fox, which is endemic to the Channel Islands. Counting unique subspecies, there are at least 30 species endemic to SCI and an additional 22 species endemic to the Channel Islands found on the Island. Management programs for the San Clemente loggerhead shrike, San Clemente sage sparrow, island night lizard, and island fox are in place and numerous other species are regularly monitored (Map 2-1). Some groups such as invertebrates have been poorly studied on SCI and may reveal additional unique species when they are surveyed more thoroughly.

Table 3-5. Animals of San Clemente Island listed with sensitive status by USFWS, CDFG, or Partners-in-Flight (PIF).

Scientific Name	Common Name	USFWS, CDFG, PIF Status	Global, State CNDDDB Rank
MARINE INVERTEBRATES			
<i>Haliotis sorensi</i>	white abalone	FE	
TERRESTRIAL INVERTEBRATES			
<i>Micrarionta gabbi</i>	Gabb's snail	FSC	
<i>Coelus pacificus</i>	Channel Islands dune beetle	FSC	G?, S?
<i>Coenonycha clementina</i>	SCI Coenonycha beetle	FSC	G1?, S1?
AMPHIBIANS AND REPTILES			
<i>Xantusia riversiana</i>	Island night lizard	FT	G1, S1
BIRDS			
<i>Gavia immer</i>	common loon	CSC	G5, S1
<i>Oceanodroma homochroa</i>	ashy storm-petrel	FSC, CSC, PIF	G2, S2
<i>Oceanodroma melania</i>	black storm-petrel	CSC, PIF	G3, S1
<i>Pelecanus occidentalis</i>	brown pelican	FE, SE, FP	G4T3, S1S2
<i>Phalacrocorax auritus</i>	double-crested cormorant	CSC	G5, S3
<i>Circus cyaneus</i>	northern harrier	CSC	G5, S3
<i>Accipiter striatus</i>	sharp-shinned hawk	CSC	G4, S3
<i>Accipiter cooperii</i>	Cooper's hawk	CSC	G4, S3
<i>Falco columbarius</i>	merlin	CSC	G5, S3
<i>Falco peregrinus anatum</i>	peregrine falcon	SE	G3, S2T2
<i>Charadrius alexandrinus nivosus</i>	western snowy plover	FT, CSC, PIF	G4T2, S2
<i>Charadrius montanus</i>	mountain plover	FPT, CSC	G3, S2?
<i>Numenius americanus</i>	long-billed curlew	CSC, PIF	G5, S2
<i>Haematopus bachmani</i>	black oystercatcher	PIF	G5, S2
<i>Larus californicus</i>	California gull	CSC	G5, S2
<i>Sterna elegans</i>	elegant tern	FSC, CSC	G5, S1
<i>Synthliboramphus hypoleucus</i>	Xantus' murrelet	FSC, CSC, PIF	G4?, S3
<i>Cerorhinca monocerata</i>	rhinoceros auklet	CSC	G5, S3
<i>Athene cunicularia hypugea</i>	burrowing owl	FSC, CSC	G4, S2
<i>Asio flammeus</i>	short-eared owl	CSC	G5, S3
<i>Asio otus</i>	long-eared owl	CSC	G5, S3
<i>Selasphorus rufus</i>	rufous hummingbird	PIF	G5, S1S2
<i>Chaetura vauxi</i>	Vaux's swift	CSC	G5, S3
<i>Empidonax trailii</i>	willow flycatcher	SE	G5, S1S2
<i>Lanius ludovicianus mearnsi</i>	San Clemente loggerhead shrike	FE	G4T1, S1

Scientific Name	Common Name	USFWS, CDFG, PIF Status	Global, State CNDDDB Rank
<i>Riparia riparia</i>	bank swallow	ST	G5, S2S3
<i>Toxostoma bendirei</i>	Bendire's thrasher	CSC, PIF	G5, S3
<i>Dendroica occidentalis</i>	hermit warbler	PIF	G4G5, S3?
<i>Icteria virens</i>	yellow-breasted chat	CSC	G5, S3
<i>Piranga rubra</i>	summer tanager	CSC	G5, S2
<i>Spizella breweri</i>	Brewer's sparrow	PIF	G5, S3
<i>Spizella atrogularis</i>	black-chinned sparrow	PIF	G5, S3
<i>Amphispiza belli clementae</i>	San Clemente sage sparrow	FT, PIF	G5T1, S1
<i>Carduelis lawrencei</i>	Lawrence's goldfinch	PIF	G3, S3
MARINE MAMMALS			
<i>Enhydra lutris</i>	sea otter	FT	
<i>Balaenoptera borealis</i>	sea whale	FE	
<i>Balaenoptera musculus</i>	blue whale	FE	
<i>Balaenoptera physalus</i>	finback whale	FE	
<i>Megaptera novaengiliae</i>	humpback whale	FE	
TERRESTRIAL MAMMALS			
<i>Urocyon littoralis clementae</i>	San Clemente island fox	FSC, ST	G1, S1
<p>USFWS and CDFG Codes: FE = Federally Endangered, FT = Federally Threatened, FSC = Federal Species of Concern, SE = State Endangered, ST = State Endangered, CSC = CDFG California Species of Concern;</p> <p>PIF = Partners in Flight Watch List</p> <p>Global and State CNDDDB Rank: GH = All sites are historical, has not been seen in 20 years, but suitable habitat still exists, G1 = Less than 6 viable element occurrences (EOs) or less than 1,000 individuals or less than 2,000 acres, G2=6–20EOs or 1,000–3,000 individuals or 2,000–10,000 acres, G3 = 21–100 EOs or 3,000–10,000 individuals or 10,000–50,000 acres, G4 = Apparently secure but some factor exists to cause some concern, G5 = Population or stand demonstrably secure; T-rank = reflects the global status of the subspecies using same definitions as the G-rank; S-rank = the status within California using same definitions as G-rank.</p>			

Marine Biology

Kelp Habitats

This section describes the fish, invertebrates, and sea turtles that could be found within Horse Beach Cove and adjacent waters. Many marine fish and invertebrates are a valuable economic resource, and are pursued by commercial and recreational fisheries.

Shallow Nearshore Fish

The nearshore zone includes a great diversity of habitats: soft and rocky bottoms, kelp forests, and rocky reefs. The nearshore sea bed around SCI is mainly rocky. Kelp beds are found on much of the nearshore rocky substrates around the island. Soft bottoms are very limited in extent around SCI. The only relatively shallow areas with extensive areas of soft substrate are on the Tanner and Cortes Banks.

Shallow nearshore habitats occupy only a small area around SCI. The diversity and abundance of fish that occupy the nearshore zone is directly related to the diversity of available habitats. Sixty species of fish have been collected from rocky and sand substrates with and without kelp cover in the offshore islands of the Southern California Bight by Engle (1993). However, this number under-represents the actual number observed by about 50 percent. Sand dwellers, rare and cryptic species, and some species that were hard to identify in the field are not included in his estimate. In all, about 125 species of fish inhabit kelp beds and rocky nearshore habitats (Ebeling *et al.* 1979).

Kelp Habitats

The most conspicuous feature of the nearshore zone off southern SCI is the presence of extensive kelp beds. Giant kelp prefer depths of less than 131 feet (40 m) (Bushing 1995). In general, there is a large positive relationship between density of kelp and the density of fish on cobble and rock

bottoms (DeMartini and Roberts 1990). A minimum density of giant kelp is necessary for populations of some species to occur on a rock reef (Holbrook *et al.* 1990). These species are strongly associated with kelp at some or all of their life stages. Removal of kelp can cause a decline of over 50 percent in fish biomass. Most of the decline is caused by the disappearance of midwater species that associate with the kelp canopy (Bodkin 1988).

In general, the abundance of fish on rock reefs is related to abundance of kelp as well as vertical relief of the bottom (Cross and Allen 1993). In the nearshore waters of nearby San Nicolas Island, Cowen and Bodkin (1993) found that within the kelp forests, areas with the greatest vertical relief supported the greatest numbers and diversity of fish, while those with sandy bottoms supported the fewest. They did not find that coverage by kelp affected the abundance of fish. However, most of their rocky sampling sites had enough kelp cover to accommodate fish that associate with kelp. In the presence of kelp, the abundance of some species assemblages does not depend on the presence of high relief rock (Larson and DeMartini 1984).

The abundance of fishes in kelp forests has been estimated for various areas (Table 3-6). However, most surveys only estimate the abundance of conspicuous fishes. The abundance of cryptic forms can be four times higher than that of conspicuous species; however, biomass of cryptic species is equivalent to only about 10 percent of that of conspicuous species (Allen *et al.* 1992).

Table 3-6. Fish per Acre within kelp beds in the Southern California Bight.

Location	Kind of Fish	Numbers /Pounds	No. Samples	Reference
Numbers				
San Nicolas Island	Conspicuous Fish	320	295	Cowen and Bodkin 1993
Santa Catalina	Conspicuous Fish	2,771	360	Allen <i>et al.</i> 1992
	Cryptic Fish	10,456	360	Allen <i>et al.</i> 1992
	All Fish	13,227	360	Allen <i>et al.</i> 1992
San Onofre	All Fish	2,506	407	Larson and DeMartini 1984
Pounds				
Santa Catalina	All Fish	46	360	Allen <i>et al.</i> 1992
San Onofre	All Fish	298	407	Larson and DeMartini 1984

Coastal Resources Management (1998) counted conspicuous fish at depths of 3 and 12 m off Wilson Cove, SCI in August 1997. They collected 29 fish in their sampling areas, which totaled 478 square yards (400 m²). Mean abundance of fish was 231 per acre at the 3 m depth and 608 per acre at a depth of 12 m. Giant kelp were virtually absent at the 3 m depth and were abundant at the 12 m depth.

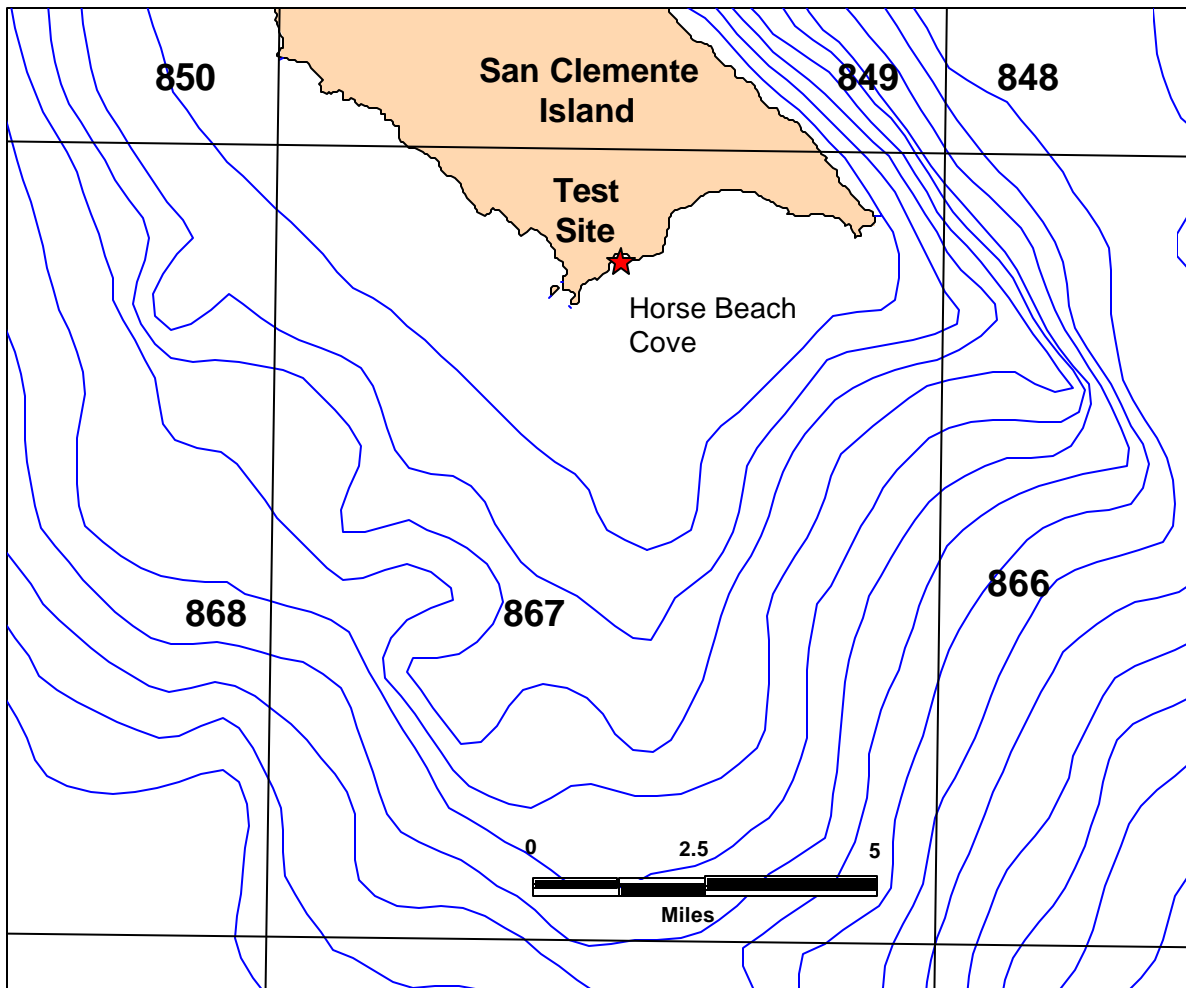
Rocky Habitats

Most of the nearshore zone around San Clement Island is rocky. Density of fish is much lower on rocky bottoms that have little or no kelp coverage than within kelp forests. Density of fish on a cobble bottom without kelp at San Onofre, which is on the mainland at the same latitude as SCI, was 324 fish per acre compared to 2,506 fish per acre within kelp forests on cobble bottoms (Larson and DeMartini 1984). Barred sand bass, white sea perch, California sheephead and kelp bass were the most common species on the cobble bottom without kelp.

Commercially Important Fish and Invertebrate Species

Commercial landings were obtained for CDFG statistical areas within and near SCI (Kobylinsky 1998). CDFG maintains commercial landings statistics for statistical blocks that are 5° latitude by

5° longitude in area (about 81 nm² or 280 km²) for nearshore areas and larger for offshore waters. The location of CDFG statistical block 867 adjacent to southern SCI is shown in Map 3-2.



Map 3-2. Location of California Department of Fish and Game Statistical Block 867 Adjacent to southern San Clemente Island.

The average seasonal and annual commercial catch in this statistical block is shown in Table 3-7. The average annual catch in this block represents about one-third of the average annual catch of 12,537,567 pounds per year for the entire San Clemente Ranges Complex (US Navy 1999). Thus, it is a very important area for commercial fishing.

Table 3-7. Average seasonal catch in pounds of fish and invertebrates in CDFG statistical block 867 off southern SCI for the period 1993-1997.

Species	Winter	Spring	Summer	Fall	Total
Yellowfin tuna	337,749	214,801	268,978	153,999	975,528
Skipjack tuna	249,038	64,271	424,196	391,881	1,129,386
Bluefin tuna	-	85,329	5,070	-	90,399
Albacore	-	20,011	1,532,667	-	1,552,678
Other tuna	-	125	4,856	1,105	6,086
Pacific mackerel	-	107,433	8,000	-	115,433
Swordfish	-	-	520	1,262	1,782
Pacific sardine	6,900	-	12,400	-	19,300
Other Pelagic fish	-	80	1,749	292	2,121
Sharks and rays	5	164	88	713	970
Flatfish	86	17	60	-	162
Rockfish	6,357	7,540	3,642	3,097	20,636
Demersal fish	1,454	7,309	1,095	1,488	11,346
Abalone	-	218	91	15	324
Squid	112,548	26	2,740	-	115,315
Crustaceans	2,799	3,632	5,236	8,291	19,958
Urchins	36,683	46,429	32,623	65,236	180,972
Other Invertebrates	-	-	-	-	-
Total	753,619	557,386	2,304,013	627,379	4,242,397

Source: Kobylinsky (1998).

Tuna account for most of the catch. Catch of tuna is highest in summer. The fall harvest of tuna is about 25 percent of the summer catch (U.S. Navy 1999). Most Pacific mackerel are landed in spring; few are caught in summer and fall. The catch of urchins is highest in fall, but is also high in summer; relatively few squid are harvested in summer or fall (U.S. Navy 1999). There is a small fishery for swordfish in summer and fall. Most of the commonly harvested species can be found in inshore waters, and only yellowfin tuna, albacore, swordfish are found exclusively in offshore waters. (Table 3-8).

Table 3-8. Habitats of common commercial fish species found off southern SCI.

Species	Habitat
Yellowfin tuna	Pelagic, open sea
Skipjack tuna	Pelagic, inshore and offshore
Bluefin tuna	Pelagic, open sea, inshore and offshore
Albacore	Pelagic, seldom close to shore
Pacific mackerel	Pelagic, usually inshore
Swordfish	Offshore
Pacific sardine	Pelagic, usually nearshore
Flatfish	Bottom Inshore and offshore
Rockfish	Bottom-inshore and offshore
Demersal fish	Bottom-inshore and offshore

Source: Eschmeyer *et al.* 1983

In general, the north, west, and south coasts of SCI are a good fishing area for urchins, bottom fish and lobster. Sea urchins are mainly caught by divers close to shore on rocky bottoms with kelp at depths of 10 to 100 feet (3 to 30 m) (Halmay 1999). Divers also take gorgonians and black coral. Prawns are caught in traps at depths of up to 1,200 feet all around the island from February to November (Guth 1999). China Point and Pyramid Cove are key anchorages for commercial fishermen because they are protected from the wind (Halmay 1999).

Sport fishing is an important activity off the southern part of the island and other locations around SCI. Major sport fish species caught near the island include yellowfin tuna, shallow water rockfish, yellowtail rockfish, kelp bass, yellowtail, California sheephead, ocean whitefish, dolphin, marlin, barracuda, and lingcod (Fletcher 1999; Helgren 1999). The recreational fishery occurs at depths of 30 to 100 feet (9 to 30 m)(Fletcher 1999).

Rare, Threatened, and Endangered Fish Species

No rare, threatened or endangered marine fish species are found in Horse Beach Cove or adjacent waters.

Giant sea bass (*Stereolepis gigas*) spawning areas are listed as endangered to extremely endangered in California (California Department of Fish and Game 1999). Giant sea bass mature at an age of 11 to 13 years and a weight of 50 or 60 pounds. This fish can grow to a weight of 500 pounds and lives to an age of 70 years (Miller and Lea 1972; Feder *et al.* 1974; Eschmeyer *et al.* 1983). It inhabits depths of 18 to 150 feet on rock bottoms outside of kelp beds and along drop-offs (Miller and Lea 1972; Eschmeyer *et al.* 1983). Large fish are usually found at depths greater than 100 feet and small individuals are found over sand in kelp beds at depths of 40 to 70 feet (Eschmeyer *et al.* 1983). They generally swim near the bottom, but are found in mid water and near the surface in kelp beds (Feder *et al.* 1974). Adults are gregarious and are found in groups of 6 to 8 (Feder *et al.* 1974). Spawning aggregations form in summer and the main spawning season is in July, August and September (Eschemeyer *et al.* 1983; California Department of Fish and Game 2000). The eggs are pelagic.

Special Areas

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (Amended 11 Oct 1996), NMFS has established three Essential Fish Habitat (EFH) zones off the west coast of the U.S. The Pacific Salmon EFH does not occur within the SCI Complex. However, the Coastal Pelagic and Groundfish EFH zones extend from the coastline out to 200 miles (320 km) offshore and cover the entire west coast of the U.S. from the Mexican border to the Canadian border. The Coastal Pelagic EFH includes surface waters, while the Groundfish EFH includes surface waters and benthos. NMFS and the Fishery Management Councils are developing Fishery Management Plans (FMP) to manage the fishery and address fish habitat issues, specifically the principle that there will be no net loss of the productive capacity of habitats which sustain commercial, recreational and native fisheries (Pacific Fishery Management Council 1998). Final recommendations for Pacific groundfish EFH are available (Core Team for EFH for Pacific Coast Groundfish 1998).

As mentioned earlier, the waters adjacent to SCI have been designated as an Area of Special Biological Significance (ASBS) by the State Water Resources Board (McArdle 1997).

SCI itself has also been designated a Significant Natural Area (Conservation Analysis Unit 1999). However, this designation does not appear to affect marine resources at sea around the island.

Sea Turtles

Four species of sea turtles occur at sea off the coast of southern California: leatherback (*Dermochelys coriacea*); loggerhead (*Caretta caretta*); eastern Pacific green (*Chelonia agassizi*); and olive ridley (*Lepidochelys olivacea*) (NMFS and USFWS 1998a, c, d, e). The eastern Pacific green, also known as the black sea turtle, is considered by some to be a subspecies of the green sea turtle (*Chelonia mydas*). There are no known sea turtle nesting beaches at SCI. Only three species of sea turtles could be encountered in or near Horse Beach Cove: leatherback, green, and juvenile loggerhead turtles. SCI is not a concentration area or a destination for sea turtles (Dutton 2000).

Seasonal Abundance

The distribution of sea turtles is strongly affected by seasonal changes in ocean temperature (Radovich 1961). In general, sightings increase during summer as warm water moves northward along the coast (Stinson 1984). Sightings may also be more numerous in warm years compared to cold years.

Juvenile loggerhead sea turtles are common year-round in the coastal waters of southern California (Guess 1981a, b; Stinson 1984) but sightings are most common during July to September (Stinson 1984). Adult loggerheads are rare in this area. The juvenile loggerheads off southern California may represent the fringe of large aggregations that occur off the west coast of Baja (Bartlett 1989, Pitman 1990). Juvenile loggerhead turtles would be the most common sea turtle present in offshore waters of San Clemente Island (Dutton 2000). An aggregation could pass through in offshore waters. It is possible that a few could stop and feed on the benthos in nearshore waters.

Off the U.S. West Coast, leatherback sea turtles are most abundant from July to September and are rarely reported during winter and spring. Their appearance in southern California coincides with the arrival of the 64-68° F (18-20° C) isotherms (Stinson 1984). Stinson (1984) noted that the July appearance of leatherbacks along the U.S. west coast was "two-pronged," with turtles suddenly appearing in southern California and also in northern California, Oregon, and Washington with few sightings along the intermediate coastline. She speculated that turtles may be moving onshore from offshore areas where the water temperature is 55-59° F (13-15° C). Turtle sightings tend to be more frequent in abnormally warm years or months and less so during cold years (Stinson 1984; Starbird *et al.* 1995). This is particularly true in more northern areas during non-summer months. It has been suggested that unusually warm ocean temperatures are responsible for sightings of sea turtles in the northern Pacific (Radovich 1961). Leatherback turtles could pass through offshore waters near San Clemente Island during migration (Dutton 2000) The could pass through as groups of a few adults and not as large concentrations (Dutton 2000).

Nearly 62 percent of green/black turtle sightings are from Baja California and southern California. The northernmost reported resident population occurs in San Diego Bay (Stinson 1984; Dutton and McDonald 1990a, b, 1992; Dutton *et al.* 1994). Green/black sea turtles are sighted year-round in the waters of southern California with the highest frequency of sightings being during the warm summer months of July through October (Stinson 1984). In waters south of Point Conception, Stinson (1984) found this seasonal pattern in sightings to be independent of inter-year temperature fluctuations. The year-round presence of green/black turtles off southern California likely represents a stable north boundary of Mexican populations. As with juvenile loggerheads, the lower number of sightings during winter months may be indicative of a retreat to warmer southerly waters or perhaps dormancy and/or lower activity levels (Felger *et al.* 1976, Mendonca 1983). Green turtles feed on sea grasses in nearshore waters. This species could be found in nearshore waters of SCI (Dutton 2000). However, the waters of SCI are colder than those preferred by green turtles and so concentrations of this species would not be found at SCI.

Loggerhead, leatherback and green turtles may be encountered off SCI year-round but the highest frequency of occurrence is during summer. Green turtles would be the only species that could be routinely encountered in nearshore waters.

Abundance of Sea Turtles

There are no known sea turtle nesting beaches at San Clemente Island or anywhere else on the West Coast of the United States.

Sea turtles typically remain submerged for several minutes to several hours depending upon their activity state (Standora *et al.* 1984, 1994). Long periods of submergence hamper detection and confound census estimates.

There are 30 to 60 green turtles resident in San Diego Bay (Dutton 2000; Dutton and McDonald 1990). They aggregate in the thermal effluent of a power plant in winter and so remain in the bay all year. Pitman (1990) presents data on relative densities off Baja California and Stinson (1984) presents data on relative abundance of turtles off the U.S. Pacific coast. There are no data on absolute densities or abundance of sea turtles on the U.S. Pacific coast.

Rare, Threatened, and Endangered Species

All four species of sea turtles are currently listed as either endangered or threatened under the Endangered Species Act (ESA) of 1973 (16 USC §1531). The leatherback sea turtle is listed as endangered throughout its entire range (NMFS and USFWS 1998c). Both olive ridley and green sea turtles are listed as threatened while at sea, and nesting populations on the Pacific coast of Mexico are endangered (NMFS and USFWS 1998a, 1998b, 1998e). The loggerhead sea turtle is listed as threatened throughout its range (NMFS and USFWS 1998d).

Marine Mammals

This section describes the marine mammals that have been observed (or those species likely to be found) within Horse Beach Cove and adjacent waters. Due to the rapid increase in water depth within a relatively short distance of the DET test area, some species normally found in deep and/or offshore waters have been, or could be expected to be, found close to shore.

This report provides estimates of marine mammal abundance and densities based aerial surveys conducted by the National Marine Fisheries Service (NMFS) in 1998 and 1999, and includes summaries of information based on previous reports and publications. NMFS provided estimates of abundance and density for marine mammals throughout the year for areas adjacent to southern SCI (Carretta *et al.* 1999). The marine mammal densities compare well with density estimates from larger-scale aerial surveys conducted in California earlier this decade (e.g., Forney *et al.* 1995). While we have only tabulated those species that NMFS observed within the study area, we have also included information on other species (such as blue whales), which are also very likely to be found in or near the study area during the period of interest.

Cetaceans

At least 34 species of cetaceans have been identified from sightings or strandings in the Southern California Bight (Bonnell and Dailey 1993; Rice 1999). These include 26 species of toothed whales (odontocetes), and eight species of baleen whales (mysticetes). At least seven species have been observed during NMFS aerial surveys within the boundaries of the study area in low or moderate numbers either year-round or during annual migrations into or through the area. These include Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), Risso's dolphin (*Grampus griseus*), bottlenose dolphin (*Tursiops truncatus*), short-beaked common dolphins (*Delphinus delphis*), and gray, fin and blue whales (*Eschrichtius robustus*, *Balaenoptera physalus*, and *B. musculus*, respectively).

Several species of cetaceans occurring in waters near the study area are listed as endangered or threatened. Most endangered mysticetes (baleen whales) that occur in California waters were once commercially hunted to the point that their populations were severely depleted. Fin and blue whales are currently federally listed as endangered species and protected by the Endangered Species Act (ESA) (16 USC. § 1531) (Braham 1991). Gray whales have recently been removed from the endangered list due to increase in population numbers (Hill and DeMaster 1998). Several of the "endangered" species have also been listed as "strategic stocks" under the Marine Mammal Protection Act (MMPA). The specific definition of a "strategic stock" is complex, but in general, it is a stock in which human activities may be having a deleterious effect on the population and may not be sustainable. The stocks of fin and blue whales occurring off California are considered "strategic" (Barlow *et al.* 1997).

In addition to the special designations summarized above, all marine mammals are protected by the MMPA (MMPA 1972, amended 1995-16 CFR §1431 *et seq.*).

A comparison of cetacean abundance in 1979/80 vs. 1991 indicated that numbers of mysticetes and odontocetes have increased in offshore California waters over the 12-year period. However, the increased abundance of blue whales reported previously in the Channel Islands and elsewhere off southern California (e.g., Calambokidis *et al.* 1990; Barlow 1994, 1995) is not confirmed by certain long-term vessel-based surveys (Larkman and Veit 1998). The abundance of cetaceans for both the study area and for California is summarized in Table 3-9. These data were obtained from results of aerial surveys commissioned by the U.S. Navy (Carretta *et al.* 1999), in addition to data from marine mammal stock assessments such as that prepared by Barlow *et al.* (1997).

Carretta *et al.* (1999) found that the most numerous cetacean in the study area during the test periods would likely be the short-beaked common dolphin, whereas the least abundant would be large mysticetes such as the fin whale (Table 3-9). A few blue whales have been seen near SCI in early-to-mid spring (U.S. Navy 1998), but they were most common during the July to September period (Hill and Barlow 1992; Mangels and Gerrodette 1994; Teransih *et al.* 1997; Larkman and Veit 1998; U.S. Navy 1998). While not sighted within the study area to date, NMFS has recommended that blue whales be included as a species possibly present (and assuming the same density and abundance values as for fin whales).

Grey whale cows with calves are seen in the Southern California Bight mainly from February through May during the northward migration (Leatherwood 1974), but a very small number of calves have also been seen during the southward migration (Sheldon *et al.* 1996). Gray whales do not spend much time feeding in waters near SCI and typically pass through waters near SCI in a few days or less.

The northern right whale (*Eubalaena glacialis*) is listed as endangered under the ESA and the North Pacific stock is considered a strategic stock. No live northern right whales have been seen in nearshore waters near SCI in the last 100 years but two sightings have been made within ~38 nm (~70 km) of SCI (on 9 May 1990 and 24 March 1992; Carretta *et al.* 1994). The scarcity of sightings and the very small population indicate that it is very unlikely that right whales will be encountered near SCI during the test period.

Table 3-9. Abundance, seasonality, and habitat preferences of Cetaceans within the study area and California.

Species	Estimated Density (no/km ²) in the Study area in*		California Stock Size (CV)**	Seasonality	Habitat Preference
	May-Oct	Nov-Apr			
Odontocetes					
Risso's dolphin (<i>Grampus griseus</i>)	0.06	0.18	32,376 (0.46) ¹	Year-round resident in the SCB, peak in winter. Low numbers in summer	Mostly offshore, recently over continental shelf
Bottlenose dolphin (<i>Tursiops truncatus</i>) (coastal)	0.90	0.90	140 (CV 0.05) ²	Year-round resident of coastal areas east of the Complex	Within 0.5 nm of shore
Short-beaked common dolphin (<i>Delphinus delphis</i>)	4.65	11.78	372,425 (0.22) ³	Year-round resident in the Complex	Coast to 300 nm or farther from shore
Mysticetes					
Fin whale (<i>Balaenoptera physalus</i>)	0.009	0.003	933 (0.27) ³	A few present year-round in the Complex, peak in summer	Continental slope and offshore waters
Blue whale (<i>Balaenoptera musculus</i>)	0.009	0.003	1,785 (0.24) ³	Migratory, resident Jun-November	Primarily offshore

* Estimated density were derived from NMFS report "Distribution and abundance of marine mammals at San Clemente Island and surrounding offshore waters: preliminary results from aerial and ground surveys in 1998 and 1999"
The summer value for Risso's dolphin is likely a conservative overestimate.

** CV (coefficient of variation) is a measure of a number's variability. The larger the CV, the higher the variability.
Sources: ¹ Forney et al. (1995); ² Barlow et al. (1997); ³ Barlow and Gerrodette (1996);

3.2 Man-Made Environment

3.2.1 Land Use

The mission of SCI, first established in 1934, is to support tactical training and research, development, test, and evaluation efforts by maintaining and operating facilities and providing services, arms and material support to the U.S Pacific Fleet. The island itself is the center of the San Clemente Island Range Complex. SCI supports the largest concentration of Naval forces in the world. Land, air, and sea ranges provide U.S. Navy, U.S. Marine Corps, and other military services space and facilities, which they use to conduct readiness training and test and evaluation activities. Over twenty Navy and Marine Corps commands conduct training and testing activities on and around SCI. Allied forces and non-DoD agencies like the INS also train at SCI.

Activities range across the entire spectrum of warfare mission areas including aviation training, air warfare, surface warfare, under sea warfare, strike warfare, submarine warfare, amphibious warfare, special warfare, RDT&E, and Joint Task Force Exercises that include other military services. Map 3-3 shows the facilities and major operations locations on SCI. The types of operations and activities that are conducted at SCI can be broken down into seven broad types, as follows.

SHOBA Operations

SHOBA range is located at the southern end of SCI and operations conducted there use both live and non-live fire. All live and inert munitions are expended only in Impact Areas I and II. It is the last range in the eastern Pacific Basin where ships can conduct Naval Gunfire Support (NGFS), which involves live fire from ships into the Impact Areas. It is also the only location where combined arms exercises can be conducted. Combined Arms exercises involve all supporting arms of the Navy, Marine Corps, and Air Force, such as NGFS, Artillery, Mortars, Fixed-wing Aircraft, and Helicopters. Other SHOBA operations include amphibious training of Marine Artillery Units using live fire; close air support/strike which is both live and inert munitions delivered from fixed wing aircraft and helicopters; and laser target designation which involves training with lasers to illuminate ground targets for precision guided munitions. SHOBA also hosts such activities as explosive ordnance disposal, Naval Special Warfare operations, and biological surveys.

Amphibious Training

Typical amphibious operations include shore assault, boat raid, airfield seizure, land and air reconnaissance, helicopter assault training, and humanitarian assistance and usually contain ground forces, air element, and service support. Amphibious landings by the Marine Corps are generally made from Navy ships offshore. The Marine Corps units making the landing may be company or platoon size. Amphibious assault landings outside of SHOBA currently take place in West Cove and Northwest Harbor. Most of the landings at West Cove are to get Marines ashore for training on other parts of the Island.

Naval Special Warfare Training

Navy SEALs conduct extensive training onshore and in the nearshore environments of SCI. Their training falls into two types: BUD/S basic military courses, and Naval Special Warfare Group ONE training. BUD/S or Basic Underwater Demolition/SEALs includes three types of activities: Phase One, basic physical and mental conditioning; Phase Two, diving operations; and Phase Three, demolition, reconnaissance, and land warfare. Basic small arms qualification is included. Most of the BUD/S training occurs in Northwest Harbor north of the runway. The small arms qualification is conducted at the rifle range at Northhead. Underwater demolitions occur in the nearshore areas, mostly in the Special Warfare Training Area, SWAT-2. BUD/S typically conducts six classes a year at SCI for four weeks. There are typically 40 to 60 students per class. Naval Special Warfare Group ONE is responsible for organizing, training, and deploying combat ready SEAL platoons. SEAL operations include clandestine insertion, minimum disturbance patrolling, and clandestine extraction. These activities may occur onshore, nearshore, or offshore. The SEAL platoons conduct the training over much of SCI. Because these operations are clandestine, they do not storm beaches, make campfires, or dig foxholes. The SEALs' purpose during insertion is to draw no notice to their presence and to make minimum change to the environment. Once at the objective, they conduct intense firepower application, including the use of demolitions. Parachute flares and tracers are subject to special restrictions on the Island because of the fire hazard. SEALs use different types of explosives in their demolition training ranging from 5 to 500 pounds. The average for small shots is 3.5 pounds and 50 pounds for larger events. There are some specific areas that are set aside for these training activities including the six Special Warfare Training Areas (SWATs) that have onshore and nearshore elements. They extend from the sea floor to the surface and in some cases the airspace above the water. Some new areas called Training Areas and Ranges (TARs) are proposed for SEAL training. These are designed to minimize disturbance and safety, fire, and environmental concerns.

Airfield Operations

NALF SCI is located at the northern end of the Island. Users of the airfield are the U.S. Navy and U.S. Marine Corps, other military organizations, civilian contract air carriers, and non-military general aviation. The airfield is restricted to military aircraft and authorized contract flights, though it is available for emergency landings year round. There are no permanently assigned aircraft, and aviation support is limited to refueling. NALF operations include Fleet Carrier Landing Practice, Visual/ Instrument approaches and departures, range support, R&D test support, supply and personnel flights, aircraft equipment calibration, survey and photo missions, exercise training, and medical evacuation.

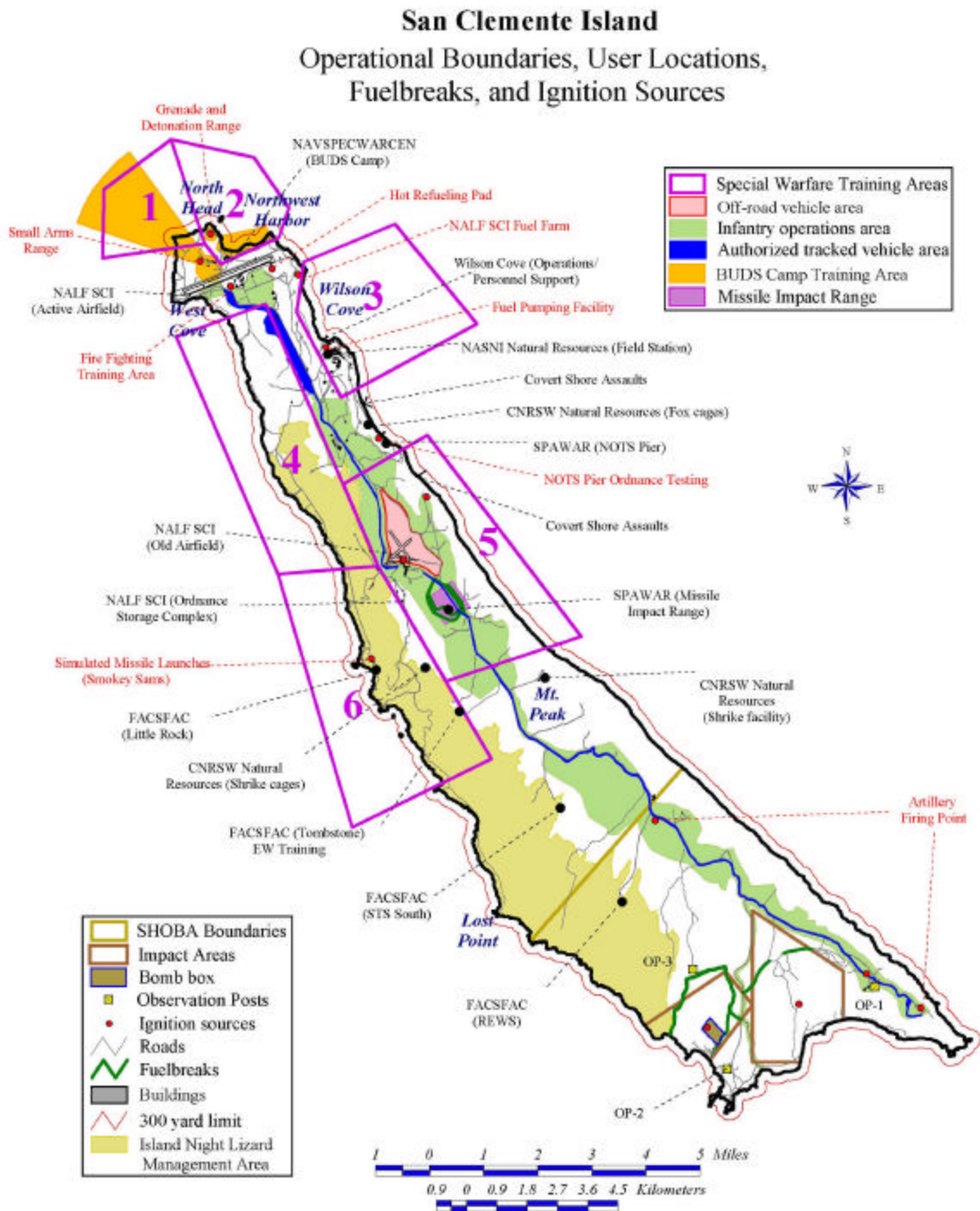
RDT & E Tests

RDT&E is a critical process in the successful assessment, safe operation, and improvement of sea, air and land weapons systems. The Space and Naval Warfare Systems Center (SPAWAR) and Naval Under Sea Warfare Center (NUWC) both conduct RDT&E operations at SCI. SPAWAR also

provides marine mammal training support. SPAWAR's tests on SCI include a wide variety of ocean engineering, missile firing, torpedo testing, manned and unmanned submersibles, unmanned aerial vehicles, electronic warfare and other Navy weapons systems. NUWC conducts weapon systems accuracy trials, sensor accuracy trials, surface ship radiated noise measurement trials, at-sea bearing accuracy tests, acoustic trails testing, as well as supporting some of the SPAWAR activities. Most of these operations occur offshore though tomahawk cruise missile tests terminate at the Missile Impact Range located about midpoint of the island. Joint Standoff Weapon (JSOW) testing is also carried out at this Range. JSOW is an unpowered glide weapon capable of carrying different modular warhead payloads.

Offshore Operations

This is one of the most complex categories with numerous operations and activities occurring in a variety of designated offshore ranges. The Fleet's fundamental peacetime mission is to train battle groups and individual ships for deployment overseas. Every ship, submarine, and deployable aircraft squadron is typically in one of three clearly identified phases of the employment cycle: refit; ready fleet; or deployment. The interdeployment training cycle corresponds with these phases and includes basic, intermediate and advanced tactical maneuvers. SCI's support and offshore ranges provide an arena for littoral warfare where friendly forces can train against a simulated adversary in a safe and controlled environment. The offshore ranges and operational areas include the Southern California ASW Range (SOAR), the Electronic Warfare (EW) Range, the Variable Depth Sonar (VDS) no notice Area, and SHOBA which has an offshore component. In addition, closer to the shore of SCI are the Mine Exercises Training Ranges, Kingfisher Mine Countermeasure Range, the SCI Underwater Range (SCIUR), Operating Area 3803, and the danger zones that extend from offshore to the nearshore area. Airspace W-291 is included in the offshore ranges. It is the special use airspace which overlays San Clemente Island and its ranges. Warning Areas are designated airspace for military activities in international airspace and are located over the coastal waters of the United States and its territories. Specific types of offshore operations occur in each of these ranges, and the complex is capable of supporting multiple operations simultaneously.



Map 3-3. Operational boundaries and user locations on San Clemente Island.

Other Island Operations

In addition to Fleet, 1 MEF, and Naval Special Warfare Units there are many other organizations that use SCI for operations and recreation. All are transient, but many have frequent and prolonged activity. The most prominent in this category are: environmental activities, communication exercises, MK 30 ASW Target Logistics activities, COMPUTEX/ITA intelligence exercises, barge operations, combat search and rescue, airfield and weather support, LCU operations, oil spill

response practice, surface/subsurface surveillance, and Boy Scout and Girl Scout camping. In recent years the environmental activities have greatly increased. This is due to the growing number of environmental issues and the military's interest in ecosystem management. One of the biggest areas of expansion has been the SCI Loggerhead Shrike Recovery Program.

3.2.2 Traffic and Circulation

San Clemente Island Ridge Road is the main transportation line over the island. The northern six miles of this road is fully paved, while the southern end (approximately 14 miles), starting at VC-3, is gravelled and graded. No standardized set of specifications is apparently in use for road maintenance. Roads are graded as needed about once per year. The majority of secondary roads are not maintained. Off road use is not permitted except in designated off-road areas or on established trails approved by NRO (NASNI Instruction). The 7th Engineer Support Battalion (USMC) recently (July 2001) began a two-month road project with gravel and filler. A larger, \$20,000,000 project to widen and asphalt the roads is being considered through the PWC who is the agency responsible for road maintenance on the Island.

The poor road conditions on the island result in unsafe conditions during the wet season. Fire response vehicles are limited to the main SCI ridge road north of SHOBA and the paved roads in the vicinity of Wilson Cove and the airport. Wilson Cove and the area around the airport are the busiest traffic locations but are never congested. However, vehicles on some roads may occasionally hit some protected species, such as the island fox. In addition, re-paving a road, as proposed for the SCI Ridge Road, requires consultation with the USFWS due to potential impacts to listed species. This road has not yet been addressed in a Biological Assessment, or BO by the USFWS, as required by Section 7 of the ESA.

3.2.3 Noise

Noise-sensitive receptors are those persons who occupy areas where noise is an important attribute of the environment. Such areas include residential dwellings, mobile homes, hotels, hospitals, nursing homes, education facilities, and libraries. In addition, noise-sensitive receptors may also include wildlife species such as migratory birds, which rely on vocalizations for communication. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human responses to environmental noise are annoyance and stress.

The Department of the Navy's *Planning in the Noise Environment, Naval Facilities Engineering Command (NAVFAC) P-970* (1978), provides compatibility criteria for various land uses. Sound levels up to 65 decibels (dB) are compatible with land uses such as residences, transient lodging, and medical facilities. Appropriate noise mitigation is required for development in areas where the Community Noise Equivalent Level (CNEL) exceeds 65 dB. Sound levels exceeding 75 dB CNEL are suitable for outdoor recreation, industrial use, aircraft engine test cells, administrative facilities that are noise insulated with a Noise Level Reduction (NLR) through incorporation of noise attenuation into the design and construction of the structure, agriculture, fishing and forestry activities, mining and utilities (AICUZ instruction).

3.2.4 Aesthetics

Aesthetic concerns are those that consider the effects to the Island as a visual resource. Changes to the landforms, vegetative patterns, rock formations, or bodies of water on the Island could potentially affect the aesthetics. SCI is a visually impressive and pleasing landscape. With the possible exceptions of Wilson Cove, the airfield, and the communications tower on top of Mt. Thirst, there is relatively little human development.

The public does not have access to SCI and typically only views the island from boats. The view from the east is that of a high, steep shore with numerous canyons and low vegetation. From the west side the island reveals a more gradual slope with numerous marine terraces and scrub vegetation. The northern end of the island is the most developed but still retains much of the same landforms and vegetation as found in other parts of SCI. The southern view is dominated by Pyramid Cove, which includes a sandy beach and marsh backed by a relatively steep rise. The rest of SCI's shoreline is rocky and small rock islands are present just offshore in some areas.

3.2.5 Cultural Resources

Cultural resources are abundant on SCI, with approximately 7600 sites, spanning three phases of historical human use of the island: Native American, Ranching (1850—1934), and Early military use (1934—1969). The oldest archaeological specimen found to date was discovered at Eel point, and has been radiocarbon dated to around 8,000 years BP (Axford and Meighan 1983). The earliest inhabitants depended primarily upon marine resources for subsistence and there is a substantial artifact record of tools made from modified bones and shells (beads, pendants, fishhooks) and ground stones (mortars, pestles, and pitted stones) (Noah 1987). At the time of European settlement, the Gabrielino people, who are associated with tribes in the Great Basin and Mojave Desert, inhabited the southern Channel Islands. SCI was used legally and illegally for sheep ranching from 1850 until 1934 when the DoN gained control of the island. Ranchers built structures, roads, fences, wells, and dams throughout this period.

Cultural resources on the island are managed extensively under the Navy's Cultural Resources Management Program. This program includes identification, preservation and protection of SCI's archaeological and historical artifacts. It is involved in site protection and mitigation for disturbed sites, extensive surveys, management of archaeological collections, and cooperative academic research.

3.2.6 Public Facilities/Access/Recreation

The SAIA requires that installations provide public access for natural resource uses to the extent that it is appropriate and consistent with the military mission, safety and security. Given its isolated location and the nature of its mission, access to the island itself is restricted to active and retired U.S. Navy military and civilian personnel, their immediate families, and guests. Even for these personnel, many areas on the island have access limited or prohibited. However, SCI currently has a golf driving range, bowling alley, gymnasium, and numerous hiking and jogging trails. Personnel also have the opportunity to fish, swim, or snorkel from certain areas of the shore. SCUBA diving is not allowed from shore. Commercial and recreational scuba divers are attracted to dive sites around San Clemente Island because of clarity of seas that can range up to 60' visibility. The surrounding waters are used and visited by a variety groups, including commercial and sport fishermen, kelp harvesters, SCUBA divers, and pleasure boaters.

3.2.7 Safety and Environmental Health

Public health and safety issues are defined as those factors that directly impact the ability to protect and preserve life and property. General safety concerns include groundwater contamination, sewer gases and odors, fire and emergency response, and hazardous materials and wastes.

Federal agencies must also "make it a high priority to identify and assess environmental health risks that may disproportionately affect children, and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks

and safety risks” (EO 13045). However, this is not a concern on SCI because no children reside on the island.

SCI is a military installation that is closed to the public. Although certain risks are associated with military operations and the island’s natural features, these do not pose a risk to the public. Potential SCI hazards identified by NASNI include: “unexploded ordnance, dense cactus, loose rocky soils, and sleep canyons and escarpments; military operations conducted on or near San Clemente Island; buried or concealed ordnance on or near San Clemente Island; weapons testing involving high explosives, experimental or operational missile flights, Naval gunfire training, piloted or pilotless aircraft, high explosives demolition and training, and any and all other phases of military operations” (undated “Statement of Awareness and Release” for SCI prepared by Naval Air Station, North Island).

Hazardous Materials

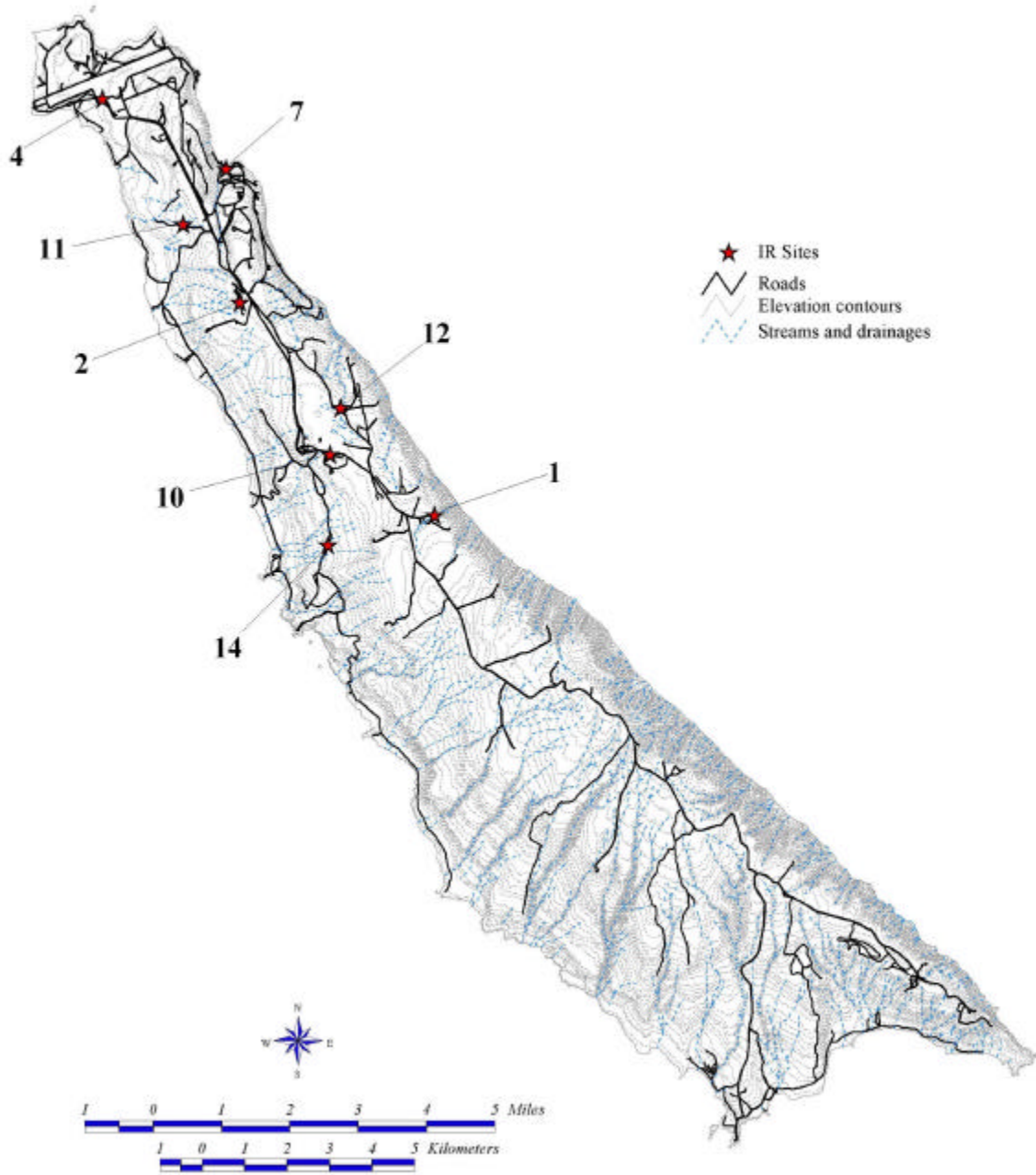
Materials of concern to public health at SCI could include herbicides, pesticides, fuels, fire retardants, and unexploded ordnance. Unexploded ordnance is present in SHOBA and other firing ranges where there are restrictions on access.

The following Table 3-10 lists known Installation Restoration (IR) sites (Map 3-4). The Resource Conservation and Recovery Act (RCRA) permit process that addresses these sites is the functional equivalent of NEPA, so these sites will not be analyzed in this EA. There are 18 sites identified for potential environmental clean-up on SCI, and 14 are Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) sites, and four are RCRA underground storage tank sites. Contaminants include ordnance compounds, paint, asbestos, heavy metals, petroleum products, and solvents. All sites are in the study phase. Environmental work at this installation is expected to start in fiscal year 2003. San Clemente Island NALF is neither listed nor proposed for listing on the National Priorities List (NPL). There is no legal driver for cleanup at the sites. See SCI PDEIS for additional background on solid waste management and recycling.

Table 3-10. Known Installation Restoration sites addressed through RCRA.

IR Site #	Description	Acreage
1	Lemon Tank Canyon disposal area	4
2	Photography Laboratory drainage	2
3	Missile guidance scene	3
4	Fire fighting training area	0.5
5	JP-5 fuel spill	1
6	Abandoned underground Air Force tank	2
7	Diesel fuel spill near power plant	1
8	Transformer spill near Building 60138	1
9	Transformer spill near Building 60142	0.5
10	Former Airfield area	2
11	Former disposal area west of Wilson Cove	0.3
12	North Tank Dam disposal area	10
13	Small disposal area west of Lemon Tank	1
14	Old ordnance disposal area	0.5
15	Wilson Cove Gas Station	1
	Total Acreage	29.8

Installation Restoration Sites on San Clemente Island



Map 3-4. Installation Restoration sites on San Clemente Island (map locations for additional sites listed in Table 3-5 currently not available).

Solid Waste and Hazardous Waste Disposal

The San Clemente Landfill is operated under a solid waste facility permit (number 19-AA-0063), issued by the Los Angeles County Department of Health Services in June 1997. The total area of the permitted facility is 20 acres with a remaining capacity of 235,459 cubic yards (as of November 1996). It is permitted through June 24, 2002. Closure of the landfill is anticipated in

2032 at 991 tons per year rate of disposal use. The facility is permitted for 82.6 tons per month of non-hazardous refuse; currently only construction and demolition rubble is accepted. The landfill is prohibited from accepting hazardous wastes, designated wastes, medical wastes, and liquid wastes.

Other garbage and hazardous materials must be containerized and shipped to NAS North Island by barge. The hazardous waste is handled there by a hazardous waste contractor who transports it to an approved treatment, storage and disposal facility. In 1997, 201,504 lb of hazardous waste was barged off of SCI. Hazardous waste on SCI is predominantly waste oil and oily waste.

No burning of refuse was allowed after October 1997. All recyclable materials must be stored in storage bins, roll-off bins, or other bins subject to approval by the local enforcement agency. The recycling program on SCI diverts some materials from the landfill; in 1997, 254,780 lb of primarily heavy and light steel materials were recycled.

3.2.8 Utilities

Utilities are operated and maintained by the PWC, which is headquartered in Wilson Cove. This agency is responsible for water treatment, storage and distribution, sewage treatment, power and steam generation, maintaining the PWC Transportation Center, and delivering potable water and diesel fuel to island ranges not connected to the power or water utilities systems (U.S.Navy 2000).

No fresh water is available on the island and thus must be barged from the mainland. An average of 245,173 gallons of water are barged weekly at a cost of approximately \$8,580.00 a week. The water is first tested, and then pumped into the island's distribution tanks for consumption. The distribution system's capacity is 2 million gallons.

Sewage is treated on the island at a plant located at Wilson Cove. The plant is a dual unit with an extended aeration system that had the capacity to process 60,000 gallons of sewage a day. Currently state restrictions set the daily limit at 25,000 gallons a day.

The power plant at Wilson Cove is composed of 2-500 kW, 1-750kW and 1-1200kW diesel generators with a total capacity of 2950 kW/Hr. This system is operated 24 hours a day, 7 days a week at a current capacity of about 35%. The power is distributed over a grid that covers 43 miles with approximately 900 poles. In 1997, several island sites were connected to the main system. In addition, a Strategic Environmental Research and Development Program adds power to the main system with a wind farm. The windfarm that was installed in 1998 provides approximately 20 percent of the electricity at SCI.

The phone system is Consolidated Area System, an integrated digital network with the capacity to interface with the other eleven area bases within the system. This service is provided through microwave relay from San Pedro.

3.2.9 Socioeconomics

This section addresses the population, employment, and income contribution affected by activities at SCI. Each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. This is the requirement of the Environmental Justice EO (EO 12898), signed on February 11, 1994. The DoD relies upon the NEPA process to assess the effects proposed actions may have on minority and low-income populations. No census data are available for SCI because personnel are only stationed there on a temporary basis.

SCI is wholly owned and operated by DoD (administered through CNRSW in San Diego); however, it is isolated from direct social or economic ties with surrounding communities because it is an island. This creates an unusual setting. SCI has indirect social and economic ties to the mainland. The city of San Diego has the highest military and civilian payroll in the nation at \$3.6 billion. In 1997, companies in the San Diego area received nearly \$2.8 billion in defense procurement contracts. In 1996, defense-industry activities contributed \$9.6 billion to the San Diego economy. Most personnel who work at SCI are stationed in San Diego, either at Naval Air Station North Island, Naval Station San Diego, or the Point Loma Naval Complex.

4.0 Environmental Consequences of Proposed Action and Alternative

This section describes the potential effects each alternative would have on the environment. Council on Environmental Quality (CEQ) regulations for implementing NEPA state that the discussion of environmental consequences shall include the direct and indirect effects of an action, as well as their significance. The two alternatives are:

- Proposed Action—implementation of the 2002 INRMP.
- No-Action Alternative—continue implementation of current projects and practices outlined in existing natural resource management documents.

This chapter is presented with subject areas in the same order as Appendix C and Appendix D, to facilitate review. Two potential impacts requiring mitigation were identified for proposed INRMP projects, one regarding the use of prescribed fire, and the other regarding use of fire retardant to control fire spread. Both of these potential impacts are mitigated to below a level of significance, and are described under pertinent subheads below. Table 4-3 summarizes the effects of both alternatives.

4.1 Physical/Natural Environment

4.1.1 Geology, Topography, and Soils

Projects that could potentially increase soil erosion or affect soil nutrient status are discussed in this section.

The proposed action would have a positive effect on the soils of SCI. The INRMP establishes objectives that would help to protect and restore soil productivity and nutrient functioning through the use of Best Management Practices (BMPs) to prevent and control soil erosion. Specifically, the INRMP establishes or continues the following policy strategies:

- Soil conservation BMPs, including associated funding, shall be included in all site feasibility studies, project planning, design and construction, and in all Real Estate agreements.
- Soil disturbance will be minimized by locating staging areas in previously disturbed areas.
- Facilitate coordination with other organizations when erosion concerns cross jurisdictional boundaries.
- Soil erosion control activities will be prioritized according to the seriousness of the degradation and its potential impacts on natural resources and training levels.
- Monitor storm runoff and its effect on particularly vulnerable areas such as steep slopes.
- Stabilize disturbed sites with protective materials or erosion control plants native to SCI, and grown in the SCI nursery.
- Adopt locally-proven revegetation practices with standards for: ground preparation, types of plants (native species when possible), seed mixtures (of native species), fertilization,

- mulching, irrigation, timing, maintenance, landscaping, cut/fill slope maximums, and standards for compliance.
- Install water bars, retaining walls, or diversion culverts in areas of high runoff.
 - Protect natural watersheds by minimizing the runoff of pollutants from roads.
 - Locate necessary off-road activity on the most tolerant soil types, such as in VC-3 and other previously disturbed areas with the capability to sustain such activity with minimum erosion. No off-road activity should be allowed except in designated areas.
 - Assess and monitor the impacts of maintenance activities on erosion.
 - Use permanently located, integrated inventory and monitoring plots to detect ecological trends in a manner that separates natural causes from the effects of land use.
 - Periodically map existing and new areas of moderate to severe erosion and digitize into the Island GIS system.

The combination of these activities will have a net benefit to the soils at SCI and no activities were determined to increase erosion.

The use of fire retardant as recommended in the INRMP will be monitored and the soils will be tested for increases in the ammonia-related breakdown constituents of the product (ammonia, ammonium, and total phosphorus), which may have a temporary fertilization effect on growing organisms. The fire retardant degrades rapidly in soil and long-term effects are unlikely (Poulton *et al.* 1997). Since effects are short-term, they are not considered significant. In addition, using retardants to restrict the ability of fires to burn across large areas will reduce erosion and sedimentation that often results from wildfires, so is beneficial in the long-term. The use of fire retardants is addressed more thoroughly in sections 4.1.2, 4.1.3, 4.1.4, and 4.2.7.

This alternative may not be effective enough in controlling soil erosion. The following are policies currently relating to soil erosion at SCI:

- Locate ground disturbing activities on previously disturbed sites whenever possible. Construction sites are minimized as practicable.
- Assure that all project work areas, including transit routes necessary to reach construction sites, are clearly identified or marked. Workers shall restrict vehicular activities to identified areas.
- Secondary roads are not maintained and off-road vehicle use is prohibited except in designated areas. Unused roads in the INLMA are closed and proposed for revegetation.
- An evaluation of road erosion priorities is currently underway in cooperation with the San Diego State Foundation, the results of which will be incorporated into INRMP updates.
- Construction contractors prepare and submit a Stormwater Pollution Prevention Plan (SWPPP) that is kept on site and addresses erosion control and stormwater sampling, if needed. In addition, the PWC has a BMP for maintenance.

4.1.2 Hydrology and Water Quality

This section addresses the effects of management on SCI's natural water resources, including surrounding ocean waters to 300 yards offshore. Alternatives that promote revegetation and soil stabilization will decrease unnatural runoff and flooding that can impact both on-Island water bodies and nearshore waters. The potable water supply at SCI is barged to the Island and neither alternative will affect this source of water.

The proposed action would have a positive effect on the water resources of SCI. The INRMP recommends water conservation practices and erosion control procedures (outlined above in Section 4.1.1) to protect the drainages of the Island from sedimentation that could alter surrounding ocean waters, that have been identified as an Area of Special Biological Significance by the State of California. The recommendation to secure certain eroding and unused dirt roads will improve water quality. Recommendations for the use of native and drought tolerant plant species in landscaping provides for both water conservation and minimal use of fertilizers that may leave the site in runoff water. The following INRMP recommendations will also provide a net benefit to water resources on SCI:

- Developing a water resources management plan that addresses the following: natural fresh water sources for wildlife, no shrinkage of fresh water resources, restricting the dumping of sea water on fresh water sources during fire suppression incidents, and determining groundwater consumptive use by native versus non-native plants.
- Developing a monitoring protocol for water and soil resources.
- Continuing to perform dry and wet season monitoring of storm drains.
- Investigating opportunities for reclaiming moisture from fog for Island Nursery, landscape irrigation, and watering of outplantings.
- Completing current wetland delineation and seeking certification of results from ACOE.
- Controlling erosion of upland watersheds with priority on areas with concentrations of vernal pools.
- Maintaining groundwater levels within the rooting zone of wetland native species throughout the growing season.
- Continuing to comply with regulations regarding ballast water and boat cleaning activities.
- Continually enhancing oil and hazardous substances spill response capabilities through equipment procurement, training, and participation in drills and area exercises.
- Conduct long-term monitoring of sea temperature and water clarity, marine wildlife, intertidal and subtidal habitats, in conjunction with Channel Island-wide programs.

The INRMP recommends continuing spraying certain targeted noxious weeds and roadbed material with herbicides. The recommended treatment procedures would be chosen and timed to provide natural controls of pests and to limit exposure of water sources to chemicals. If this method proves unsuccessful, the least environmentally harmful herbicides would be used. All herbicides will be applied according to label instructions.

The INRMP also recommends the use of the fire retardant Phos-Chek G75 to reduce the risk of escaping wildfires and to protect sensitive resources. Fire retardant would be one of several fire management tools available to land managers as a pre-suppression strategy, especially around high-priority control areas. These areas have been identified as Impact Area I in Pyramid Cove, Impact Area II in China Cove, along the south side of Chukit Canyon, the SHOBA Ridge Road, the north side of Eel Cove Canyon and vicinity of Eel Point, Northwest Harbor, and VC-3. For the retardant to be effective, 2,112 gallons of retardant would be used per mile of 20-foot wide fire line. Its use would be evaluated based upon factors such as: accessibility, weather conditions, expected training, sensitive species locations, and fuel loads. Fire retardant is an option when other pre-suppression methods such as disking, prescribed burns, and herbicide application are not available because of safety concerns associated with accessibility in areas with unexploded ordnance or because of their impact on natural resources. The ingredients of Phos-Chek G75 are shown in Table 4-1.

Table 4-1. Components of Phos-Chek G75 and their volume by weight according to the Material Safety Sheet provided by Astaris Inc.

Component	% by weight
Diammonium Sulfate	>65
Monoammonium Phosphate	>20
Diammonium Phosphate	<5
Guar Gum	<5
Performance Additives	<5

Phos-Chek G75 was chosen for consideration for a number of different reasons: it is used routinely by other federal agencies for fire suppression, is available locally, can be applied aerially, and has been found to have few impacts on the environment. The National Wildfire Coordinating Group (NWCG) has approved the use of this retardant for fire suppression, and all federal firefighting agencies (e.g. US Forest Service, BLM, USFWS) have concurred with this approval.

The NWCG has conducted an analysis of several studies performed on the impacts of fire retardants (Poulton *et al.* 1997) and found that caution should be exercised when applying the chemical near streams with sensitive species. The principal by-products of fire retardant are phosphorous and ammonia nitrogen (NH_3 and NH_4^+). Phosphorous can cause downstream eutrophication (Norris and Webb 1989). However, un-ionized ammonia (NH_3) is of primary importance because of its potential toxicity on aquatic species (Norris and Webb 1989). Application of the retardant directly into the water showed some toxic impacts to fish species (Poulton *et al.* 1997). However, a separate study (Norris and Webb 1989) indicated that application of retardant outside of the riparian zone should have little or no effect on stream water quality. The retardant degrades quickly once it reaches the soil and no information on salt-water ecosystems, in particular how quickly it dilutes in ocean waters, was considered in these studies.

The INRMP recommends practices that would minimize the effects of the chemical, including avoiding establishment of chemical mixing areas near water, and avoiding aerial flight patterns that may result in accidental application to fresh or sea water resources. The retardant would only be applied to vegetation. Fire retardants will only be used when deemed necessary to maintain the military mission and protect sensitive resources.

4.1.3 Air Quality

Section 176 of the Clean Air Act requires any action on the part of a federal agency in an area considered nonattainment for air quality standards to conform to the state's efforts to attain and maintain these standards. As stated in Chapter 3, SCI is in Los Angeles County, which is part of the South Coast Air Basin. The emissions from SCI do not contribute to the SCAQMD air basin, but the weather patterns take all the emissions to the south and out of the South Coast Air Basin. According to the more stringent state standards, this air basin is currently in extreme nonattainment for ozone and serious nonattainment for CO and PM_{10} .

The Environmental Protection Agency's General Conformity Rule (40 CFR Part 93, Subpart B), effective January 31, 1994, implements the statutory provisions of Section 176(1) of the Clean Air Act which prohibits federal agencies from conducting activities that contribute to new or existing violations of National Ambient Air Quality Standards, or delays in timely attainment of these standards. A federal agency's actions may be declared exempt or clearly *de minimis*, and

thus the General Conformity Rule is not applicable. A facility that has been determined as *de minimis* according to the SCAQMD have such low emissions that they logic ally could not exceed the Title V (of the 1990 Clean Air Act) emission thresholds. Clearly *de minimis* emissions include continuing and recurring activities, routine maintenance and repair, administrative and planning actions, land transfers, and routine movement of mobile assets (such as vehicles). Emergency response actions are exempt from the General Conformity Rule. Annual emission thresholds for the South Coast Air Basin are: 10 tons of NO_x, 100 tons for SO_x, 70 tons for PM₁₀, and 50 tons for CO (SCAQMD webpage 2002). Ozone emissions are often quantified using a precursor to ozone, Volatile Organic Compounds (VOCs) which have an annual emission threshold of 10 tons. The Rule only applies to federal actions in designated nonattainment or maintenance areas.

The INRMP outlines many routine maintenance activities and small construction projects that would result in minor and insignificant emission increases. Small projects, such as construction of water bars, diversion culverts, or a demonstration garden are recommendations in the INRMP and project details are not yet defined. Landscaping projects, mowing along the edges of roads, exotic weed control using “weed-whackers,” and outplanting native plant species grown in the SCI nursery may also require the use of mechanical equipment. Natural resource inventory and monitoring projects would require the use of vehicles to transport personnel, and so would routinely add travel-related emissions to the air.

Most INRMP-related emissions meet the clearly *de minimis* criterion and thus do not apply to the General Conformity Rule. The use of diesel or gas equipment for the above-mentioned projects would be short-term and temporary, and are considered routine and thus clearly *de minimis* under the General Conformity Rule. They are consistent with the General Conformity Rule in that emissions from proposed activities are already accounted for in California’s emissions budget as described in the State Implementation Plan. However, emission-emitting projects will be evaluated prior to implementation to ensure they are within *de minimis* limitations.

Table 4-2 depicts hypothetical values of activities that could potentially exceed *de minimis* levels. These emissions are clearly less than the area’s emission budget, and consequently, the Proposed Action is exempt from a conformity determination. There would be no measurable change to health risks for any person from emissions produced by actions in the INRMP. A Record of Non-Applicability (RONA) is provided in Appendix B.

Table 4-2. Estimated annual emissions from activities that could occur beyond clearly *de minimis* levels of the General Conformity Rule. Values are from the California Environmental Quality Act (CEQA) air quality handbook (SCAQMD 1993). Helicopter emissions are for a military helicopter containing a UH-1 engine which is much larger than the helicopter needed for fire suppression and, consequently emissions data can be considered conservative.

Activity	Carbon Monoxide (CO)	Nitrous Oxides (NO _x)	Sulfur Oxides (SO _x)	Particulate Matter (PM ₁₀)	Volatile Organic Compounds (VOCs)
Gas Mower (Wheeled Tractor) 8 hrs/day, 5 days/week, 4 weeks/year	0.762 tons	0.034 tons	0.001 tons	0.002 tons	0.028 tons
Fire Engine (Trucks: Off-Highway Diesel) 8 hrs/day, 5 days/week, 4 weeks/year	0.144 tons	0.334 tons	0.036 tons	0.021 tons	0.015 tons
Helicopter for fire suppression and retardant application 8 hrs/day, 5 days/week, 2 weeks/year	0.014 tons	0.08 tons	0.006 tons	0.058 tons	0.002 tons
Water truck and diesel truck for transporting and mixing product for retardant application (2 Trucks: Off-Highway Diesel) 8 hrs/day, 5 days/week, 1 week/year	0.072 tons	0.167 tons	0.018 tons	0.011 tons	0.0002 tons

The spraying of herbicides or fire retardant would be performed at concentrations recommended by the manufacturer and by individuals trained in their application. The chemicals would only be applied locally and would have no impact on air quality in public places.

Any temporary effects due to the use of equipment for activities such as those described above, will be offset by the long-term benefits provided by the following activities outlined in the Proposed Action including:

- tree planting and other revegetation with perennial species that absorb carbon dioxide;
- landscaping practices that reduce carbon dioxide in the atmosphere and may benefit energy efficiency of buildings; and
- closing some dirt roads and limiting off-road vehicle access may reduce dust emissions.

Prescribed burning is recommended as a management tool in the INRMP. It is widely accepted as a cost-effective and ecologically sound tool for land management. It reduces the potential for ecologically destructive fires that produce much higher emissions due to their larger size and higher intensity. Consequently, they benefit long-term air quality. The practice is also recognized for benefits of controlling insects and disease, improving wildlife habitat and forage production, fostering natural succession of plant communities, and reducing the need for pesticides and herbicides.

The major pollutant of concern is the smoke produced. Air pollutant emissions are thought to be directly related to the direction (relative to the wind and populated areas) and intensity of the fire, and indirectly related to the rate of fire spread. In turn, these factors are related to weather (wind speed, air temperature, relative humidity); fuels (fuel type, fuel bed array, moisture content, and fuel size); and topography (slope and profile).

If prescribed burning is used, the procedures for conducting the burn will fall under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). Under Rule 444 of the SCAQMD, provisions regarding open fires do not apply to islands located 15 miles or more from the mainland coast. For this reason, no burn permit is required from SCAQMD when conducting a burn. The islands are exempted in part because they do not experience the same weather conditions as the mainland, which include seasonal inversions with stagnant air that contribute to degraded air quality conditions, and because air quality is generally better on the islands than on the mainland. However, a prescribed fire plan will still be developed prior to a burn to describe the conditions under which the burn would take place, including wind speed, wind direction, humidity, and fuel loads. Conducting low-intensity prescribed burns will reduce fuel loads and decrease smoke emissions expected from uncontrolled wildfires in the long run.

Table 4-3, below, depicts estimated emissions from prescribed fire under the assumption that approximately 200 acres of grassland and 100 acres of chaparral would be burned annually. Chaparral values were used to represent any shrub communities burned at SCI. Though most shrub communities proposed for burning on the Island would contain less fuel than a chaparral habitat, this value was used to give a conservative estimate. Fuel loads (tons/acre) were based on the 13 Northern Forest Fire Laboratory (NFFL) fuel models (Anderson 1982) used by most federal agencies. Pollutant emission factors were based on Table 13.1-3 of the U.S. Environmental Protection Agency's "Compilation of Air Pollution Emission Factors" commonly referred to as AP-42 (Technology Transfer Network webpage 2001). The estimated emissions were less than the annual *de minimis* levels.

Table 4-3. Estimated annual emissions from proposed prescribed burns at SCI. Emissions assume 200 acres of grassland and 100 acres of chaparral are burned annually. Emissions of sulfur oxides (SO_x) from wildland burning are negligible. Nitrogen oxides (NO_x) are emitted at rates of 1 to 4 g/kg burned depending on combustion temperatures (AP-42; Technology Transfer Network webpage 2001). Annual de minimis levels are also shown for comparison.

Habitat	Fuel Load (tons/acre)	PM _{2.5}	PM ₁₀	Total PM	CO	NO _x	VOCs
Grassland	0.74	No data	1.5 tons	1.5 tons	11.1 tons	0.148-0.59 tons	No data
Chaparral	6.0	4.8 tons	5.4 tons	9.0	37.2 tons	0.6-2.4 tons	3.8 tons
Total		4.8 tons	6.9 tons	10.5 tons	48.3 tons	0.748-2.99 tons	3.8 tons
<i>De minimis</i>		NA	70 tons	NA	50 tons	10 tons	10 tons

Numerous steps can be taken during a prescribed burn to reduce emissions and these guidelines are included in the INRMP (INRMP Table 4-9). The desired burn conditions correlate well with smoke management needs. Some of these recommendations include:

- Conducting prescribed burns when small fuel moisture is low and large fuel moisture is high to make less fuel available for combustion.
- Isolating fuel that has the potential to smolder for long periods.
- Burning smaller parcels of land.
- Taking advantage of weather conditions that direct smoke away from smoke-sensitive areas or that dilute the smoke before it reaches unacceptable concentrations.

Wind speeds at SCI are typically stronger during the winter months and blow from the west (see Section 3.3.1 of the INRMP for a complete description of weather patterns at SCI). Prescribed burns would not be conducted during times of strong wind, when fire control may be more difficult, and smoke trajectories might reach the mainland.

Prescribed burns are well recognized to minimize emissions in the long term, due to the reduction in possibility of future, uncontrolled conflagrations.

4.1.4 Biological Resources

4.1.4.1 Vegetation Communities

The INRMP provides objectives for the protection of natural plant communities on SCI through monitoring existing conditions and adjusting management practices to maintain healthy plant communities. Recommendations for maintaining or improving the condition of each ecological unit found on the Island are provided (see appropriate unit headings in INRMP Section 2.2.2). Guidelines for developing a plan for detection, monitoring, and treatment of invasive species using principles of integrated pest management are also incorporated. In addition, reducing erosion by methods outlined in sections 4.1.1 and 4.1.2 will stabilize the soil and nutrients required for continued vegetation growth. The INRMP also recommends the following policy strategies that, in conjunction with those listed above, will provide a net benefit to the vegetation communities of SCI:

- Produce a new vegetation map of the Island and revise the current plant community descriptions;
- Evaluate the recent work performed by San Diego State University Foundation on mycorrhizae for its ecological and management significance,
- Evaluate the nutrient cycling process on SCI and develop a nutrient cycling management plan as a component to the fire management plan and restoration plan, and
- Participate in Channel Island-wide monitoring of kelp beds.

The use of herbicides to eradicate non-native or invasive weeds is recommended in the INRMP. Where recommended, the use of herbicides would be applied in accordance with strict label procedures and will yield a net benefit to native plant communities by reducing competition from non-native species.

As discussed above in Section 4.1.2, the fire retardant Phos-Chek is recommended for use as a fire suppression tool. During analysis of this chemical, impacts to vegetation varied (Poulton *et al.* 1997). In one study of a sagebrush community, the application of this fire retardant had no impact on the growth, resprouting, number of flowers, or number of galls of any woody species. Non-woody species diversity and abundance declined after initial application, however, most species returned to control levels after first rains. Its rapid degradation suggested that long-term effects would be unlikely, though the study was only a single year. In a separate study performed in a prairie habitat, a pronounced fertilization effect on annual grasses resulted from the application of Phos-Chek. However, this effect was not noticeable the following year (Poulton *et al.* 1997).

Finally, some foliage damage and death to exposed plants may occur from the application of fire retardants containing ammonium sulfate (Labat-Anderson Inc. 1996). However, similar damage would occur from burning if the retardant were not used. If the retardant is applied just prior to fire season, which starts May 15, then most annual plants will already have completed growth and set seed, thus having little impact on their reproduction.

The possibility that exotic, annual grasses could increase after application of this chemical suggests that retardants should be used only when necessary to maintain the military mission or to protect sensitive resources. Fire retardant may not be appropriate for use in some communities that are particularly susceptible to invasion by non-native grasses. The use of the retardant will be monitored and its impacts to vegetation evaluated regularly.

The fire management strategies of the proposed action will protect plant communities from detrimental effects of uncontrolled wildfire. Since nearly all undeveloped habitat on the Island has the potential to harbor one or more sensitive species, both the past impact and future benefit are difficult to quantify. However, total acreage burned in the four-year period 1996-1999 was 5,441 acres.

The No-Action Alternative includes practices for controlling the introduction of exotic species and monitoring plant communities. Most guidelines are designed to help protect sensitive plant and wildlife species and few protocols are in place to react to declines in plant community health. As evidenced by the dramatic increase in native vegetation in the last 10 years, current practices have successfully managed the native vegetation. The No-Action Alternative would continue existing practices, including propagation of native plants on Island, flagging sensitive species locations, and locating ground disturbing activities on previously disturbed ground. However, the lack of a Fire Management Plan under the No-Action Alternative could result in temporary impacts to sensitive plants and wildlife, and in the worst case scenario, localized extirpations.

4.1.4.2 Sensitive Plant and Wildlife Populations

An element of the INRMP's goal is to protect all of the native species on SCI and to ensure that additional species do not decline to the point where listing is required. However, many sensitive species were designated as Management Focus Species or addressed as part of their taxonomic group during the development of the document. All federally-listed species received special consideration when goals and policies were set for management units, as did most state-listed species, species of concern, and endemic species. In addition, management recommendations provided for each ecological unit were designed for overall community health and should benefit all organisms living within them. Most recommendations were designed to be consistent with existing BOs; any that were not will undergo consultation with USFWS. The following strategies were developed for specific listed species:

San Clemente Loggerhead Shrike

- Initiate Section 7 consultation with the USFWS to establish an incidental take allowance for loggerhead shrikes.
- Continue the captive propagation and rearing of loggerhead shrikes. Maximize the genetic diversity of the captive population. Manage the captive population for 60 adults entering the breeding season and continue to release captive-reared shrikes into the wild. In 2002, determine which of the four release methods used during the previous three years was most effective.
- Continue predator management efforts. All cats on SCI should be removed and the feeding of cats in Wilson Cove should be discouraged. Renew Instruction regarding feral animals and their control on SCI. Continue to remove black rats from around shrike nesting areas. Continue to trap and radio-collar island foxes that consistently use active shrike breeding territories. Monitor ravens and raptors near shrike nests and remove nests of these shrike predators from the vicinity.
- Continue to enhance shrike nest locations and foraging areas. Continue supplemental feeding of recently released pairs and family groups. Propagate tree species used by shrikes for nesting and perching in the nursery, and outplant them into appropriate canyons. Until the island's tree species recover, continue to provide artificial perches in shrike foraging areas to increase foraging success. Manage grasslands to encourage the reduction of non-native, annual grasses and the recovery of native bunch grasses.
- Continue island-wide monitoring of the wild population. Within the limits of current funding, during the breeding season monitor, to the best of the available personnel's ability, all shrikes. In November and March, conduct island-wide surveys semi-annually.
- Ensure that shrike ecology is considered in all fire management decisions. Assure that a qualified biological monitor observes shrikes during all phases of the installation of fuelbreaks to assure that shrikes are not impacted by installation activities.
- Reduce conflict between military activities and shrike recovery. In coordination between the SCI Shrike Program Manager and SCORE Range Manager, review flight patterns to avoid shrike breeding areas for helicopters involved in range maintenance and clean up during the shrike breeding season.
- Continue current research projects into various aspects of shrike ecology and captive rearing techniques, and encourage new research that may elucidate aspects of shrike ecology and improve recovery.

San Clemente Sage Sparrow

- Manage disturbance in this community. Minimize ground and vegetation disturbance in the high-density sage sparrow area, from the rifle range east of the dunes to Seal Cove. Minimize the footprint of activity in high-density boxthorn habitat. Locate ground-disturbing activities on previously disturbed sites whenever possible. Keep vehicle activity to clearly delineated roads or transit zones. Restore unused, closed, or unnecessary roads to native vegetation in order to prevent erosion of topsoil. Where repeated use is expected, create trails.
- Reduce the cover of exotic species, based on at least one seven year El Niño cycle.
- Improve fire management strategy development by evaluating the status of the community on sites with different fire history. Conduct experimental burns to clarify the response of this community to fire, in consultation with the USFWS.

- Continue monitoring and expand surveys to the winter time to determine seasonal changes in home ranges and habitat use. Quantify attributes of wintering and breeding habitat and properly incorporate into sage sparrow management strategies for SCI. Develop a Habitat Suitability Index model for the species.
- Ensure that cat and rat control efforts are properly integrated with the San Clemente sage sparrow conservation program.

Island Night Lizard

- Conduct INL surveys in the INLMA every five years. If numbers suggest a dramatic population decline, identify probable causes, take remedial measures as necessary, and expand surveys as appropriate to other island locations to confirm status.
- Establish that military training exercises in the form of dispersed pedestrian traffic and minor localized construction adjacent to existing facilities on already disturbed ground will still be allowed. Establish that recreational use of the west shore of San Clemente within the management area can continue.
- Establish a “no net loss” habitat policy for the management area. Determine that existing roads, utilities, and other areas of past disturbance, if still needed, will be excluded from the INLMA. Avoid large scale construction or military activities in the management area and restore newly disturbed areas.
- Continue site approval process for military activities within and outside the INLMA to determine effects on INL and potential need for further consultation with USFWS.
- Survey for invasive weeds and prioritize annual control programs for the INLMA. Ensure that no new animals are introduced to the island that could be a INL predator, competitor, or introduce disease. Provide for aggressive control of existing invasive animals in the INLMA. Continue program of vigilance by personnel trained in identifying exotic plants and animals. Increase emphasis of the cat and rat control program in the INLMA.
- Manage fire to protect the integrity of the management area for INL. Avoid or minimize live fire exercises that heighten the frequency of wildfire or size of area burned in the management area. Any prescribed burning program for long-term maintenance should be confined to a small portion of the INLMA at sufficiently low frequencies to avoid excessive effects on the species in a short time frame.
- After implementing the designated land management units recommended in the INRMP, re-evaluate the necessity of the INLMA.
- Seek de-listing of the INL since population levels appear secure and there are no clear threats to these numbers.

Western Snowy Plover

- Continue annual monitoring of the snowy plover. Ensure that timing of monitoring includes best opportunity to detect nest scrapes and to determine the presence prior to beach hovercraft landings.
- Avoid enhancement projects aimed at promoting nesting of western snowy plovers that are subject to predation of nests and young by foxes and cats. Determine the extent of predation on plovers.
- Investigate and resolve potential conflicts between target placement and snowy plover beach use in Pyramid Cove.
- Minimize shoreline construction that results in a loss of coastal strand habitat. Loss of this habitat could also reduce beach training capabilities.

- All snowy plover nests found will be protected with exclosures and/or symbolic fencing with interpretive signs (see USFWS draft Recovery Plan, Appendix F).
- Military operations should not be conducted at Horse Beach from 15 March–31 July, and military personnel should be encouraged to keep out of this area during the same time period. Human disturbance should be minimized at West Cove from 15 March–31 July for at least two consecutive years to allow Western snowy plovers to successfully breed.
- Removal of feral cats should continue at all beach sites..

Island Fox

- Develop a Candidate Conservation Agreement with the USFWS that outlines implementable conservation measures to decrease the number of foxes killed by vehicles, to increase the visibility of foxes on roadsides, and to increase our knowledge of the distribution of island foxes in relation to various vegetation communities. Mow the vegetation within 10 feet of roadways to provide better visibility of and by foxes. Educate personnel about the road kill issue and enforce the slower speed limits instigated in 2001.
- Continue to monitor and study fox demographics and ecology. Determine current levels of reproductive success, prey abundance, and disease, and causes of mortality. Focus telemetry work on better understanding the fate of foxes that were held in captivity during the shrike breeding season and later returned to their home ranges.
- Consider establishing additional trapping grids in SHOBA. Weigh the value of adding a new grid in SHOBA with expected effects on training there as an integral part of the continued planning for fox status surveys.
- Find ways to better educate the public (i.e., recreational boaters) about the effects to foxes of bringing domestic dogs onto the island. Continue to disseminate the brochure made by NRO regarding this topic.
- Non-native grasses are presently too tall and inhibit the fox's ability to hunt. Grassland habitat should be enhanced for the benefit of Island foxes through prescribed burns, herbicides, or other means which reduce standing crop biomass.

Fishes

- Federal agencies are required to ensure that their actions will not adversely impact Essential Fish Habitat. If Essential Fish Habitat is likely to be adversely impacted, the Navy shall enter into consultation with NMFS.
- Comply with Essential Fish Habitat guidance on defining effects on habitat of these species for any in-water projects.
- Conduct an EFH analysis for use in future project planning, targeting the fishes listed in Chapter 3.
- Habitat protection, water quality improvement, and monitoring are the primary means SCI will provide for marine fishes.
- Conserve eelgrass and unvegetated, shallow habitat that provides reproductive, nursery, and foraging functions for fishes.
- Comply with the Southern California Eelgrass Mitigation Policy.
- Conserve surf grass as a nursery for lobster and for its other values.
- Implement Best Management Practices to protect and improve water quality and to prevent sedimentation from SCI land and roads into sensitive waters.

- Continue to implement BMPs during construction and training evolutions to keep temporary turbidity increases to a minimum, for the protection of foraging fishes.
- Cooperate in interagency monitoring that will help improve fish management decisions.
- Promote education and outreach.
- Cooperate with interagency environmental education programs and that make available informational literature and signs to raise awareness of threats, concerns, and management needs for fishes, including enforcement of fishing regulations.

Marine Mammals

- Minimize access and disturbance to California sea lion haul outs and rookeries during April through May that may result in mortality to pups.
- Report dead or stranded marine mammals to the appropriate agency. The NMFS Southwest Fisheries Science Center (858-546-7162) should be contacted when dead marine mammals (or turtles) are located. Seaworld's Animal Care Office (619-226-3893 or 619-225-3213) should be contacted when stranded or injured marine mammals are located.

White Abalone

- Participate in recovery planning for the white abalone and be a full partner on the recovery team or other recovery planning.
- Support Navy abalone hatchery outplanting program, but this should not be funded out of the natural resources program, and care should be taken regarding the inadvertent introduction of exotics.

Rare plants

- A list of 21 rare plant species proposed for special management focus is presented in the INRMP. Recommendations for these species are contained within species profiles in Appendix D of the INRMP and within the strategies proposed for individual ecological units.

As described in sections 4.1.2 and 4.1.4.1, the fire retardant Phos-Chek D75-F is recommended for use as a fire management tool. This chemical was found to have a low order of ammonia or phosphorus toxicity to terrestrial species and “no detectable change in small mammal or insect communities post treatment” was observed (Poulton *et al.* 1997). Some larval stages of fish found in freshwater systems were intolerant of the chemical when it was added directly to the water and mortality was the result. However, at recommended concentrations, the retardant was found to be “practically nontoxic” to an aquatic arthropod (*Daphnia magna*), rainbow trout, fathead minnows, rabbits, and rats (Astaris Material Safety Data Sheet 2000, Appendix C). At recommended levels, no mortality of birds was observed during laboratory tests (Poulton *et al.* 1997). Steps will be taken to minimize the effects of the retardant on native wildlife, especially potential impacts to aquatic systems (Section 4.1.2).

Under the No-Action Alternative, current management strategies would not change; current programs continue to be updated as information on sensitive species is developed. The management of most sensitive species is mandated by state or federal. Consequently, this alternative would continue to improve the status of sensitive species in compliance with federal mandates.

4.2 Man-Made Environment

4.2.1 Land Use

Potential land use impacts resulting from the Proposed Action are based on the level of use and sensitivity of areas affected by the action. In general, land use impacts would be significant if they:

- are inconsistent or noncompliant with the military mission,
- result in net loss of military land use,
- reduce the viability of existing land use activities,
- are incompatible with adjacent land use to the extent that public health or safety is threatened.

The proposed action would have no impact on land use patterns at SCI by ensuring the compatibility of the military mission with environmental protection and no net loss of available land and operational carrying capacity. The INRMP divides the Island into 18 land management units (LMUs). The LMUs were designed to allow for a finer scale focus and aid in supporting use, natural resource and fire management, and restoration objectives, and deconflicting possible incompatibilities. In addition, personnel trained in natural resource management would help make land use decisions and guidelines are described for evaluating land use changes. The Proposed Action includes a series of maps that identify operational and sensitive habitat areas. It also provides enhanced guidelines for NEPA compliance and defines an organized structure for restoration decisions. The Proposed Action includes making the entire Island accessible for bird surveys several times a year, thus affecting existing operational land use.

Policies described in the INRMP will allow, once again, for military training to be conducted in most of the SHOBA training area with only limited restrictions. New fire management capabilities and guidelines for de-conflicting incompatibilities between natural resources and military needs will allow for multiple uses of formerly restricted areas. These new strategies will be consulted on under the ESA with USFWS in preparation for the 2002 fire season. The INRMP also presents a thorough discussion of the location and condition of most natural resources on the Island, as described to date. This compilation of information gives land managers an easily accessible guide for making land use decisions.

4.2.2 Transportation and Circulation

Impacts to transportation and circulation are assessed with respect to the potential for disruption or improvement of current transportation patterns, deterioration or improvement of existing levels of service, or changes in existing levels of transportation safety. Traffic congestion is not a significant concern on SCI and road maintenance is addressed under soil erosion (Section 4.1.1).

The proposed action would have no effect on current levels of transportation and circulation. It is recommended that infrequently-used roads be closed, that necessary roads be brought up to standard to control erosion, and off-road vehicle traffic be limited to specific areas, but this will not noticeably change the amount of traffic on primary roads. It is also recommended that the recently established lower speed limits continue to be enforced to reduce island fox mortality, but this should have no affect on traffic patterns.

The INRMP also proposes a program to reduce the possibility of Bird/Aircraft Strike Hazards (BASH). These recommendations will improve the safety of the SCI airfield to military and contractor aircraft serving or training on the Island while reducing the potential for birds to be killed. Access by recreational boats is addressed below in Section 4.2.6.

4.2.3 Noise

Noise issues are considered in terms of their impacts to humans and wildlife. Human land uses that are considered sensitive to noise levels include residential, educational, and health care facilities. On SCI, living quarters are restricted to Wilson Cove; there are no schools and only a small medical clinic. Increases in local traffic resulting from proposed actions can also affect areas sensitive to noise levels. Noise impacts would occur if an action directly or indirectly:

- increases the ambient community noise equivalent level (CNEL) above the acceptable land use compatibility criteria (typically 60 or 65 decibels CNEL for residential, education, and health care land uses) at areas considered sensitive to noise; 65 to 85 Ldn noise levels are suitable for recreation and open space uses, in accordance with Air Installation Compatible Use Zone (AICUZ) guidance ; or
- Less stringent guidelines apply to noise sources that are temporary in nature and are restricted to daytime hours, such as most construction activities, unless they impact noise-sensitive land areas. Military training exercises and aircraft noise levels are within the parameters of noise levels associated with airfields and explosive training ranges.

The INRMP does not recommend any activities that would noticeably increase noise levels on SCI. Small projects, such as construction of water bars, retaining walls, diversion culverts, or a demonstration garden are recommendations in the INRMP and project details are not yet defined. The NEPA review of noise impacts from small construction projects will verify that no significant effects are likely. The INRMP recommends performing construction outside of the breeding season of most birds and placing new projects within previously disturbed areas. Any proposed construction project will be temporary, restricted to daylight hours, and will not produce long-term adverse noise effects. As discussed in Section 4.2.2, no increases in transportation or circulation are expected from the Proposed Action.

4.2.4 Aesthetics

The Proposed Action would improve the local aesthetics by enhancing and protecting natural habitats through new erosion control measures (Section 4.3) and habitat restoration (Section 4.1.4.1), weed control, and by improving the condition of the landscaping in residential areas. However, additional fuelbreaks and prescribed burning would result in acreage that is regularly burned, and this could be considered detrimental to aesthetic values. However, these fuelbreaks are necessary for the safety of personnel and to manage detrimental effects of uncontrolled wildfire on natural resources.

4.2.5 Cultural Resources

Federal laws and regulations protect cultural resources and require Federal agencies to identify, protect, and manage them. Within Navy Region Southwest and Naval Base Coronado, compliance with these requirements and general management of cultural resources issues are the responsibility of the CNRSW Cultural Resources Management Program (CRMP). In coordination with the Public Works Officer and other resource management programs, the CRMP ensures that qualified professional oversight is provided for archaeological and architectural resources.

Consistent with existing protocols, all actions under this INRMP of a type that could affect cultural resources must be reviewed by the CRMP in advance of implementation through the site approval process. Ground disturbing activities and alteration of landscaping in proximity to structures are examples of such actions. Prior to commencement of work, biological management actions must be evaluated by the CRMP, in order to ensure that the actions do not create adverse effects to National Register eligible cultural resources.

4.2.6 Public Facilities/Access/Recreation

SCI is not open to the public. Recreational boats are allowed in the waters surrounding SCI as long as they remain in radio contact with the Navy. They are restricted from coming ashore, though occasionally some do. Boy Scout and Girl Scout troops are also granted permission for multiple day camping trips to the Island. In addition, the Navy frequently receives requests to conduct natural resource research on the Island from public and private organizations. This section addresses public access issues and also considers the impacts of recreational opportunities for on-Island personnel, including fishing, boating and diving.

The proposed action does not recommend any restrictions on recreational boat access or current use by scouting organizations. It suggests creating clear, coherent policies and procedures for allowing temporary public access to SCI that does not interfere with the military mission. Under recommendations for monitoring the Island's resources, the impacts of this recreational use on marine resources could be gauged and access adjusted as needed. The INRMP also encourages cooperation with outside agencies interested in performing research on SCI. The INRMP recommends participating in regional conservation and monitoring programs and soliciting funding from outside sources for use in natural resource management projects.

Recreational opportunities for individuals stationed on SCI are not numerous and this alternative proposes a program to identify and enhance these. The INRMP recommends developing maps of those areas suitable for recreational use and producing interpretive material for resources found in those areas. Information will also be included describing which areas are to be avoided because of sensitive resources or safety concerns. Recreational use of undeveloped areas on SCI by personnel is negligible and no adverse impacts to the environment are expected from these activities.

4.2.7 Safety and Environmental Health

Since this is a natural resource management plan, there would be few effects on people in developed areas. Some appropriate concerns are increases in herbicide and rodenticide use in urban areas and vehicle-caused injuries to pedestrians. Where recommended, the use of herbicides or rodenticides would be applied in accordance with strict label procedures, and using an Integrated Pest Management approach as required by Navy guidance. This proposed action recommends limiting the application of herbicides and pesticides, including rat bait used at shrike nests, by use of DoD mandated integrated pest management procedures. Traffic increases were addressed in Section 4.2.2.

Federal agencies must "make it a high priority to identify and assess environmental health risks that may disproportionately affect children, and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks and safety risks" (EO 13045). Neither of the Alternatives propose measures that would present environmental health risks that disproportionately affect children. Children are only present during Boy Scout and Girl Scout field trips to the Island.

The fire retardant Phos-chek G75 is not significantly toxic, with constituents comparable to low concentrations of nitrogen and phosphorus fertilizer. It is no more than slightly irritating to the eyes, skin, or respiratory tract, and is not toxic if swallowed. However, the retardant would not be applied near facilities and would only be applied by trained personnel. It is not considered a hazardous waste when discarded and may be landfilled. Additional application procedures to minimize environmental impacts are discussed in Section 4.1.2.

No INRMP action is expected to alter the operation of the existing landfill on SCI. Earthmoving, traffic, and cleared areas in the landfill footprint are essential for meeting landfill operation, and any changes to these operations have been avoided in the INRMP, to avoid impairment to these operations.

Finally, personnel safety is expected to be enhanced by the establishment of fuelbreaks and fire-safe planning around structures.

4.2.8 Utilities

No changes to current utility use are expected under the proposed action. However, recommendations are made for protecting existing utility poles from igniting wildfires by mowing around their bases. In addition, water conservation measures for landscaping will reduce water use in developed areas. To improve communication for all individuals working on the Island, satellite radios are proposed for use. These changes are expected to have positive but insignificant changes to the utilities at SCI. Many conservation policies for power and water are currently in effect.

4.2.9 Socioeconomics

SCI is isolated from the mainland and is solely occupied by the Navy. The communities surrounding NAS North Island or the Anti-submarine Warfare Base Point Loma where administration of Island activities is conducted would most heavily experience the impacts associated with activities proposed in the alternatives. Only a limited number of individuals are stationed on the Island at any one time and most are stationed on a short-term basis. The greatest socioeconomic impact would occur if the Navy could no longer train on SCI, and resulted in much of the NAS North Island support was moved elsewhere.

This proposed action would have no effect on local population, employment, or income contributions as no significant increase or decrease in SCI personnel are expected under proposed measures. Overall, the proposed action would have no impact on current socioeconomic conditions in the area.

4.3 Environmental Effects Comparison and Summary

Table 4-3 contrasts and summarizes the environmental effects of the two alternatives.

Table 4-3. Comparison of environmental effects of the Proposed Action and No-Action Alternative.

Topic	Proposed Action	No-Action Alternative
Geology, Topography, Soils	Positive Effect	No Effect
Hydrology and Water Quality	Positive Effect	No Effect
Air Quality	No Effect	No Effect
Vegetation Communities	Positive Effect	No Effect
Sensitive Plant and Wildlife Populations	Positive Effect	No Effect
Land Use	Positive Effect	No Effect
Traffic and Circulation	No Effect	No Effect
Noise	No Effect	No Effect
Aesthetics	Adverse Effect or No Effect	No Effect
Cultural Resources	Positive Effect	No Effect

Topic	Proposed Action	No-Action Alternative
Public Facilities/Access/Recreation	Positive Effect	No Effect
Safety and Environmental Health	Positive Effect	No Effect
Utilities	No Effect	No Effect
Socioeconomics	No Effect	No Effect
<p>No Effect=alternative would have no impact on current status of topic; Positive Effect=alternative would produce a net benefit to topic; Negative But Less Than Significant Effect=alternative would detract from the values described for the topic area but the impact is temporary or below a threshold of significance; and Significant Negative Effect=alternative could produce an undesired impact on topic and this effect is above a threshold of significance.</p>		

5.0 Cumulative Impacts

Cumulative impacts are those effects resulting from incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions (regardless of which agency or person undertakes such actions). Cumulative impacts can result from individually insignificant but collectively significant actions taking place over a period of time. Consideration must be given to the cumulative effects of the Proposed Action and alternatives with management actions occurring on SCI and within the surrounding region.

Topics that could potentially be affected by cumulative impacts with the Proposed Action or No-Action alternative and local and regional projects are discussed below under those projects. The Proposed Action should not produce any cumulative negative effects with other projects. It was designed to protect and enhance the natural resources on SCI while helping to conserve regional plant and wildlife populations. It also considers the cultural and socioeconomic effects to surrounding communities of actions taken. All other projects were previously reviewed for conflict with existing natural resource management, including the construction projects, BOs, and programs that the No-Action Alternative is based upon, and were approved in one form or another. Therefore, cumulative impacts with the No-Action Alternative would have been addressed during the approval process for each project.

In addition, the implementation of any alternative would comply with the General Conformity Rule of the Clean Air Act (Sec. 176c), because previously established time lines for attaining air quality standards will still be enforced and no alternatives would cause or contribute to any new violations of air quality standards in the region. Consequently, no significant cumulative impacts to air quality would result from the implementation of any of the alternatives.

5.1 Projects on SCI

The effects of all alternatives must be considered in conjunction with other projects on (or near) SCI to determine if they would produce conflict or result in cumulative effects. Projects that were developed concurrently with the INRMP, and evaluated in this section, are the Operations Management Plan and associated Environmental Impact Statement (EIS), the Draft SCI Wildland Draft Fire Management Plan (Appendix I of INRMP), Island Night Lizard Management Plan (currently in draft), and the San Clemente Loggerhead Shrike Recovery Plan by USFWS (currently in draft). These are all key documents that influence the future management direction of SCI, and with which the INRMP attempts to be consistent.

5.1.1 Operations Management Plan, Environmental Impact Statement, and Associated Increase in Training Footprint and Tempo

The Operations Management Plan (OMP) for the Ranges and Operational Areas at San Clemente Island, California and the related EIS/Overseas EIS (OEIS) have been under development during a timeframe parallel to that of this INRMP. Currently, the Navy has a Draft OMP, but has not yet funded a revision phase.

The OMP discusses the impacts on SCI's natural resources from expected increases in training. These impacts are analyzed in the EIS/OEIS, which discusses increasing operations from the 1997 baseline of 2700 operations to alternative 1 (3000 operations plus air operations) and the preferred alternative 2 (3400 operations, plus air operations). It also discusses installation of a

battalion landing exercise that would place tracked vehicles in an exercise that runs parallel to the Ridge Road for most of the length of the Island, the West Coast Shallow water extension range (SWTR), improvements in 16 training area ranges (TARS) for use by Navy SEALs, and increases in other island operations including SCORE, SHOBA and research, development, training, testing and evaluation (RDT&E). In expectation of increased training a new BEQ has recently been constructed and a permit to increase sewage discharge from 25,000 gallons/day to 40,000 gallons/day is being sought.

De-conflicting training and natural resource management is a primary emphasis of the OMP and impacts to the environment will be disclosed and mitigated for in the EIS. In addition, individuals responsible for developing the OMP and EIS were members of the SCI working group that helped develop the INRMP. Consequently, potentially conflicting issues were discussed and dealt with during working group meetings and early drafts of the INRMP. Because the EIS/OEIS is still under development and the INRMP is scheduled for completion prior to the EIS, the EIS will discuss any potential cumulative impacts. Amendments to the INRMP may be expected in conjunction with the completion of the SCI Range Operations EIS.

5.1.2 SCI Wildland Fire Management Plan

The San Clemente Island Draft Wildland Fire Management Plan (Fire Plan) is intended to shape fire policy, management, and decisions on the Island for the next five years. It sets the course for the integrating the Navy's mission, fire management, and related natural resource protection on SCI. The Draft Fire Plan addresses all aspects of wildland fire management consistent with federal fire policy, environmental laws, and the Sikes Act Improvement Act. Any effects to federally listed species will be consulted on in a Biological Assessment on the Draft Fire Plan.

Federal wildland fire policy mandates that all federal lands with burnable vegetation have a fire plan and resources to safely mitigate any resource losses. This Draft Fire Plan is to be consistent with federal wildland firefighting policy as it was adopted by the DoD Wildland Fire Policy Working Group in 1966, signed by DoD, and implemented as DoD Instruction 6055.6 (DoD Fire and Emergency Services Program October 10, 2000). This Instruction provides policy and criteria for the allocation, assignment, operations, and administration of the DoD Fire and Emergency Services (F&ES) and Emergency Medical Service programs.

The Draft Fire Plan was developed in conjunction with the INRMP, and is the basis of the delineation of the Management Units, because fire management is a key concern of natural resource management on SCI. Since both plans were developed simultaneously, management recommendations are identical between the two documents. The Draft Fire Plan simply develops the principles behind the recommendations in more detail and provides a more concise document for fire managers to use. Consequently, there will be no conflicts or cumulative impacts due to the concurrent implementation of these two documents.

5.1.3 Island Night Lizard Management Plan

A special management area has been designated on the west side of San Clemente as part of consultation and a BO on fire management on the Island. The area consists of approximately 11,000 acres (4,400 ha), approximately 30 percent of the Island (36,200 acres). The INLMA encompasses night lizard habitat containing the highest lizard densities on the Island; it collectively accounts for about 50% of the island population. It is currently recognized by the Navy as an area of conditional use. Within this region all military construction over five acres or increased training requires review to assess the effects on the lizard. The terms and conditions from this consultation and concept of an INLMA are the most sweeping conservation measures yet for the lizard on the Island. Some of these conditions include: restrictions on training and ground disturbance, a limit on the amount of "superior quality" habitat that may be disturbed,

mitigation for newly disturbed habitat, designation of best management practices for construction projects, enhancement measures for degraded habitat, and population monitoring every five years. INRMP conditions include exempt training and construction outside the INLMA from further consultation on Island night lizard until future activities disturb 20% or more of the “unmanaged” habitat that is outside the INLMA.

5.1.4 San Clemente Loggerhead Shrike Recovery Program

The current recovery program for the San Clemente loggerhead shrike includes: 1) a captive breeding and rearing program, 2) island-wide monitoring throughout the year, 3) predator management efforts, 4) nest location enhancement, 5) fire management protocols, and 6) restrictions on military use in some parts of SCI. The captive breeding program is handled by the Zoological Society of San Diego and includes a rearing facility on the Island. Individual shrikes and eggs are continually removed from, or released into, the wild depending on their condition and genetic disposition. Island-wide surveys are conducted quarterly and monitoring of breeding pairs in the wild occurs regularly during the breeding season. Feral cats are tracked and removed from areas used by shrikes throughout the year. In addition, island foxes located within shrike breeding territories are trapped and radio-collared with a device that deters them from entering the area near a nest. Nest locations are enhanced through supplemental feeding and rodent deterrence. Military training activities are restricted with regard to timing and use of ordnance, and must be preceded by shrike surveys and fuelbreak preparation. In addition, research projects are underway to study various aspects of shrike ecology and captive rearing techniques.

5.1.5 Feral Mammal Removal Program

A feral mammal removal program, begun in 1972, resulted in the removal of 28,381 goats and 2,195 pigs over close to 20 years. The effort included goat trapping, netting, adopt-a-goat program, lethal removal, and ended with the Judas goat program. San Clemente Island is now free of feral grazers. However, decades of disturbance, possibly starting from Spanish exploration times in the 16th century, from feral grazers altered most of the native plant communities on SCI. Since the removal of these mammals, the island ecosystem has begun to recover and move towards a new, possibly unprecedented equilibrium. It is often the case that perturbed systems do not return to their natural successional or climax pattern even when the perturbing agent is removed (George *et al.* 1990). This INRMP is developed in this dynamic context, that is, in which the Island is recovering on its own course as management direction is developed. For this reason, and for reasons of many other unknowns about the resource, the INRMP explicitly adopts an adaptive management approach that provides for strategy adjustments from year to year.

5.2 Regional Projects

Because SCI is isolated from the mainland, there are few regional construction or management projects that affect the Island. Past, present, or future projects relevant to the region around SCI include: the Channel Islands National Marine Sanctuary, the newly proposed state Marine Protected Areas near SCI, and the Navy’s Regional Shore Infrastructure Plan.

5.2.1 Channel Islands National Marine Sanctuary

The Channel Islands National Marine Sanctuary surrounds Channel Island National Park (Anacapa, Santa Cruz, Santa Rosa, San Miguel, and Santa Barbara islands) to six nm from shore.

A separate five-year management planning process is now in progress for the area. Fishing and many other kinds of uses are restricted under a Sanctuary designation.

5.2.2 Proposed State Marine Protected Areas

As part of the Marine Life Protection Act of 1999, many new Marine Protected Areas (MPAs) were proposed including three in the waters around SCI. The proposal states that the MPAs are not intended to limit or restrict military exercises in the region. Management of the MPAs will eventually be addressed in a CDFG-led Master Plan. The goals of the MLPA are to protect the natural diversity and abundance of marine life, improve recreational, educational, and study opportunities provided by marine ecosystems, and to manage California's MPAs in a clear and consistent way.

5.2.3 CNRSW's Regional Shore Infrastructure Plan (RSIP)

The RSIP includes an imbedded Activity Overview Plan for SCI with a dual purpose: to provide the Navy with land use planning tenets that will guide general locations for infrastructure, activities, and operations; and to provide a guide for utilities and facilities infrastructure planning, maintenance and future development. It is scheduled for completion in March 2002.

6.0 Other NEPA Considerations

6.1 Irreversible and Irretrievable Effects of the Proposed Action If Implemented

NEPA requires an analysis of significant irreversible effects. Resources that are irreversibly or irretrievably committed to a project are those that are utilized on a long-term or permanent basis. This includes the use of non-renewable resources such as metal, fuel, and other natural or cultural resources. Human labor would be considered a non-renewable resource because once labor is expended it cannot be renewed. These resources are considered irretrievable because they would be utilized for a project when they could have been used for other purposes.

Implementation of the proposed INRMP would result in a minor irreversible and irretrievable commitment of certain non-renewable resources. Erosion control, weed control, prescribed fire application, use of fire retardant, and long term monitoring, for example, associated with the INRMP would result in an irretrievable commitment of fossil fuels for vehicles and equipment, and other resources, such as human labor. These commitments of resources are neither unusual nor unexpected, given the nature of the INRMP, and are generally understood to be tradeoffs, which benefit the resources if the INRMP is implemented. These long-term impacts associated with the proposed action that for all purposes are considered irreversible have been discussed in greater detail in Chapter 4 of this EA.

6.2 Short-Term Use Versus Long-Term Productivity

This section provides a discussion of the relationship between local short-term uses of the human environment by the Proposed Action, and the maintenance and enhancement of long-term environmental productivity. The Proposed Action is the implementation of the INRMP. As described in this EA, the INRMP would not result in any long-term negative effects on the environment of SCI. As a result, the Proposed Action would not result in any environmental impacts that would permanently narrow the range of beneficial uses of the environment, or pose long-term risks to the health or safety of personnel working and residing on the Island. In fact, the proposed INRMP would have primarily beneficial impacts to most of the resources on SCI.

6.3 Potential Conflicts Between the Proposed Action and the Objectives of Federal, State, and Local Land Use Plans, Policies and Controls for the Area Concerned

The Proposed Action was designed to ensure that activities at SCI are conducted in accordance with all federal, state, and local land use plans, policies and controls. It is in compliance with all Acts of Congress, EOs, and DoD and Naval Instructions. Regulations and strategies to protect populations of sensitive plant and animal species were also followed in preparation of the

Proposed Action. The following is a discussion of local and regional plans and policies and their interactions with the Proposed Action.

Regional Water Quality Control Board's Los Angeles Basin Plan. This plan is designed to preserve and enhance water quality and protect the beneficial uses of all regional waters. Specifically, the Basin Plan: 1) designates beneficial uses for surface and ground waters; 2) sets objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's anti-degradation policy; and 3) describes implementation programs to protect all waters in the Region. In addition, the Basin Plan incorporates all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. The Basin Plan is a resource for the Regional Board and other agencies that use water and/or discharge wastewater in the Los Angeles Region.

Island Fox Conservation. Four subspecies of the Channel Islands fox were recently listed as Threatened under the ESA by the USFWS. The SCI subspecies was not listed. However, the NRO is currently working with the USFWS to develop a San Clemente Island fox conservation agreement. This agreement is designed to protect the island fox on SCI and to preclude the need for federal listing (it is currently State listed as endangered). The recovery of the fox on SCI is a unique management situation because of current measures being taken to protect the San Clemente loggerhead shrike, including trapping and removing foxes from shrike territories.

Strategic Plan for Channel Islands National Park. This plan addresses the management of five of the Channel Islands including the Navy-owned San Miguel Island, managed by NPS under a MOU. There are no known incompatibilities between the INRMP and the Resource Management Plan for Channel Islands National Park.

Catalina Island Management. Catalina Island, under the direction of the Catalina Island Conservancy, is currently developing a natural resources management plan. There are no known conflicts between the INRMP and the Catalina Island management plan.

Proposed Marine Protected Areas. Three new marine protected areas are proposed in SCIRC waters under Assembly Bill 993 (Shelley), and the Marine Life Protection Act (MLPA). CDFG will develop a Master Plan for these areas once their sites and boundaries are finalized. A Revised Draft Concept will be published and discussed in meetings before it goes to the Fish and Game Commission (Commission). The Draft Master Plan is due to the Commission on January 1, 2003, a revised draft is due on April 1, 2003, and the Commission must adopt the Master Plan by December 1, 2003. The proposal currently states that the MPAs are not intended to limit or restrict military exercises in the region. The Navy may seek an exemption to continue current activities related to SCIRC if these Marine Protected Areas are formalized and military exercises are affected.

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Appendix A: Acronyms

Acronyms	
1 MEF	One Marine Expeditionary Force
ASBS	Area of Special Biological Significance
BASH	Bird Aircraft Strike Hazard
BEQ	Bachelors Enlisted Quarters
BMPs	Best Management Practices
BO	Biological Opinion
BUD/S	Basic Underwater Demolition/SEALs
BWG	BASH Working Group
CCC	California Coastal Commission
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CINWCC	California Interagency Noxious Weed Coordinating Committee
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CSC	California Species of Concern
CWA	Clean Water Act
CWQCP	Comprehensive Water Quality Control Plan
CZARAs	Coastal Zone Act Reauthorization Amendments
DoDINST	Department of Defense Instruction
DoN	United States Department of the Navy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESA	Endangered Species Act
F&ES	Fire and Emergency Services
FDRS	Fire Danger Rating Systems
FE	Federally Endangered
FONSI	Finding of No Significant Impact
FOs	Forward Observers
FSC	Federal Species of Concern
ft	feet
FT	Federally Threatened
GIS	Geographic Information System
ha	hectare
ICS	Incident Command System
INL	island night lizard
INLMA	Island Night Lizard Management Area
INS	Immigration and Naturalization Service
IR	Installation Restoration
JSOW	Joint Standoff Weapon
kw/Hr.	Kilowatt per hour
LCAC	Landing Craft Air Cushion
LCTA	Land Condition Trend Analysis
LCU	Landing Craft Units
LMUs	Land Management Units
MAROPS	Maritime Operations
MCAS	Marine Corps Air Station
MCBCP	Marine Corps Base Camp Pendleton
MDS	Maritime Desert Scrub
MDSLY	Maritime Desert Scrub <i>Lycium</i> phase
MLPA	Marine Life Protection Act

MOU	Memorandum of Understanding
MOUT	Military Operations in Urban Terrain
MPA	Marine Protected Areas
NALFSCIINST	Naval Auxiliary Landing Field San Clemente Island Instruction
NASNI	Naval Air Station North Island
NAVSPECWARGRU1	Naval Special Warfare Group ONE
NBC	Naval Base Coronado
NEPA	National Environmental Policy Act
NFFL	Northern Forest Fire Laboratory
NGFS	Naval Gunfire Support
NH3	Phosphorous
NH4+	ammonia nitrogen
NO2	Nitrogen dioxide
NOx	Nitrous oxides
NPL	National Priorities
NPS	Non-point Source
NRCS	Natural Resource Conservation Service
NRO	Natural Resource Office
NUWC	Naval Under Sea Warfare Center
NWCG	National Wildfire Coordinating Group
O3	Ozone
OEIS	Overseas EIS
OICs	Officers in Charge
OMP	Operations Management Plan
OPNAVINST	Naval Operations Instruction
PIF	Partners In Flight
PM10	particulate matter
ppm	Parts per milimeter
PWC	Public Works
R&D	Research and Development
RAWS	Remote Automated Weather Stations
RCRA	Resource Conservation and Recovery Act
RDT&E	Research, Development, Test and Evaluation
REWS	Range Electronic Warfare System
RONA	Record of Non Applicability
RSIP	Regional Shore Infrastructure Plan
RSOs	Range Safety Officers
RWQCB	Regional Water Quality Control Board
SAIA	Sikes Act Improvement Act
SCAQMD	South Coast Air Quality Management District
SCCAT	Southern California Caulerpa Action Team
SCIRC	San Clemente Island Range Complex
SCIUR	San Clemente Island Underwater Range
SCORE	Southern California Offshore Range
SDSU	San Diego State University
SE	State Endangered
SEALS	United States Navy Sea, Air and Land
SHOBA	Shore Bombardment Area
SHPO	State Historic Preservation Officer
SOAR	Southern California ASW Range
SOx	Sulfur oxides
SPAWAR	Space and Naval Warfare Systems Center
SWATs	Special Warfare Training Area
TARs	Training Areas and Ranges
USACOE	United States Corps of Engineers
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
VDS	Variable Depth Sonar
VOC	volate organic compounds

Appendix B: Record of Non-Applicability

Department of Defense

Department of the Navy

Record of Non-Applicability

San Clemente Island, California
Integrated Natural Resources Management Plan

Pursuant to Section 176 (c) of the Clean Air Act, as amended by the 1990 amendments; the General Conformity Rule at 40 CFR Parts 51 and 93; and the Chief of Naval Operations Interim Guidance on Compliance with the Clean Air Act Conformity Rule, the Department of Navy (DoN) determined that the majority of practices outlined in the Integrated Natural Resources Management Plan are exempt from conformity requirements. The plan outlines many routine activities that would result in no emission increase or an increase that is clearly *de minimis* such as weed control, fire retardant application, and erosion control. Fire suppression, environmental monitoring activities including use occasional use of helicopters, are also expected to be *de minimis*, however, calculations for these activities will be prepared when specific designs are completed to verify that emissions do not exceed *de minimis* levels. Consequently, the proposed action is exempt from the conformity determination requirements of the Environmental Protection Agency's conformity rule.

To the best of my knowledge, the information contained in the DON's applicability analysis is correct and accurate and I concur in the finding that air emissions associated with the proposed action are below *de minimis* levels, are not regionally significant, and therefore do not require further conformity analysis or determination.

Commanding Officer
San Clemente Island, CA

Date

Appendix C: Current Management Practices of the No-Action Alternative, Including Conditions of Biological Opinions

This appendix describes current management practices that comprise the No-Action Alternative. The table “Condensed Biological Opinions, Management Practices” describes each current USFWS Biological Opinion and its conditions as related to natural resource management on SCI. The following section describes all current management practices as outlined by:

- Landscape Management Plan for Endangered Species Recovery at San Clemente Island (Gripp and Howard 1986);
- Biological/Conference Opinion on Training Activities on San Clemente Island, San Diego County, California (USFWS 1997a) (This BO primarily addresses concerns with impacts of wildfire);
- Biological Opinion for Military Training Impacts to Island Night Lizard Caused by Existing and Proposed Naval Activities on San Clemente Island (USFWS 1997d);
- Biological Opinion on Strategic Environmental Research and Development Program Windfarm (USFWS 1997a) and amendment to this BO (1997b);
- Biological Opinion on Utility Pole Installation, San Clemente Island (USFWS 1997e);
- Biological Opinion on Training Area Ranges 1, 4, and 16 on San Clemente Island (USFWS 2001);
- Draft Fire Management Plan for San Clemente Island U.S. Forest Service;
- Environmental and Natural Resources Program Manual, OPNAVINST 5090.1B (USDoN 1999);
- Naval Base Coronado Instructions which apply to San Clemente Island, or Instructions which apply to SCI alone. These include:
 - NASNI Instruction 5100.2F, Animal Control 2001
 - NALFSCI Instruction 5300.1F, California Fish and Game Regulations and Predator Population Control
 - NALFSCI Instruction 5760.2D, Navy Youth and Navy Supported Youth Organizations
 - DoD Instruction 6055.6, Department of Defense Fire and Emergency Services Program
 - NALFSCI Instruction 7310.3D, Reimbursement Procedures for San Clemente Island
 - NBC Instruction 11013.3G, Project approval procedures for new construction, alterations, space assignments, equipment installations, structure modifications repairs and maintenance of class 1 (land) and Class 2 (buildings) properties
 - NASNI Instruction 11015.2, Protection of Natural and Cultural Resources on Lands Administered by NAS North Island 1981
 - NALFSCI Instruction 12300.1, Policies Governing the Handling and Employment of Weapons by Natural Resource Office
- Cooperative Agreement and MOUs
 - 1978 Cooperative Agreement between Naval Base Coronado and California Department of Fish and Game allowing access of CDFG officials onto Navy land for enforcement of CDFG regulations
 - Memorandum of Understanding by the National Park Service on Outdoor Recreation

- Memorandum of Understanding between the National Marine Fisheries Service Southwest Region and the Naval Air Station, North Island Regarding Management and Protection of the Marine Mammal Populations of San Clemente Island

The following section is organized by natural resource topic area to facilitate comparison with Appendix D, ‘Proposed Action and INRMP Project Implementation Table for Budget Planning.’ Following this description is a table that summarizes conditions of current Biological Opinions.

Current Management

Fish and Wildlife Management

San Clemente Loggerhead Shrike Recovery Program

Existing BOs require the following:

- Continue implementing a program to protect and augment the population of shrikes through: 1) captive propagation and rearing, and release of captive birds, 2) monitoring of the wild shrike population, 3) predator control, 4) genetics research, and 5) habitat evaluation.
- Use a preset flight pattern that avoids shrike breeding areas for helicopters involved in range maintenance and clean-up.
- Assure that a qualified biological monitor observes shrikes during all phases of the installation of fuelbreaks to assure that shrikes are not impacted by installation activities. The Navy shall provide to the USFWS a written annual report summarizing this monitoring activity within three months of fuelbreak installation. As part of this program the island fox is monitored and removed from shrike nesting sites. Additional research on fox demographics is also performed.
- Informal consultation with the USFWS is initiated if uncontrolled wildfire occurs outside of the fuelbreaks and defoliated areas within SHOBA, to determine if further measures are necessary to prevent wildfire within shrike habitat. If such fire results in harassment or other take of an individual shrike, the Navy will cease the activity, which resulted in the take until formal consultation has been re-initiated and completed.
- Provide the USFWS with annual reports regarding listed species surveys.
- Provide the USFWS opportunity to review and comment on the predator control management plans and activities on SCI.
- Assure that coordination occurs between shrike monitors and firebreak installation contractors prior to firebreak installation to minimize the possibility of harassment to shrikes.
- Disposition of sick, injured, or dead specimens: notify the USFWS’s Carlsbad Office within three working days should any endangered or threatened species be found dead or injured.

Island Night Lizard Management Area

The BO on Impacts of Military Training on the Island Night Lizard requires the following:

- Designate 11,010 acres (4,425 ha) of SCI as an Island Night Lizard Management Area (INLMA), where only limited disturbance is allowed, through signature of a Memorandum of Agreement (MOA) with the USFWS. Within this area:
 - all construction projects and training exercises will be individually reviewed for impacts to the island night lizard (INL),

- surveys for INLs will be performed at least every five years,
 - consult with the USFWS if two consecutive surveys indicate declining INL populations,
 - annual reports summarizing projects planned within the INLMA will be produced,
 - install gates or barricades on dead-end roads and unused roads within the INLMA to prevent use of unauthorized routes and to allow the area to recover,
 - assure that the unused roadways within the INLMA are removed and restored to native vegetation, especially fishing area access roads spurred along West Shore Road, and
 - assure that appropriately timed exotic plant removal projects continue in the INLMA.
- Mitigate for impacts to INL for all projects proposed outside of the INLMA but within superior INL habitat, as defined by vegetation characteristics or habitat maps. As mitigation, the Navy shall enhance degraded INL at a ratio of 1 acre treated for each acre of disturbance to superior habitat outside the INLMA.
 - Direct disturbance due to military construction projects or operational training exercises to areas outside the INLMA to the maximum extent practicable.
 - Allow continued operational training within the INLMA by:
 - Navy SEAL covert landings by small (less than 10 individual) pedestrian units that traverse the habitat on foot en route to final destinations. Such activity occurs up to three times per month.
 - Marine amphibious landings of 30 to 50 individuals that land at Eel Cove and traverse a 200 m disturbed area en route to the road. Such groups are restricted from transiting the surrounding habitat.
 - Seek USFWS concurrence on all projects or new activities proposed within the confines of the INLMA to assure that such projects do not threaten the integrity of the INLMA or pose additional impacts that could require reinitiating of consultation. Reinitiate consultation with the USFWS for all new construction projects or training activities over five acres in size proposed within the INLMA.

Management of the San Clemente Sage Sparrow as addressed under the INLMA and TARS BOs.

- The Navy shall develop and implement, with the review and concurrence of the Service, TAR 4 Habitat Monitoring and Restoration Guidelines that outline: 1) methods of monitoring island night lizards and sage sparrow habitat changes associated with ongoing training at TAR 4; 2) methods of identifying impacts; 3) a schedule of habitat restoration relative to habitat damage; 4) restoration techniques; 5) success criteria; and, 6) locations of proposed restoration sites. Maritime desert scrub *Lycium* phase should be the target plant community of the plan. Potential impacts that must be identified include fire, and changes in plant species composition of density due to foot traffic, vehicle incursion, explosives use, etc. The guidelines shall identify the impact threshold that will necessitate restoration actions. As habitat damage is identified, restoration shall begin and be maintained until success is achieved. Habitat Monitoring and Restoration Guidelines must be completed prior to May 1, 2001.
- The Navy shall compensate for 30 acres of existing and recovering sage sparrow habitat that will be modified as a result of TAR 4 development and use. Compensation shall occur by adding 120 acres of Maritime desert scrub *Lycium* phase (MDSL Y) contiguous with the current northern boundary of the INLMA to the INLMA. For disturbance within 30 acre footprint identified for TAR 4, adding acreage to the INLMA will be conducted in lieu of restoration activities identified in Terms and Condition 2.2 of Biological Opinion 1-6-97-F-58. This one-time modification is made due to the high value of the 120 acres of MDSL Y to the San Clemente sage sparrow. Adding this acreage to the INLMA will afford additional protection to the core populations of sage sparrow and island night lizard, and is consistent with the objectives of Opinion 1-6-97-F-58.

- The Navy shall restore disturbances to MDSLY that occur due to TAR 4 training or maintenance activities, but outside of permanently marked boundaries of TAR 4 and rifle ranges north of the runway. The Navy shall: 1) restore the disturbed site, and mark this site as an “off-limits restoration area”, and 2) restore an equivalent acreage of MDSLY within the boundaries of the INLMA.
- The Navy shall initiate MDSLY restoration experimentation, 2001, in accordance with TAR 4 Habitat Monitoring and Restoration Guidelines.
- The Navy shall establish permanent fireproof boundary markers to mark the boundaries of the TAR 4 training area prior to the initiation of construction activities. The location of these markers shall be confirmed with GPS coordinates to the accuracy of 1 m. This will allow future assessment of changes in the size of disturbed areas.
- Navy biologists and/or botanists, in coordination with Service biologists, shall check TAR 4 and the boundary markers on a quarterly basis, or more frequently, to identify and quantify habitat disturbance and impact to the area.
- Sites within the action area that will require on-site restoration if disturbed during construction or range use shall be identified prior to construction and use of TAR 4, and locations for off-site restoration efforts in the INLMA shall be mapped and quantified prior to construction and. Locations shall then be incorporated into TAR 4 Habitat Monitoring and Restoration Guidelines.
- The Navy shall confirm baseline vegetation conditions on the lowermost terrace north of the runway, the hillside adjacent to proposed TAR 4, and the area adjacent to the rifle ranges on the upper terrace, prior to the initiation of TAR 4 construction activities. Baseline conditions must be evaluated in a manner that will allow future assessment of changes that occur in these areas due to training activities or range maintenance. The mechanism for determining baseline conditions shall be stated in the TAR 4 Habitat Monitoring and Restoration Guidelines.
- The Navy shall complete the Maritime Operations (MAROPS) manual, including maps and the following impact avoidance measures, prior to initiating training exercises at proposed TARs, and distribute the amended manual to the Service.
 - delineate “excluded areas” on the MAROPS manual maps.
 - include accurate depiction of “fan of fire” on MAROPS map.
 - include a sheet with the “rules” for each TAR in the manual.
- The Navy shall sign habitat as “excluded” to protect it from incidental foot or vehicle traffic prior to construction and training at proposed TARs. Additionally, during military operations in urban terrain (MOUT) and rifle range construction, the boundaries of the approved construction site shall be flagged or temporarily fenced to prevent unanticipated habitat disturbances. Signs placed in MDSLY shall be approximately 0.5 m higher than the surrounding vegetation. This requirement is intended to allow visibility to people using the area, but minimize the attractiveness of signs as avian perches. Maps defining the location of “excluded areas” shall be provided to the Service prior to construction.
- The Navy shall place water buffalos, swatters and any other appropriate fire fighting equipment at each TAR, and train all personnel to use this fire fighting equipment, prior to commencement of training.
- The Navy shall assure that construction personnel have been briefed on the environmental sensitivity of listed species within TAR 4 and TAR 1, and instructed on the necessity to minimize surface disturbances associated with the facility improvement prior to the initiation of construction at proposed TARs.
- The Navy shall assure that all off-island vehicles are thoroughly washed prior to barging to the island, to prevent dispersal of soil or weed seed from the mainland.

- The Navy shall monitor each new TAR for new exotic plant introductions on a semi-annual basis, and control new species if they are introduced.
- The Navy shall provide ongoing natural resources training for the MAROPS Officers in Charge (OICs) so they can convey necessary environmental information to user groups.
- All Range Safety Officers (RSOs) and Range OICs leading training exercises on SPECWAR ranges on SCI shall receive a brief from the range manager on rules and regulations for each TAR. The RSOs should be certified on a TAR-by-TAR basis to assure that they have vital environmental information about each TAR. "Vital information" includes knowledge of "excluded" area locations, and awareness of fire prevention mechanisms and restrictions that may be specific to the site.
- The Navy shall develop a process that ensures that all range users are held accountable for any unauthorized use of TARs and remedy environmental damage resulting from unauthorized use. Authorized and unauthorized uses shall be clearly delineated in the MAROPs manual (NAVSPECWARGRU1 instruction #3575.1).
- All units that use proposed training areas shall adhere to the SCI "Fire Instruction" generated each fire season. The "fire instruction" outlines operational measures necessary to reduce the chance of wildfires associated with training during the dry months of the year. Measures provide guidelines on the use of munitions, incendiaries, and flares. Paraflakes used during training exercises shall not be used in the wind speeds in excess of 13 knots.
- To aid in the ongoing efforts to identify ignition sources and reduce accidental ignitions on the island, the Navy shall immediately report any fires to the Service, and include them as a part of annual fire reporting. Information should include the time of the fire and the cause of the fire (as specifically as possible). Fires ignited during the Naval Special Warfare activities or activities or other Special Warfare platoons, shall be mapped in the SCI fire Geographic Information System (GIS) database.
- Naval Special Warfare shall develop a TAR Fire Management Plan or Instruction that addresses fire prevention, suppression, and containment for TARs 1, 4, and 16 prior to April 1, 2001.

Management of Brown Pelicans under TARS BO for Castle Rock and Bird Rock.

- The Navy shall minimize the potential for munitions to hit Castle Rock and the water immediately surrounding this rock. One way of accomplishing this objective would be to align the new rifle to avoid Castle Rock. If this is infeasible, a soil berm or other appropriate barrier shall be installed to reduce the range of munitions.
- The Navy shall route helicopters and boats away from Castle Rock to the maximum extent possible when transporting people to and from TAR 4. Helicopters transporting personnel to TAR 4 must maintain a distance of 100 m from Castle Rock and vessels must remain at least 25 m from Castle Rock when transporting people to and from TAR 4.
- If the Navy is unable to re-align the new rifle range to avoid Castle Rock, then the Navy shall monitor brown pelican abundance on an annual basis during the late summer and fall to ascertain their continued use of Castle Rock as a secure offshore roost.
- The Navy shall remove metallic debris, including shell casings and bullets (where easily accessible without damaging vegetation), from TAR 4.
- To the maximum extent possible, the Navy shall conduct any range surface clearance necessary in MDSLY on foot to reduce habitat damage.
- The Navy shall continue ongoing population monitoring of the sage sparrow.

- The Navy shall initiate, with Service approval, a study to assess the effects of range construction and use on continued sage sparrow use of the action area. This study shall focus explicitly on changes associated with range construction and use.

Western Snowy Plover Management under TARS BO.

- The Navy shall monitor Graduation Beach and TAR 1 for western snowy plovers during the plover breeding season. If plovers are discovered using Graduation Beach and/or TAR 1 during the breeding season, the area shall be searched thoroughly for nests.
- The Navy shall establish a 100 m buffer around any western snowy plover nests discovered in the vicinity of TARs, and maintain this buffer for at least three weeks post-nest discovery to prevent nest disturbance or destruction.

Rare Plants

- Assure that aerial fire suppression units are not staged in the vicinity of the Santa Cruz Island winged rock cress population, or on beaches within SHOBA.
- Mark individual San Clemente bushmallow (*Malacothamnus clementinus*) plants prior to EOD removal, fuelbreak establishment, and backburning practices to avoid disturbance.
- Develop recovery programs for listed plant species including SCI bushmallow and SCI Indian paintbrush in coordination with the USFWS.
- The NRO botanist shall meet with USFWS botanists at least twice annually to discuss results of plant surveys, plant genetics research and the progress of propagation and outplanting programs.

Invasive Species Control

- Require that all vehicles and equipment used in construction or training activities on SCI be washed prior to coming onto the island to help prevent the spread of exotic plants. The Navy shall assure that the underside and wheel wells of all vehicles are sprayed to remove weed seed.
- Assure that roadbed material is weed free prior to shipping to SCI by requiring that a sterilant or herbicide be mixed with roadbed material prior to shipping. The Navy shall assure that stockpiled roadbed material is checked annually between April and June for weed growth and that an appropriate herbicide is applied prior to seed set if weeds are present.
- Assure the weed eradication plan for SCI is completed and implemented.

Predator Control

- Target predator control efforts on SCI toward nesting areas of San Clemente loggerhead shrikes and release areas.
- Assure that required access to SHOBA is provided to predator control personnel and shrike monitor personnel until such time as the Navy and the USFWS determine that these activities are not necessary.
- Design and apply feral cat control efforts to include the INLMA.
- Remove black rats from around shrike nesting areas.

- Ravens and raptors are monitored near shrike nests and nests of these shrike predators are removed from the vicinity.
- The Navy shall develop an approach, with the concurrence of the Service, to reduce non-native predator densities within the action area. The Navy shall conduct non-native predator management activities on at least a quarterly basis north of the runway in sage sparrow and island night lizard habitat and around new structures. Target species should be limited to cats and rats, which are expected to increase due to new structures.
- The Navy shall install anti-perch material on the buildings and range tower at TAR 4, except in instances that compromise the intended use of such structures, to reduce the suitability of structures as avian predator perches.
- The Navy shall assure that personnel using TAR 4 do not feed cats, remove all trash and training refuse from the TAR after each exercise. These measures are intended to reduce human-induced increases in the feral cat and rat populations north of the runway.
- Feral cats are tracked and removed from areas used by shrikes throughout the year. In addition, island foxes located within shrike breeding territories are trapped and shock-collared with a device which deters them from entering the area near a nest.
- Ensure that no new animals are introduced to the island that could be a INL predator, competitor, or introduce disease. Provide for aggressive control of existing invasive animals in the INLMA.
- Continue program of vigilance by SCI personnel trained in identifying exotic plants and animals.
- Increase emphasis of the cat and rat control program in the INLMA.

Restoration Enhancement Planning, and Artificial Propagation

- Establish an Island nursery and greenhouse to raise plants to improve habitat for the San Clemente Island loggerhead shrike.

Land Management

Fire Management

- Adopt a fire instruction which states that no wildfires will be allowed to burn on SCI without fire containment measures.
- Train and educate SCI personnel through the use of pamphlets and yearly briefings regarding fire prevention and implications of the ESA to wildland fire issues.
- Time training to reduce ignitions:
 - During the fire season, restrictions will be instituted as to the kind of ordnance that can be used.
 - The size and location of targets will be adjusted to reduce the area vulnerable to ignition and training with live ordnance will occur within areas surrounded by firebreaks.
 - If U.S. Forest Service aerial suppression units are unavailable due to fires on the mainland, then SHOBA will be closed to ordnance training.
 - From May–July, when the shrike breeding season and fire season overlap, or when wind speeds exceed 13 knots during the fire season, training involving incendiary devices will only be allowed if sufficient suppression resources are on site.
- A 120-ft wide firebreak is to be maintained around Training Area 2 (TA2) and areas around targets in TA1 and TA2 will be defoliated.

- All Standard Operating Areas are to be surrounded by firebreaks.
- Prescribed fires are included as a tool for fire management.
- Fire retardant is to be applied around the remaining population of Santa Cruz Island rock cress, to further reduce the risk of burning.
- Herbicides will only be aerially applied to firebreaks when windspeeds are below 13 knots.
- Conduct surveys for sensitive species prior to installation of any firebreak or controlled burn and consult with USFWS if a sensitive species is located.
- Maximize use of available roads to position firefighters between sage sparrow habitat and approaching fires.
- Minimize the use of backburning in sage sparrow habitat when possible. Water will be the primary suppression agent used in sage sparrow habitat.
- Develop a fire history databank that includes information on each fire regarding ignition source, fire size, weather conditions at time of ignition, time of initial report, time of response, method of suppression, duration of fire, intensity of fire, and proximity to sensitive resources.
- Assure that collection of fire information includes a site visit by the Natural Resource Office (NRO) biologist within one week of fire occurrence. Aerial surveillance shall be conducted on any fires over 100 acres in size.
- Prohibit incendiary use during the entire fire season, if uncontrolled wildfire due to incendiary devices occurs outside of the firebreaks and defoliated areas within SHOBA.
- Quantify the number of and causes of fires that occur within the “no suppression zones” to aid in evaluation of effectiveness of prevention and containment measures.
- Ensure that fire suppression units capable of extinguishing escaped fire shall be on-site during all firebreak installation that utilizes fire, and all controlled burns that occur near shrike breeding areas.
- Prohibit the use of incendiary devices unless sufficient on-site aerial resources are present to adequately extinguish any fire.
- Develop a fire management plan that incorporates the above recommendations, and the requirements of sensitive species, and also divides the Island into fire management zones.
- Inform the USFWS about all ignition sources and provide maps of all fires that occur on SCI.
- Notify the USFWS in advance of any prescribed burn activities and review with the USFWS the specific measures designed to prevent fire from escaping outside of the prescribed burn areas.
- Provide the USFWS ample opportunity for review and comment on the draft and final SCI Fire Management Plan.

Construction and Maintenance

- Locate ground disturbing activities on previously disturbed sites whenever possible.
- Assure that all project work areas, including transit routes necessary to reach construction sites, are clearly identified or marked. Workers shall restrict vehicular activities to identified areas.
- Fill or cover all holes excavated as part of construction projects to prevent island night lizards from falling into open holes.

Military Operations

- Avoid military training activities in San Clemente Island sage sparrow habitat to the maximum extent practicable, consistent with INLMA and TARs BOs.
- Ensure that Range Safety Officers responsible for implementation of wind restrictions receive appropriate environmental training to understand the endangered species issues in SHOBA.
- Ensure that all operators operating aircraft or conduction training activities near sage sparrow habitat receive training and education on the sage sparrow and the INL.
- Ensure that all Public Works (PWC) workers and contracted construction workers be briefed on the biology and status of the INL, and on protection measures designed to reduce potential impacts to the species.
- Develop and distribute INL wallet cards or similar printed information to all PWC workers. Cards or pamphlets shall include a picture of the INL and information on the biology of the species.

Road Maintenance and Erosion Control

- Primary roads are graded or paved as needed.
- Secondary roads are not maintained and off-road vehicle use is prohibited except in designated areas.
- Repaving requires consultation with the USFWS if listed species are present.
- An evaluation of road erosion priorities is currently underway in cooperation with the San Diego State Foundation.

Inventory, Monitoring, and Research

- Perform periodic surveys and monitoring of vegetation communities, rare plants, and continue annual snowy plover surveys.
- Conduct off-site propagation of Santa Cruz Island rock cress (*Sibara filifolia*).
- Research should be directed toward the effects of fire on the recovery of listed species including the distribution of INL in postburn areas.
- Assure that sage sparrow surveys occur on an annual basis and include work in previously unsurveyed potential habitat.
- CDFG conducts annual regional abalone surveys, including around SCI.

Outdoor Recreation and Public Access

- Currently, outdoor recreation opportunities on SCI include a golf driving range and numerous hiking and jogging trails.
- Personnel also have the opportunity to fish, swim, or snorkel from certain areas of the shore.
- Free divers and snorkelers shall comply with the regulations contained in reference (b) of NALFSCIINST 5300.1F (1999). Recreational SCUBA Diving at San Clemente Island is strictly prohibited.

Condensed Biological Conditions, Management Practices

No.	Biological Opinion/ Date	Page, Section	No Action Alternative Project Specific Biological Opinion Conditions and Programmatic Biological Conditions
1.	West Cove Beach Cable June 1995	Page 6	Reasonable and Prudent Measure #1: Impacts to snowy plover habitat will be avoided or reduced. Terms and Conditions:
2.		Page 6	1) Begin construction, equipment staging after 14 Aug, to minimize conflict with breeding season.
3.			2) Limit construction corridor to smallest size practicable.
4.			3) 2 weeks prior to construction, consult with SCI plover biologist. If chicks are present, install chick fencing around construction footprint.
5.			4) Remove storm debris from high water mark on beach.
6.			5) Return beach to pre-construction topography.
7.			6) Remove exotic vegetation from West Cove Beach and foredunes by herbicide and mechanical removal between 15 Jan and 1 Mar 1996.
8.		Page 7	Conservation Recommendation: Conduct study on beach replenishment feasibility
9.	Windfarm March 1997	Page 11	TAKE: All Island night lizards on three acres of windfarm site could be taken within the project footprint.
10.		Page 12	Reasonable and Prudent Measures:
11.			1) Navy will implement all mitigation measures in project description.
12.			2) Navy will continue to evaluate the area for shrike use and avian mortality.
13.		Page 12	Terms and Conditions
14.			1- Mitigation Measures in project description 1.1: Training in Island night lizard biology for construction workers, including flagging work areas, protocol for encountering lizards
15.			1.2: Designate a Field Contact Person trained on lizard handling/relocation, keeping records of relocated lizards.
16.			1.3: Flag outer boundary of work area to restrict activity.
17.			1.4: Lizards are to be held no longer than 5 hours, and be held in separate containers.
18.			1.5: Release lizards in early morning or late afternoon to avoid high temperatures.
19.		Page 13	2- Evaluate area for shrike use and avian mortality 2.1: Survey regularly for shrike use during non-breeding season
20.		Page 13	2.2: Assure that if shrikes are seen, assess shrike behavior is assessed if windfarm turbines pose a threat.
21.		Page 13	Conservation Measures: 1) Restoration plan on site; 2) Survey windfarm to determine avian mortality.

No.	Biological Opinion/ Date	Page, Section	No Action Alternative Project Specific Biological Opinion Conditions and Programmatic Biological Conditions
22.	Utility Pole Installation May 1997	Page 3	TAKE: Lizards in 1.75 acres of Island Grassland and 3.2 acres of Maritime Desert Scrub, Prickly Pear Phase;
23.		Page 4	Reasonable and Prudent Measure #1: Minimize lizard habitat loss during utility pole installation
24.		Page 4	Term and Conditions 1.1: Survey each segment within a week of utility pole installation and relocate all lizards found within 5 meter linear corridor.
25.			1.2 Lizards shall be held captured no longer than 8 hours, and released at least 15 meters from project site, in densest vegetation, and in morning or late afternoon hours.
26.			1.3 Restrict off-road activities, and mark work areas
27.			1.4 Brief all workers on lizard biology, protection measures, and procedures if lizards are encountered.
28.			1.5 Designate field contact person to assure that habitat disturbance is minimized, and will move any lizards from the corridor line.
29.			1.6 No holes excavated shall be left open overnight.
30.	Island Night Lizard Impacts 1997	Page 12	TAKE: Lizards occupying 210 acres (85 hectares) of Island Grassland, 37 acres (15 hectares) of Maritime Desert Scrub and 740 acres of previously disturbed (as defined within the project description) or developed areas could be taken
31.		Page 12	Reasonable and Prudent Measures
32.			1) Navy will designate Island Night Lizard Management Area (INLMA) to assure lizard will remain protected in perpetuity and military operations will avoid the INLMA to the maximum extent possible
33.		Page 13	2) Navy will stipulate measures applicable to all construction projects and training that minimize impact on lizards, as part of the NASNI Site Approval Process.
34.			3) Minimize exotic plant introduction on SCI
35.			4) Educate construction/training personnel on lizard biology and measures.
36.			5) Coordinate with FWS on INLMA regarding projects/training proposed in MDS Lycium phase or MDS Prickly pear phase.
37.			6) Management to hasten recovery of disturbed areas within the INLMA
38.		Page 13	Terms and Conditions Measure #1: Navy will designate INLMA and avoid INLMA to maximum extent possible.
39.			1.1 Sign a MOU with FWS by 31 Mar 98
40.			1.2 Incorporate INLMA into OMP Process
41.		Page 13	Terms and Conditions Measure #2: Navy measures to all construction/training to minimize lizard impact
42.			2.1 Locate ground disturbing activities on previously disturbed ground
43.			2.2 Projects outside the INLMA, but within superior INL habitat shall mitigate for impact to INL. As mitigation, Navy will enhance degraded INL at a ration of 1 acre treated for each acre of disturbance to superior habitat outside the INLMA. Treatment protocols in 3.2,6.2 and 6.3.
44.		Page 14	2.3 Wash all vehicles prior to coming on SCI to be free of mud and weed seed.
45.			2.4 Assure roadbed material is weed free prior to shipping to SCI by requiring a sterilant or herbicide be mixed with roadbed material prior to shipping. Check stockpiled material between April and June for weed growth, and apply herbicide if weeds are present.
46.			2.5 Clearly mark all transit routes to construction sites, and restrict to identified areas.
47.			2.6 Because lizards may fall into holes, cover holes at the conclusion of a construction phase and minimize open holes.
48.		Page 14	Terms and Conditions Measure #3: Minimize exotic plant introduction

No.	Biological Opinion/ Date	Page, Section	No Action Alternative Project Specific Biological Opinion Conditions and Programmatic Biological Conditions
49.			3.1 Implement weed eradication plan
50.			3.2 Exotic plant removal projects, appropriately timed. Projects within INLM and within superior habitat outside INLMA shall contribute toward to exotic plant control effort within the INLMA.
51.		Page 14	Terms and Conditions Measure #4: Educate construction/training personnel on lizard biology and measures
52.			4.1 Brief all PWC/contracted workers on biology/status of lizard and protection measures
53.			4.2 Develop wallet cards or printed lizard information, with picture and biology
54.			Terms and Conditions Measure #5: Coordinate with FWS on projects and training proposed for MDS lycium and MDS prickly pear phase.
55.			5.1 Reinitiate consultation for all new construction/training over 5 acres within the INLMA
56.		Page 15	5.2 Seek FWS concurrence on projects/new activities proposed within INLMA to assure integrity of INLMA
57.			5.3 NASNI provide FWS with draft INLMA Management Strategy within 2 weeks of receipt by Navy and incorporate FWS comments into final document
58.			5.4 NASNI submit annual surface disturbance monitoring report on 31 Jan beginning 1998. Include actual acres of INL habitat disturbed and numbers of killed lizards.
59.		Page 15	Reasonable and Prudent Measure #6: Management to hasten recovery of disturbed areas within INLMA
60.			6.1 Feral cat control efforts applied to include INLMA
61.			6.2 Install gates or barricades on dead-end roads and unused roads within INLMA to prevent use of unauthorized routes in INLMA and allow area to recover.
62.			6.3 Assure unused roadways within INLMA are removed and restored to native vegetation. This pertains specifically to fishing area access roads spurred along West Shore Road.
63.		Page 16	Conservation Measures: Navy work toward future development of Ecological Reserve Area or formal sanctioned conservation area on SCI.
64.	Training Activities 15 Mar 97	Page 62	TAKE: No take of SCI Loggerhead shrike; Island night lizard take over an estimated 450 acres of lizard habitat due to fuelbreak establishment within TA 1 and TA2 (SHOBA); take of lizard habitat in 300 acres due to wildfire in "no suppression zones" over next 4 years; 12 Sage sparrow as follows: 3 in direct mortality outside the West Shore population, 5 in mortality within West Shore population and 50 acres of habitat subject to fuelbreak establishment in "no suppression zone".
65.		Page 64	Reasonable and Prudent Measures:
66.			1) Implement fire suppression, etc., as in project description
67.			2) Implement all conservation measures in project description
68.			3) Minimize shrike habitat modification during training fuelbreak installation or fire suppression activities
69.			4) Minimize sage sparrow habitat loss
70.		Page 64	1- Implement fire suppression in project description
71.			1.1 Maintain daily contact with USFS during fire season
71.			1.2 Range Safety Officer (RSO) will use anemometer close to impact area for windspeed in analyzing ignition potential.
72.			1.3 Fire suppression personnel will be present at each fixed range, except SHOBA, during exercises

No.	Biological Opinion/ Date	Page, Section	No Action Alternative Project Specific Biological Opinion Conditions and Programmatic Biological Conditions
73.		Page 65	1.4 Training fire suppression personnel on location of listed species and habitats to minimize adverse effects.
74.			1.5 FWS to be notified of ignition source and maps of all fires at SCI
75.			1.6 Develop a fire history databank on ignition source, fire size, weather conditions, duration and intensity of fire and proximity to sensitive sources
76.			1.7 Within 1 week of fire, NRO biologist will visit, and fires over 100 acres will have aerial surveillance.
77.			1.8 Avoid vicinity of <i>s.filifolia</i> population, or SHOBA beaches, for aerial suppression units.
78.			1.9 Share criteria defining “fire season” with FWS
79.			1.10 Notify FWS prior to prescribed burn to review measures to prevent fire from escaping outside prescribed burn areas.
80.			1.11 FWS to review and comment on Fire Management Plan
81.			1.12 Preset flight pattern that avoids shrike breeding areas for helicopters involved in range maintenance and clean-up.
82.		Page 66	1.13 Outfit gas combustion engines with spark arrestors
83.		Page 66	1.14 Informal consultation with FWS on fire outside of firebreaks to determine if further measures are necessary to prevent wildfire within shrike habitat. If fire results in harassment or “other take” of a shrike, the Navy will cease activity until formal consultation has been reinitiated and completed.
84.			1.15 If incendiary use causes wildfire outside of firebreaks within SHOBA, the Navy shall prohibit incendiary use during the entire fire season.
85.			1.16 Quantify the number and causes of fire within the “no suppression zones” to aid in prevention and containment measures
86.		Page 66	Reasonable and Prudent Measure #2: Implement conservation measures in project description
87.		Page 66	2.1 Provide to FWS annual reports on listed species surveys. This is also a requirement of Section 10 (a) recovery permit for listed species.
88.			2.2 Target predator control efforts toward nesting areas of shrike and release areas.
89.			2.3 NRO access to SHOBA for predator control and shrike monitor personnel until Navy and FWS determine these monitor activities not necessary
90.			2.4 FWS to comment on predator control management plans/activities, with Navy report summarizing activities, including location information.
91.		Page 67	2.5 Survey sage sparrow annually, including work in previously unsurveyed potential habitat. Coordinate with FWS on survey protocol
92.			2.6 Train RSO for wind restrictions regarding environmental/ESA training
93.			2.7 NRO botanist to meet with FWS twice annually to discuss progress of propagation and outplanting programs
94.		Page 67	Reasonable and Prudent Measure #3: Minimize shrike habitat modification during training fuelbreak installation and fire suppression activities
95.			3.1 On site fire suppression unit during all firebreak installation that uses fire, and controlled burns near shrike breeding areas.
96.			3.2 Coordinate firebreak installation with shrike monitors
97.			3.3 During firebreak installation, qualified biologist monitor shrikes, with written annual report summarizing monitoring activity within 3 months of firebreak installation.
98.			3.4 Prohibit use of incendiary devices during the proposed action unless sufficient on-site aerial resources are present to extinguish any fire
99.		Page 68	Reasonable and Prudent Measure #4: Minimize sage sparrow habitat loss
100.			4.1 Minimize backburning in sage sparrow habitat when possible, using water as suppression agent in sage sparrow habitat.

No.	Biological Opinion/ Date	Page, Section	No Action Alternative Project Specific Biological Opinion Conditions and Programmatic Biological Conditions
101.		Page 68	4.2 Maximize available road to position firefighters between sage sparrow habitat and approaching fire.
102.			4.3 Avoid training activities in sage sparrow habitat to maximum extent practicable.
103.			4.4 Train “all operators operating aircraft or conducting training activities near sage sparrow habitat” on importance of sparrow and lizard and avoiding fire ignition.
104.		Page 68	Conservation Recommendations
105.			1) Surround <i>S.filifolia</i> population with fire retardants
106.			2) Conduct survey of sensitive species prior to firebreak installation or controlled burn.
107.			3) Mark individual SCI bushmallow plants prior to activities such as EOD removal, fuelbreak establishment, backburning.
108.			4) Research effect of fire on recovery of listed plant and animal populations.
109.			5) Begin work to reestablish <i>M. clementinus</i> and <i>C. grisea</i> on SCI.
110.			6) Coordinate with FWS in recovery program development for listed plants.
111.			7) Incorporate into Fire Management Plan needs and requirements of listed plant species
112.			8) Research on lizard distribution in postburn areas
113.			9) Apply aerial herbicide within firebreak corridors when windspeed is below 13 knots.
114.	Predator Management Sep 98		Amendment to Biological Opinion 1-6-97-F-21, Predator Management
115.			Term and Condition 2: Navy shall remove all cats from all canyons containing breeding territories; continue “no cats” policy at SCI; for next 3 years, Feb through May, the Navy shall remove all Island fox from within 300 meters of shrike nest sites; destroy all raptor or corvid nests within 400 meters of a shrike nest; remove all rats and mice within 50 meters of nest trees used in previous breeding season; monitor fox grids for detecting fluctuations in fox population; evaluate efficacy of predator removal effort.
116.		Page 5	4 Conservation Measures: 1) retain all fox carcasses in freezer; 2) conduct nationwide search for zoos or educational facilities for disease free foxes, after quarantine and approval of CDFG; reevaluate removal activities if fox declines; refine predator activities to minimize effect on predators while maximizing shrike breeding territories.
117.			
118.	TARs 1/01		Training Areas and Ranges EA
119.	TARs 1/01	Page 50	TAKE: FWS anticipate 22 SC sage sparrows occupying 84.8 hectares (209.5 acres) of MDSLY, north of the runway. In form of 6 sparrows killed, 13 sparrows with reduced fecundity and 3 sparrows affected by habitat modification and fan of fire around TAR 4.
120.	TARs 1/01	Page 51	TAKE: Island night lizard habitat on 84.8 hectares (209.46 acres) (TAR 4) of MDSLY and 225 hectares (556 acres) (TAR 16) around TAR 16 could be taken.
121.	TARs 1/01	Page 51	TAKE: 3 Pelicans on Castle Rock could be taken, and 150 pelicans/year harassed around TAR 4.
122.	TARs 1/01	Page 51	TAKE: One pair of breeding snowy plovers every 5 years adversely affected by TAR 1.
123.	TARs 1/01	Page 53	Reasonable and Prudent Measures:
124.	TARs 1/01	Page 53	1) Conserve/restore MDLSY
125.			2) Implement conservation measures described in project description
126.			3) Conduct quarterly evaluation of condition of training ranges
127.			4) Prevent accidental fires, and minimize extent of fires
128.			5) Minimize Castle Rock disturbance to pelicans
129.			6) Minimize risks to sparrow at TAR 4

No.	Biological Opinion/ Date	Page, Section	No Action Alternative Project Specific Biological Opinion Conditions and Programmatic Biological Conditions
130.			7) Continue assessing sparrow population and effects of military training
131.			8) Avoid harassment to plovers
132.	TARs 1/01	Page 53	Terms and Conditions
133.			1- Conserve and restore MDSLY to compensate for loss and modification to MDSLY
134.		Page 54	1.1 TAR 4 Monitoring and Restoration Guidelines (by 1 May 2001); 1.2 Methods of monitoring lizard and sparrow habitat changes associated with TAR 4 training; 1.3 Methods of identifying impacts; 1.4 Schedule of habitat restoration relative to habitat damage; 1.5 Restoration techniques; 1.6 Success Criteria; 1.7 Locations of proposed restoration sites.
135.	TARs BO Reasonable & Prudent Measure 1	Page 54	1.2 Compensate for 30 acres of existing /recovering sparrow habitat modified as a result of TAR 4 development and use. Compensate by adding 120 acres of MDSLY contiguous with northern boundary of Island Night Lizard Management Area (INLMA) in lieu of Term and Condition 2.2 of BO 1-6-97-F-58.
136.		Page 54	1.3 Restore MDLSY disturbances by TAR 4 training by 1) restoring disturbed site; 2) restore equivalent acreage of MDSLY within INLMA boundaries.
137.			1.4 Initiate MDSLY restoration experimentation prior to 1 Oct 01, in accordance with Monitoring and Restoration Guidelines.
138.			1.5 Install fireproof TAR 4 boundary markers, GPS coordinates to accuracy of 1 meter.
139.			1.6 Check TAR 4 boundaries on quarterly basis to quantify habitat disturbance.
140.		Page 55	1.7 Prior to TAR 4 construction, identify areas that will require on-site restoration if disturbed during construction; and locations for off-site restoration in the INLMA shall be mapped and quantified.
141.		Page 55	1.8 Confirm vegetation conditions on hillside adjacent to TAR 4, lowest terrace north of the runway, and adjacent to the rifle ranges on the upper terrace, prior to TAR 4 construction.
142.	TARs 1/01	Page 55	Reasonable and Prudent Measure #2: Implement conservation measures described in project description prior to construction/use at TARs 1.4.16.
143.		Page 55	2.1 Complete MAROPS manual, with copy to FWS. A. Delineate “excluded areas” on MAROPS manual maps. B. Include depiction of “fan of fire” on MAROPS maps. C. Include sheet with “rules” for each TAR in MAROPS.
144.		Page 55	2.2 Install signs 0.5 m higher than surrounding vegetation showing “excluded” areas from foot or vehicle traffic. Provide “excluded area” maps to FWS. During construction flag or fence approved construction site.
145.		Page 55	2.3 There is no 2.3
146.		Page 55	2.4 Place fire fighting equipment at each TAR prior to training at TARs.
147.		Page 55	2.5 Brief environmental sensitivity to construction personnel.
148.		Page 56	2.6 Complete Management Plan and MOU designating the Island Night Lizard Management Area (INLMA) by 1 Sep 01.
149.		Page 56	2.7 Wash all construction vehicles prior to barging to SCI
150.		Page 56	2.8 Monitor TARs for exotic plants semi-annually.
151.	TARs 1/01	Page 56	Reasonable and Prudent Measure #3: Quarterly Evaluation of condition of TARs, and preclude inappropriate/unauthorized uses of TARs.
152.		Page 56	3.1 Provide natural resources training to MAROPS OICs
153.			3.2 Brief range safety officers on rules and regulations for each TAR, including “vital information” on the “excluded” area locations and fire prevention.
154.		Page 56	3.3 Process to hold accountable unauthorized range users and remedy environmental damage.
155.	TARs 1/01	Page 56	Reasonable and prudent Measure #4: Prevent and minimize accidental fire

No.	Biological Opinion/ Date	Page, Section	No Action Alternative Project Specific Biological Opinion Conditions and Programmatic Biological Conditions
156.		Page 56	4.1 All units adhere to “SCI Fire Instruction”, including no paraflares used in wind speeds in excess of 13 knots.
157.		Page 56	4.2 Report all fires to the FWS, and include in annual fire reporting, including time and cause of fire, and map in GIS database.
158.		Page 57	4.3 Naval Special Warfare develop a TAR Fire Management Plan prior to 1 Apr 01.
159.	TARs 1/01	Page 57	Reasonable and prudent Measure #5: Minimize pelican disturbance at Castle Rock and Bird Rock
160.		Page 57	5.1 Align new rifle range to avoid Castle Rock, or install a soil berm/barrier to reduce munitions range.
161.			5.2 Route helicopters 100 m from Castle Rock, and vessels 25 m from Castle Rock when transporting people to TAR 4.
162.			5.3 If unable to realign rifle range, monitor pelican abundance annually in late summer/fall to ascertain continued use of Castle Rock as secure roost.
163.	TARs 1/01	Page 57	Reasonable and prudent measure #6: Minimize risk to sparrow at TAR 4 and maintain habitat value in surrounding area to maximum extent.
164.			6.1 Remove metallic debris from TAR 4
165.			6.2 Conduct range surface clearance necessary in MDSLY on foot
166.			6.3 Develop approach, with FWS concurrence, to reduce non-native predator densities (cats and rats) within action area. Conduct non-native predator management activities quarterly north of runway and around new structures.
167.		Page 58	6.4 Install anti-perch material on buildings and range tower at TAR 4, except where use is compromised, to reduce avian predator perches.
168.			6.5 Remove all refuse from TAR and do not feed cats.
169.	TARs 1/01	Page 58	Reasonable and prudent measure #7: Assess sage sparrow status population and effects of military training on species.
170.			7.1 Monitor population of sage sparrow
171.			7.2 Initiate, with FWS approval, a study to assess effects of range construction on sage sparrow, focusing on changes associated with range construction and use.
172.	TARs 1/01	Page 58	Reasonable and prudent measure #8: Avoid and minimized harassment to plovers
173.			8.1 Monitor Graduation Beach and TAR 1 for plovers in breeding season. If plovers are discovered during breeding season, search for nests.
174.			8.2 Establish 100 m buffer around plover nests in the vicinity of TAR, and maintain for 3 weeks post nest discovery to prevent nest disturbance/destruction.
175.	TARs 1/01	Page 58	Conservation Measures (Discretionary activities)
176.			1. Use fire model i.e. “Behave”, or similar model, to predict potential fire patterns prior to consideration of additional TARs.
177.			2. Conduct surveys on <i>Cryptantha traskiae</i> populations at TAR 1, develop seed bank.
178.		Page 59	3. Limit use of TAR 1 road, no vehicles east of the end of the road.
179.			4. Collect seed from <i>Lotus dendroideum</i> var. <i>traskiae</i> , <i>delphinium variegatum</i> ssp. <i>Kinkiense</i> within 1.5 m of TARs. Restore burned sites with seed.
180.			5. Develop alternative sites for previously proposed live fire exercises along West Shore.
181.			6. Monitor condition of <i>Lotus dendroideus</i> populations with TARs, report to FWS.
182.			7. Study fire effects on <i>Lotus dendroideus</i> , <i>delphinium variegatum</i> and other listed species at SCI.
183.		Page 59	8. Re-seed burned areas adjacent to TAR 16 with native grass seed.
184.			8. (sic) Assess risks posed by munitions residues, including lead, TNT, RDX, HMX, white phosphorus or other residues that could be deposited in soils.
185.			

Appendix D: Proposed Action and INRMP Project Implementation Table for Budget Planning

Ecosystem Management

The 2002 INRMP specifies an ecosystem approach to management by looking at ecological processes as well as individual habitats and species. It identifies ecological units, management of focus species, and the entire suite of native species that are considered for conservation planning. The INRMP identifies reference or benchmark sites that contain the best examples of habitats on the Island. It addresses conflict and compatibility of military operations and natural resources by establishing land management units for which military and resource values are described and priorities identified.

Canyon Shrubland/Woodland

- For all woodlands, promote soil recovery on eroded areas, increase water retention by soils and reduce runoff.
- Priority erosion control should be provided to oak groves.
- Foster recruitment in all native woody species.
- Improve the native woody cover condition by 10% from the 1992—93 baseline (INRMP Section 3.8.1.2) of 61% of total vegetative cover.
- At a minimum, maintain the current percent bare ground cover, which averages less than two percent across all woodlands, with monitoring plots.
- Reduce non-native herbaceous species to 10 percent less than the 1992—93 baseline (INRMP Section 3.8.1.2) of 45% of total cover in the next ten years.
- Fire effect risks (risk due to extremes in fire pattern, both lack of fire and with fire) to Canyon Shrubland and Woodland resources are to:
 - shrub or tree recruitment especially for those that reproduce infrequently;
 - possible biodiversity decline due to loss of herbaceous perennials and short-lived shrubs from the community due to a simplified structure from shrub canopy closure (fewer edges and openings); and
 - type conversion (change from shrubland to grassland due to too short fire interval).
- In contrast, a mature shrub community on the Island tends to be less diverse than one with openings or other variation in structure due to soil, topography, etc. The native herbaceous perennials may decline in areas without some process such as fire to open up stands. Certain of the federally listed species depend on this periodic or geographic variation for their niche. In such a case, appropriate use of fire may be an asset to provide these niches.
- The objective of fire management in shrublands and in woodlands is that recruitment exceeds mortality of all focus management species and all native trees, that shrubland or woodland boundaries stay the same or increase as far as fire has any control on this, and that a diverse habitat structure exists sufficient to support self-sustaining populations of all native plants and wildlife. Also, oaks and other woodlands on eroding or erodible surfaces should develop on stable sites.
- Foster recruitment and improved age structure in woodlands, especially oak and ironwood woodlands. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturation, reproduction and recruitment are the biggest risks of fire.
- Small patch size will be targeted by keeping fires to less than a targeted acreage that burns

at moderate intensity or higher [Score 3 on NPS scale (INRMP Table 4-9)] where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts). This preliminary target of three acres will be consulted on under the ESA in association with the Fire Plan in preparation for the 2002 fire season.

- No more than a maximum targeted percentage across the Island may be burned over a 10-year period for fires of moderate intensity or higher [Score 3 on NPS scale (INRMP Table 4-9)] where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts). A preliminary target of 70 acres (about 10% of all canyon woodland habitat) will be consulted on under the ESA in association with the Draft Fire Plan in preparation for the 2002 fire season.
- For cherry woodlands, use Eagle Canyon as a reference site to monitor composition and change.
- Use Land Condition Trend Analysis (LCTA) monitoring plots to support development of a reference condition for cherry woodlands in which all species are provided for.
- For toyon woodlands, use Horse Beach Canyon as a reference site to monitor composition and change.
- Use established vegetation trend monitoring plots to support development of a reference condition for toyon woodlands in which all component species are provided for.
- Continue the current expansion of shrubs on the margins of these woodlands which is currently dramatically increasing.
- For oak groves, foster stands able to support germination and survival of seedlings, focusing efforts at the stand periphery and in canopy gaps.
- Achieve seedling establishment and survival after every reproductive event.
- Improve the composition of native herbaceous plants compared to exotics from a 1992—93 baseline (Section 3.8.1.2) of 29% exotics.
- Experiment with oak introduction on upper north slopes of western canyons such as Horse, or upper north slopes of eastern canyons.
- Determine what is the oldest and what is the youngest tree in order to calculate the length of time between reproductive events.
- Identify new reference sites for monitoring.
- Develop propagation techniques for oaks.
- Improve management of seedbed conditions so that successful, wildland acorn germination occurs in the next ten years.
- Protect existing ironwood trees, recognizing the threat of short-interval, excessively hot, or large acreage fires.
- For ironwood woodlands, use Canchalagua Canyon as a reference site to monitor composition and change. Use vegetation trend monitoring plots to support development of a reference condition for ironwood woodlands in which all component species are provided for. Shrubs tend to be less frequent than in other woodland communities except oak groves, or shrubs are absent altogether.
- Consider the use of prescribed fire to protect from the catastrophic loss of entire groves, to improve seedbed conditions, and reduce exotics.
- Increase water retention by soils and reduce runoff on steep, eroded slopes to provide a stable substrate with a litter/duff layer that is at least 15 mm deep and growing.
- Achieve recruitment and establishment of woody canopy and understory species in the ironwood stands. Achieve presence of seedlings or saplings in three locations in the next

- ten years. Determine if cross-pollination will increase seed set. Keep apprised of recent genetic studies and facilitate the work of those researching the genetics of ironwood.
- Develop a propagation technique for ironwood, considering both seedling and vegetative approaches.
 - Identify priority outplanting sites, first within gaps of existing groves, then on their margins, then expand to new locations.
 - Determine microsite needs for ironwood seedling establishment.
 - Improve seedbed conditions in grove gaps.
 - Reduce total cover of exotic species to less than 30%.

Maritime Desert Scrub (MDS) Boxthorn (Lycium Phase)

- Within delineated high-density sage sparrow areas, maintain a target percentage of the first-terrace boxthorn community in the reference condition (monitoring plot 6) of 28% cover of boxthorn (50% of total plant cover) and less than 20% cover exotics (13% of total plant cover) based on long-term vegetation monitoring plots, and improve, where possible, the condition of this plant community by reducing the distribution and abundance of non-native species. Maintain a target percentage of the second-terrace boxthorn in 14% cover boxthorn and less than 50% cover of exotics and improve, where possible, the condition of this plant community by reducing the distribution and abundance of non-native species. The target percentages of each area will be decided in consultation with the USFWS in the Draft SCI Wildland Fire Management Plan. The area of each habitat not in the reference condition may have higher percentages of exotics, higher amounts of bare ground, lower cover of boxthorn, or other attribute that places the condition in a lower-than-reference state. Evaluate the condition of exotics over at least one seven-year El Niño cycle.
- The greatest fire effect risks in MDS-boxthorn are probably that fires will result in shrubs that are not large enough (less than 20 cm) or of insufficient density to support sage sparrows or other dependent species, and too short return interval between fires (risk of type conversion or long-term loss of shrubs). There is an additional risk that interspaces may become unusable to the sage sparrow. Low fire incidence might result in changed community and fuel values and dominance by exotic annual grasses in shrub interspaces, and fire may be the best management tool available to control exotics.
- Maintain high-density and moderate-density sage sparrow habitat on a fire return interval that, across these areas as a whole, will support self-sustaining populations of sage sparrows during population downturns related to drought or other extreme conditions by maintaining minimum shrub height, foliar density, and interspace conditions the species prefers. The following preliminary target will be consulted on under the ESA in association with the Draft SCI Wildland Fire Management Plan in preparation for the 2002 fire season: achieve a 40-year or greater average fire return interval for the entire area. (Fire may return at about every 40 years on average. Some places will never burn and be very “old”, while some will burn more frequently than once in 40 years.)
- Fire patch size targets will be achieved that allow the Federal Fire Department to target the level of response and response priority desired (such as for an unprecedented incident in which multiple fires are burning) in the most cost-effective manner, and that minimize biological impacts. Some fire patches may be beneficial to certain species by opening up areas for foraging and establishment of native herbs and short-lived shrubs that are not typical of the mature community. Too-large patch sizes may temporarily eliminate too much habitat for target species to self-recover, delay community re-establishment by making dispersal distances too large, or eliminate feeding opportunities for wildlife by making foraging distances too large to be usable. Patch sizes are selected to minimize these

- possible impacts. Fire patch size controls will be applied using the following guidelines for evaluating fire intensity within patches. Fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts) will be counted as a patch, whereas fires of lower intensity are likely to be beneficial and are not counted against successful target size. Calculations will be based on fires mapped using a minimum 1/2-acre mapping unit for boundaries (including unburned inclusions) and intensity.
- In high-density sage sparrow habitat, fires of moderate intensity or higher should be kept to less than five acres. This preliminary target will be consulted on under the ESA in association with the Draft SCI Wildland Fire Management Plan in preparation for the 2002 fire season.
 - In moderate-density sage sparrow habitat, 20-acre patch size limits for fires that burn at moderate intensity or higher will be the standard. This preliminary target will be consulted on under the ESA in association with the Draft SCI Wildland Fire Management Plan in preparation for the 2002 fire season.
 - In low-density sage sparrow and other boxthorn habitat, 40 acres will be the standard. This preliminary target will be consulted on under the ESA in association with the Draft SCI Wildland Fire Management Plan in preparation for the 2002 fire season.
 - To prevent cumulative burns over years from causing the temporary loss of too much habitat for the sage sparrows to be self-sustaining, in high-density sage sparrow habitat, no more than 90 acres (about 10% of all high-density sage sparrow habitat) may be burned over a 10-year period. (This is based on assumption that boxthorn must be 20 cm in height before it is used by sage sparrows (Munkwitz *et al.* 2000), and this much growth can occur in one good growing season (D. Pivorunas, *pers. comm.*) or one El Niño cycle (about seven to ten years).
 - For areas with very high military value, the usual boxthorn objectives will not apply. The focus will be on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn. For a fire to be counted as a burn it must be at least a moderate burn [Score 3 on NPS scale (INRMP Table 4-9)] where litter, duff, and grasses burned to ash; shrubs are burned to singed with some resprouts) mapped using a 1/2-acre minimum mapping unit for boundaries (including unburned inclusions) and intensity.
 - Similarly, any fire that stays within the fire control boundaries of Impact Areas I and II, or any other firing range, should be reported (if a running fire and not a spot fire that self-extinguishes in place) but will not be used as justification for providing additional fire suppression resources above the standard response defined in the Draft SCI Wildland Fire Management Plan.
 - Improve fire management strategy development by evaluating the status of the boxthorn community on sites with different fire history.
 - Examine areas in boxthorn habitats and soil types throughout the Island that have varying burn histories and compare habitat values among them.
 - Conduct experimental burns to clarify the response of this community to fire, in consultation with the USFWS.
 - Conduct an experiment on boxthorn recovery by using various clearing treatments on a small site.
 - Manage disturbance in this community.
 - Minimize ground and vegetation disturbance in the high-density sage sparrow area, from the rifle range east of the dunes to Seal Cove.

- Minimize the footprint of activity in high-density boxthorn habitat.
- Locate ground-disturbing activities on previously disturbed sites whenever possible.
- Keep vehicle activity to clearly delineated roads or transit zones. Restore unused, closed, or unnecessary roads to native vegetation in order to prevent erosion of topsoil.
- Where repeated use is expected, create trails.
- Reduce the cover of exotic species, based on at least one seven-year El Niño cycle.
- Define what is “sufficient” habitat for self-sustaining sage sparrow population.
- Develop a Habitat Suitability Index model for the species.
- Improve mapping of the boundaries of this community.

MDS Boxthorn/Grassland Transition

- Improve understanding of the direction of change in this community. Monitor to determine whether the increased cover of San Clemente tarweed will lead to further change in composition, structure and function.
- Improve the mapping and description of the composition of these areas in order to improve management objectives.
- Fire management targets in Boxthorn/Grassland Transition areas are the same as low-density boxthorn habitat. The risk to natural resources from short fire return intervals appears to be low and fire is expected to be a useful tool in control of exotic plants. Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species.
- Experiment with the use of low-intensity fire to improve native subshrub and herbaceous forb dominance, and to open up dense annual grasslands for improved foraging by the island fox and other species.
- Conduct restoration experiments to shift dominance towards native species.
- Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species.
- Experiment with the reintroduction of Southern Island tree mallow (*Lavatera assurgentiflora* ssp. *glabra*) in suspected historic locations.

MDS Terrace Complex (Cholla and Prickly Pear Phases)

- Accelerate the recovery of shrubs on the terrace faces and flats.
- On the flats, establish or augment existing shrub islands. Increase the cover of woody shrubs by 25% from the 1992—93 baseline (INRMP Section 3.5.4.2) of 6% of total vegetative cover in the next 10 years.
- On the faces, manage shrub recovery primarily by controlling fire intensity so that shrubs and herbaceous perennials may compete with prickly pear (*Opuntia littoralis*) and cholla (*Opuntia prolifera*) thickets.
- Reduce the percent cover of invasive plants from the 1992—93 baseline (INRMP Section 3.4.4) of 41% on the faces, 53% on the flats, as evaluated over at least one seven-year El Niño cycle.
- Control erosion. Evaluate effects of abandoned and existing roads on continuing erosion, and its impacts to the marine environment, and prioritize abandoned roads for restoration if not needed. SCORE will gather input from Fleet users to determine if roads are needed.
- The risks to natural resource values in the MDS Terrace Complex community (comprised

of the plant communities MDS-prickly pear and MDS-cholla with interspersed grasslands and shrublands) are that excessively hot, frequent, or large fires may delay or prevent woody plant recovery. At the same time, allowing some fires can reduce fuel loads that may lead to over-hot fires, and native grasses and forbs may be enhanced and exotics reduced under a fire regime where timing and intensity are controlled. This habitat is a primary foraging area for the loggerhead shrike, and past fires in this habitat in SHOBA appear to have become an “attractive nuisance” to the shrike, leading to difficulties in its management. Shrikes are attracted to burned areas because of at least temporarily enhanced foraging on the opened-up ground. They tend to set up housekeeping in canyons adjacent to burned sites. This has led to their concentration in SHOBA where, ironically, they are difficult to protect from subsequent fire hazard as they nest and raise their young near where ordnance are routinely delivered.

- In the terrace face-terrace flat complex, manage for periodic, cool fires of NPS intensity 5 (INRMP Table 4-9) (litter and duff blackened but not converted to ash, herbs and grasses singed or stressed but some recover and at least some resprout; shrubs are not affected or show minor stress but at least some recover or resprout; and no effect on mature trees, seedlings, or saplings) to keep the grassland in an open condition and control exotics, while favoring shrub and tree recruitment.
- Manage for fire return intervals in grasslands and shrublands of the terrace complex that achieve the above habitat objectives. A preliminary target of five years or longer in grassland, 10 years or longer in shrublands will be consulted on under the ESA in association with the Draft SCI Wildland Fire Management Plan in preparation for the 2002 fire season.
- There will be no controls on patch size except to prevent fires from entering or crossing canyons and high fire management areas on south side of Chukit Canyon boundary and along SHOBA Ridge Road.

MDS Pyramid Cove

- Control invasive exotic grasses using appropriate wildland fire management protocols.
- Improve the soil and community description of this area, and its range of variability.
- Increase cover of *Euphorbia misera* where it currently exists from its 1992—93 baseline (INRMP Section 3.4.5) of less than 1%.
- Reduce exotics, mostly red brome, from the 1992—93 baseline (INRMP Section 3.4.5) condition of 40% by maintaining the current pace of shrub recovery.
- Control escape of fire from Impact Area 1 into the woodlands of east side canyons.
- Maintain shrub and woodland cover within the canyons at existing levels, or greater if this does not conflict with training needs.
- Conduct fog drip study on SCI.
- In Maritime Desert Scrub of Pyramid Cove, protect rare species while allowing light fire.
- Protect Horse Beach Canyon from moderate intensity (NPS intensity 3) or hotter fires (INRMP Table 4-9) by applying pre-suppression and suppression tools.
- Excessively frequent or large fires may affect certain sensitive species that occur in these locations, but their tolerance to fire varies and is largely unknown.
- Evaluate fire tolerance of Santa Cruz Island rock cress seed. Compare habitat of this species here with that where it was recently rediscovered on Santa Catalina Island for insight into its habitat preferences to help improve our ability to define a desired future condition for Santa Cruz Island rock cress habitat.

- Boxthorn areas outside the Impact Area will have same objectives as that of low-density boxthorn.

Maritime Sage Scrub

- Improve understanding of this community's natural boundaries and shifting dominance from north to south. Re-map the boundaries.
- Evaluate the potential of this community to support sage sparrow in areas with high boxthorn cover.
- Promote a fire regime which allows native shrubs and herbaceous species to out-compete prickly pear and cholla.
- Excessively hot, frequent, or large fires may affect the health and biodiversity of Maritime Sage Scrub. California sagebrush is a very flammable fuel, but a plant that seeds prolifically after fire. Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water.
- Manage for fire return intervals and patch sizes that achieve the above habitat objectives. A preliminary target of fire return interval of at least 20 years, and patch sizes that do not exceed 200 acres will be consulted on under the ESA in association with the Draft SCI Wildland Fire Management Plan in preparation for the 2002 fire season.
- Monitor this community for the reappearance of shrubs missing from the Island ecosystem, or the increased prominence of shrubs that now occur in isolation and without clear community membership.
- Improve monitoring of this community, using photography in steep areas. Repeat 1992—93 photography from established photo points.

Loamy Grassland

- Allow fire to play its natural part, as far as possible considering the pervasiveness of exotic species that are unnatural to the system, in dictating the boundaries of shrublands and grasslands.
- Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage the risk of catastrophic fire.
- Control erosion, prioritizing locations that may be lowering the water table, affecting listed species such as San Clemente Island larkspur (*Delphinium kinkiensis*) or water quality in ocean waters designated an Area of Special Biological Significance.
- Improve the dominance of needlegrass and other native herbaceous species from the 1992—93 baseline (INRMP Section 3.4.7.1) of 29% by a favorable burning regime.
- Experiment with fire management to improve native dominance, protect sensitive plant populations, and achieve an open grassland condition.
- Reduce exotics from the 1992—93 baseline (INRMP Section 3.4.7.1) of 58% by a favorable burning regime, as evaluated over at least one seven-year El Niño cycle.
- The risk to natural resources from short fire return intervals appears to be low in Loamy Grasslands and fire is expected to be a useful tool in control of exotic plants. There may be risk to some native perennial herbs with extremely short fire intervals. Currently due to lack of scientific information, specific herbs at risk have not been identified.
- Manage fire intervals and patch size to achieve openness of grasslands and enhance native plants, enhance transit and prey availability for Island fox, and prey availability for the shrike. As a preliminary target, a minimum five-year return interval for wildland fires

larger than 300 acres will be consulted on under the ESA in association with the Draft SCI Wildland Plan in preparation for the 2002 fire season. However, no extra suppression resources will be summoned in case of a repeat fire in the same location.

- Allow fire to play its natural role, as far as possible considering the highly unnatural pervasiveness of exotic species, in dictating the boundaries of shrublands and grasslands.
- Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage the risk of high-intensity fire.
- Experiment with fire management to improve native dominance, protect sensitive plant populations, and achieve an open grassland condition.

Clay Grassland

- Allow patches and stands of *Baccharis* to fluctuate naturally (increase and decrease in the size and extent) within a larger mosaic of grasslands.
- Seek a condition where alien species are not a significant factor in community structure, function, or composition.
- Decrease exotic cover by 10% in 10 years from the 1992—93 baseline (INRMP Section 3.4.7.2) of 70% of total cover, as measured over at least one El Niño cycle.
- Conduct restoration experiments to shift dominance towards native species.
- Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species and native forbs.
- Experiment with the restoration of Southern Island tree mallow in suspected historic locations.
- Improve understanding of where needlegrass currently resides to help focus restoration objectives.
- The risk to natural resources from short fire return intervals in clay grasslands appears to be low and fire is expected to be a useful tool in control of exotic plants. Use prescribed fire to foster a mosaic of grassland with shrubs in patches or on knolls, while considering the impacts of fire on rare shrub species and native herbs and grasses.
- Few specific fire targets are identified because clay grassland is likely to maintain its health at fire intervals as short as 5—10 years. Manage fire intervals and patch size to achieve the above habitat objective. As a preliminary target, a minimum five-year return interval for wildland fires larger than 300 acres will be consulted on under the ESA in association with the Draft SCI Wildland Fire Management Plan in preparation for the 2002 fire season. However, no extra suppression resources will be summoned in case of a repeat fire in the same location.
- Manage fire for openness of grasslands and for native perennial herbs and grasses, to enhance transit and prey availability for Island fox, and prey availability for the shrike.
- Coyote bush (*Baccharis pilularis*) invasion of moist, clay grasslands may be temporary and this shrub community is not specifically protected from fire unless locally occupied by a nesting San Clemente Island loggerhead shrike. So, until further understanding changes this approach, no situation is identified (except nesting by San Clemente Island loggerhead shrike) in which enhanced fire suppression would be justified due to exceeding target values.

Active Sand Dune

- Protect the active dunes that now exist by controlling exotics and uses that may affect sand

replenishment.

- Define and map the boundaries of the active dunes as they are now, based on cover and plant composition. Compare to historical photographs for size and location of active portion of dunes.
- Continue to restrict access to the dunes, especially by vehicles.
- Control ongoing erosion of the dune roads. Close all roads through the dunes to vehicle access, to reinforce the current restriction on access to the dunes.
- Reduce the cover of exotic species by 50% in the next ten years from the 1992—93 baseline (INRMP Section 3.4.8.1) of 20% of total plant cover, based on long-term vegetation condition and trend monitoring.

Stabilized Sand Dune

- Continue to restrict access to the dunes, especially by vehicles.
- Control ongoing erosion of the dune roads. Close all roads through the dunes to vehicle access.
- Reduce the cover of exotic species by 50% in the next ten years from the 1992—93 baseline (INRMP Section 3.4.8.2) of 35% of total plant cover, based on long-term vegetation condition and trend monitoring.

Coastal Strand

- Continue to monitor for activity by the western snowy plover before beach hovercraft landings, as deemed necessary by NRO.
- Monitor and remove species, such as iceplant, that may be encroaching on the beaches.
- Clean up trash and debris.

Coastal Salt Marsh

- Maintain the existing community boundaries, allowing no shrinkage.
- Watch for composition shift to more upland vegetation which may result from upstream sedimentation.
- Monitor for excessive sedimentation levels.
- Check for changes in boundaries on historic aerial photos.
- Periodically clean up debris.

Sea Stacks and Sea Bluff Succulent

- Survey this community for use by plants and animals, with emphasis on endemics.
- Ensure recruitment of rare species exceeds mortality.
- Limit disturbance to sea stacks.
- If feasible, do not use as military targets.
- Survey for use by cats and rats and expand management of any predators as needed.

Intertidal

- Participate in the Channel Islands Rocky Intertidal Monitoring Program.
- Establish four permanent monitoring locations around SCI in intertidal habitats.

- The locations will represent the fixed array of organisms and physical settings associated with intertidal habitats at SCI.
- Establish permanent markers suited to chosen monitoring techniques at each of these locations.
- Select appropriate species for monitoring including, if present in high numbers, those species monitored at other islands.
- Use the published handbook for monitoring rocky intertidal ecosystems to select appropriate techniques for surveying.
- Data collection and analysis, and preparation of reports will be conducted in accordance with procedures consistent with those of the Channel Islands National Park.

Nearshore Shallow Subtidal

- Allow no net loss of shallow subtidal habitat in acreage or in existing net biological values.
- Use the black sea bass as a management focus species for evaluating habitat condition.
- Using substrate and other data, identify the likely location of fish species covered under Essential Fish Habitat regulation.
- Keep informed on the status of recovery efforts for the white abalone.

Fish and Wildlife Management

The 2002 INRMP is comprehensive in its treatment of native and non-native species, covering all taxonomic groups, and identifying management focus species for special attention in the context of an ecosystem management approach.

Terrestrial Plants

- Produce a new vegetation map of the Island and revise the current plant community descriptions.
- Maintain accurate and updated information on locations and status of Island plants.
- Consider some species as Management Focus Plants (a list of potential species is in section 4.3.1 of INRMP) that are considered independently from their plant communities for management.
- Ensure that management focus plants have a network of suitable sites.
- Continue to apply genetic research and management approaches to rare plant management.
- Evaluate the recent work performed by San Diego State University (SDSU) Foundation on mycorrhizae for its ecological and management significance.
- Evaluate the nutrient cycling process on SCI and develop a nutrient cycling management plan as a component to the SCI Wildland Fire Management Plan and Restoration Plan.

Terrestrial Invertebrates

- Determine the status and distribution of invasive ants on SCI.
- Develop identification aids to distinguish native vs. potential invasives and establish simple monitoring program using bait stations at key island entry points, develop inspection standards for equipment, building materials, and other items coming to the island to minimize establishment and spread of invasive ants.

- Determine baseline information on the invertebrate community of SCI.
- Consolidate existing information on SCI invertebrates in the possession of Dr. Scott Miller (Smithsonian Institution) and Dr. Jerry Butler (University of California-Berkeley).
- Support completing baseline field surveys stratified across SCI ecological units.
- Determine the status and habitat affiliations of the San Clemente Coenonycha beetle (*Coenonycha clementina*) and other endemics.

Amphibians and Reptiles

Island Night Lizard Management Area

- Formally designate and implement the INLMA as an experiment and finalize a management plan. Prepare annual summaries and evaluations of conformance with the management plan terms and results of inventories.
- Conduct INL surveys in the INLMA every three years. If numbers suggest a dramatic population decline, identify probable causes, take remedial measures as necessary, and expand surveys as appropriate to other Island locations to confirm status.
- After five years, evaluate and analyze benefits to the INL and associated species of the INLMA management area, including: habitat protected and individuals conserved, the effects of the designation on natural resources outside the INLMA due to displacement of operational activities, whether the location, size, and shape of the INLMA should continue or be adjusted to better conserve the INL, provide more effective balance between the INL and military needs, or to ameliorate negative effects on other resources.
- Formalize the management emphasis in the INLMA. All allowed activities can continue; however in the event of unresolvable conflict the INL takes priority until the conflict can be resolved.
- Establish that military training exercises in the form of dispersed pedestrian traffic and minor localized construction adjacent to existing facilities on already disturbed ground will still be allowed.
- Establish that recreational use of the west shore of San Clemente within the management area can continue.
- Establish a “no net loss” habitat condition policy for the management area.
- Determine that existing roads, utilities, and other areas of past disturbance if still needed will be excluded from the INLMA.
- Avoid large scale construction or military activities in the management area and restore newly disturbed areas.
- Establish a review procedure for military activities outside the INLMA that determines threshold for significant effects and further consultation on INL.
- Exempt training and construction outside the INLMA from further consultation on INL until future activities disturb 20% or more of the “unmanaged” habitat.
- Survey for invasive weeds and prioritize annual control programs for the INLMA.
- Manage fire to protect the integrity of the management area for INL.
- Any prescribed burning program for long-term maintenance should be confined to a small portion of the INLMA at sufficiently low frequencies to avoid excessive effects on the species in a short time frame.

Land Birds

- Determine the status, health, and habitat use of migratory birds, raptors, and non-native species targeting certain focus management “indicator” species not currently considered sensitive.
- Use cooperative assistance from wildlife agencies, non-governmental organizations, and volunteers to collect needed data.
- Minimize access into and disturbance of nesting and breeding grounds during critical periods. Incorporate this restriction as a mitigation for proposed projects.
- Consider the following opportunities for enhancement of bird habitat: 1) use of artificial aids such as nest boxes, especially around Wilson Cove where the local people can see and enjoy the birds, 2) choose appropriate food plants for landscaping, 3) protect areas of dense vegetative cover, 4) prevent noxious weeds from taking over native habitats.
- If it is determined that a non-native species is having a direct effect on a sensitive native species (e.g. brown-headed cowbirds parasitizing San Clemente sage sparrows), then take appropriate removal actions for pests.
- Protect the populations from the lethal effects of human facilities and activities, where this does not conflict with safety concerns.
- Limit the use of rodenticides and herbicides. Remove any dead or dying rodents from a treated area to reduce the possibility of secondary poisoning.
- Take bird populations into consideration when reviewing all projects, scopes of works, contracts, and agreements associated with construction and/or vegetation manipulations or removal.
- Projects should be phased to avoid disturbing nesting birds.
- If nesting birds or eggs are encountered within a project area, the contractor or military operators must immediately notify the Contracting Officer or Project Manager and not attempt to remove the bird or its nest from the area.
- Cooperate with large-scale efforts to research, monitor, and manage migratory bird populations.
- Establish a standardized monitoring program for birds (MAPS program, Breeding Bird Survey route, or Channel Islands monitoring protocol) to track bird occurrence and trends on SCI and contribute to regional and national databases.
- Be aware of the regional and national bird and habitat conservation priorities under the Partners In Flight (PIF) program and integrate into natural resources planning as appropriate.
- Prepare educational materials regarding SCI’s migratory birds and management practices. Include information on what personnel can do to help, species lists, and activities detrimental to bird populations, including avoiding the care and feeding of cats.

San Clemente Loggerhead Shrike Recovery Program

- Initiate Section 7 consultation with the USFWS to establish an incidental take allowance for loggerhead shrikes.
- Continue the captive propagation and rearing of loggerhead shrikes.
- Continue predator management efforts.
- Continue to enhance shrike nest locations and foraging areas.
- Continue island-wide monitoring of the wild population.
- Ensure that shrike ecology is considered in all fire management decisions.

- Reduce conflict between military activities and shrike recovery.
- Continue current research projects into various aspects of shrike ecology and captive rearing techniques, and encourage new research which may elucidate aspects of shrike ecology and improve recovery.

San Clemente Sage Sparrow Management

- Maintain at a minimum the existing cover and distribution of this community on Westshore silt loam soil type since this is where this community is best expressed.
- Facilitate military use that is consistent with the above objectives.
- Provide sage sparrow habitat that is safe from excessive predation.
- Maintain 80% of the first-terrace boxthorn community in the reference condition of 28% cover of boxthorn (50 % of total plant cover) and less than 20 % cover exotics (13 % of total plant cover) based on long-term vegetation monitoring plots. Maintain 80% of the second-terrace boxthorn in 14% cover boxthorn and less than 50% cover of exotics. Evaluate the condition of exotics over at least one seven-year El Niño cycle.
- Non-core boxthorn areas on a 20-year fire rotation for burns larger than 20 acres. This means that once an area burns and the boxthorn is at least 50 % consumed, enhanced fire suppression will be used to prevent a repeat fire that consumes vegetation in that location.
- Core areas should not have burns exceeding five acres in which vegetation is at least 50 % consumed. No repeat burns should occur within 20 years.
- Minimize ground and vegetation disturbance in the core area, from the rifle range east of the dunes to Seal Cove.
- Minimize the footprint of activity in this habitat. Where repeated use is expected, create trails.
- Reduce the cover of exotic species, based on at least one seven-year El Niño cycle.
- Improve fire management strategy development by evaluating the status of the community on sites with different fire history.
- Conduct experimental burns to clarify the response of this community to fire, in consultation with the USFWS.
- Continue monitoring and expand surveys to the winter time to determine seasonal changes in home ranges and habitat use.
- Quantify attributes of wintering and breeding habitat and properly incorporate into sage sparrow management strategies for SCI.
- Develop a Habitat Suitability Index model for the species.
- Ensure that cat and rat control efforts are Island-wide and properly integrated with the sage sparrow conservation program.
- Upon receipt of a USFWS San Clemente Sage Sparrow Recovery Plan, develop a sage sparrow management plan for SCI.

Shorebirds

- Determine the status, health, and habitat use by shorebirds emphasizing certain target or indicator species not currently considered sensitive.
- Use cooperative assistance from wildlife agencies, non-governmental organizations, and volunteers to collect needed data.
- Restrict access into and disturbance of nesting and breeding grounds during critical periods.

Incorporate this restriction as a mitigation for proposed projects.

- Prevent noxious weeds from degrading shorebird habitats.
- If it is determined that a non-native species is having a direct effect on a sensitive native species, then take appropriate removal actions for the pest.
- Cooperate with large-scale efforts to research, monitor, and manage shorebird populations.
- Establish a standardized monitoring program for birds (MAPS program, Breeding Bird Survey route, or Channel Islands monitoring protocol) to track bird occurrence and trends on SCI and contribute to regional and national databases.
- Be aware of the North American Bird Conservation Initiative and priorities for shorebird conservation in the U.S. Shorebird Conservation Plan and the North American Colonial Waterbird Conservation Plan to understand how shorebird management might be most effectively addressed at SCI.
- Prepare educational materials regarding SCI's shorebirds and management practices. Include information on what personnel can do to help, species lists, and activities detrimental to bird populations, including avoiding the care and feeding of cats.
- Avoid shoreline construction that results in a loss of coastal strand/beach habitat.

Western Snowy Plover Management

- Continue annual monitoring of the snowy plover. Ensure that timing of monitoring includes best opportunity to detect nest scrapes.
- Avoid enhancement projects aimed at promoting nesting of western snowy plovers and predation of nests and young by foxes and cats.
- Continue to monitor for activity by the snowy plover before beach hovercraft landings.
- Avoid shoreline construction that results in a loss of coastal strand habitat.

Seabirds

- Establish a standardized monitoring program for birds (MAPS program, Breeding Bird Survey route, or Channel Islands monitoring protocol) to track seabird occurrence and trends on SCI and contribute to regional and national databases.
- Focus surveys on sea stacks around the island to determine location and species' use of stacks.
- Limit disturbance to sea stacks, and do not use as military targets.
- Survey for use by cats and rats and expand management of any predators as needed.

Terrestrial Mammals

- Develop an all-island approach to rat and cat management rather than restricting management to only part of the island and effectively maintaining a protected source population.
- Remove restrictions on managing cats in the Wilson Cove area, but develop alternatives that represent effective management and are sensitive to the social considerations of removing cats in an urban-type setting.
- Eliminate feeding sources that support thriving populations of cats and rats.
- No person shall import, shelter, or maintain any domestic or feral mammal (NALFSCIINST 5300.1F 1999).

- Convert all trash bins on the island to rodent-proof and cat-proof containers.
- Develop guidance for protecting native rodents during baiting programs for black rats and evaluate the efficacy of alternative baits.
- Ensure that all management activities for feral rodents and cats have properly considered trade-offs to other native wildlife in the planning and post-implementation evaluations.
- Conduct bat reconnaissance surveys.

San Clemente Island Fox

- Consider establishing additional trapping grids beyond the single one in SHOBA and expand population status monitoring to one more season. Weigh the value of adding a new grid in SHOBA with expected effects on training there as an integral part of the continued planning for fox status surveys.
- Radiotelemetry should be continued at least in a limited, re-occurring program. Especially focus on better understanding of the fate of females and their young that were held in captivity during the shrike breeding season and later returned to their home ranges.
- As funding allows, consider mowing vegetation along the main roads on SCI to provide better visibility of and by foxes in an attempt to avoid road kill of foxes. Educate SCI personnel about the road kill issue and the connection of speeding on the roads and fox mortality.
- Find ways to educate recreational boaters not to bring their dogs onto SCI.
- Educate SCI personnel by posting signs and distributing the natural and cultural resource brochure currently in production. The purpose of the sign will be to alert drivers to the potential of foxes in the road, and to indicate the legal vehicle speed. The brochure is intended to inform and educate Island military and civilian visitors about natural and cultural resources, and rules and regulations regarding their protection.
- Enforce posted speed limits in order to reduce the number of road kills.

Marine Macroalgae, Plants and Coral

- Participate in Channel Island-wide monitoring of kelp beds.

Marine Invertebrates

- Continue to develop baseline information on the status of marine invertebrate populations around SCI.
- Ensure cooperative funding of baseline and trend monitoring of in-water surveys by the National Park Service [Channel Islands Monitoring Group?].
- Participate in regional long-term monitoring and scientific evaluations of Channel Island marine ecology and management.
- Provide a representative to the Channel Islands Science Panel.
- Support the inclusion of SCI as part of the Channel Island rocky intertidal monitoring program.
- Evaluate threats to white abalone from short rounds off SHOBA.
- Participate in recovery planning for the white abalone. Be a full partner on the recovery team or other recovery planning.

Fishes

- Ensure fishes covered by the Magnuson-Stevenson Act are identified and categorized by habitat for protection as Essential Fish Habitat.

Marine Mammals

- Minimize access and disturbance to California sea lion haul outs and rookeries during April through May that may result in mortality of pups.
- Be aware of whale migration pathways near SCI.
- Report dead or stranded marine mammals to the appropriate agency.

Restoration, Enhancement Planning, and Artificial Propagation

- Prioritize potential sites that support threatened and endangered species' habitats for restoration.
- If active restoration is appropriate, secure adequate funding and resources needed for the restoration project.
- Gather and analyze historical information about the area requiring restoration.
- Perform new research to clearly establish what is currently inhabiting a site and the state of the physical characteristics of a site.
- Properly plan the restoration effort.
- Perform the restoration.
- Ensure BMPs for reducing erosion and pollution are followed.
- Monitor and evaluate the effectiveness of restoration efforts and adjust management accordingly.
- Annually monitor the location to determine if restoration is successful.
- Maintain careful records of the habitat's restoration, including photographs, for future reference in other projects and to receive mitigation credit.
- Proposed projects should be evaluated by a team of qualified biologists, land managers, and military operations personnel to determine the projects merits and potential effects on SCI's military mission.
- Ensure that SCI receives appropriate mitigation and public credit for any approved project.

Invasive Species Control

- Develop an instruction to prevent the introduction of exotic marine and coastal species to SCI as a first priority for control. Promote education about preventative methods.
- Periodically update and distribute the list of exotic species found at SCI.
- Define a management corridor within which measures are taken during construction and other activities that minimize the disruption of coastal soils in order to prevent weed invasion.
- Develop a list of native species useful for landscaping and require the use of these plants. Use only native plants grown in the Island Nursery.
- Support state policies that control invasive nonindigenous coastal and marine plants and animals through the Fish and Game Code and other appropriate regulations.
- According to the INLMA BO (1997), the Navy should require that all vehicles and equipment used in construction or training activities on SCI are washed prior to coming onto the island to help prevent the spread of exotic plants. Vehicles must be free of mud

- and weed seed. The Navy should assure that the underside and wheel wells of all vehicles are sprayed under high pressure to remove weed seed.
- The Navy should assure that roadbed material is weed free prior to shipping to SCI by requiring a sterilant or herbicide be mixed with roadbed material prior to shipping. The Navy should assure that stockpiled roadbed material is checked annually between April and June for weed growth and an appropriate herbicide is applied prior to seed set if weeds are present (INLMA BO 1997).
 - Become a partner in the California Interagency Noxious Weed Coordinating Committee (CINWCC).
 - Evaluate the status and biology of invaded ecosystems and nonindigenous marine and coastal species in the Channel Islands, focusing on those with the most potential for ecological disruptions.
 - Study the basic biology of existing and probable new arrivals that have the potential to become pests or alter habitats.
 - Identify use of exotics by native animals (e.g. insect use of plants).
 - Evaluate the introduced species for their effect on the Island's ecosystem. Determine negative and positive effects on native species, the Island's marine and terrestrial food webs, and habitat quality, as well as assess the magnitude of each species' impact.
 - Rank the relative impact of known exotic species in order to determine control priorities.
 - Support the implementation of an exotic species portion of the Channel Island's ecological monitoring program.
 - Promote cooperative interagency efforts to collect and analyze comprehensive monitoring data, including shared funding and staffing.
 - Support easy access to the ecological monitoring program's results (e.g. agency website).
 - When feasible, minimize costs by using knowledgeable volunteers to assist with exotic species inventories.
 - Provide for an early warning system for newly discovered non-native species.
 - Conduct weed related inventories. Target locations with higher probability for newly arrived species (e.g. disturbed sites).
 - Evaluate the results of all species monitoring on the Island for the presence of new exotics on an annual basis at least.
 - Develop a descriptive list of possible control measures, including mechanical, chemical, biological, and harvest management.
 - Create a list of target species that may invade to be watchful for.
 - Work on developing biological controls that could be used for existing and potential arrivals, while ensuring safety of nontarget species.
 - Control the black mustard (*Brassica nigra*) population along the China Road.
 - Control the invasion of veldt grass (*Ehrharta calycina*) by the runway fuel depot.
 - Continue to spray priority noxious weeds.
 - Experiment with prescribed fire as an appropriate and effective tool for controlling exotic annual plants that are pervasive in the environment.
 - Beware of fire resulting in increased exotics.
 - Hold an annual Channel Islands-wide workshop on the topic, including a brainstorming session on alternative measures.
 - Provide an information center at CNRSW offices on exotic species and control measures

accessible to resource managers.

- Determine the distribution and status of native and invasive ants on SCI.
- Develop inspection standards for equipment, building materials, and other items to minimize establishment and spread of invasive ants.
- Do a status review of the brown-headed cowbird on SCI.
- Prevent the introduction of killer algae (*Caulerpa taxifolia*). Watch for killer algae in the water and on vessels and gear. If located on SCI, it should not be disturbed and Southern California Caulerpa Action Team (SCCAT) should be contacted immediately.
- Conduct prescribed fires to reduce or eliminate non-native plant species.

Predator Control

- Continue predator management efforts:
 - Implement a no-tolerance policy toward feral cats. All cats on SCI should be removed and the feeding of cats in Wilson Cove should be discouraged.
 - Renew Instruction regarding feral animals and their control on SCI.
 - Continue to trap and shock-collar island foxes that consistently use active shrike breeding territories.
 - Continue to remove black rats from around shrike nesting areas.
 - Monitor ravens and raptors near shrike nests and remove nests of these shrike predators from the vicinity.

Bird Aircraft Strike Hazard (BASH)/Wildlife Hazard Assessment.

- Develop a BASH Instruction.
- Participate in Naval Base Coronado's BASH working group (BWG) and delineate responsibilities of all personnel involved.
- Use BASH Plans developed at other installations for guidelines until a plan is developed for SCI. Review and update the plan annually to include new deterrence methods and management guidelines.
- Conduct surveys (by an individual trained in wildlife identification) to monitor wildlife populations and use patterns at the airfield.
- Institute an uncomplicated bird hazard reporting system that ensures that SCI is informed of incidents no matter where pilots are based.
- Require that pilots, tower personnel, and mechanics report all incidents, damaging and non-damaging, so that corrective actions may be assessed.
- Make available Bird/Animal Strike Hazard Report forms.
- Make wildlife species identification guides available.
- Place posters for bird species identification at air control tower and at pilot gathering areas.
- Collect feather or any body parts for determination of species.
- Continue to maintain a database to organize wildlife strike information from pilot reports, mechanical inspections, and runway surveys.
- Be responsible for obtaining and renewing appropriate permits for wildlife removal and environmental modifications. A depredation permit should be procured from USFWS.
- All vehicles which regularly work on the airfield should be equipped with a 15 mm single

- or double shot pyrotechnic launcher and accompanying supply of bangers, screamers, or whistlers. All weapons will be registered with SCI Security.
- At a minimum, the airport should have at disposal: 2 pyrotechnic pistol launchers with caps, 10 boxes of bird bangers, 10 boxes of screamers, 1 carton of Mylar tape, 2 propane cannons.
 - Adopt a zero-tolerance policy toward hazardous wildlife on the airfield. All birds should be consistently and immediately scared off of airfield.
 - Comment on projects that could potentially increase wildlife hazards near the airfield in order to prepare avoidance and minimization measures. These may include, but are not limited to: new building construction, wildlife habitat enhancement, landscaping, or refuse disposal projects.
 - Support research that will enhance safety of pilots with respect to bird aircraft strikes.
 - Consider use of a marine doplar radar or other radar system to study bird migration patterns.
 - Bird-proof airport buildings. Exclude small birds such as house sparrows, finches, and starlings from cavities and openings using wire mesh.
 - Persistent birds may be shot with a pellet gun or trapped.
 - Replace bare ground, which is habitat for animals that prefer bare ground conditions, with other material and leave no standing water in the airfield vicinity. Eliminate low spots. Avoid materials that may cause foreign object damage (FOD) to aircraft.
 - Reduce the edge effect between habitats that attracts birds and other wildlife by maintaining a uniform appearance of the airfield.
 - Identify any nearby roost trees and prune to make less attractive. Remove trees and shrubs within 600 feet of any runway or approach path.
 - Prohibit the planting of berry-bearing shrubs and trees near the airfield.
 - Ensure NSW facilities do not attract birds.
 - Remove from the active airfield all posts, poles or solitary shrubs or trees that might serve as perches for birds of prey.
 - Ensure windbreaks or other landscaped plantings utilize species that do not attract flocks of birds.
 - Ensure all trash bins, waste receptacles, and landfills near the airfield are covered to reduce their attractiveness to birds.
 - Keep drainage ditches clear so they do not become a breeding ground for wildlife.
 - Develop routine practices for removing hazards.
 - Assign personnel to sweep the runways every morning for potential hazards.
 - Train and allow military personnel how and when to haze (scare off) birds during normal flight, and educate Air Traffic Control personnel on what to look for.
 - Assign personnel to the following tasks:
 - Ensure the tower is advised when hazards are observed or removal techniques are about to be employed.
 - Disperse birds in the vicinity of the airfield that pose an aviation hazard and serve as an attractant to other birds. Methods used could be pyrotechnics, bioacoustics, live trapping and euthanasia. Additional personnel may be required to provide continual harassment.

- If pigeons are a problem, discourage nesting and roosting by: applying Nixalite™ and owl decoys to commonly used areas, remove birds by shooting with air rifles at night when the birds are roosting, or trap birds with funnel traps baited with grain or decoys.
- Keep a record of the number of birds hazed and their activity.
- Ensure all hazing activities will avoid habitats or known populations of federally listed species.
- Increase dispersal tactics during migrational periods. Fox effigies, owl decoys, and raptor silhouettes are best used at this time.
- Adopt a policy of lethal control for unusually persistent wildlife.
- Ensure that the species has been properly identified and is not a sensitive species.
- Eggs, chicks, and fledglings of nuisance species located at the airfield will be dispatched with using legal, humane methods of euthanasia. Records will be kept of the date, location, and number of young removed.
- Ensure planes fly with aircraft lights on at all hours during peak migration periods.
- During migratory periods aircrew conducting low-level flight should be cautioned that peak periods of bird sensitivity exist one hour before and after sunrise and sunset. Reduction of the number of aircraft conducting low altitude (500ft& below), high-speed flight through bird migratory routes should be considered.
- If necessary, one option is to close portions of the airfield for short periods of time to accomodate large-scale removal efforts.

Land Management

Fire Management

- Adopt the Guiding Principles of the 1995 Federal Wildland Fire Management Policy and DoD INST 6055.6:
 - Safety is top priority.
 - Plan for fire as an essential ecological process.
 - Support land and resource management plans.
 - Fire policy is established on a foundation of sound risk management.
 - Fire management must be economically viable.
 - Fire management is based on the best available science.
 - Public health and environmental quality are considered.
 - Coordination and cooperation are essential.
 - Fire management involves ongoing standardization of policy and procedures.
- Integrate federal fire policy with the following Fire Management Guiding Principles for SCI:
 - There will be no net loss of training access and opportunities due to wildland fire management (SAIA).
 - There will be no net loss of habitat value across the Island.
 - Fire-safe planning and defensible space will be the principal protection strategy for inhabited structures and high-value facilities.

- In the wildland environment, pre-suppression management and timely and appropriate response will be the principal protection strategy. Fires are suppressed at minimum cost, considering firefighter and public safety, benefits, and values to be protected, consistent with resource objectives.
- The primary purpose of pre-suppression management strategies will be to reduce the risk of ignitions and adverse ecological effects of wildland fire, and the associated costs of fire suppression.
- Wildland fire strategy and control will be based upon designated Fire Protection Units.
- Firefighting resources will be allocated based on the following principles.
 - For each Fire Protection Unit, assets will be valued to guide the allocation of Fire Department resources. The valuation of assets will be based on the following general principles:
 - Priority 1: Human life, firefighter safety.
 - Priority 2: High-value, vulnerable facilities, structures, habitats, natural and cultural resources.
 - Priority 3: Major military planned exercises, and other natural or cultural resources of concern.
 - Priority 4: Recreational opportunities, air quality, fire suppression cost.
 - Assets at risk from wildland fire will be prioritized in advance, whether facilities or natural resources, by assigning relative values and considering both commodity and non-commodity values, so that Fire Department resources may be allocated according to potential losses.
 - Pre-suppression management projects will be prioritized based on:
 - Priority 1: Greatest potential reduction of wildfire suppression cost and the value of assets to the Island, as a whole, for the investment required.
 - Priority 2: Projects for which the Fire Department receives partial funding from benefiting organizations and parties with responsibilities for those assets.
 - When pre-suppression management strategies are primarily needed to protect natural resource assets, first priority will be placed on assets that fall under regulatory compliance.
 - Pre-suppression management projects affecting non-regulated natural resource assets will subsequently be prioritized based on the “no net loss of resource value” principle. (Fire Department resources will be prioritized for these areas upon determination of an overall reduction in habitat quality or quantity.)
 - Identify natural resource assets and circumstances requiring funds for losses associated with wildfire. Assign a relative value to these losses on a per-acre basis.
- Establish a San Diego County Department of Navy Wildland Fire Coordinating Group consisting of representatives from:
 - San Diego Area Federal Fire Department
 - San Clemente Island Federal Fire Department
 - Marine Corps Air Station Miramar Fire Department
 - Marine Corps Base Camp Pendleton Fire Department
 - Navy Reserve Unit HC-85
 - Navy Helicopter Unit—NASNI
 - Navy Landing Craft Air Cushion (LCAC) group

- The purpose of the Coordinating Group is to share wildland and prescribed fire personnel, equipment and specialized skills, establish Standard Operating Procedures when sharing these resources, and to conduct joint wildland and prescribed fire training exercises. This Group should have a Charter and Rules of Operation.
- Implement a Rapid Wildland Fire Response Program to share among fire departments. Establish a Strike Team of Type 3 Wildland Fire Engines, plus staffing, to jointly share during periods when one fire department exceeds their wildland firefighting capabilities. This is especially important in regard to SCI Federal Fire Department.
- Work with MCBCP LCAC Facility to develop coordination, operational and dispatch procedures to send the Type 3 Strike Team to San Clemente Island via hovercraft during a wildland fire emergency on SCI.
- Establish a Prescribed Fire Implementation Team consisting of representatives of all Department of Navy fire departments in San Diego County. This Prescribed Fire Team would be available for all Department of Navy fire departments, if requested. Reimbursement funding procedures would be established by the Wildland Fire Coordinating Group.
- Use the established Incident Command System (ICS) terminology, procedures, and certification standards required in all federal wildland fire policy, which the Department of Navy is a signatory partner, in all wildland and prescribed fire activities.
- Prepare a three-year renewable (annually) contract for a private Type 3 helicopter equipped with a water/ Class A foam bucket system from the period of June 15 through November 1 (Option No. 1).
 - Explore the option of requiring the contractor to supply a small (75 to 100-gallon) 4-wheel drive fuel truck to service and refuel the helicopter near the fire scene or at other pre-designated sites close to the fire area. This option would reduce the normal 20–30 minute round-trip flight time to and from the SCI Naval Auxiliary Landing Field to re-fuel after every two hours of flight. This requirement makes for a longer and more effective firefighting use of the helicopter.
 - The contract helicopter should be stationed at the SCI Naval Auxiliary Landing Field near the fire station during fire season.
 - The contract helicopter would be initially dispatched, along with the wildland fire engine, on all wildland fires on SCI. This contract helicopter will reduce response time and support the ground firefighting resources in the earlier stages of a fire. The contract initial attack helicopter is considered the most effective choice due to the following:
 - helps to contain wildfires at the outer edges of the Impact Area #2 between the pre-established fuel break (just outside the unexploded ordnance areas) and the actual impact area boundary,
 - enhances the protection of sensitive areas and/or single nesting areas,
 - aids the ground firefighting effort to contain wildfires along roads, fuelbreaks, and other fuel treatment areas by cooling fire intensities and rapid knock-down of small spot fires (that spot over containment lines) before they can become larger.
 - After the three-year contract period, the NRO and the Fire Department should prepare an analysis to evaluate the positive and/or negative resource values

- effects of having this private helicopter as the prime rapid initial attack firefighting resource.
- Alternatively (Option No. 2), contract for a small private helicopter with crew and water bucket to be on fire standby at SCI on every predicted High or Extreme Fire Danger Day. Have HC 85 or Heavy Lift Navy Helicopter placed on alert and on-call (one-hour) for follow-up fire suppression assignment on High and Extreme Fire Danger Days.
 - Alternatively (Option No. 3), require HC 85 or Navy Heavy Lift helicopter to be on fire standby at SCI during all High or Extreme Fire Danger Days.
- Staff a full-time Wildland Fire Manager position on SCI.
 - This billet would be responsible for all wildland fire related activities (wildland fire suppression, aviation management (water dropping deployment targets) and fuels pre-planning) and be the Fire Department's principal liaison with Military Operators and Aviation Units and the Natural Resources Staff.
 - This person would coordinate all wildland fire training, collection and dissemination of fire weather and Fire Danger Rating information to all Island users, make the necessary notifications and interpret restrictions based upon the fire weather information and pre-planned operational guides.
 - In addition to the above, this position would manage the implementation of the proposed SCI prescribed fire and fuelbreak projects and prepare annual budget requests in coordination with the Natural Resource Staff.
 - Funding for this position is required over and above existing Federal Fire Department budget allocation.
 - Consider the following options for staffing a wildland fire crew:
 - Option No. 1. Hire two additional full-time federal fire captains (two shifts). One of these fire captains will be responsible for wildland and prescribed fire/fuels projects. Hire six additional full-time federal firefighters.
 - Option No. 2. Hire one additional full-time federal fire captain as a Wildland Fire Coordinator. Hire six additional seasonal wildland fire technicians, either federal firefighters or through NRO.
 - Once the full implementation of the SCI Fire Plan is funded, 5 or 6 additional seasonal (June 1 to November 1) wildland firefighters may be required to implement and maintain the full range of fuel treatment activities recommended. They will also add to the effectiveness and high probability of roads and fuel treatment areas being effective containment lines for wildland fires.
 - The actual need for staffing of these five or six seasonal firefighters will be determined at a later date after three-year annual review of the effectiveness of recommendations one through five.
 - Ensure Remote Automated Weather Stations (RAWS) are providing consistent and accessible fire weather information on a daily basis.
 - Upgrade computer system in Federal Fire Department to provide fire weather processing capability and video views of fire.
 - Design a system for consistent and reliable helicopter response to keep fire size to a minimum targeting a ready-response during high fire danger days of 15 minutes or less.
 - A key investment in improved radio and telephone communication systems is necessary so that reporting of a fire incident reaches Federal Fire in three minutes or less from time of first knowledge. All services must be able to talk to each other from key locations on the

- Island immediately and on the same frequency. Very high priority, more than roads.
- Adopt the following preliminary Fire Danger Rating System (FDRS) for SCI (INRMP Table 4-9). The daily rating will be based upon weather data collected at the OPS 1 and OPS 3 weather stations. Development of this system is described in the Draft SCI Wildland Fire Management Plan.
 - Evaluate and revise the FDRS on an annual basis based on new resource information, improved weather data, and fire history.
 - The Fire Danger Rating should be announced daily on a website accessible to all operators.
 - If training using incendiary ordnance or devices is taking place when the FDRS is HIGH, either a contracted helicopter or military HC-85 unit shall be on ready stand-by alert for response to wildland fire as its only responsibility from SCI Auxiliary Landing Field.
 - If training using incendiary ordnance or devices is taking place when the FDRS is EXTREME, both helicopters shall be on ready standby alert from SCI Auxiliary Landing Field with no other assigned responsibilities.
 - If a helicopter is not available, then training will be restricted to non-incendiary ordnance use.
 - In high-density sage sparrow habitat, consider the effectiveness of bumping up by one step the daily FDRS restrictions on ordnance use. Implement if considered an effective preventative measure, and re-evaluate annually.
 - Seven locations are identified as strategic, high-priority fire control areas to protect natural resource values from high ignitions. Natural or constructed fuelbreaks are important in these areas. They are: Impact Area I in Pyramid Cove, Impact Area II in China Cove, along the south side of Chukit Canyon, the SHOBA Ridge Road, the north side of Eel Cove Canyon and vicinity of Eel Point, Northwest Harbor, and VC-3.
 - Once the planned fuelbreak in Management Unit 16 “China Cove” is in place, the existing restrictions on use of white phosphorus and illuminating for marking on deck and tracers, as well as the reduced target area size in Impact Area II should be lifted. This recommended change in policy is currently undergoing consultation with the USFWS under the ESA for effects on federally listed species. Should a fire emanate from activities in this target area, escape beyond the Management Unit and burn sensitive resource exceeding target objectives defined in the SCI Wildland Fire Management Plan and as identified in the INRMP, this policy will be immediately re-evaluated for adjustment for the remainder of the fire season upon evaluation of cause.
 - Evaluate the use and application of the fire retardant Phos-Chek D75-F, especially around high-priority control areas, to reduce the risk of escaping wildfires and to protect sensitive resources.
 - Develop application protocols that minimize the effects of fire retardant application on plant and wildlife communities. Consider the following:
 - Prescribed fire is likely to be the most environmentally compatible alternative to establishing fuelbreaks, compared to disking and herbicide use. The temporary fertilizing effect of residual NH₃, NH₄, and total phosphorus, which occur in the natural environment, might promote annual grasses.
 - This effect has been shown to disappear after the year of application in two separate studies.

- Retardant can be applied after grasses have seeded out to avoid this effect.
 - Retardant use can be rotated within the fuel management zone to avoid repeated application.
 - Application by aerial spraying or from roads will prevent damage to habitats caused by vehicle or foot traffic.
 - Develop a system whereby EOD may ensure ranges are safe for aerial application of fire retardant or prescribed fire in a non-wildfire situation.
 - Aerial spraying from a boom on a small helicopter (similar to crop-dusting) is expected to be safe enough to use above unexploded ordnance.
 - Only a small width (20 ft.) of the larger fuel modification zone (200 ft. wide) will need retardant in any given year, reducing the need for repeated application in the same area.
 - Some years may not require any application depending on weather, fuel loads, and training schedules.
 - Retardant should be applied adjacent to and outside of the previous year's retardant line. The previous year's retardant line should then be allowed to burn to reduce any increase in exotic species caused by the application of the retardant.
 - A controlled burn within the area of concern soon after retardant application will ensure the effectiveness of the retardant line.
 - Application of retardant after the winter rains will reduce the risks of chemicals washing into water sources.
 - Application of retardant should avoid standing water and areas that would immediately drain into a canyon to avoid impacts to in-water wildlife.
 - Application of retardants should be performed in conjunction with long-term studies on soil and vegetation responses to this activity. The long-term impacts to plant and wildlife communities are largely unknown at this time.
- Fire retardants should only be used when deemed necessary to maintain the military mission and protect sensitive resources.
- Adopt Fire Management Success Targets by ecological unit such that each community and habitat is expected to be resilient and self-sustaining, while achieving this INRMP's goal of ensuring all native species are self-sustaining, plants and animals, in the system while minimizing the abundance of exotics.
 - Identify fire intervals, patch sizes, and fire intensities which are expected to protect long-term community values and achieve the INRMP's goal.
 - If any of the following targets are exceeded, then the situation will be evaluated for impacts to sensitive resources, and if found detrimental, then enhanced pre-suppression or suppression tools will be applied to correct the situation. "Enhanced pre-suppression and suppression tools" may mean: use of fuelbreaks and/or use of retardant; pre-positioning of a suppression asset such as a fire truck or helicopter during an incendiary activity; fuels management by prescribed burning; or restrictions on activities that are incendiary in nature. This accelerated use of fire management tools in such a situation means effort will occur beyond the normal implementation of FDRS restrictions; enhanced communication system to achieve three-minute or less fire reporting time; fire season helicopter availability; supervised seasonal fire crew; and use of fuelbreaks in seven key fire control areas.

- In all cases no matter what the military or natural resource value rating, fires that burn at NPS Intensity 5 are considered potentially beneficial and are not assessed as a negative impact for adjusting fire suppression resources (litter and duff are blackened and not converted to ash; grasses and forbs are singed/stressed, many resprout/recover; shrubs are not affected or slightly stressed; trees are unaffected including seedlings or saplings).
- Adopt the success targets described under each habitat category in sections 4.1.1 through 4.1.8, once specific targets have been consulted on under the ESA with USFWS for potential effects on federally listed species.
- No fire risk is anticipated, so no management direction is provided for: Active Dune, Stabilized Sand Dune, Coastal Strand, and Coastal Salt Marsh
- Monitor all fires regardless of size and location.
 - Map fire boundaries
 - For evaluating fire intensities, implement the National Park Service’s post fire monitoring protocol (1992) or evaluating this factor. The following is an adaptation of that protocol for trial use on SCI:
- Reinitiate consultation on fire’s effects on listed species with USFWS.
- Establish an SCI Wildland Fire Coordination Group that involves user command representatives including SCORE, as well as the OIC and representatives from Federal Fire, Public Works, EOD, and natural and cultural resources.
- Improve access to a water tender truck from Public Works, and possibly a nurse water tanker to draw from during incidents. Otherwise, require that private helicopter provide their own.
- Write an Island-wide Fire Management Instruction that reaches the entire spectrum of those who need to know, explaining all protocols required for use of ordnance and any other training activity on SCI, as well as protocols for all other activities that carry risk of fire ignition and may require fire response.
- Use defensible space principles to defend NRO facilities including shrike cage complex, the field station, and fox holding cages.

Soil Erosion

- Soil conservation shall be considered in all site feasibility studies and project planning, design, and construction, and agreements. Appropriate conservation work and associated funding shall be included in project proposals and construction contracts and specifications.
- Generate and ensure incorporation of innovative Best Management Practices (BMPs) in the preliminary design of construction and maintenance activities involving ground disturbance.
- Develop an erosion control plan.
- Minimize disturbance by locating staging areas in disturbed areas only. Staging areas shall be prohibited within sensitive habitat areas.
- Ensure NEPA review includes the mandate for erosion control.
- Prioritize soil erosion control activities according to the seriousness of the degradation and potential impacts.
- Regularly monitor storm runoff and its effect on vulnerable areas.
- Stabilize disturbed sites with protective materials or erosion control plants native to SCI and grown in the nursery .

- Water bars or dips should be constructed on dirt roads located on slopes.
- Retaining walls should be erected along the uphill edges of roads where the road has created a significant cut bank.
- A system of cement diversion culverts or rock lined channels are appropriate for vegetated slopes.
- Keep specifications for each culvert, road structure, road, utility line, communication line, and other infrastructure in an electronic format.
- Protect natural watersheds by minimizing the runoff of pollutants.
- Minimize the proliferation of roads, keeping only those that are essential for safety and access.
- Work with PWO to develop a 5—10 year Long-term Maintenance Plan.
- Provide overall management guidelines for maintenance activities while preventing erosion and protecting sensitive natural and cultural resources.
- Use the breeding season as a guide to when impacts may be avoided by timing, or by adjustments in maintenance practices or location.
- Mitigate for unavoidable impacts.
- When repair work becomes necessary, it will be prioritized according to its seriousness and potential impact.
- Road repair should be coordinated with NRO.
- Continue to prohibit off road use except in designated off-road areas or on established trails approved by NRO (NASNI Instruction).
- Assess and monitor the biological impacts of maintenance activities on sensitive species, water quality, and erosion. Adopt road construction and maintenance standards and BMPs that prevent impacts to sensitive resources.
- Comply with water quality permit requirements if a project may affect wetlands or watercourses.
- Seek and obtain regional 404 permits (four months in advance) from USACOE, if needed.
- Obtain the following concurrently with regional 404 permit from ACOE: 401 permit from California Regional Water Quality Control Board (RWQCB), CDFG Streambed Alteration Agreement, documentation of contact with State Historic Preservation Officer (SHPO), and documentation of contact with USFWS.
- Use permanently located, integrated inventory and monitoring plots to detect ecological trends in a manner that separates natural causes from the effects of land use.
- Periodically map existing and new areas of moderate to severe erosion and digitize into an Island GIS. Establish and actively update this GIS.

Wetland and Water Resources Protection

- Complete the wetland delineation currently underway and have it certified by the USACOE.
- Develop a water resources management plan.
- Maintain fresh water sources for wildlife to access.
- Do not dump sea water on fresh water sources or endangered or threatened species (especially sage sparrow) habitats during fire suppression practice or incidents.
- Determine groundwater consumptive use by native versus non-native plants.

- Develop a monitoring protocol for water and soil resources.
- Explore and establish mechanisms to mimic or restore natural hydrologic regimes.
- Investigate opportunities for reclaiming moisture from fog for Island Nursery, landscape irrigation, and watering of outplantings.
- Sedimentation rates into wetlands should be at pre-1840 levels. Control erosion of upland watersheds with priority on vernal pools.
- Control invasive non-natives.

In-water Activities Management

- Emphasize cost savings of preventative actions in comparison to remedial, cleanup actions (following spills and discharges).
- Ensure that BMPs are effective and diligently implemented.
- Incorporate internal pollution prevention plan requirements by the Navy for this installation through specific instructions to include specific components:
 - An audit of all pollutants generated by the facility and their sources within the operation.
 - An analysis of appropriate pollution prevention methods to address each pollutant.
 - A strategy to prevent pollution, including specific objectives to be accomplished.
 - Anticipated short- and long-term costs and savings.
 - A detailed description of tasks and time schedules for the above.
- Continue to comply with regulations regarding ballast water and boat cleaning activities.
- Educate Port Operations personnel about the potential effects exotic marine organisms can have on the Island and provide identification materials for particularly noxious species.

Landscaping and Grounds Maintenance

- Develop an Instruction for landscaping and maintenance.
- Develop an Instruction for herbicides/pesticides.
- Prioritize landscape improvement projects.
- Implement projects that will reduce water usage and help meet water conservation goals.
- Develop a priority planting scheme to determine which areas should receive higher levels of watering during emergency drought conditions.
- Use landscaping to moderate environmental influences (e.g., solar heat gain, glare, dust, and wind), mitigate human activities (e.g., noise, construction), unify exterior spaces, enhance biological values, and enhance functionality.
- Plan new facilities in coordination with existing and new landscaping.
- Take advantage of building orientation, overhangs, trellises, etc.
- Use landscaping, where necessary, to define edges and buffer areas that are incompatible with the surrounding use.
- Plant locations and spacing should permit normal plant development without undue crowding or pruning.
- Develop a list of acceptable and successful drought-tolerant, native plants which can be used for landscaping.

- Choose plants that are useful to wildlife as a food source, where practicable, but not near eating areas.
- Use trees and shrubs to block all undesirable views, noise, and lights and provide privacy.
- Plant native deciduous trees for summer solar-insulation / winter heat-gain screening at buildings. Plant windbreaks for wind deflection, dust control and noise suppression.
- Use mulches to reduce evapotranspiration and erosion, and to control weeds.
- Apply herbicides on an as-needed basis only.
- Minimize water use, maintenance, and fertilizers wherever possible through efficient irrigation systems, drought-tolerant plants, appropriate plant use and effective plant establishment techniques.
- Plant native species only.
- Prohibit water runoff onto streets or sidewalks.
- Upgrade manual systems and hand watering to automatic systems.
- Require all new irrigation to use automatic systems with water-conserving systems including soil moisture sensors, weather station monitors, flow and pressure sensors.
- Increase the uniformity of water distribution in manual and automatic irrigations systems and adjust irrigation schedules to maximize efficiency and emphasize a reduction in evaporation.
- Water between midnight and 7 a.m.
- Set runtimes during periods of less wind velocity, usually dusk until dawn.
- Lengthen the irrigation interval between irrigations and increase the amount of water at each irrigation to promote deep rooted turf.
- Monitor plant health and appearance and adjust controllers to minimum water levels.
- Observe the California Water Authority's water use and conservation policies with seven stages of alert (INRMP Section 4.2.6.1).
- Group plants into "hydrozones" based on similar water requirements and exposure to sun and wind.
- Amend the soil to improve water retention, drainage, and aeration.
- Encourage recycling or burning of trash.
- Meter water use to obtain and provide records of actual usage as an incentive for conservation.
- Substitute plant material with non-vegetative groundcover where suitable.
- Encourage use of mulches, decomposed granites, and other high quality paving materials for areas of high use or prominence.
- Prohibit the substitution of existing plant materials with asphalt, plain concrete, or barren soil.
- Aerate soil that has become compacted by continuous traffic over wet soils by foot and equipment traffic.
- Use fog collecting devices for irrigation as much as practical.

Inventory, Monitoring, and Research

- Compile, review, and integrate into the management program existing data collected but left unanalyzed by previous researchers.
- Conduct baseline ecological mapping of bottom substrate in nearshore and intertidal

waters. Repeat Littler transects from the 1970s. Participate in channel island intertidal surveys.

- Update the vegetation map and improve characterization of the plant communities due to dramatic changes over the last 20 years.
- Collect historic aerial and satellite photos and maintain in a central location. Purchase new aerial photos at least every five years to monitor change.
- Conduct a baseline small mammal inventory, including abundance, distribution, and habitat relationships in order to evaluate the prey base for the shrike and fox.
- Conduct baseline insect surveys.
- Conduct baseline bat surveys, already funded for 2002.
- Conduct targeted exotic species surveys to detect recent introduction and prioritize eradication effort.
- Conduct a baseline kelp inventory at 26 sites, and monitor at 12 sites.
- Monitor fire weather in at least four locations and improve access to data.
- Conduct long-term monitoring of sea temperature and water clarity, at a minimum, in conjunction with channel island-wide programs.
- Continue to monitor Island trends using Land Condition and Trend Analysis (LCTA) plots.
- Monitor fire intensity using a nationally developed method.
- Set up a central clearinghouse for data, reports, and publications on the Island's natural resources that is accessible to a broad range of users, both technical and nontechnical.
- Develop and adopt a means to catalog and access this information that would avoid conflict and dilution of effort.
- Establish or use an existing website for Island natural resource information that is designed to be useful to the general public, agency, and academic users.
- Establish a standardized format for submitting data or reports to the clearinghouse.
- Produce a biannual report on the results of long-term monitoring and other research in a format accessible to the involved public.
- Integrate data with that of other Channel Islands.
- Enhance data compatibility and standardization of study methods so that data may be more effectively integrated.
- Ensure that GIS data are collected and delivered in a standard format so that layers are compatible among studies, such as in the federal government's Tri-Services format.
- Prioritize research using the following criteria:
 - Ongoing work must address a specific, acknowledged management need. Research is directly linked to management objectives that are identified and ranked by managers.
 - The protocols, methods, and results of research must be presented in a form useful to managers.
 - Research is linked with, continues, or augments accepted past and current monitoring programs.
 - Work must be done in the context of a disturbed ecosystem, requiring that projects focus on impact dynamics rather than on traditional ecology alone. However, the work could compare disturbed and undisturbed functions.
 - Research must be done at a scale applicable to management.

- The work must provide insight into the strength and dependencies of one habitat or community upon another, and structure and function of the ecosystem.
- Research addresses highly ranked items on a Priority Problem List, which is agreed upon by consensus of the Island managers, a science team, and stakeholders.
- Coordinate with USFWS and NPS on updating the Channel Island Recovery Plan.
- Establish a committee of scientists, managers, and users, and the involved public to prioritize research needs.
- Conduct studies on ecosystem function and process. Improve understanding of the essential elements of habitat and environmental quality necessary to support the potential productivity, abundance, and diversity of resources.
- Conduct pilot projects that expand restoration science or technical understanding.
- Select focus management species for long-term monitoring that together meet the above objective.
- Coordinate sampling to maximize the ability to establish correlations among the monitoring elements.
- Make effective use of existing regional monitoring data to shed light on the status and trend of conditions on SCI, and to separate natural from anthropogenic change.
- Consider identifying and sampling for functional ecological groups meaningful to management objectives, such as fish assemblages important for bird foraging, species associated with scarce habitats, young-of-the-year or subyearling stages for commercially sought-after species, or those providing a major prey base for an endangered species.
- Apply adaptive management principles to modify the content of a comprehensive monitoring program to be more supportive of the needs of managers.
- If appropriate, develop an artificial propagation and outplanting program for green and pink abalone at SCI in conjunction with Dr. Dave Lapota and the Point Loma propagation program. This should only be done if not funded through the natural resources budget, and proper precautions are taken to prevent exotic introductions.

Outdoor Recreation and Public Access

- Develop an Outdoor Recreation Plan in cooperation with the National Park Service (NPS).
- Identify and evaluate suitable outdoor recreation opportunities for installation personnel in developed and undeveloped areas.
- Areas where outdoor recreation is restricted should be clearly delineated.
- Maps should be created for personnel showing appropriate places for outdoor recreation opportunities.
- Develop brochures, on-site interpretive signage, and a field guide for wildlife viewing.
- Seek strategies for compatible use, sustained yield, and overall protection of natural, cultural and outdoor recreation resources.

Environmental Awareness

- Provide a clear, concise manual of environmental precautions and restrictions to be used by personnel.
- Integrate instruction on environmental precautions and restrictions into existing training opportunities (i.e., safety stand downs, environmental awareness training, security briefings).

- Develop a multimedia educational program in support of the natural resources program objective.
- Support a natural resource orientation program for new personnel. Create a video or digitized compact disc for distribution to new personnel and for use at meetings and conferences. The video should feature educational information about the sensitive plant and wildlife species on SCI, why the Navy is required to manage for them, and how to avoid disturbing the habitats they reside in.
- Educate personnel about land management goals by way of classes, workshops, displays in communal areas, literature and signs.
- Ensure that natural resource personnel, including contractors, observe the schedules and regulations of military personnel on SCI.
- Create a video for natural resource employees explaining the military importance of SCI and the military training performed on the Island. Require new personnel to view it.