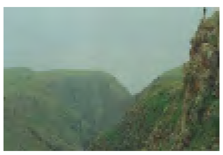
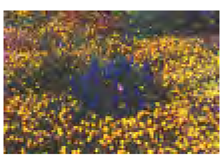
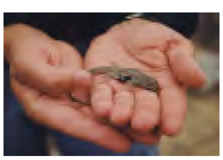
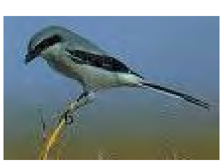
San Clemente Island Integrated Natural Resources Management Plan









May 2002

SCI Integrated Natural Resources Management Plan

May 2002

Reference: U.S. Department of the Navy, Southwest Division (USDoN, SWDIV) San Clemente Island Integrated Natural Resources Management Plan Draft Final, October 2001. San Diego, CA.
Prepared by Tierra Data Systems, Escondido, CA.

Key words/phrases: Natural Resources Management; NAVORDCENPACDIV; OPNAVINST 5090.1B; Natural Resources Plan; Wildlife Management Plan; Ecosystem Management Plans.

All maps were compiled by TDS, except if noted, using data believed to be accurate at the time of publication. However, a degree of error is inherent in all maps. The maps are distributed “AS-IS,” without warranties of any kind, either expressed or implied, including, but not limited to, warranties of suitability to a particular purpose or use. No attempt has been made in either the design or production of the maps to define the limits or jurisdiction of any federal, state, or local government. The maps are intended for use only at the published scale. Detailed on-the-ground surveys and historical analyses of sites may differ from the maps.

San Clemente Island Integrated Natural Resources Management Plan

This Plan was prepared during 2000–2001 under the direction and advice of the following:

Working Group:

Commanding Officer, Naval Base Coronado	*CAPT D. R. Landon, Chair*
Commander Navy Region Southwest	*Jan Larson*
U.S. Navy, Southwest Division	*Mike Stroud*
U.S. Navy, Southern California Offshore Range (SCORE)	*Robert Tahimic*
U.S. National Park Service, Channel Islands National Park	*Gary E. Davis*
U.S. Fish and Wildlife Service	*Nancy Gilbert*
California Department of Fish and Game	*William Tippets*
Catalina Island Conservancy	*Peter Schuyler*

Technical Support provided by:

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California Department of Fish and Game	*Lyann Comrack*
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Commander Navy Region Southwest	*David Pivorunas*
Commander Navy Region Southwest	*Dr. Kelly Brock*
SKR Technologies	*Dr. R.G. Head*
San Clemente Island Range Complex EIS Program Mgr.	*Carrie Downey, Esquire*
U.S. Navy, Southwest Division	*Danielle Flynn*
U.S. Navy, Southwest Division	*Kim O'Connor*
U.S. Navy Southwest Division	*Mitch Perdue*
U.S. Navy Southwest Division	*Dr. Andy Yatsko*
U.S. Fish and Wildlife Service	*Sandy Vissman*
U.S. Navy, SCORE	*Les Stone*
U.S. Navy Naval Spec War Group One	*GMSC W. Keith Robinson*

This plan was prepared by:

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This plan was prepared for the US Department of the Navy, Southwest Division, Naval Facilities Engineering Command, 1220 Pacific Highway, San Diego, CA 92132. Contract No. N68711-95-D-7605/0058.

San Clemente Island Integrated Natural Resources Management Plan

Approving Officials:
U.S. Navy:

D. R. Landon — 19 Apr 02

David R. Landon
Captain, U.S. Navy
Commanding Officer, Naval Base Coronado
San Diego, California

Date

DW Ham — 1/28/02

Darren W. Hamre
Commander, U.S. Navy
Officer In Charge, San Clemente Island
Naval Base, Coronado
San Diego, California

Date

Jan K. Larson — 1/28/02

Jan K. Larson
Director, Environmental Operations
Environmental Department
Commander, Navy Region Southwest
San Diego, California

Date

Michael C. Stroud — 1/28/02

Michael C. Stroud
Natural and Cultural Resources Lead
Southwest Division
Naval Facilities Engineering Command
San Diego, California

Date

DEPARTMENT OF THE NAVY
COMMANDER IN CHIEF
UNITED STATES PACIFIC FLEET
250 MAKALAPA DRIVE
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:
5090
Ser N46523/0492
26 Mar 02

From: Commander in Chief, U.S. Pacific Fleet
To: Commander, Navy Region Southwest (N45)

Subj: FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR PROPOSED IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP), NAVAL BASE CORONADO, SAN DIEGO COUNTY, CALIFORNIA

Ref: (a) COMNAVREG SW ltr 5090 Ser N45R2/020 of 25 Feb 02
(b) OPNAVINST 5090.1B

Encl: (1) Finding of No Significant Impact (FONSI)
(2) Notice of Availability (NOA)

1. An Integrated Natural Resource Management Plan (INRMP) and accompanying Environmental Assessment (EA) for Naval Base Coronado, San Diego County, California were forwarded by reference (a) for review in accordance with reference (b). It has been determined that preparation of an Environmental Impact Statement (EIS) is not required and that neither the proposed action nor management measures would generate significant impacts. Accordingly, it is considered that, with implementation of the following paragraph and any mitigation measures described in enclosure (1), compliance with the National Environmental Policy Act and the Sikes Act Improvement Act of 1997 has been effected, and the proposed management measures described in the above plan may be initiated.

2. The Council on Environmental Quality regulations require public notification of the availability of the EA and of the decision not to prepare an EIS. If appropriate, publication in a foreign-language newspaper should also occur.

Subj: FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR PROPOSED IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP), SAN CLEMENTE ISLAND, NAVAL BASE CORONADO, CALIFORNIA

Please provide verification of local publication to CINCPACFLT (N465) upon implementation. The INRMP and accompanying EA should be retained in project files for possible future use.

3. Point of contact is Ms. Karen A. Verkennes, N46523, at COMM/DSN (808) 474-0745 or E-mail VerkenKA@cpf.navy.mil.

Date 26 March 2002

D L Crisp
D.L. CRISP
Deputy Chief of Staff, for
Shore Installation Management

Copy to:
NAVAL BASE CORONADO (CO)
SOUTHWESTNAVFACENGCOM (Code 5GENP, 5GPN.TC)
CNO WASHINGTON DC (N456)
CHINFO WASHINGTON DC

DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY

FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR ENVIRONMENTAL ASSESSMENT (EA) FOR THE PROPOSED IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP) FOR SAN CLEMENTE ISLAND, SAN DIEGO, CALIFORNIA

Pursuant to Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] §§ 1500-1508) implementing procedural provisions of the National Environmental Policy Act (NEPA), the Department of the Navy gives notice that an EA has been prepared and an Environmental Impact Statement (EIS) is not required for the implementation of an INRMP for San Clemente Island, San Diego, California.

In January 2002, the INRMP was prepared in accordance with the Sikes Act Improvement Act (SAIA) which requires the Secretary of Defense to carry out a program for the conservation of natural resources on military installations. To facilitate this program, the SAIA states that all Navy facilities with natural resources will prepare and implement an INRMP. The goal of the INRMP is to implement an ecosystem-based program that provides for conservation and rehabilitation of natural resources in a manner that is consistent with military mission; integrates and coordinates all natural resources management activities; provides for sustainable multipurpose uses of natural resources; and provides limited public access for use of natural resources subject to safety and military security considerations. The INRMP objectives would integrate fish and wildlife management, land management, and management for outdoor recreational opportunities as practicable and consistent with the military mission and established land uses.

The proposed action would implement the overall goals and actions described in the INRMP. Any requirement for the obligation of funds for projects in this INRMP, evaluated in this EA, 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 USC § 1341 *et seq.*

The EA addresses the preferred alternative and the no-action alternative. The preferred alternative comprises the proposed action, described above. The no-action alternative comprises continued implementation of existing natural resources management programs at San Clemente Island, implementing those actions that are legally required. On-going practices used for management of natural resources at San Clemente Island would continue and there would be no change to the objectives of current natural resources management programs.

Direct, indirect, and cumulative impacts of the proposed action and the no-action alternative were analyzed for the following resources: geology/seismicity; soils; hydrology and water quality; air quality; vegetation communities; biological resources including sensitive plant and wildlife populations; land use; traffic and circulation; noise; aesthetics; cultural resources; public facilities/ access/recreation; safety and environmental health; utilities; and socio-economics. The Department of the Navy determined that all potential environmental impacts from the proposed action would not be significant. The following paragraphs summarize potential impacts on environmental resources.

The proposed INRMP management effects on soils, hydrology and water quality, vegetation communities, biological resources including sensitive plant and wildlife populations, land use, aesthetics, cultural resources, and public facilities/access/recreation would have a beneficial impact, including cumulative impacts. The proposed INRMP management effects on air quality, traffic and circulation, noise, safety and environmental health, utilities, and socio-economics would have no effect.

A Record of Non-Applicability (RONA) for Clean Air Act Conformity was approved and signed in February 2002. Based on information gathered during preparation of the EA, the Department of the Navy finds that the proposed implementation of the INRMP will not significantly impact the environment.

The EA addressing this action may be obtained from: Commander, Southwest Division, Naval Facilities Engineering Command, 2585 Callagan Highway, Building 99, San Diego, CA 92136-5198. Attn: Christine Tuttle, Code 5SPR.CT, telephone (619) 556-8706.

After careful review of the EA prepared in accordance with the requirements of NEPA, CEQ regulations, and Department of Navy Procedures for implementing NEPA, I have determined that implementation of the proposed action would not have significant impacts on the natural and human environment; therefore, an EIS does not need to be prepared.

26 March 2002
DATE

D L Crisp
D. L. CRISP
Rear Admiral (sel), U.S. Navy
Deputy Chief of Staff
Shore Installation Management
U.S. Pacific Fleet

DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY

NOTICE OF AVAILABILITY OF THE FINDING OF NO SIGNIFICANT IMPACT (FONSI) AND ENVIRONMENTAL ASSESSMENT (EA) FOR PROPOSED IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP) SAN CLEMENTE ISLAND, NAVAL BASE CORONADO, SAN DIEGO, CALIFORNIA

Pursuant to Council on Environmental Quality regulations (40 CFR Parts 1500-1508) implementing procedural provisions of the National Environmental Policy Act (NEPA), the Department of the Navy gives notice that an EA has been prepared and an Environmental Impact Statement (EIS) is not required for the proposed implementation of an INRMP for San Clemente Island, Naval Base Coronado, California.

The proposed action would implement the overall goals and actions described in the INRMP, as well as implement the specific Department of the Navy projects. The execution of any of the INRMP projects will be dependent on the availability of appropriate funding sources.

The goal of the INRMP is to implement an ecosystem-based conservation program that provides for conservation and rehabilitation of natural resources in a manner that is consistent with the military mission; integrates and coordinates all natural resources management activities; provides for sustainable multipurpose uses of natural resources; and provides for limited public access for use of natural resources subject to safety and military security considerations. The INRMP management objectives are to integrate fish and wildlife management, land management, and management for outdoor recreational opportunities, as practicable and consistent with the military mission and established land uses.

Direct, indirect, and cumulative impacts of the proposed action and the no action alternative were analyzed for the following resources: geology/seismicity; soils; hydrology and water quality; air quality; vegetation communities; biological resources including sensitive plant and wildlife populations; land use; traffic and circulation; noise; aesthetics; cultural resources; public facilities/access/recreation; safety and environmental health; utilities; and socio-economics. The Department of the Navy has determined that all potential environmental impacts from the proposed action will not be significant.

Based on information gathered during preparation of the EA, the Department of the Navy finds that implementation of the Proposed Action will not significantly impact the environment. The EA and FONSI prepared by the Navy addressing this action is on file and interested parties may obtain a copy from: Commanding Officer, Southwest Division, Naval Facilities Engineering Command, 2585 Callagan Highway, Building 99, San Diego, California, 92136-5198, Attn: Christine Tuttle, telephone (619) 556-8706.

San Clemente Island Integrated Natural Resources Management Plan

Concurring Agency:

U.S. Fish and Wildlife Agency:

Steve Thompson
~~Acting~~ Manager
California Nevada Operations Office
U.S. Fish and Wildlife Service
Sacramento, California

2-22-02
Date

United States Department of the Interior

FISH AND WILDLIFE SERVICE

California/Nevada Operations Office
2800 Cottage Way, Suite W-2606
Sacramento, California 95825

In Reply Refer To: FWS-LA-2483.2

FEB 22 2002

Captain D.R. Landon, Commanding Officer
Naval Base Coronado
P.O. Box 357033
San Diego, California 92135-7033

Dear Captain Landon:

The U.S. Fish and Wildlife Service (Service) has reviewed the draft final San Clemente Island Integrated Natural Resources Management Plan (INRMP), received January 29, 2002. The submission of this INRMP has been conducted pursuant to the Sikes Act (16 U.S.C. 670) (as amended), requiring that the resulting plan reflect the mutual agreement of the parties concerning conservation, protection, and management of fish and wildlife resources. We have worked closely with your Natural Resources Office and the San Clemente Island INRMP Working Group, and appreciate the level of coordination achieved during the development of this INRMP. Accordingly, we concur that this document, as outlined, will furnish a viable framework for managing natural resources at the installation while continuing to support the tactical training and research needs of the Department of Navy.

We provided comments on the draft INRMP during our working group meetings and in our December 2001 comment letter. Many of our comments have been incorporated into the INRMP, however, we would like to work with you on future revisions to incorporate comments that remain unaddressed in the draft final INRMP. Specifically, comments numbered 2, 4, 5,16,17, 32, 33, 39, 40, 43 in the comment matrix contained in Appendix H warrant further discussion. Some of these issues will be addressed during formal consultation on San Clemente Island fire management.

Twelve federally listed species occur on San Clemente Island. Species listed as endangered include the white abalone (*Haliotis sorenseni*), San Clemente loggerhead shrike (*Lanius ludovicianus mearnsi*), California brown pelican (*Pelicanus occidentalis californicus*), San Clemente Island broom (*Lotus dendroideus var. traskiae*), San Clemente Island bush mallow (*Malocothamnus clementinus*), Santa Cruz Island rockcress (*Sibara filifolia*), San Clemente Island larkspur (*Delphinium variegatum kinkiense*), San Clemente Island Indian paintbrush (*Castilleja grisea*), and San Clemente Island woodland star (*Lithophragma maximum*). Federally threatened species that occur on San Clemente Island include the San Clemente sage sparrow (*Amphispiza belli clementeae*), western snowy plover (*Charadrius alexandrinus nivosus*), and island night lizard (*Xantusia riversiana*). While all of these species occur on or around the island, and could be affected by implementation of planning actions, we recognize the INRMP as a general planning document whose overarching goals and stated planning actions are not likely to adversely affect these species. Development of programs outlined in the INRMP will lead to further detail regarding actions proposed in the INRMP. Based on our analysis, the activities proposed as part of the INRMP would not require formal consultation under section 7 of the Endangered Species Act of 1973 (as amended) at this time.

We anticipate that the Navy will initiate formal consultation if additional details regarding planned actions reveal potential adverse effects to listed species. We remain concerned over the inclusion of target fire patch sizes in habitats occupied by federally listed species, as we have stated in previous comments. As a result of discussions between our staffs, we anticipate your request for formal consultation in the near future regarding the draft Environmental Impact Statement/ Environmental Impact Report for operations on San Clemente Island and the San Clemente Island Fire Management Plan. If fire management guidelines are modified during consultation, the INRMP should be modified accordingly.

The Sikes Act directs installations to review INRMPs and update/amend these plans at least every five years. We are interested in working with you to continue to improve natural resource management and stewardship on San Clemente Island, and look forward to coordination on future revisions of this plan. We would like to thank Tammy Conkle, of your staff, and Liz Kellogg, of Tierra Data Systems, for their hard work coordinating this INRMP. Please contact Sandy Vissman, of the Carlsbad Fish and Wildlife Office, at (760) 431-9440, if you have questions or concerns.

Sincerely,

D. Kennedy

for Steve Thompson
Manager, California/Nevada Operations Office

cc: Carlsbad Fish and Wildlife Office

San Clemente Island Integrated Natural Resources Management Plan

Concurring Agency:

California Department of Fish and Game:

G Raysbrook — 02/19/02

C.F. Raysbrook
Regional Manager
South Coast Region
California Department of Fish and Game
San Diego, California

Date

STATE OF CALIFORNIA-THE RESOURCES AGENCY GRAY DAVIS, *Governor*

DEPARTMENT OF FISH AND GAME
South Coast Region
4949 Viewridge Avenue
San Diego, California 92123
(858) 467-4201
FAX (858) 467-4239

February 19, 2002

Ms. Tamara Conkle
Navy Region Southwest
Natural Resources Office
NAS North Island, Building 3
San Diego, California 92135-7088

Dear Ms. Conkle:

Comments on the Final Draft Integrated Natural Resources Management Plan (INRMP) for Naval Base San Clemente Island

The Department of Fish and Game (Department) has reviewed the final draft INRMP for Naval Base San Clemente Island. The Department, as the State wildlife agency, has participated in the review and preparation of the INRMP pursuant to the Sikes Act Improvement Act (SAIA) of 1997. Our involvement has included meetings with the INRMP consultants and stakeholders, discussions with the U.S. Fish and Wildlife Service, and submittal of oral and written comments to the INRMP preparers.

In accordance with the SAIA, this INRMP will provide a framework to manage natural resources on San Clemente Island for the next five years, while still preserving the military mission of the installation. By this letter, the Department concurs that the INRMP meets with the requirements of the SAIA. As noted in the comments below, the Department has identified some issues that should be worked on as part of the first five-year performance period.

Many uncertainties still exist regarding the appropriate fire management methods needed to maintain or enhance the natural resource values of the Island's varied ecological units. We will work with the Navy and the USFWS to refine fire management goals for each community and to ascertain fire intervals and patch sizes that maximize species diversity while reducing exotics. The Department will also review the Island's Wildland Fire Management Plan and provide comment in the near future.

The Department recognizes that a complete prioritization of natural resource management objectives and actions is not possible prior to finalization of this version of the INRMP. We will continue to work with the Island's Natural Resources' personnel and the Navy to refine priorities and management goals over the course of the next five years.

The Department requests that data from biological surveys regarding the distribution of sensitive plants, animals, and natural communities be submitted to the California Natural Diversity Database (NDDB). The NDDB is continually updated in an effort to provide the most current location and condition data for California's rarest species and communities. Field survey forms and instructions may be obtained from the Department's Wildlife and Habitat Data Analysis Branch web site at http://www.dfg.ca.gov/whdab/index.html under the "Biological Info" menu.

The Department appreciates the opportunity you have given us to provide input and comment throughout the development of this INRMP. We recognize that much time and thought has been applied to this comprehensive and well-organized document. We will continue to consult with the Navy in the future regarding natural resource planning for San Clemente Island and look forward to working collaboratively to implement the INRMP. If there are any questions regarding these comments, please contact Meredith Osborne at (858) 636-3163 with any questions.

Sincerely,

C F Raysbrook

C. F. Raysbrook
Regional Manager

Attachment

cc: Bill Tippets, DFG
Meredith Osborne, DFG
Elizabeth Kellogg, Tierra Data Systems
Sandra Vissman, USFWS

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file:mosborne\NB San Clemente Island INRMP concurltr.wpd

San Clemente Island Integrated Natural Resources Management Plan

Concurring Agency:
National Marine Fisheries Service

Rodney R McInnis

Rod McInnis
Acting Regional Administrator
Southwest Regional Office
National Marine Fisheries Service
Long Beach, California

2-11-02

Date

Table of Contents

1.0 Introduction

San Clemente Island harbors priceless assets that are inextricably linked...it is an indispensable platform for national defense readiness, and home to globally significant natural resources. This Plan sets the course for their protection over the next five years.

1.1 Purpose and Background

San Clemente Island (SCI or Island) is the southernmost of California's Channel Islands, located 68 nautical miles west of San Diego and 55 nautical miles south of Long Beach (Figure 3-1). With its associated offshore range complex (SCIRC) (Figure 2-2), it is the primary maritime training area for the U.S. Department of the Navy (DoN) Pacific Fleet, U.S. Navy Sea, Air and Land (SEALS), and supports the U.S. Marine Corps (USMC or Marine Corps), the U.S. Air Force and other users. It is also 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. This Integrated Natural Resource Management Plan (INRMP, or Plan) sets the course for the sound integration of the Navy's mission and natural resource protection on SCI over the next five years.

The Sikes Act Improvement Act (SAIA) of 1997 committed the U.S. Department of Defense (DoD) and U.S. Navy (Navy) to develop INRMPs for installations like San Clemente Island by November 2001. The purpose of an INRMP is to guide installation commanders in managing their natural resources in a manner that is consistent with sustainability of those resources while ensuring continued support of the military mission. Specifically, the INRMP (Plan) is to provide for:

- Fish and wildlife management, land management, and forest management;
- Fish and wildlife habitat enhancement or modifications;
- Wetlands protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants;

- Integration of and consistency among the various activities conducted under the Plan;
- Establishment of specific natural resource goals and objectives and time frames for proposed actions;
- Sustainable use by the public of natural resources to the extent that the use is not inconsistent with needs of the fish and wildlife resources;
- Public access to the military installation that is necessary and appropriate for the use described above, subject to requirements necessary to ensure safety and military security;
- Enforcement of natural resource laws and regulations;
- No net loss in the capability of the military installation lands to support the military mission of the installation; and
- Such other activities as the Secretary of the Navy determines appropriate.

An INRMP is a five-year, ecosystem-based plan that is to be developed in cooperation with and with the concurrence of U.S. Fish and Wildlife Service (USFWS) and the state fish and wildlife agency, in this case the California Department of Fish and Game (CDFG). The document reflects the mutual agreement of all parties.

1.2 INRMP 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; and
- Maintain the full suite of native species, emphasizing the endemics.

This goal statement represents the consensus of the diverse group of stakeholders developing the INRMP. "Goal" is here defined as *"a broad statement of intent, direction and purpose; an enduring, visionary description of where we want to go."* It is also not necessarily completely obtainable. However, its vision is used as the compass of a plan's progress: are we continuing to move in the agreed upon direction? Without the compass, a plan can easily wander off course.

1.3 Plan Collaborators and Public Participation

The office of the Commander Navy Region Southwest (CNRSW) initiated this planning process for SCI. The users, managers and agencies with responsibility for, or interest in protecting SCI resources, partnered together in the form of a Working Group. This Working Group met every other month, and consisted of the Commanding Officer (CO) Naval Base Coronado (NBC) and representatives from CNRSW Natural Resources Office, San Clemente Island Range Operations, USFWS, CDFG, Southern California Offshore Range (SCORE), Southwest Division, Naval Facilities Engineering Command (SWDIV), The Catalina Conservancy, and Channel Islands National Park.

The Working Group adopted the following as their mission statement:

The SCI INRMP Working Group will develop an implementable plan to maintain long-term ecosystem health consistent with the operational requirements of the Pacific Fleet's training and testing mission.

In addition to an inter-agency approach to the planning process, the public is invited to participate at various stages of Plan development. The SAIA requires that INRMPs be made available to the public for comment. A web site was developed in the fall of 2000 with which Working Group members could track progress and comment on the Plan, and the public could voice opinions about the approaches taken. Periodic public workshops are planned.

Other partners conducting work on San Clemente Island are described in Section 2.1.8 "Current Partnerships."

1.4 Military Mission and Island Management Responsibilities

1.4.1 Military Mission

In keeping with the principal use of military installations to ensure the preparedness of the U.S. Armed Forces, the SAIA mandates that the INRMP shall provide for *no net loss* of the capability of the installation's lands to support the military mission. For the Island, this mission is:

To support tactical training and research and development efforts in the SCI Range Complex by maintaining and operating facilities and providing services, arms and material support to the U.S Pacific Fleet and other operating forces.

The mission of the Commander-in-Chief, Pacific Fleet (CINCPACFLT) is to support the U.S. Pacific Command's theater strategy, and to provide inter-operable, trained and combat-ready Naval forces to CINCPACFLT and other U.S. unified commanders. As such, the U.S. Pacific Fleet is a "force provider" to unified commanders in various regions around the world.

In addition to its Operational and Type Commanders, the Pacific Fleet also coordinates Navy support activities ashore through Regional Coordinators. Overseas, these Regional Coordinators serve as the Pacific Fleet's military liaison with host governments to facilitate combined exercises and enhance mutual force coordination. There are six Regional Coordinators, one of them here in San Diego, CNRSW. The following are the mission and vision of CNRSW.

Commander, Navy Region Southwest Mission: *We are a regional team dedicated to providing the highest level of base operating support and quality of life services for all operating forces and shore activities in the Southwest Region.*

Navy Region Southwest Vision*: We will be recognized as the leader in shore installation management: One Team, One Voice, One Mission.*

CNRSW, as the Naval shore installation management headquarters for the Southwest region (California, Arizona, and Nevada), coordinates base operating support functions for operating forces throughout the region. The guiding principles of CNRSW are (USDON, SWDIV 2001):

- Preserve mission integrity and capability;
- Ensure the quality of life of the sailors and their families;
- Optimize efficiency and reduce redundancy through regionalization of functions;
- Be a good neighbor by acting as a steward of the environment and working with local communities;
- Establish live/work zones through compatible development; and

- Foster inter-service relationships for joint use opportunities.

Figure 1-1 depicts the organizational administration of CNRSW.

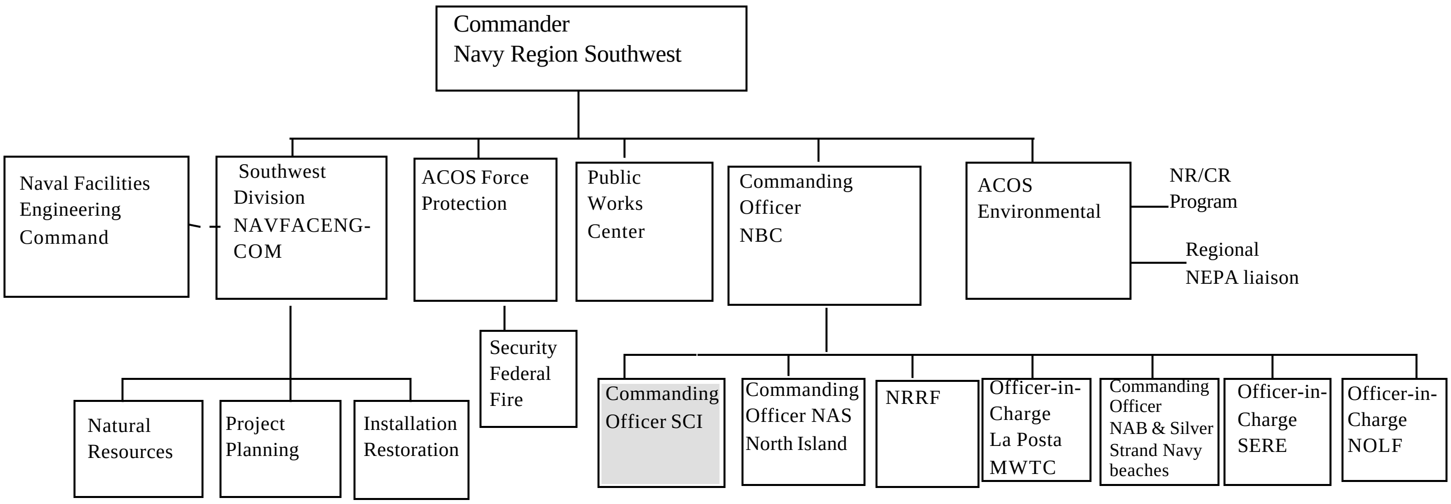


Figure 1-1. Administrative organizational chart for Commander, Navy Region Southwest as related to this Plan.

Figure 1-2 displays the relationship between Base Commanders and their Assistant Chiefs-of-Staff (ACOS). This chart is commonly referred to as the “Galactic Radiator.”

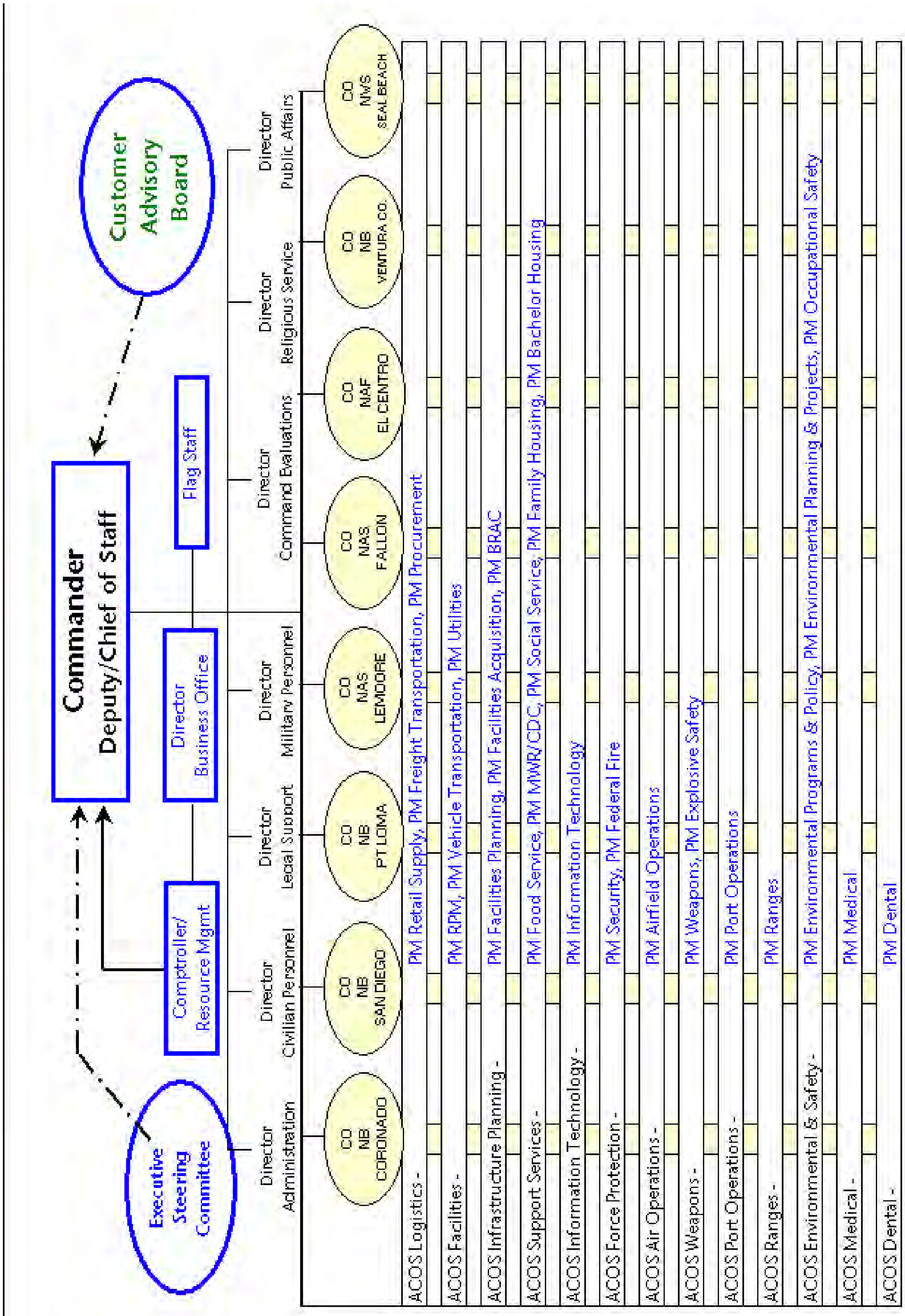


Figure1-2. Relationship matrix for Assistant Chiefs-of-Staff and Base Commanders.

1.4.2 Organizational Responsibilities and Users

CINCPACFLT is ultimately responsible for SCI operations, maintenance, training and support. Regional command is provided by CNRSW (Figure 1-3).

Local command of SCI is provided by the CO, NBC. It is the mission of NBC and its environs to equip, maintain, train and support Naval surface and aviation units of the Pacific Fleet and other operating forces in order to conduct military operations in support of the Fleet's operational commanders.

The following descriptions of organizational responsibilities and users are consistent with the Operations Management Plan (OMP) for the Ranges and Operational Areas at San Clemente Island, California (Draft 2000).

The Major Claimant, CINCPACFLT, and the Primary Host Command, CNRSW and NBC, have the principal interest and primary responsibility for oversight and management of SCI.

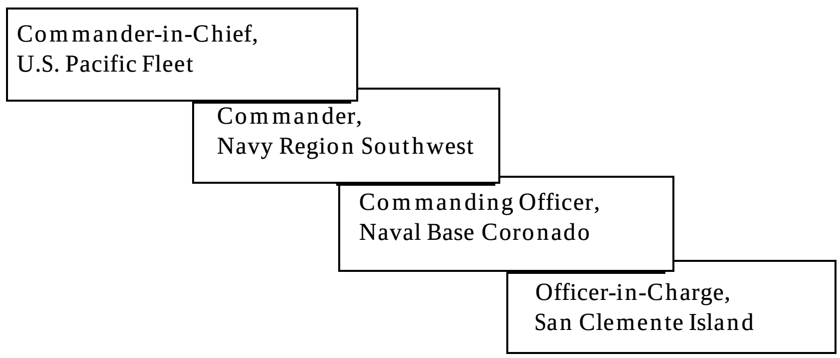


Figure1-3. San Clemente Island chain of command.

Primary Host Command

The CO, NBC is responsible for Island infrastructure and provides resources including personnel and facilities to host tenant operations. The mission of NBC is "to arm, repair, provision, service and support the U.S. Pacific Fleet and other operating forces." CNRSW provides shore installation management for those facilities owned or managed by CINCPACFLT in California, Arizona and Nevada. This includes support for housing, environmental, security, family services, port services, air services, supply, medical and logistics. The command also serves as the regional coordinator for the CINCPACFLT.

The Officer-In-Charge of SCI supervises non-range day-to-day operations and activities on and around the Island. Naval Auxiliary Landing Field (NALF) SCI is responsible for airfield operations. Airfield Operations provides fleet aviation training and support for take-off, landing, touch and go, ground control approach, and Fleet Carrier Landing Practice for fixed-wing, turbo prop, jet and rotary-wing aircraft. NALF SCI also serves as a primary, secondary and emergency landing field. The airfield provides logistic support for military and other government projects, fleet operations for ship and squadron units and support for contract air carriers. Contract air carriers provide transportation service to and from Naval Air Station (NAS) North Island for most SCI military/civilian/contractor support personnel.

The SCI Range Complex Fleet Support Officer manages and coordinates between range operations (managed by SCORE) and Island support activities. This includes facilitating operational events, logistics support and coordination with the CNRSW, Environmental Department, Natural Resources Office (NRO) (Figure 1-4) in reviewing operations for compliance with all applicable statutes, laws, and environmental regulations.

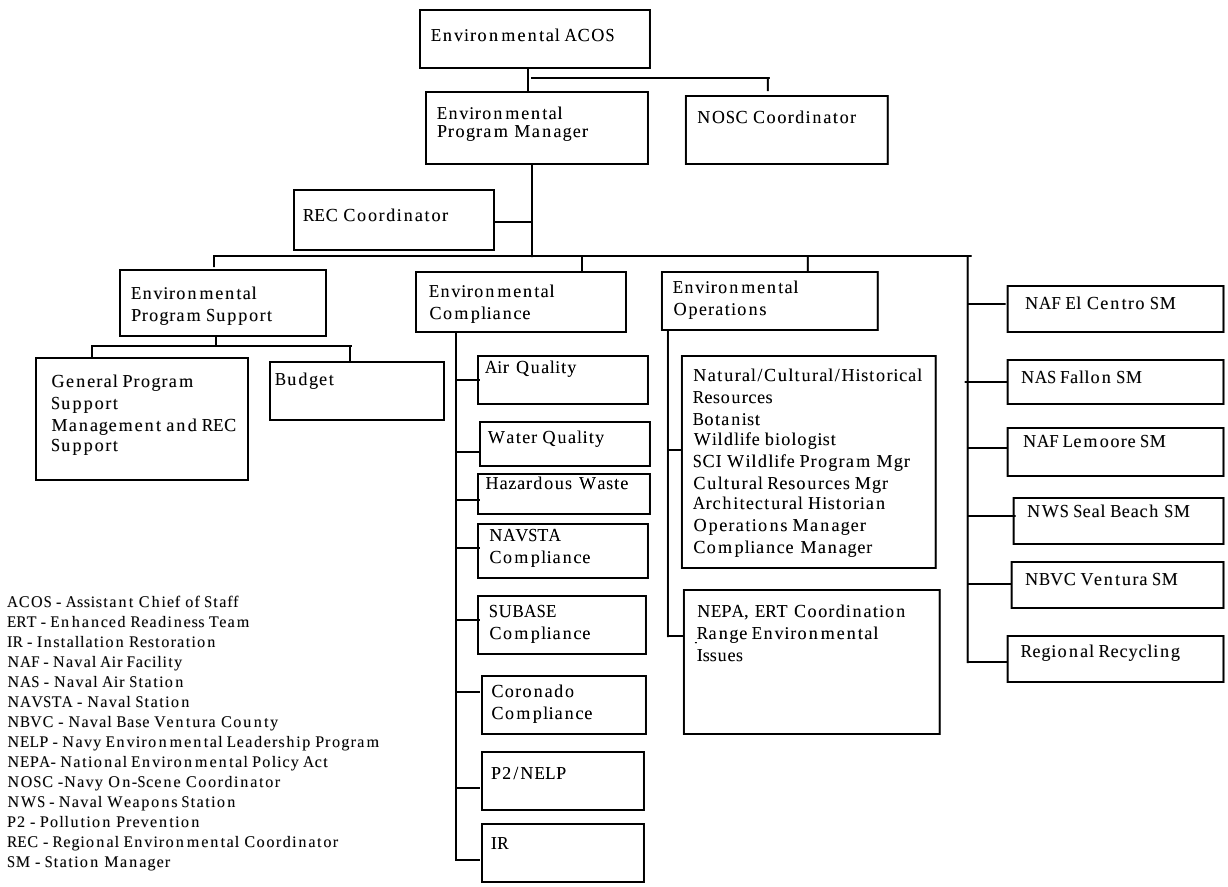


Figure1-4. CNRSW environmental organizational chart. Most natural resource functions on San Clemente Island occur under Environmental Operations.

Users

There are three main types of users: tenants, frequent users and intermittent users. Tenants are users that maintain a permanent presence on the Island and occupy permanent facilities or operational areas. Frequent users conduct operations on and around the Island throughout the year, but do not have permanent assigned structures or a daily presence. Users are listed in Table 1-1. An organizational chart of Navy users is shown in Figure 1-5.

Table1-1. Users of San Clemente Island and associated offshore ranges.

Tenants

- Fleet Area Control and Surveillance Facility (FACSFAC)
- Southern California Offshore Range (SCORE)
- Space and Naval Warfare Systems Command Systems Center (SSC SD-SYSCEN)
- Naval Undersea Warfare Center (NUWC)
- Naval Special Warfare Command (NAVSPECWARCOM)
- Naval Special Warfare Center (NAVSPECWARCEN)
- Naval Special Warfare Group ONE (NAVSPECWARGRUONE)
- Special Boat Squadron ONE (SPECBOATRON ONE)
- Public Works Center (PWC)
- Military Welfare and Recreation (MWR)
- Naval Medical Clinic (NMC)
- Natural Resources Office (NRO)
- Federal Fire Department (FFD)
- Naval Command, Control, and Ocean Surveillance Center Research, Development, Test, and Evaluation Division (NCCOSC RDT&E)

Frequent Users

- Naval Air Force Pacific (COMNAVAIRPAC)
- Naval Surface Forces Pacific (COMNAVSURFPAC)
- Submarine Forces Pacific (COMSUBPAC)
- 1st Marine Expeditionary Force (I MEF)
- THIRD Fleet (COMTHIRDFLT)
- Carrier Group ONE (COMCARGRU ONE)
- Afloat Training Group Pacific (ATGPAC)
- Expeditionary Warfare Training Group Pacific (EWTGPAC)
- Sea-based Weapons and Advanced Tactics School, Pacific (SWATS)
- Naval Warfare Assessment Station (NWAS)
- Submarine Squadron 11
- Fleet Information Warfare Command (FIWC)
- Very Shallow Water (VSW) Mine Countermeasures (MCM) Test Detachment
- Command Training Pacific (COMTRAPAC)
- Marine Artillery
- Helicopter Combat Support Squadron 85 (HC-85)
- Airline transport contractor

Intermittent Users

- Naval Air Warfare Center Weapons Division (Point Mugu)
- Explosive Ordnance Demolition Mobile Unit 3
- U.S. Army 864th Engineers (Fort Lewis, WA)
- U.S. Army 14th Combat Engineering Battalion (Fort Lewis, WA)
- U.S. Army 555th Engineers (Fort Lewis, WA)
- 409th Construction Battalion Unit (Long Beach, CA)
- Naval Reserve Readiness Command Region 19
- Naval Coastal Systems Station (LCAC Operations)
- California, Arizona, and Nevada Air National Guard Units
- California Army National Guard
- Mobile Diving Salvage Units
- Naval Construction Battalion Units
- U.S. Air Force Units
- U.S. Army Rangers and Special Forces
- Marine Air Wings
- Immigration and Naturalization Service
- University Research Programs
- Boy Scouts of America
- Girl Scouts of America
- State and Federal Resource Agencies
- Commander, Marine Force Reserve
- Amphibious Assault Vehicle Test Facility (AAV)

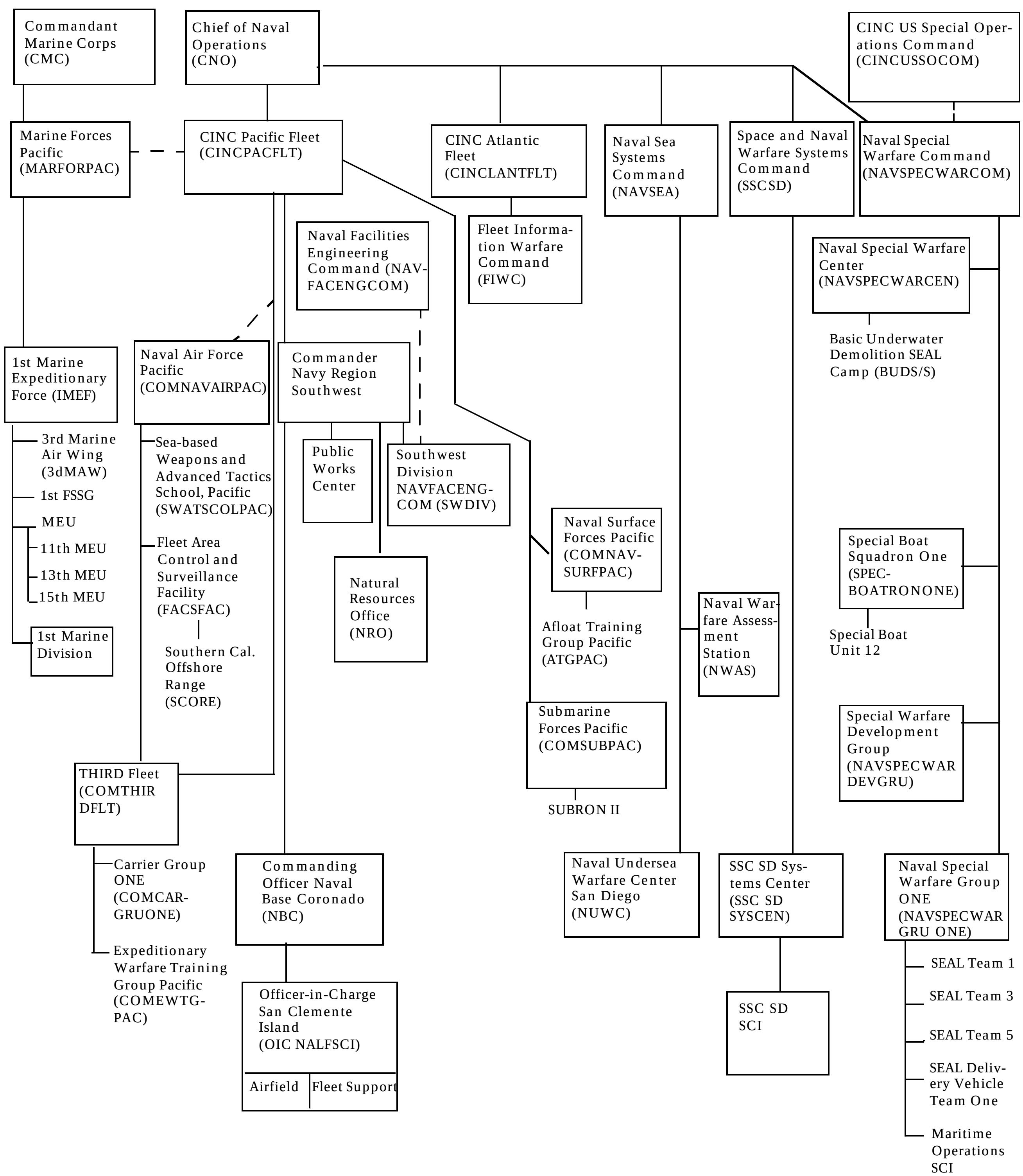


Figure1-5. Organizational chart showing Navy users of San Clemente Island. Adapted from the Draft Operations Management Plan for the ranges and operational areas at San Clemente Island. Cited source: US Naval Institute Proceedings, April 1997, p 56, Norman Polmar, Ships and Aircraft of the US Fleet, and interviews.

1.4.3 Land Uses

Table 1-2 and Map 1-1 give locations and land-use areas on the Island. Refer to Map 2-3 for additional land use areas. Land and water use activities under the purview of this Plan are discussed in detail in Chapter 2 "Current and Future Island Uses and Management." Total acreage of the Island is 37,200 plus 54 acres in off-shore islands and rocks. Due to the need for safety zones associated with firing ranges, open space accounts for the great majority of the Island land use, accounting for approximately 87% of the Island.

Table1-2. Summary of land-use areas occupied by developed areas, roads, impact areas, and other on- and off-shore training areas.

Land Use Type	
***Land Use Categories** (as defined in Activity Overview Plan 2001)*	**Acres**
Air Operations	292
RDT&E/Communications	263
Ordnance/Live Fire Range	3,454
Others (medical, utilities, supply, housing, etc.)	75
Open space	32,401
Extent/Acreage of Selected Features	
Roads	**Length (mi)**
Primary	59
Secondary	94
On-Shore Features	**Acres**
Developed areas	360
Island Night Lizard Management Area	9,653*
Shore Bombardment Area (SHOBA, including Impact Areas)	10,061
SHOBA Impact Areas	3,103
Missile Impact Range	54
Off-Shore Features	**Acres**
Mining Training Ranges	28,458
Kingfisher	1,629
Underwater Range	21,022

**Acreage from GIS coverage revised 1/25/02*

1.5 Planning Framework

1.5.1 Ecosystem Management

The SAIA states that the INRMP goals "shall be to maintain or develop an ecosystem-based conservation program…" The DoD Ecosystem Initiative (1996) and DoD Instruction 4715.3 require that Navy installations incorporate ecosystem management as the basis for land use planning and management. This approach shall take a long-term view of human activities, including military uses, and biological resources as part of the same environment. The goal is to preserve and enhance ecosystem integrity, and to sustain both biological diversity and continued availability of those resources for military and other human use. The INRMP should benefit the species of SCI, and be implementable and achievable.

Ecosystem-based management shall include (OPNAVINST 5090.1B, 9 September 1999):

- A shift from single species to multiple species conservation;
- Formation of partnerships necessary to consider and manage ecosystems that cross boundaries; and

Map1-1. San Clemente Island place names. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

- Use of the best available scientific information in decision-making and adaptive management techniques in natural resource management.

The ecosystem management mandate is accomplished by applying principles of sustainability and proper, compatible use. Figure 1-6 illustrates the context in which ecosystem management decisions are made. 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 this decision process.

Figure1-6. Ecosystem management.

Figure shows the decision process used by the Working Group to implement the ecosystem approach while developing this Plan.

1.5.2 Planning Footprint

This Plan addresses all natural resources and their use on land and 300 yards offshore from the “low water mark” (assumed to be the Mean Lower Low Water [MLLW] tide line) (Map 1-1). This is the limit of jurisdiction per President Franklin D. Roosevelt’s Executive Order (EO) 6987 from the 1930s, which declared this offshore boundary a “defensive sea area” and transferred “control and jurisdiction” to the Secretary of the Navy. This Plan also specifically addresses the nearshore environment from –1.61 ft MLLW to the approximate maximum depth of submerged vegetation.

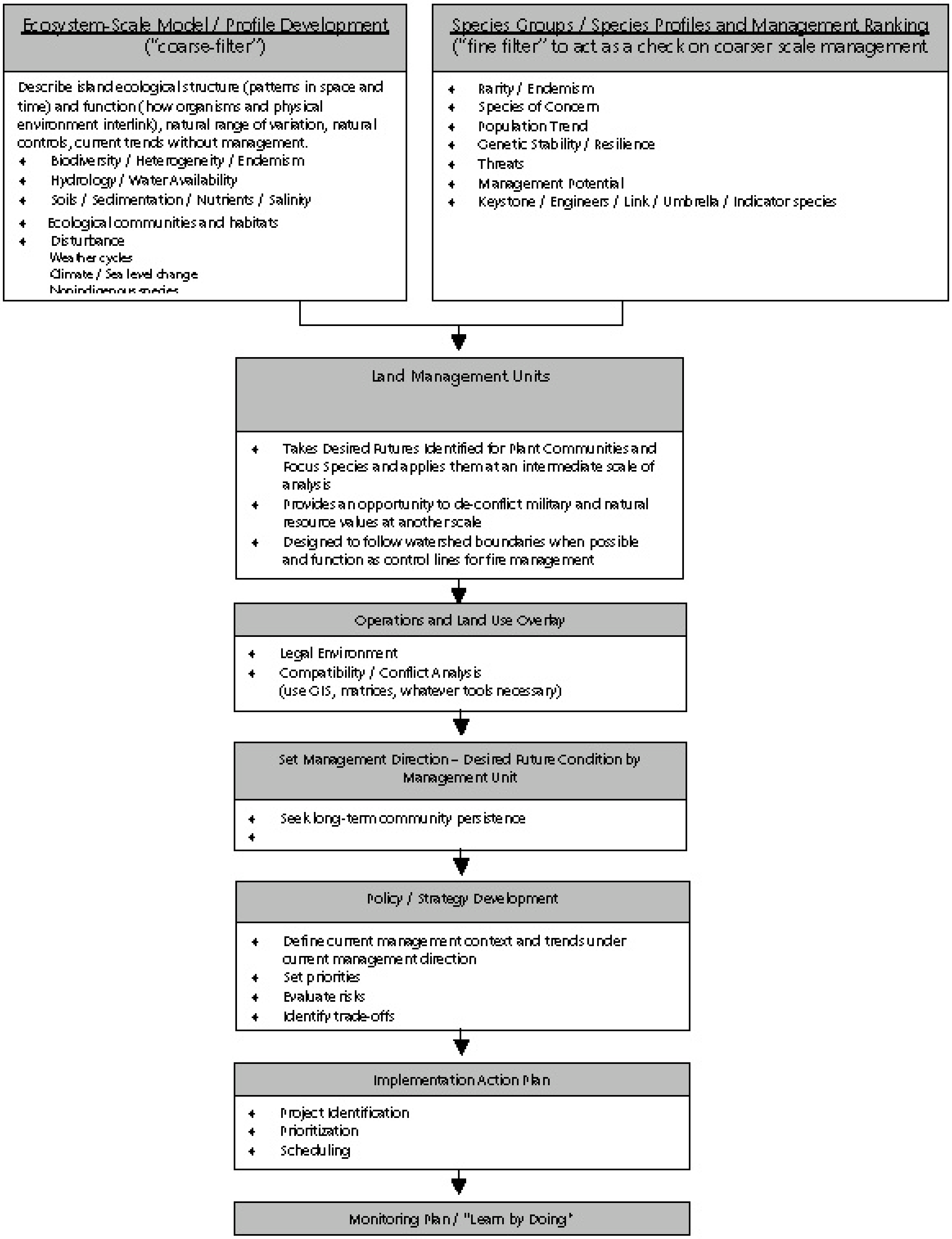


Figure1-7. Decision process for ecosystem management.

1.5.3 Key Issues

A “key issue” is a focus of effort for the Working Group because it is important, not easily solved, and it may have more than one solution in which trade-offs need to be evaluated. The Working Group identified the following key issues to be addressed using the planning process and framework as described in this chapter; they are listed in no particular order:

- 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.
- 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.
- There is a lack of quantitative data on the effects that current and proposed uses have on habitats and species.
- 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.
- 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. There are a total of 153 miles of roads on SCI.
- 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.
- 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.
- There is a need for effective control of invasive species in order to protect habitat values for endemic species.
- Wildland fire patterns may affect the ability of sensitive species to be self-sustaining.
- There is logistical and organizational difficulty in accomplishing wildland fire management objectives for natural resource protection.
- Some Island endemic populations are naturally small and have become fragmented, which may limit their recovery.
- Clarification on policy is needed regarding who should fund activities that are inherently operational versus natural resource-based for short- and long-term management.
- Resolution is needed to issues surrounding project-specific impacts and the need to minimize those impacts vs. ongoing stewardship responsibilities of the Navy.
- 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.

1.5.4 Relationship to Other Plans

The OMP and the related Environmental Impact Statement (EIS) and Overseas EIS (OEIS) (these latter documents are combined as one) 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.

A *vision statement* for use of the Island has been developed in the context of the OMP:

Operations Management Plan Vision: *San Clemente Island is the center of the Pacific Fleet's major training area. The Island and its operational areas should be viewed as a Tactical Training Range Complex, and its areas and services should be coordinated with Fleet user requirements. The infrastructure can be modernized, and operations developed to provide realistic, integrated, comprehensive tactical training in the littoral area. The concept of operations is to coordinate naval operations and natural resource management to provide enhanced training and Research, Development, Test and Evaluation (RDT&E) opportunities to support and sustain Fleet, joint and combined operations.*

Developed concurrently with this INRMP, besides the OMP and EIS/OEIS, are the SCI Wildland Fire Management Plan, Island Night Lizard Management Plan (currently in draft), San Clemente Loggerhead Shrike (SCLS) Recovery Plan by USFWS (currently in draft), and the Channel Islands Fox Recovery Plan. CNRSW's Regional Shore Infrastructure Plan (RSIP) includes a related 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. These are all key documents with significant influence on the future management direction of SCI, and with which this INRMP attempts to be consistent. For instance, the SCLS Recovery Plan will call for long-term monitoring and will have specific requirements for recovery, both before and after delisting of the shrike. NRO is currently initiating work on a Conservation Agreement with USFWS for protecting the San Clemente Island fox, which is currently proposed for listing under the ESA.

Documents and planning processes relevant to the region around SCI include:

San Nicolas Island INRMP. An Integrated Natural Resources Management Plan is being developed for San Nicolas Island (Navy-owned) concurrently to this one.

R*egional Water Quality Control Board's (RWQCB) Los Angeles Basin Plan.* The Los Angeles Regional Board's Basin 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 narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy; and 3) describes implementation programs to protect all waters in the Region. In addition, the Basin Plan incorporates (by reference) all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations.

Channel Island National Park's 1999 Resource Management Plan. This plan covers, in addition to four other islands, the Navy-owned San Miguel Island, managed by the National Park Service (NPS) under a Memorandum of Understanding (MOU).

1984 Channel Island Recovery Plan. A Northern Channel Island Recovery Plan for plants has been developed by USFWS and a Southern Channel Island Recovery Plan for plants is in progress.

Catalina Island management process. The Catalina Island Conservancy has a science plan, ecological restoration plan, and an education plan currently in place that define the direction of actions taken to manage Catalina's resources. Their board is currently in the process of revising and writing a new strategic plan that will condense and generalize the above plans. The plan should be completed in spring 2002, and followed by more specific annual working plans for different projects. Catalina Island Conservancy is also working with FIREWISE 2000 on a wildland fire management plan that should be completed the end of summer 2002. A wildland weeds plan is also currently in place and may be revised in the next year or so.

Channel Islands National Marine Sanctuary Management Plan. The sanctuary, which surrounds Channel Island National Park to six nm from shore, has a separate five-year management planning process now in progress. Three newly proposed state Marine Protected Areas near SCI (Assembly Bill 993 [Shelley] and the Marine Life Protection Act [MLPA]), will eventually be addressed in a CDFG-led Master Plan for MPAs.

1.5.5 Strategic Design of the Plan and Planning Assumptions

1.5.5.1 Overview

Figure 1-8 depicts the adaptive management cycle of plan development and implementation. As a description of the historic baseline and present context of the Island's resources is pulled together, simple models or profiles of the ecosystem and how it is believed to work in the context of military use are constructed at three scales (Chapter 2 "Current and Future Island Uses and Management" and Chapter 3 "Status and Current Management of Natural Resources"). The coarse scale describes whole-island or broader processes that shape and regulate ecological change. The intermediate scale is the use of management units to apply the INRMP goal and objectives closer-up than across the entire island (Chapter 5 "Strategies by Management Unit"). At an even finer scale, individual sensitive species or groups of species are described to ensure their life histories are protected in the management scheme. From here, the plan collaborators can build a vision and "desired future condition" for components of the landscape and water habitats, then set goals, objectives, and strategies to reach that desired condition. Watchful, targeted monitoring helps refine the models and decisions made in search of the INRMP's broad goal. Details of this decision process are described more fully in Chapter 4 "Natural Resource Management."

1.5.5.2 Plan Organization

Descriptive sections on the current state of human use and ecosystem resources are at the beginning of the Plan (Chapter 2 "Current and Future Island Uses and Management" and Chapter 3 "Status and Current Management of Natural Resources", respectively). Chapter 2 contains a discussion of the laws and regulations that frame Island management, as does Appendix F. Chapter 4 "Natural Resource Management" brings together the primary objectives and strategies for managing the Island's resources. Objectives were developed by first establishing a desired future condition (DFC) for the resource in question. DFCs portray the military, land, or resource condition expected once goals and objectives are met.

They envision all aspects of management in the future, including human organization and needs, in measurable terms. An objective is a realistic step towards a DFC.

Chapter 5 “Strategies by Management Unit” organizes the information first described in Chapter 4 and presents it by management unit (area of SCI defined by organizational principles), going into more detail on the relative importance of certain objectives in each management unit. Chapter 6 “Planning” provides a long-term approach to internal Navy and collaborative planning activities including a discussion of sustainable military use and “no net loss” provisions of the SAIA. Finally, Chapter 7 “Implementation” synthesizes management strategies into a tactical set of priorities and timelines for implementation. The strategy statements in Chapters 4 and 6 are in a hierarchical format, beginning with broad, long-term goals and ending with specific, short-term methods or tasks. For clear communication, the planning terms used are described in Table 1-3.

Table1-3. Planning definitions.

Hierarchy	Definition
Goal	Broad statement of intent, direction, and purpose. An enduring, visionary description of where you want to go. A goal is not necessarily completely obtainable.
Objective	Specific statement that describes a desired condition. Can be quantitative. Should be good for at least five years.
Recommended Strategy	Explicit description of ways and means chosen to achieve objectives.
Policy	Formally-adopted strategy or decision to carry out a course of action.
Recommended Task/Activity	Specific step, practice, or method to get the job done, usually organized sequentially with timelines and duty assignments. These go out of date quickly and should be updated annually.

1.5.5.3 Implementation

To be implemented, the INRMP must first be understandable, practical, and supportable by those who need to implement it. If these criteria are met, then the Plan will need a commitment of intent, time, and, in many cases, money by the implementers and their supporters.

Some of the strategy involves specific actions that may need cooperative funding (e.g. in-water habitat monitoring). However, other strategies suggest changes in policy and do not necessarily require direct funding to implement (e.g. environmental assessment methods or criteria for habitat protection). Whatever the case, cooperative efforts are essential to ensure the complete implementation of this INRMP. Signature approval by the Navy as well as by other agencies and organizations provides an authority for implementation.

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. § 1341, et seq.

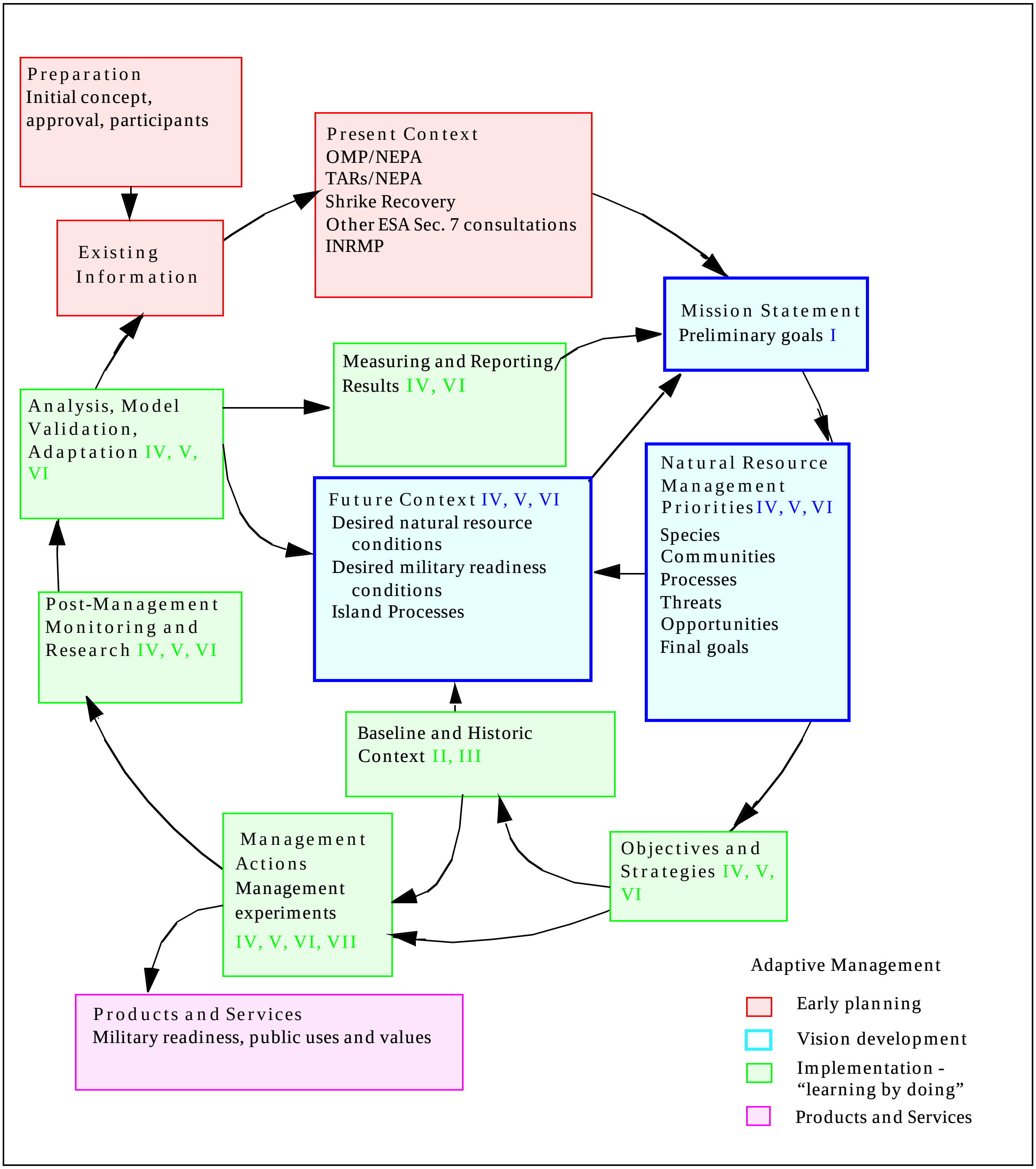


Figure1-8. Planning model for development and adaptive management of the San Clemente Island INRMP. Adapted from Leslie et al. *1996. Roman numerals refer to chapters in the INRMP that address each topic.*

1.5.5.4 Updating

This Plan is intended to be dynamic and, as such, will require revision to remain current and relevant. Its loose-leaf format provides for changing or updating as frequently as needed. Entire sections or individual pages can be removed and replaced. New sections can also be appended. Updating would be appropriate, for example, when results of monitoring efforts reveal new insights and a change in strategy. As an INRMP, the Navy has an obligation to review and, as appropriate, update on a five-year basis. A "Plan maintenance" item in the Navy's annual budget is one method to ensure regular evaluation of the Plan's progress and need for updating.

1.5.6 Project Funding Criteria

It is important to understand how funding is channeled to natural or cultural resource projects, and how priorities are set. DoD guidance for assessing environmental conservation programming and budgeting priorities is described in DoD Instruction 4715.3 (Environmental Conservation Program). Priority ranking is described in Table 1-4, below. Rarely does a project receive funding that is not ranked Class 1, the exception being when Legacy or agricultural outlease money becomes available for installation use. These guidelines are further implemented by way of the Chief of Naval Operations' (CNO) Funding Guidelines and Program Objective Memorandum (POM) for Fiscal Year 2004 Naval Environmental Requirements Guidebook. These are described in Chapter 7 "Implementation."

Table1-4. Programming and budgeting priorities for conservation programs.

PROGRAMMING & BUDGETING PRIORITIES FOR CONSERVATION PROGRAMS (DoD Inst 4715.3 Environmental Conservation Program)

CLASS 0: RECURRING NATURAL AND CULTURAL RESOURCES CONSERVATION MANAGEMENT REQUIREMENTS.

Includes activities needed to cover the recurring administrative, personnel, and other costs associated with managing DoD's conservation program that are necessary to meet applicable compliance requirements (federal and state laws, regulations, Presidential EOs, and DoD policies) or that are in direct support of the military mission. Also included are environmental management activities associated with the operation of facilities, installations, and deployed weapons systems. Recurring costs consist of manpower, training, supplies, hazardous waste disposal, operating recycling activities, permits, feeds, testing and monitoring and/or sampling and analysis, reporting and record-keeping, maintenance of environmental conservation equipment, and compliance self-assessments.

CLASS I: CURRENT COMPLIANCE.

Includes projects and activities needed because an installation is currently out of compliance (has received an enforcement action from a duly authorized federal or state agency, or local authority); has a signed compliance agreement or has received a consent order; has not met requirements based on applicable federal or state laws, regulations, standards, Presidential EOs, or DoD policies, including those listed in enclosure 2; and/or are immediate and essential to maintain operational integrity or sustain readiness of the military mission. This also includes projects and activities needed that are not currently out of compliance (deadlines or requirements have been established by applicable laws, regulations, standards, DoD policies, or Presidential EOs, but deadlines have not passed or requirements are not in force), but shall be if projects or activities are not implemented in the current program year. Those activities include the following:

- Environmental analyses for natural and cultural resource conservation projects, and monitoring and studies required to assess and mitigate potential impacts of the military mission on conservation resources.
- Planning documentation, master plans, and integrated natural and cultural resource management plans, etc.
- Baseline inventories of natural and cultural resources.
- Biological assessments (BAs), surveys, or habitat protection for a specific listed species, critical for the protection of the species so that proposed or continuing actions can be modified in consultation with the USFWS or the U.S. National Marine Fisheries Service (NMFS) to prevent "taking" of the species.
- Inventories and surveys of historical and archeological sites critical for the protection of cultural resources so that continuing actions can be modified in consultation with the Advisory Council for Historic Preservation.
- Mitigation to meet existing regulatory permit conditions or written agreements.
- Nonpoint source pollution or watershed management studies or actions needed to meet compliance dates cited in approved State coastal nonpoint source pollution control plans, as required to meet consistency determinations.
- Wetlands delineation, following existing statutory requirements, critical for the prevention of adverse impacts to wetlands without a permit so that continuing actions can be modified to ensure mission continuity, as required by 32 U.S.C. 1251 et seq. (reference (p)0.
- Efforts to achieve compliance with requirements that have deadlines that have already passed, as cited in DoD executed agreements, such as support for the Chesapeake Bay Agreement Action Plan and the DoD Mojave Desert Ecosystem Management Initiative.

CLASS II: MAINTENANCE REQUIREMENTS.

Includes those projects and activities needed that are not currently out of compliance (deadlines or requirements have been established by applicable laws, regulations, standards, Presidential EOs, or DoD policies, but deadlines have not passed or requirements are not in force), but shall be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year. Examples include the following:

- Compliance with future requirements that have deadlines.
- Conservation and Geographic Information System (GIS) mapping in order to be in compliance with federal, state and local regulations, Presidential EOs, and DoD policy.
- Efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives, such as Coastal America, the "Chesapeake Bay Agreement Action Plan," and "Mojave Desert Ecosystem Management Initiative."
- Wetlands enhancement, in order to achieve the President's Order for "no net loss" or to achieve enhancement of existing degraded wetlands, as required under E.O. 11990 (reference (1)) and 32 U.S.C. 1251 et seq. (reference (p)).

CLASS III: ENHANCEMENT ACTIONS, BEYOND COMPLIANCE

Includes those projects and activities that enhance conservation resources or the integrity of the installation mission, or are needed to address overall environmental goals and objectives, but are not specifically required under regulation or EO and are not of an immediate nature. Examples include the following:

- Community outreach activities, such as "Earth Day" and "Historic Preservation Week" activities.
- Educational and public awareness projects, such as interpretive displays, oral histories, "watchable wildlife" areas, nature trails, wildlife checklists, and conservation teaching materials.
- BAs, surveys, or habitat protection for a candidate species for listing as "endangered or threatened."
- Restoration or enhancement of cultural or natural resources when no specific compliance requirement dictates a course or timing of action.
- Management and execution of volunteer and partnership programs.

2.0 Current and Future Island Uses and Management

Goal: to facilitate sustainable military readiness and foreclose no options for future requirements of the Pacific Fleet. In pursuit of this Goal, this chapter provides a summary of the military mission, current operations and predicted future operations. It also describes the regulatory framework around which the military mission and natural resource conservation must be integrated.

2.1 Current Uses and Their Management

2.1.1 Military Mission

- The mission of SCI 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 mission of SCI 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 SCIRC. SCIRC supports the largest concentration of Naval forces in the world. It is a cornerstone of tactical training and supporter of the Southern California Operations Area. Land, air, and sea ranges provide the Navy, USMC, 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. 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 like the immigration and Naturalization Service (INS) also train at SCI.

Being discontiguous from yet proximate to the mainland makes SCI an important asset to the Navy. Proximity to the mainland allows for less cost of transit to training sites. Geographic isolation and restricted airspace are key to facilitating testing and training programs with minimal restrictions and maximum flexibility. Safety and security can be maintained since the Island is wholly Navy-owned. Scheduling is controlled by SCORE, and positive radar control is led by the Fleet Area Control and Surveillance Facility (FACSFAC). This reduces the potential for physical danger and disturbance to civilians due to noise hazard, electromagnetic interference, ordnance use, and airspace congestion that exists on the mainland. The use of live fire and the ability to combine exercises as would occur under actual battle conditions also make SCI a strategic and unique asset. Units are deployed significantly better trained than would be possible without this Navy real estate.

2.1.2 Operations and Activities

SCI is administered by the CO of NBC, San Diego, California. As the host for all tenants and users of the Island, NBC is responsible for all facilities and day-to-day control and compatibility of land uses.

The airfield itself, NALF SCI, provides fleet aviation training and support. It functions as a primary, secondary and emergency divert airfield. It hosts a number of major tenants and frequent users, including those listed in Table 1-1.

The military defines an operation as a training exercise, Research and Development test or field event, or a combination of activities accomplished together for an intended military task. At SCI, operations and the activities that make up the operations occur in onshore, nearshore and offshore environments.

- In Fiscal Year 1997, offshore and onshore operations (excluding the airfield) totalled 2,685. Airfield operations totaled 41,949. Use of SCI occurs year round.

Onshore operations include all operations and functions that take place physically on the Island including aviation overflight. Map 2-1 shows operational boundaries and user locations.

The types of operations and activities that are conducted at SCI can be further broken down into seven broad types. Six of these occur in the onshore/ nearshore environment. They are:

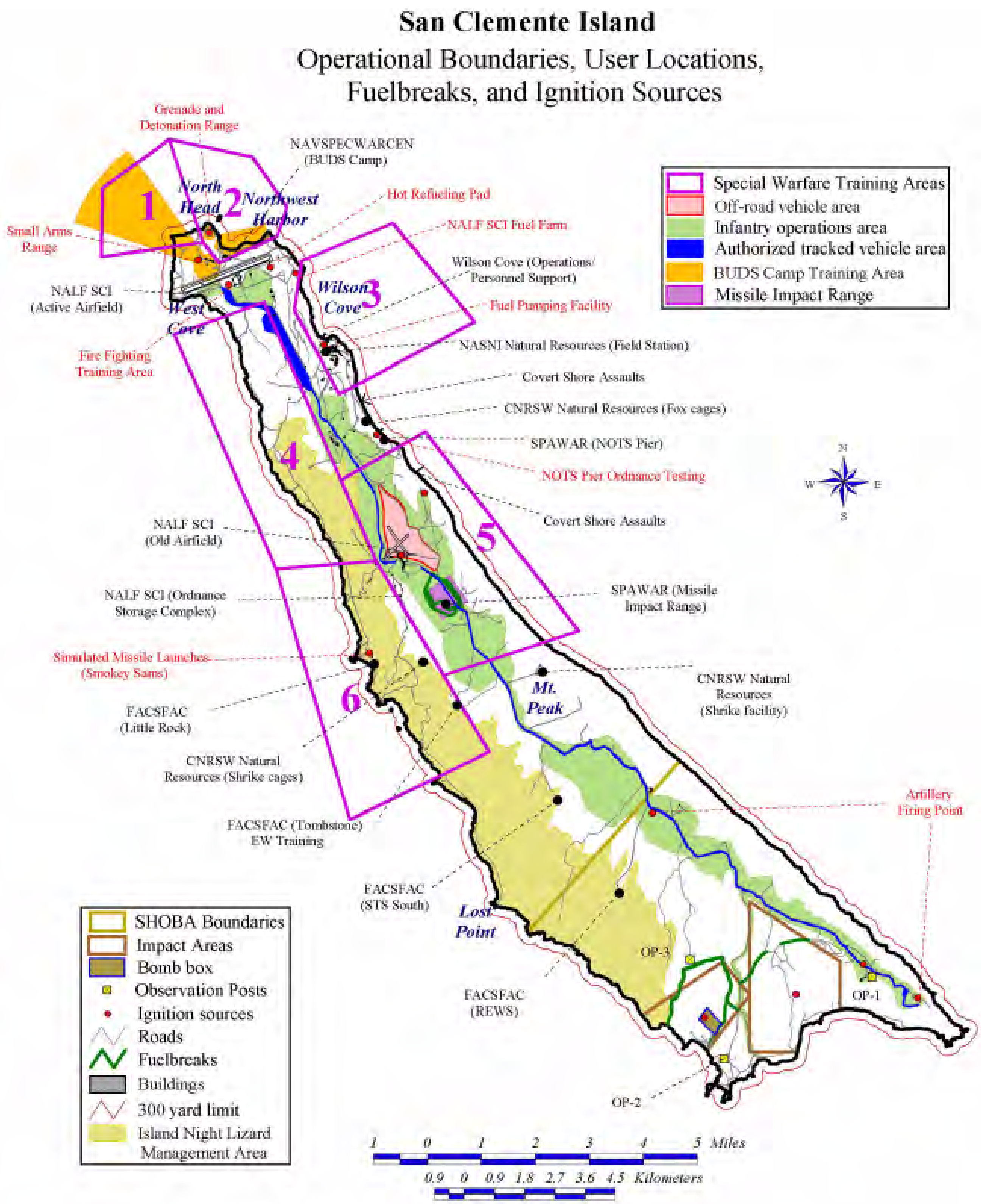
- Shore Bombardment Area (SHOBA) Operations;
- Amphibious Training;
- Naval Special Warfare Training;
- Airfield Operations;
- RDT & E Tests; and
- Other Island Operations.

The seventh type is Offshore Operations. This is one of the most complex categories with numerous operations and activities occurring in a variety of designated offshore ranges of the SCIRC.

- From 1993–97 SHOBA averaged about one operation per week, many were multi-day exercises.

Shore Bombardment Area

SHOBA range is located at the southern end of SCI (Map 2-1).



Map2-1. On-shore operational boundaries and user locations on San Clemente Island. (Do not reproduce or distribute without Navy permission [see Document Disclaimer].)

Operations conducted in SHOBA 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 Surface Fire Support (NSFS), which involves live fire from ships into the Impact Areas. Live fire is required for battle group readiness before deployment (a battle group is an air-craft carrier, a battleship if available, one or more cruisers, a unit of destroyers, and a logistic support ship). Without this type of training, these battle groups are not ready to carry out the missions expected to be assigned by the Theatre Com-manders-In-Chief. SHOBA is the only location where Naval ships and Navy and Marine Corps Forward Observers (FOs) can be trained and qualified in NSFS, and where combined arms exercises can be conducted with NSFS. Combined Arms exercises involve all supporting arms of the Navy, Marine Corps, and Air Force, such as NSFS, Artillery, Mortars, Fixed-wing Aircraft, and Helicopters, and includes exercising protocols for coordination of these assets. Combined Arms Evolutions are central to the military's Joint Warfare/Littoral Warfare Strategy. Every Amphibious Task Group (ATG) preparing for deployment is required to do a combined arms exercise at SHOBA.

The Supporting Arms Coordination Exercise (SACEX) is one of the major SHOBA Combined Arms operations (Figure 2-1). It is usually conducted in conjunction with a Fire Support Coordination Exercise (FSCEX). The SACEX is oriented around Naval Surface Fire Support for ships, and the FSCEX is focused on the Marine Corps artillery effort. SACEXs generally use both Impact areas. Amphibi-ous landings operations are often associated with a SACEX or FSCEX. A typical operation is to land an artillery battery (five-ton trucks plus 155 mm howitzers) via Landing Craft Air Cushions (LCAC) at either West Cove or Northwest Harbor (Map 1-1). Additionally, a Tactical Air Control Party (TACP), a Shore Fire Control Party (SFCP), or spotter teams arrive via transport helicopters to SHOBA, and the remainder of the Fire Support Coordination Center lands at Wilson Cove via a Landing Craft Unit (LCU). Overland travel is accomplished on the Ridge Road to SHOBA.

Other SHOBA operations include amphibious training of Marine Corps Artillery Units using live fire; close air support/strike which is both live and inert muni-tions delivered from fixed wing aircraft and helicopters; and laser target designa-tion which involves training with lasers to illuminate ground targets for precision guided munitions. Though somewhat smaller in scope, SHOBA also hosts such activities as explosive ordnance disposal and Naval Special Warfare operations. It is commonly thought that all of SHOBA is used intensively, but in reality much of SHOBA is a buffer area where little or no military activity cur-rently takes place.

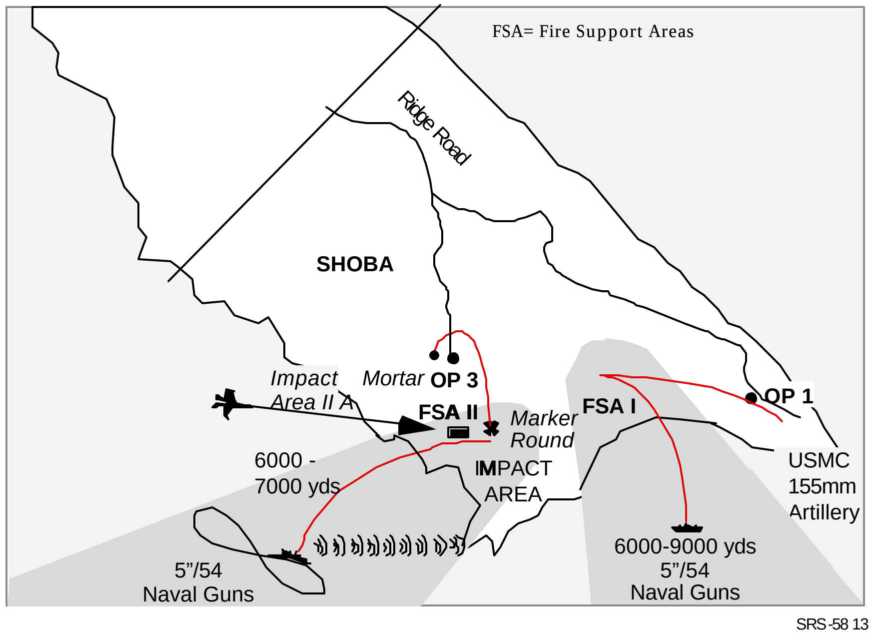


Figure2-1. Supporting Arms Coordination Exercise (SACEX). Integrates Naval Surface Fire, Artillery and Air Support (from San Clemente Island Operations Management Plan).

Amphibious Training

Both the Navy and the Marine Corps conduct amphibious warfare training, which involves operations on land and sea. Typical amphibious operations include shore assault, boat raid, airfield seizure, land and air reconnaissance, helicopter assault training, and humanitarian assistance. Marine Corps training usually contains what is considered to be the main elements of amphibious capability–ground forces, air, and service support.

Amphibious landings by the Marine Corps are generally made from Navy ships offshore. The Marine Corps units making the landing are battalion size or smaller. They can come ashore in Landing Craft Air Cushions (LCACs), LCUs, Amphibious Assault Vehicles (AAVs) and helicopters. LCACs are high speed cargo carrying vessels that ride on a cushion of air. The LCACs' air cushion ability allow them to ride onto the beach, discharging cargo, vehicles and personnel. LCUs are used for follow-on logistics. The AAVs are lightly armored swimming troop carriers. They are tracked vehicles which can only operate on the beach and in assault maneuvering areas because of the heavy footprint of the tracks. Amphibious assault landings outside of SHOBA currently take place in West Cove and Northwest Harbor (Map 1-1). Most of the landings at West Cove are to get Marines ashore for training on other parts of the Island.

The Marine Corps is also planning landings of the new AAAV Advanced Amphibious Assault Vehicle on the beaches of San Clemente Island. They are currently projected to arrive at Camp Pendleton in the calender year 2006, and will be used on SCI sometime after that.

The typical Marine Corps company will have one or two High Mobility Medium Wheeled Vehicles (HMMWVs) and one or two five-ton trucks. The large trucks are used to tow artillery. The company may also have Light Armored Vehicles (LAVs), a high speed armored reconnaissance and personnel carrier with eight tires. Any tracked vehicle, tank, AAV or AAAV is required to use the Authorized Tracked Vehicle Area, which is a dirt track that parallels Ridge Road to VC-3 (also known as the old Airfield). Ridge Road runs the length of the Island.

Navy SEALs also conduct amphibious training, though usually in smaller-sized units. Navy SEAL training is discussed in the following section.

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 is the initial training program for new recruits. It 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. Phase One and Phase Two occur on the mainland primarily, at NAB Coronado of NBC.

Most of the BUD/S training occurs in Northwest Harbor north of the runway (Map 2-1). The small arms qualifications 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 SEAL's 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. They may use shotguns, rifles, machine guns, submachine guns, and pistols. 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 five 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 (Map 2-1). They extend from the sea floor to the surface and in some cases the airspace above the water. Each SWAT has specific ordnance restrictions dictating types and sizes of explosives, small arms, or other munitions that may be expended. Some new areas called Training Areas and Ranges (TARs) are proposed for SEAL training (Map 2-1). These are designed to minimize disturbance and safety, fire, and environmental concerns. They will not replace the SWATs. TARs are discussed in Section 2.2.

- The average number of airfield operations per year from 1993–97 was 53,978.

Airfield Operations

NALF SCI is located at the northern end of the Island (Map 2-1). Users of the airfield are the Navy and 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. There are currently no aircraft repair or maintenance facilities on the Island. However, future operations may require this type of support.

Operations include Fleet Carrier Landing Practice (FCLP), 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.

FCLP is the most prevalent of the aircraft operations, accounting for 40% of all use. FCLPs are actual landings on a simulated aircraft carrier deck near the east end of the runway. Operations include low approaches, “touch and go” landings, and full stop landings. These are conducted by a variety of aircraft including rotary and fixed wing, jet and propeller driven. A critical component of the FCLP is that the flight operations occur both during day and nighttime. Landing on SCI provides more realistic training because of the relatively little lighting surrounding the airfield as compared to other Naval air facilities. It is also a way of mitigating the amount of nighttime operations at NAS North Island that can disturb residents nearby.

A Wildlife Hazard Assessment (WHA) Program has recently been funded at SCI. In June 2001, two strikes by horned larks were reported; they caused no damage. Since then, two more strikes have been reported, including one with a northern pintail (a duck) which resulted in minor damage to the aircraft.

Research, Development, Test & Evaluation

RDT&E is a critical process in the successful assessment, safe operation, and improvement of sea, air and land weapons systems. DoD has a formal, institutionalized process for RDT&E. This process is governed by the DoD 5000 series directives and regulations, which provide guidance and direction for program managers in all phases of the acquisition process. The overarching purpose of DoD 5000 is to ensure that the military acquires quality products at the lowest practical costs while still meeting military requirements and mission needs.

The SPAWAR Space Center San Diego (SSC SD) and Naval Under Sea Warfare Center (NUWC) both conduct RDT&E operations at SCI. SSC SD also provides marine mammal training support.

SSC SD’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. Electronic warfare uses the Radar/Electronic Warfare Simulator (REWS) facility and trains participants to detect, identify, characterize and counter and electronic threat. NUWC conducts weapon systems accuracy trials, sensor accuracy trials, surface ship radiated noise measurement trials, at-sea bearing accuracy tests, acoustic trials testing, as well as supporting some of the SSC SD 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.

Other Island Operations

In addition to the Fleet, 1 Marine Expeditionary Force (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 anti-submarine warfare (ASW) Target Logistics Activities;
- Composite Training Unit Intelligence Exercises (COMPTUEX/ITA);
- 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 San Clemente Loggerhead Shrike Program.

Offshore Operations

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. It begins with basic training involving individual ships countering single threats and concludes with coordinated battle group activities in which the battle group encounters a multiple and simultaneous threat environment. 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 Anti-Submarine Warfare (ASW) Range (SOAR), the Electronic Warfare (EW) Range, the Variable Depth Sonar (VDS) no notice Area, and SHOBA (previously discussed) 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 (Map 2-2). Figure 2-2 shows the SOAR and EW ranges.

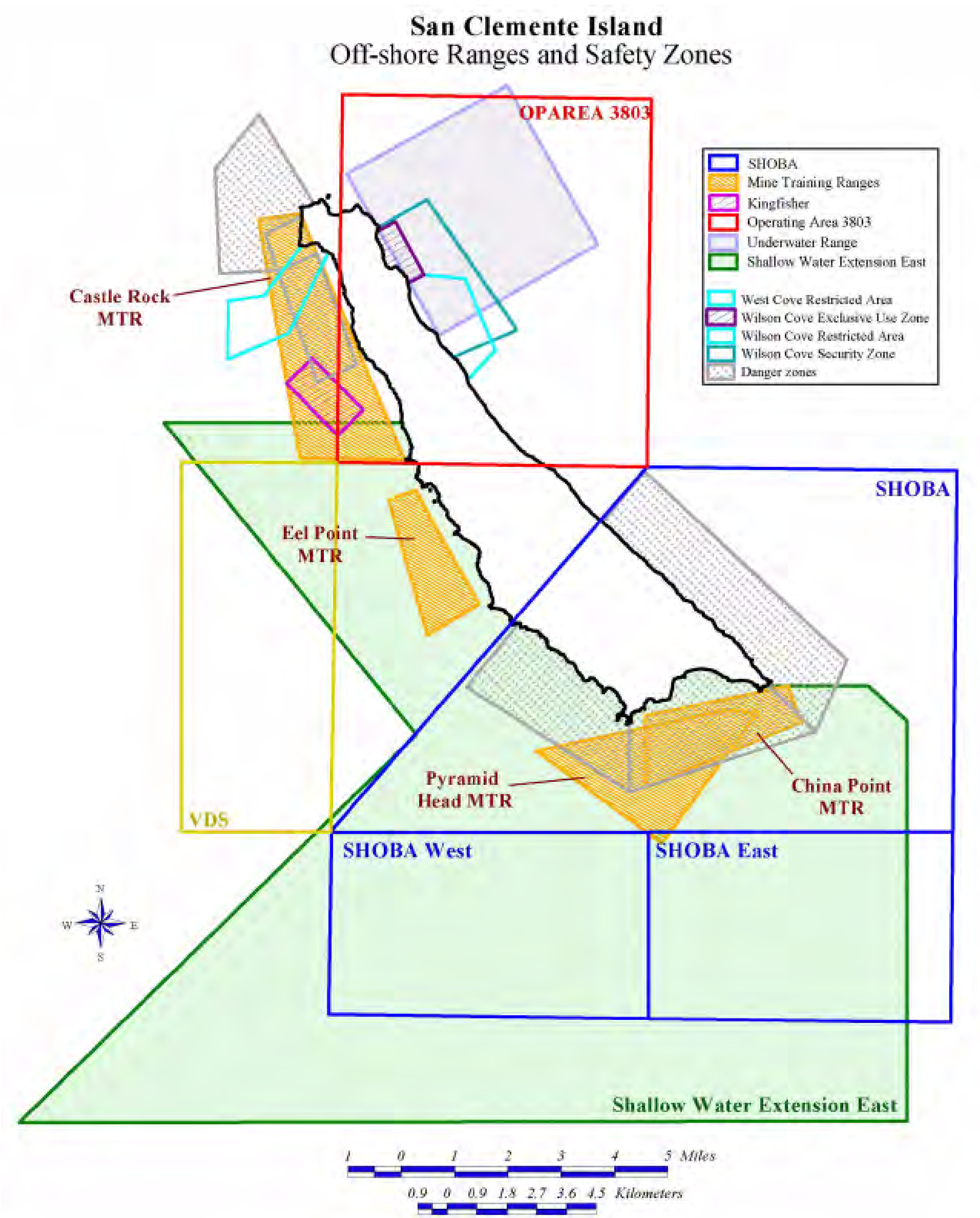
Photo 2-1. US Navy FA18 hornet.

Airspace W-291 is included in the offshore ranges. It is the special use airspace which overlays SCIRC. 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. Although military activities conducted in Warning Areas may be hazardous in nature, there are no restrictions to flight for non-participating aircraft since the airspace is over international waters. W-291, which covers 149,000 square miles, is the Navy's most heavily scheduled and utilized training area. FACSFAC San Diego provides scheduling, surveillance, and control of military aircraft operating in the area.

Specific types of offshore operations occur in each of these ranges, and the complex is capable of supporting multiple operations simultaneously. Table 2-1 provides an abbreviated list of types of exercises conducted on the offshore ranges.

Table2-1. Offshore activities and operations by type and location.

Activity	Type	Location
Under Sea Warfare	Aircraft Torpedo Training Exercise	SOAR
	Surface Ship Torpedo Training	SOAR
	Submarine Training Exercise	SOAR
	Surface Ship Mine Countermeasures	Kingfisher
	Aerial Mining Exercises	Mine Training Ranges
Air Warfare	Missile Firing Exercises	W-291
Integrated Warfare	Joint Task Force Exercises	W-291
Electronic Warfare	Electronic Warfare Exercises	EW Range



Map2-2. Offshore operational boundaries and danger zones around San Clemente Island. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

Many of these activities have little impact on the Island itself except for minor support. However, the Joint Task Force Exercises (JTFEX) is the largest and most complex of the Battlegroup training operations. It provides progressive and realistic pre-deployment training for Carrier Battlegroups, Amphibious Ready Groups, and Marine Expeditionary Units and other deployers in a joint environment. The exercise is crafted to require a battle group to execute multiple mission areas based on THIRD Fleet's review of activities the battle group may be expected to encounter during a routine deployment overseas. These exercises are flexible in nature to ensure that THIRD Fleet and the deploying battle groups are able to focus the exercise on changing world situations and the mission requirements resulting therefrom, as well as areas of concern particular to each battle group. This scenario stresses the ability to perform peacetime missions, surveillance, operations other than war, embargo, and humanitarian operations, which leads to regional conflict, precision engagement, and battlespace dominance. The exercise can last 12–18 days. The U.S. Air Force, Army, and National Guard units participate together in this exercise. Canada also participates to the extent that it provides assets to the deploying battle group; other countries participate in training evolutions other than a JTFEX with the U.S. Navy in the spirit of cooperation and when the training benefits all concerned. The exercise takes place on SCI, the Southern California Operations Area, and over the Western Range Complex (covering parts of California, Nevada, Idaho, Utah, and Arizona). Major operational elements include a 96-hour surge of aircraft launches, operational testing of various weapons systems, space and Theater Ballistic Missile simulation, Naval Special Warfare operations ashore, and a large-scale amphibious landing on Marine Corps Base (MCB) Camp Pendleton, California. The JTFEX does not include tests of weapons systems. Its focus is to ensure that a battle group demonstrates required levels of readiness in a task force setting with existing weapons systems. Typical duration of a JTFEX is two to three weeks (Figure 2-2). Similarly, a COMPTUEX is 18 days long plus three days of Final Battle Problem solving.

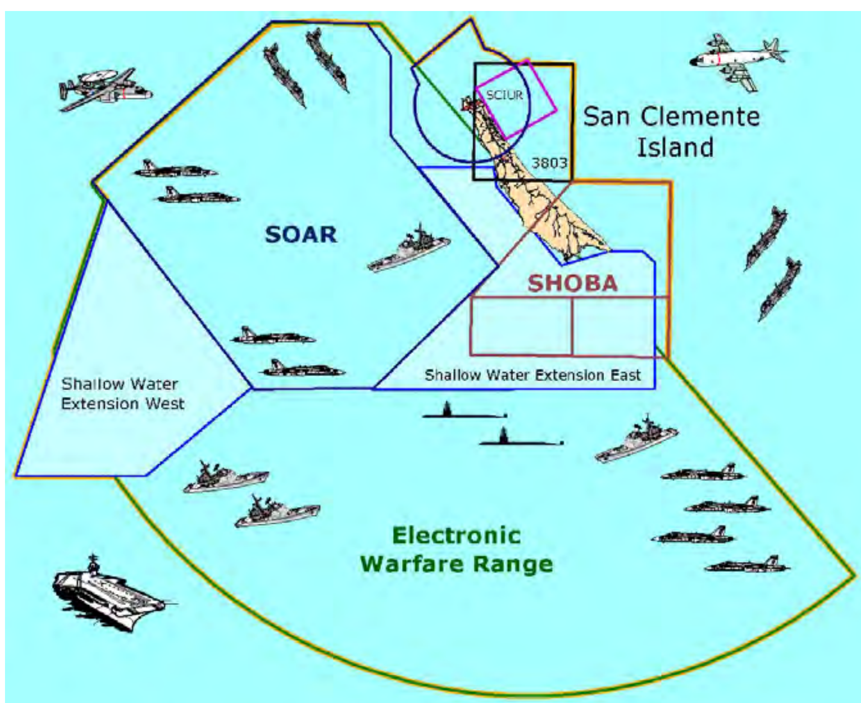


Figure2-2. JTFEX scenario from San Clemente Island Operations Management Plan (Draft 2000).

The SCIRC is also used for experiments during which relatively small numbers of operational assets are used to test new ways of conducting warfare. Some of these are referred to as Fleet Battle Experiments. Other times, it is merely the project proponent conducting the experiment who requires space on which to test and evaluate.

In summary, SCI supports numerous key training and testing activities. Many of these occur with little impact to the Island itself. Figure 2-3 provides a condensed look at the current operations by specific location.

2.1.3 Facilities and Developed Areas

NALF SCI Facilities

NALF SCI is the host organization for all Island activities. It also has the maintenance and repair responsibility for buildings and roads. The facilities used by NALF SCI are those which support the airfield, waterfront operations, military and civilian support personnel berthing, general messing, and administrative/supply buildings.

Currently, there are more than 300 buildings and structures on the Island (USDON, SWDIV 2001), the majority of which are over 60 years old and reflect their age in habitability, maintainability and functionality. However, many of the berthing structures are less than five years old, and the mess hall is less than two years old. A military construction project (MILCON) is currently in progress to upgrade barracks.

NALF SCI has a single concrete runway with a control tower, taxiway and ramp on the south side. Airfield operations are supported by a surveillance radar.

NALF is also responsible for the explosives storage or bunker area down-Island and all ready service lockers for munitions storage at several remote sites. At most times there are approximately 500 personnel housed on the Island, including Naval personnel, civil service employees, and civilian contractors (USDON, SWDIV 2001), but can exceed 1,000 for short periods. Twenty-one berthing buildings accommodate all NALF SCI personnel. The Wilson Cove pier was recently rebuilt, and construction is nearly complete on major projects to alleviate other recognized deficiencies. Renovation of the North Light pier is also planned.

Major facility locations are summarized in Map 2-3.

FACSFAC/SCORE Range Facilities

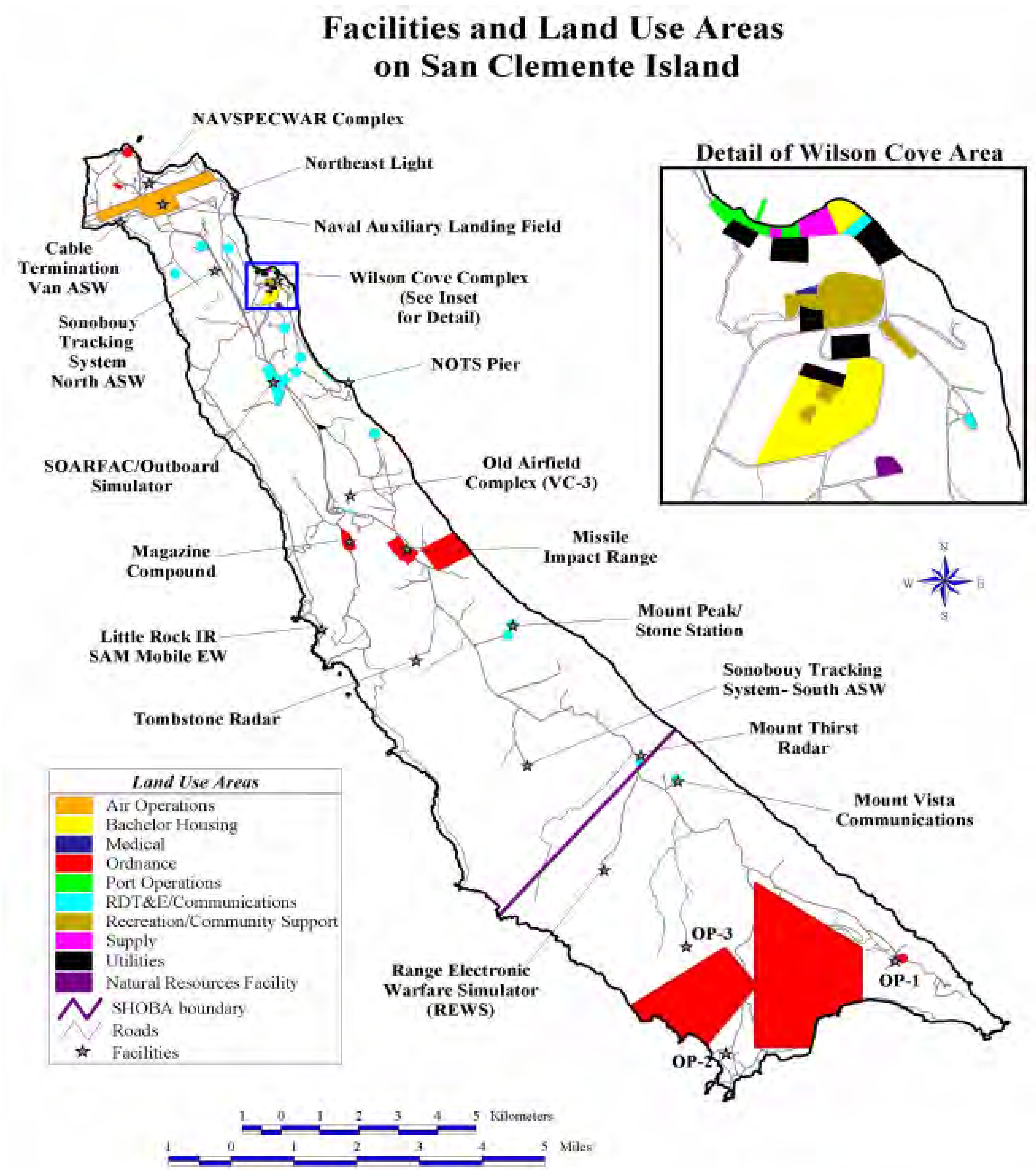
The majority of SCI range related facilities are occupied by SCORE. Range facility site locations extend from the Cable Termination Van site in West Cove at the north end of the island to Observation Post #1 (OP 1) located in SHOBA at the south end. There are 20 range operations/equipment sites that comprise the SCORE facilities on the Island. At these sites, there are a total of 22 permanent buildings and 18 operational/equipment support shelters.

The main FACSFAC facilities are located down-Island at Mount Thirst and Mount Vista. Mount Thirst is the location of the Southern California Area air control and surveillance radar. This facility is comprised of five structures that house the radar antenna, electronics equipment, and utilities support equipment.

Mount Vista Communications, located just south of Mount Thirst, is comprised of five structures that house the FACSFAC Point Loma-San Clemente Island microwave link. A surface search radar, SPS-10, is also located here.

NALF SCI Airfield	**Northhead**	**Northwest Harbor**	**West Shore - Lost Point**
Land Reconnaissance	Shore Assault Training	Land Reconnaissance	Land Reconnaissance
Helicopter Assault Training	Fire Support Coordination	Shore Assault Training	Shore Assault Training
Explosive Charge Testing	Water Insertion/Extraction	Explosive Charge Testing	Water Insertion/Extraction
Ground Assault	Combat Swimmer Ship Attack	Company Sized Raid	Combat Search and Rescue
Air Insertion	Range Support	Combat Swimmer Ship Attack	Combat Swimmer Ship Attack
Tactical Airlift Extraction	Combat Search and Rescue	Aerial Recon/Photo-Help	Small Boat Landing
Aerial Recon/Photo-Help	JTFEX	Water Insertion/Extraction	Tactical Airlift Extraction
SACEX		Small Boat Landing	Air Operations
COMPTUEX		Air Insertion	Ground Assault
		Combat Search and Rescue	COMPTUEX
Type of Operations 9	Type of Operations 7	Type of Operations 10	Type of Operations 10
No. of Operations 69	No. of Operations 52	No. of Operations 52	No. of Operations 48
VC-3	**SHOBA**	**West Cove**	**Wilson Cove**
Land Reconnaissance	Land Reconnaissance	Shore Assault Training	Land Reconnaissance
Ground Assault	Shore Assault Training	Helicopter Assault Training	Ground Assault
Company Sized Raid	Aerial Recon/Photo-Help	Explosive Charge Testing	Small Boat Landing
Combat Search and Rescue	Combat Search and Rescue	Ground Assault	Combat Search and Rescue
Tactical Airlift Extraction	Explosive Charge Testing	Combat Swimmer Ship Attack	Combat Swimmer Ship Attack
COMPTUEX	Fire Support Coordination	Company Sized Raid	Water Insertion/Extraction
RDT&E	Tactical Airlift Extraction	Water Insertion/Extraction	Helicopter Assault Training
Helicopter Assault Training	Range Support	Small Boat Landing	Company Sized Raid
Range Support	Air Insertion	Fire Support Coordination	Air Insertion
Air Insertion	COMPTUEX	Combat Search and Rescue	COMPTUEX
Explosive Charge Testing	JTFEX	Survival Training	JTFEX
Aerial Recon/Photo-Help	SACEX	SACEX	Explosive Charge Testing
Fire Support Coordination		JTFEX	Aerial Recon/Photo-Help
			Range Support
			Shore Assault Training
			SACEX
Type of Operations 13	Type of Operations 12	Type of Operations 13	Type of Operations 16
No. of Operations 99	No. of Operations 42	No. of Operations 24	No. of Operations 108
SWAT-1 (Near-Shore)	**SWAT-2 (Near-Shore)**	**SWAT-3 (Near-Shore)**	**Ridge Road**
Land Reconnaissance	Land Reconnaissance	Land Reconnaissance	Land Reconnaissance
Shore Assault Training	Shore Assault Training	Shore Assault Training	Ground Assault
Fire Support Coordination	Fire Support Coordination	Ground Assault	Air Insertion
Combat Swimmer Ship Attack	Combat Swimmer Ship Attack	Small Boat Landing	Tactical Airlift Extraction
Small Boat Landing	Small Boat Landing	Water Insertion and Extraction	Combat Search and Rescue
Explosive Charge Testing	Explosive Charge Testing	Aerial Recon/Photo-Help	Range Support
	Water Insertion and Extraction		COMPTUEX
	Aerial Recon/Photo-Help		JTFEX
	Small Boat Landing		
	Company Sized Raid		
Type of Operations 6	Type of Operations 10	Type of Operations 5	Type of Operations 8
No. of Operations 13	No. of Operations 30	No. of Operations 38	No. of Operations 66
MIR	**Eastern Escarpment**	**Other Near-Shore Operations**	**Mount Peak Area**
Land Reconnaissance	Land Reconnaissance	Shore Assault Training	Range Support
Company Sized Raid	Shore Assault Training	Water Insertion and Extraction	Helicopter Assault Training
Aerial Recon/Photo-Help	Water Insertion and Extraction	Small Boat Landing	Explosive Charge Testing
Combat Search and Rescue	Combat Swimmer Ship Attack	Combat Search and Rescue	Combat Search and Rescue
Range Support	Small Boat Landing	Air Operations	Aerial Recon/Photo-Help
COMPTUEX	COMPTUEX	Combat Swimmer Ship Attack	RDT&E
RDT&E		RDT&E	JTFEX
Type of Operations 7	Type of Operations 6	Type of Operations 7	Type of Operations 7
No. of Operations 34	No. of Operations 16	No. of Operations NA	No. of Operations 20
Photo Lab	**NOTS Pier**	**Eel Point**	
Company Sized Raid	Range Support	Small Boat Landing	
	Small Boat Landing	Shore Assault Training	
	Water Insertion and Extraction		
Type of Operations 1	Type of Operations 3	Type of Operations 5	
No. of Operations 1	No. of Operations 18	No. of Operations 20	

Figure2-3. San Clemente Island historic use by area (October 1994 –March 1997) (from San Clemente Island Operations Management Plan).



Map2-3. Facility and land use areas on San Clemente Island (from San Clemente Island Operations Management Plan, Draft 2000 and Activity Overview Plan, 2001). (Do not reproduce or distribute without Navy permission [see Document Disclaimer].)

A total of 13 personnel are assigned to the FACSFAC facilities. They are accommodated in two separate berthing facilities at Wilson Cove. Several sites are operated remotely from the SCORE Range Operations Center (ROC) located at NAS North Island, NBC in San Diego. Microwave links are presently used for this purpose. Future planning includes complete control of all Under Sea Warfare and Electronic Warfare systems from the ROC via fiber-optic communications. Over half of the ranges' contractor personnel are housed in two separate trailer complexes in the Wilson Cove area. Present manning is 23 contractor personnel. Future facilities plans include completion of the Torpedo Facility (TORPFAC) just south of the airfield. Additional facilities include a target shop, helicopter pad, an improved ramp area and vehicle accesses, and an aircraft tow-road.

Basic Underwater Demolition/SEAL (BUD/S) Complex

This special warfare training site is located at Northwest Harbor at the extreme north end of SCI. It is comprised of 36 buildings accommodating 53,246 square feet of berthing, messing facilities, classrooms, and training range support structures. Berthing facilities can accommodate 64 students and 48 staff personnel. This facility was completely rebuilt in 1990. BUD/S also has a vehicle support structure in Wilson Cove.

Maritime Operations (MAROPS) Complex

This site is comprised of three Naval Special Warfare buildings at Northwest Harbor that provide 26,130 sq ft of training rooms, personnel accommodations, vehicle and boat support. Berthing facilities can accommodate 60 personnel. Construction of major Special Warfare waterfront entities in Northwest Harbor to support future training activities is being planned. These would include a breakwater, boat berthing, boat repair, and boat launching ramps. Construction of a second BUD/S weapons firing range parallel to the existing "Pop-Up" range is planned, as is a new medical/weight room facility.

SPAWAR Space Center San Diego Systems Center Facilities

SSC SD Systems Center (SSC SD SYSCEN) presently has 33 buildings assigned. However, 20 of these structures are simple camera/tracking pad sites. The normal day-to-day manning levels for SSC SD SYSCEN are approximately five personnel, but during a major test, this level will increase to around 40–50 persons. Berthing for SSC SD SYSCEN personnel is in a six-trailer complex in Wilson Cove. Future facility construction plans are currently to build a berthing complex for approximately 60 persons in the same location as a replacement for these trailers. Planning for future Unmanned Aerial Vehicle test and evaluation (T&E) support calls for major construction in the Old Airfield complex area. Two hangars and two office facilities are also planned for this site.

Public Works Center Facilities

The Public Works Center (PWC) is assigned 29 structures on the Island, which include maintenance, warehousing, power plant, and other utility facilities. The majority of these facilities are located in Wilson Cove. PWC has the operation and maintenance responsibility for all the island utilities and motor pool vehicles. It also has the additional responsibility of delivering fuel and potable water to all outlying sites south of the Photo Lab complex. There are currently 44 PWC personnel. All personnel, with the exception of four supervisors, are billeted in one berthing facility.

Naval Undersea Warfare Center

Naval Undersea Warfare Center (NUWC) provides SCORE range logistics and T&E support for forces afloat by operating underwater test ranges. The main support facility, Range Control, is located on the waterfront in Wilson Cove. Personnel support is provided in six four-room modular berthing units located in Wilson Cove. Due to the shortage of berthing on the Island and minimal manning requirements, several of these units are rented out to other activities.

Transient Activity Facilities

Transient personnel are those persons present for temporary purposes, such as aviation detachments, military construction units, combat operations training detachments, or others. Certain berthing facilities are specifically assigned to accommodate these personnel. Transient personnel numbers frequently exceed 150.

Utilities

- *Power Plant*: The power plant at Wilson Cove is comprised of 2–500 kilowatts (kW), 1–1200kW, and 1–750kW diesel generators with a total capacity of 2950 kW/Hr. This plant is presently loaded to a nominal capacity average of 35 percent. The plant is operated and maintained 24-hours a day, 7-days a week. A Strategic Environmental Research and Development Program (SERDP) wind farm that was constructed in 1997–1998 augments the existing power system, providing approximately 20% of the island's power. It provides between 12 and 15% of SCI electricity, or about 150 kilowatts per month. The monthly load is about 1 megawatt.
- *Power Distribution*: The system consists of approximately 925 poles spanning a distance of 45 miles. Several sites on the Island were connected to the power grid in 1997, which significantly increased the efficiency of power production.
- *Sewage*: Sewage generated at SCI is treated at the sanitary sewage treatment plant in Wilson Cove to secondary levels before being discharged into the ocean water nearby (under NPDES Permit # CA 0110175 CI 6432, 31 July 2000). The treatment plant is a dual unit, extended aeration system, presently at state-licensed capacity of 25,000 gallon/day. The facility is capable of 60,000 gallon/day but is restricted by the state to its present processing level. The plant is operated by Navy Public Works. Monthly monitoring reports are sent to the Los Angeles Regional Water Quality Control Board (RWQCB).
- *Water*: There is no on-Island source of water. Water is presently barged to the Island each week (245,173 gal/week average) at a cost of almost a half a million dollars per year ($8,581.55 week average). Once test results indicate the water meets all standards, it is then pumped into the distribution tanks. The present capacity of the system is 2.3 million gallons.
- *Communications*: Telephone service is provided to the island via microwave relay from San Pedro, CA. This Consolidated Area Telephone System (CATS) is a fully digital integrated network that interfaces with the eleven area bases within the system. The on-Island network of equipment requires continuous maintenance.
- *Landfill*: The current landfill is permitted for 20 acres through 24 June, 2002. Closure of the landfill is anticipated on 2032 at 991 tons per year rate of disposal use. It is currently being augmented by shipping surplus trash back to the mainland via the weekly barge. Approximately 127 tons of recycled materials are also shipped to the mainland annually. Since 1 October 1997, no burning of trash has been allowed due to air quality concerns.

- *Circulation Roads*: The main circulation artery of SCI is San Clemente Island Ridge Road, which extends from the NALF SCI south for approximately 20 miles. Only the north section, approximately six miles, is fully paved. During periods of inclement weather such as rain and/or fog, this road, particularly the unpaved portions, can be extremely dangerous. Other secondary roads to sites along the San Clemente Island Ridge Road are generally unpaved or partially paved. Conditions of the Island circulation roads are poor and are generally non-maintainable because of poor drainage during the rainy season and lack of paving. Any increases in tempo of operations in the future will require increased road maintenance.

Current Fire Protection and Management Framework

Uncontrolled wildland fire poses a serious threat to facilities, personnel and natural resources. Wildland fire hazard is high due to the extended dry periods which occur on SCI and the ongoing use of munitions or other activities, which can serve as ignition sources for the abundant fuel available. Fire season usually extends from May through November. Fire danger is expected to increase as the Island recovers from the damage previously caused by feral goats, which kept fuel loads to a minimum.

Existing Federal Fire Department resources on-Island are designed and staffed for airfield and structural fire protection only. They consist of one Class 3 wildland fire (brush) engine that can be manned by three personnel. A similar reserve engine is available but only if the airfield is shut down since it can be manned only by staff assigned to airfield crash response. Fires cannot be suppressed on the ground in the SHOBA training area, except for backfiring from Ridge Road, due to danger from unexploded ordnance.

The Navy has actively implemented a program to minimize wildfire danger. Provisions include: a matrix of fuelbreaks; stationing of a firefighting helicopter on the airfield during shore bombardment; operational limitations (primarily restrictions on the use of incendiary ordinance) for activities in SHOBA during the shrike breeding and fire seasons; reduction in the size of the target area during fire season; and other operational restrictions on tenants and users. The Wildland Fire Instruction provides policy and guidelines for the prevention, suppression, reporting, and monitoring of fires. Recently the NRO successfully tested the use of fire retardant as a fuelbreak. This is especially helpful in areas with ordnance concerns and is also a benefit to natural resources as compared with plowing firebreaks through vegetation because it reduces erosion as no biomass is removed. In the summer of 1999 the Navy contracted with a private firm to provide helicopter fire fighting capability on ground alert at the main airfield. This contracted helicopter is assisted by the reserve helicopter unit HC-85, which may be diverted from support of training operations during a fire. There is no nighttime capability to fight fires aerially.

2.1.4 Installation Restoration Sites

The following Table 2-2 lists known Installation Restoration (IR) sites (Map 2-4). The Resource Conservation and Recovery Act (RCRA) permit process that addresses these sites is the functional equivalent of the National Environmental Policy Act (NEPA), so these sites will not be analyzed in the EA on this INRMP. There are 18 sites identified for potential environmental clean-up on SCI, 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. NALF SCI is neither listed nor proposed for listing on the National Priorities List (NPL). There is no legal driver for cleanup at the sites.

Table2-2. Known Installation Restoration sites addressed through the Resource Conservation and Recovery Act.

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 Canyon	1
14	Old ordnance disposal area	0.5
16	Wilson Cove Gas Station	1
	Total Acreage	29.8

Map2-4. Installation Restoration sites on San Clemente Island (map locations of additional sites listed in Table 2-2 not currently available). (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

2.1.5 Waterfront Operations

The waterfront area at Wilson Cove is the center of SCI support operations. This area includes a small berthing pier, logistic support, ammunition unloading, barge/landing craft ramp, and supply, issue, and general storage facilities. All supplies are barged from Naval Station San Diego, which is part of Naval Base San Diego. The barge ramp provides the only means of delivering fresh water, supplies, and materials to SCI. Typically, relatively small Navy research, diving and supply vessels moor in Wilson Cove. The boat ramp and pier were both completely repaired in 1998.

Vessel Maintenance Operations

A future boat maintenance facility is planned for the Maritime Operations facility, while moorage, loading, and unloading are the primary activities at Wilson Cove. Vessel repair and maintenance activities are regulated by the RWQCB due to their potential for water quality impacts. Antifouling coatings, or biocidal paint, on boats and ships are significant contributors of copper and other metal contaminants in waters where ships or boats are maintained due to leaching and cleaning of hulls. Pollution is a problem at marinas due to improper practices related to boat cleaning, fueling operations, and marine head discharge. Small boat minor repairs are performed by SCI boats and docks personnel in confined areas and are covered by Best Management Practices (BMPs) found in the "SCI Storm Water Discharge Management Plan."

While in port, vessels are prohibited from discharging or off-loading sanitary or industrial wastes at SCI. In deeper waters, discharge of sanitary sewage through a properly functioning U.S. Coast Guard (USCG) certified Type I or Type II marine sanitation device is allowed. Vessels at SCI are required to comply with the Uniform National Discharge Standards.

Shoreline Construction

There apparently are no current proposals for shoreline construction for the Island. If such a proposal were to be put forward, shoreline construction or maintenance activity in Waters of the U.S. must be permitted under the Clean Water Act (CWA) and also must comply with the NEPA EA requirements. In cases where listed federally species may be affected, mitigation is also required under the ESA. Above the mean higher high water line, construction activities must comply with provisions of the California Coastal Act (CCA) and are permitted by the California Coastal Commission (CCC). In San Diego Bay the Navy, for example, has a General Consistency Determination for periodic replacement of piers and shoreline structures dated 1998 (CD-070-98).

Permitting for any proposed riprap and other structures is primarily reviewed for the requirement for no net loss of jurisdictional waters of the U.S. (a balanced cut and fill must be part of the site plan). Mitigation for fill is required, as well as for impacts to marine resources or listed species. However, there normally is no consideration of differences in habitat value of different designs or materials used in a structure.

Oil Spill Prevention and Cleanup

The National Response Team (NRT) is the primary national contingency planning, policy, and coordination organization for oil and hazardous substances emergency response. The Oil Pollution Act of 1990 and the CWA are the driving public laws behind the formation of the NRT. The 16 federal member agencies of the NRT have expertise and interests in various aspects of emergency preparedness and response. They have developed a National Response System (NRS) that provides a framework for coordination among federal, state, and local responders. The NRS includes four levels of contingency planning (federal, regional, area and local, and site-specific industry) that guide response efforts (Figure 2-4). SCI falls under the Region IV Regional Contingency Plan.

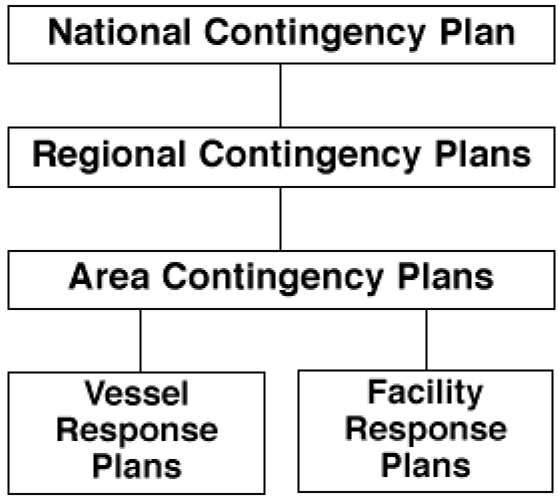


Figure2-4. Four levels of oil spill response contingency plans (U.S. Coast Guard 2001).

Because of over-water transfer of petroleum products, and in accordance with the Oil Pollution Act of 1990, SCI has a Facility Response Plan and an Emergency Response Action Plan (both updated in April 2001). In addition, Boats and Docks personnel at SCI are trained in oil spill response and are equipped with a platform boat, oil spill containment boom, a skimmer, utility boats, a vacuum truck and disposable absorbent materials in the event of a spill.

SCI also has a current Spill Prevention, Control and Countermeasures Plan (SPCC) (June 2001) to comply with Title 40 Code of Federal Regulations (CFR), Parts 110 (Discharge of Oil) and 112 (Oil Pollution Prevention). This SPCC Plan addresses petroleum storage, handling facilities and shore operations at SCI.

In addition, SCI's Storm Water Discharge Management Plan is consistent with and falls under the nationwide General Permit for Storm Water Discharges Associated with Industrial Activities. It contains BMPs for prevention and containment of oil spills associated with industrial activity.

2.1.6 Outdoor Recreation and Environmental Awareness for On-Island Personnel

For military and on-Island personnel, outdoor recreation, as defined for this INRMP, is the integration of recreational activities with the Island's natural resources for recreation and physical exercise, as well as indoor/outdoor interpretive activities where the focus is on understanding the natural environment. Outdoor recreation activities are intended to support the wise stewardship of DoD's natural resources. In the event of potential conflicts of use, sound biological management practices shall prevail.

Recreational opportunities are particularly important at SCI because personnel are often sequestered on the Island for long periods of time. SCI currently has a few hiking and jogging trails (such as on the hillside behind the old "downtown" above Wilson Cove harbor) and picnicking areas. Interpretive signs welcome arriving personnel and visitors at the airport, at the beginning of the hiking trail above Wilson Cove harbor, and at the site of the old downtown Galley, now demolished. Campgrounds are located below Wilson Cove and are primarily used by Boy Scout and Girl Scout units. Permanent military and civilian personnel also have the opportunity to whale watch, fish, swim, surf, 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 on SCI is strictly prohibited. Certain favorite fishing spots for Island personnel have resulted in the establishment of trails through habitat areas (a single, well-worn path is preferable to multiple, less-worn paths through habitat).

Some resource conservation measures have been incorporated into SCI regulations. However, a formal program of conservation education is not presently in place.

2.1.7 Public Uses

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 are limited access or prohibited.

NRO occasionally invites skilled volunteers (usually professional biologists with an interest in Island resources) to participate in intensive, on-Island monitoring efforts such as semi-annual San Clemente loggerhead shrike surveys or occasional long-term vegetation plot surveys.

In contrast to access controls on the mainland, the surrounding waters are used and visited by a variety groups, including commercial and sport fishermen, kelp harvesters, SCUBA divers, and pleasure boaters.

2.1.7.1 Access Control

Several coastal areas around SCI have been identified in Code of Federal Regulations as restricted to Navy vessels only or as presenting a significant hazard to mariners. The Wilson Cove Exclusive Use Zone is used extensively by Navy ships for anchorage for port facilities. The West Cove Restricted Area precludes anchorage by ships to avoid damage to underwater cables laid on the sea floor supporting the acoustic sensors on the SOAR range. The Wilson Cove Security Zone, the Southeast Wilson Cove Restricted Area, and the three danger zones are areas from which non-participating vessels may be excluded during testing or training activities. This is done for protection of other vessels from the extensive firing and demolition activities that can occur in these areas. When areas are scheduled to be active, a Notice to Mariners is published to inform the public. This information can be obtained at the website www.scisland.org or by telephoning (619) 545-6536. It is also available over Control Bravo on Channel 16.

Table 2-3 summarizes formal access restrictions published in navigation regulations of The U.S. Coast Pilot 7 (32nd Ed. 2000).

Table2-3. Navigation regulations cited on U.S. Coast Guard charts and published in the U.S. Coast Pilot 7 (32nd Ed. 2000) for San Clemente Island (U.S. Department of Commerce 2000).

Area and Citation	**Regulations**
110.218 Restricted Anchorage Area In vicinity of Wilson Cove. The anchorage grounds.	1. This area is reserved exclusively for anchorage of U.S. Government vessels or vessels temporarily operating under Government direction and no vessels except in an emergency shall anchor in the area without first obtaining permission from the Commandant, Eleventh Naval District, or the Senior Naval Officer present who shall in turn notify the Commandant promptly. 2. No vessel shall anchor in such a manner as to unreasonably obstruct the approach to the wharf.
165.1111 Security Zone Wilson Cove. The water adjacent to SCI within 1.5 nautical miles off the shoreline from Wilson Cove North End Light to Spruce Pier, about 4.1 nautical miles southeast of Wilson Cove North End Light.	1. In accordance with the general regulations in 165.33 of this part, entry into the area of this zone is prohibited unless authorized by the Captain of the Port, SD, CA.
165.1112 Safety Zone West Cove. The water adjacent to SCI.	1. In accordance with the general regulations in 165.33 of this part, entry into the area of this zone is permitted, but anchoring, fishing, and other similar activities are prohibited unless authorized by the Captain of the Port, SD, CA. 2. Entry into the area of this zone will be prohibited at certain times. U.S. Coast Guard personnel in the zone will provide notification to the public of the times when entry into the zone is prohibited.
334.920 Restricted Area The waters of the Pacific Ocean within an area extending easterly from the east coast of SCI, CA described as follows: The northerly boundary to be a continuation, to seaward of the existing southerly boundary of the restricted anchorage area.	1. No person or vessels, other than Naval Ordnance Test Station craft, and those cleared for entry by the Naval Ordnance Test Station, shall enter the area at any time except in an emergency, proceeding with extreme caution. 2. Dredging, dragging, seining or other fishing operations within these boundaries are prohibited. 3. No seaplanes, other than those approved for entry by Naval Ordnance Test Station, may enter the area. 4. The regulations in this section shall be enforced by security personnel attached to the U.S. Naval Ordnance Test Station, China Lake, CA, and by such agencies as may be designated by the Commandant, Eleventh Naval District, SD, CA
334.921 Restricted Area All waters between the northern and southern boundaries of the area known as West Cove seaward approximately four miles.	1. The use of this area for anchorage is prohibited to all craft at all times. 2. The regulations in this section shall be enforced by the Commander, Naval Base, SD, and such agencies as he/she shall designate.
334.950 Danger Area Navy shore bombardment areas.	1. All persons and all vessels shall promptly vacate the areas when ordered to do so by the Navy or the Coast Guard. Persons and vessels shall not enter the areas during periods scheduled for firing. These areas are used for various surface and air gunnery and aerial bombing exercises by the U.S. Navy, Coast Guard and Marine Corps. Hazardous conditions exist during shore bombardment by naval ships in the area seaward of that described in paragraphs a1 and a2 of this section between the firing vessel and the shore. The area described in paragraph a3 of this section is hazardous due to the possibility of rounds landing in the waters east of SCI. 2. All persons in the area are warned that unexploded ordinance exists within the shore bombardment area on SCI and in the surrounding waters. All persons should exercise extreme caution when operating in the area. 3. Information about scheduled exercises will be published in the Local Notice to Mariners and also may be obtained by calling the shore bombardment area scheduler at (619) 437-2844. Vessels in the vicinity of SCI may obtain information on the status of the range by contacting the Navy Observation Post by marine radio on channel 16. However, the Navy Observation Post is normally manned only during firing exercises. In addition, since the Navy Observation Post may not be able to receive radio transmissions or answer a vessel calling from the area described in paragraph a3 of this section due to interference form the land mass, it is recommended that callers position their craft for line-of-sight transmission with the Navy Observation Posts near Pyramid Cove prior to assuming that the range is not in use.4. Except in an emergency, no vessel shall anchor in these areas without first obtaining permission from the Commander, Naval Base, SD or from the senior officer present in t he area who may grant permission to anchor not exceeding the period of time that he, himself, is authorized to remain there. The senior officer present shall advise the Commander, Naval Base, SD when and to whom a berth is assigned. 5. The regulations in this section shall be enforced by the Commander, Naval Base, SD, and such agencies as he/she shall designate.
334.960 Danger Area West Cove. The waters in an area about one-half mile off the west coast of SCI.	1. Intermittent firing may take place in the danger zone on any day from 8:00 a.m. until 1:00 p.m. 2. Except as otherwise provided in this section, the danger zone will be open to fishing and general navigation. 3. The operations officer, Naval Ordinance Test Station, Pasadena Annex, Pasadena, Ca, will announce firing schedules. Each week, public notices will be issued gibing advance firing schedules. Such notices will appear in the local newspapers and in local “Notice to Mariners” and “Notice to Airmen.” For the benefit of the fishermen and small-craft operators, announcements will be made on the marine radio. 4. When a scheduled firing is about to be undertaken, fishing boats and other small craft will be contacted by surface patrol boast or aircraft equipped with loudspeaker system. When so notified, all persons and vessels shall leave the area immediately by the shortest route. Upon completion of firing or if the scheduled firing is canceled for any reason, fishermen and small-boat operators will be notified as far in advanced as possible by Marine Radio Broadcast. 5. The regulations in this section shall be enforced by security personnel attached to the Naval Ordinance Test Station, Pasadena Annex, and by such agencies as may be designated by the Commandant, Eleventh Naval District, SD.
334.961 Danger Area Naval danger zone off northwest shore.	1. No person shall enter this area during closure periods unless authorized to do so by the enforcing agency. No vessel or other craft, except vessels of the U.S. Government or vessels duly authorized by the enforcing agency shall enter this area during closure periods. 2. The regulations in this section shall be enforced by the Commander, Naval Base, SD, CA and such agencies as he/she shall designate.
334.970 Danger Area	Removed.

2.1.7.2 Commercial and Sport Fishing and Kelp Harvest

- See commercial and recreational fish harvest summaries in Section 3.6.8 Fishes.

Given the highly productive waters surrounding SCI, it is a popular spot for fishermen and aquaculturists. The Navy retains no authority over these activities, except for the declaration of no access areas, as described above, and the control it has over the 300-yd limit.

A wide variety of species are caught in the commercial fishery. Important fish species caught around the Island, in terms of pounds landed, include Pacific mackerel (*Scomber japonicus*), jack mackerel (*Trachurus symmetricus*), swordfish (*Xiphias gladius*), California sheephead (*Semicossyphus pulcher*), and blackgill rockfish (*Sebastes sp.*). Important invertebrates include red urchin (*Strongylocentrotus franciscanus*), market squid (*Loligo opalescens*), spot prawn (*Sicyonia sp.*), and California spiny lobster (*Panulirus interruptus*). The state of California retains authority over fishing within three miles from the shore of SCI. The legislature and the Fish and Game Commission set fisheries policy, which is implemented by the CDFG.

Recreational sport fishing takes place around SCI from commercial passenger vessels (party boats) and private boats (Map 2-5). Major fish species taken include kelp bass (*Paralabtax clathratus*), rockfish species, ocean whitefish (*Caulolatilus princeps*), California sheephead, and halfmoon (*Medialluna californiensis*). Catch composition can vary from year to year, depending upon fish availability, weather, fishing effort and other variables. Figure 3-9 shows the number of fish landed on party boats in 1990, 1995, and 1998 from three areas surrounding SCI.

Photo 2-2. Kelp located at Pyramid Head, San Clemente Island.

Kelp is harvested commercially for use as a binder, emulsifier, and molding material in a broad range of products, and as a food source in abalone aquaculture operations. Commercial harvest of kelp began in the early 1900s in southern California. The annual kelp harvest increased from 10,000 tons in the early 1930s to a high of 170,000 tons in the late 1970s. An El Niño event in the early 1980s decimated kelp beds, and harvest levels remain significantly lower than those of the late 1970s (CA State Lands Commission 1994). The beds of SCI and Santa Catalina Island have recovered much of their former extent since this time, in contrast to those of the northern Channel Islands which still are reduced in area (J. Engle, University of California at Santa Barbara [UCSB] 2001). The volume and area of kelp harvested each year are currently regulated by the California Fish and Game Commission by the leasing of individual beds and licensing of individuals interest in harvest (CCR Title 14 Sec. 165 and 165.5). About 100,000 tons of giant kelp are harvested per year in California, primarily in southern California, by one San Diego-based company (CA State Lands Commission 1994).

The state monitors the harvest of SCI kelp beds, two of which are currently under lease to Kelco. The beds are tracked by number as follows: Bed 101 (Pyramid Head to China Point), 102 (China Point to Seal Cove), 103 (Seal Cove to Northwest Harbor), and 104 (Northwest Harbor) to Pyramid Head (east side of Island).

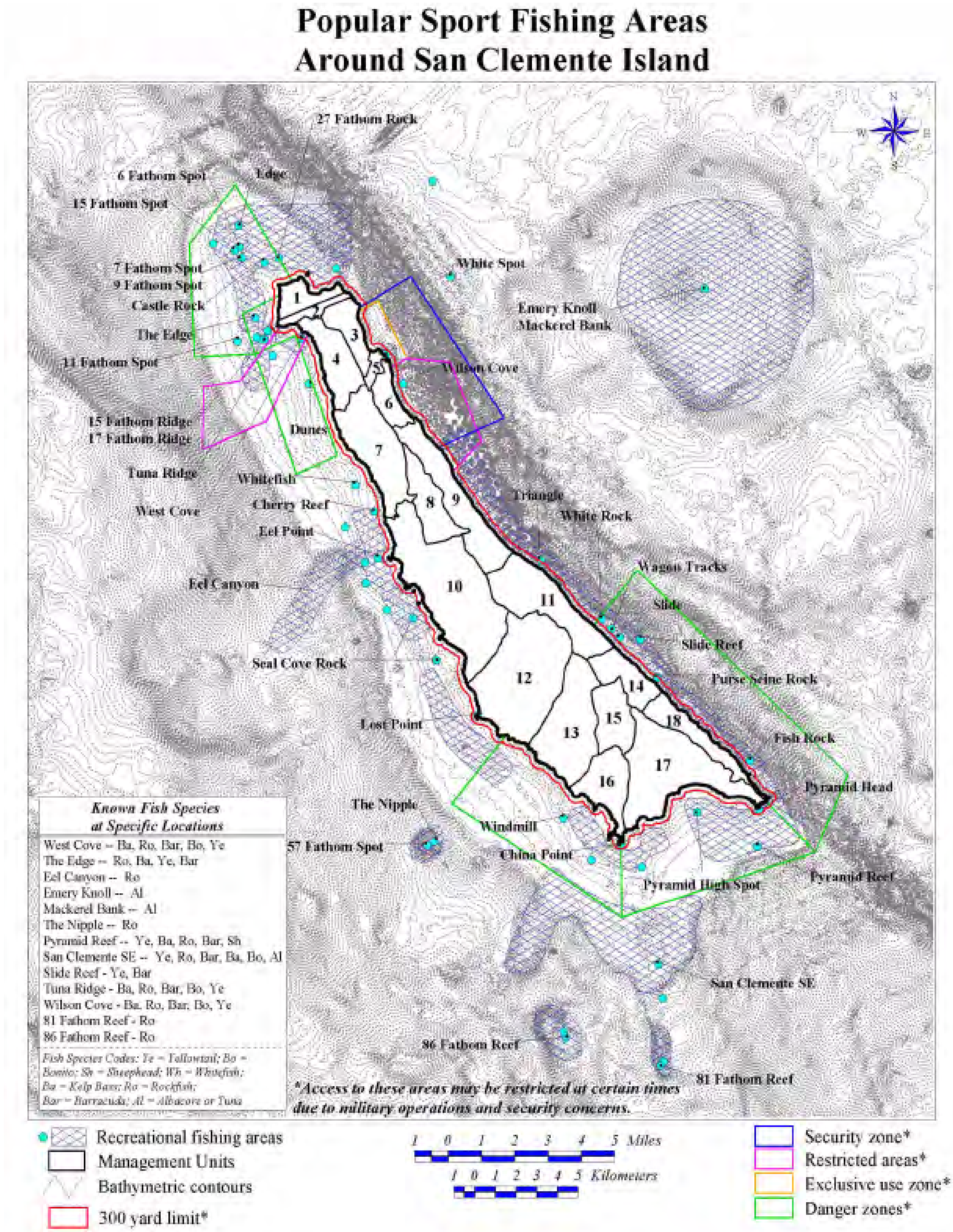
2.1.7.3 Recreational Diving

Recreational diving by the public has continued to grow steadily as a popular sport since the 1980s. SCI is a very popular destination in the southern California region, with its great underwater diversity and high underwater visibility (Map 2-6). The leeside of the Island has consistently good water clarity, with visibility of 60 to 80+ ft. Northwest Harbor is home of the shipwreck USS Butler, a Naval destroyer that sits on the sandy bottom 80 ft below the surface. The west side of SCI is known for its lobster, abalone, purple coral colonies, rock scallops and large fish. Again, Navy control over this activity is limited to declaring some areas hazardous to non-participating vessels, and to the ability to impose control over the 300-yard buffer zone surrounding the Island.

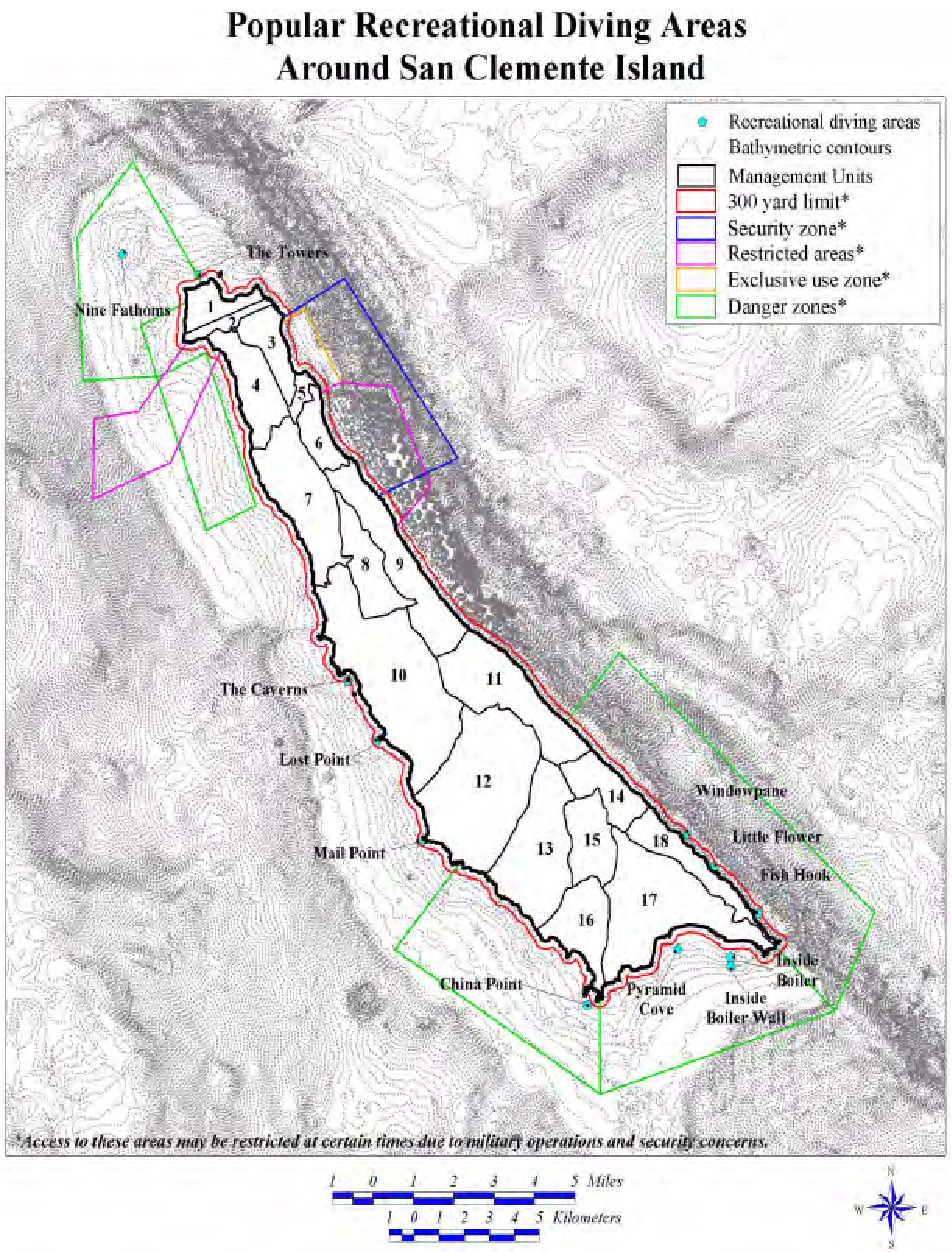
2.1.8 Current Partnerships

The Navy is assisted by numerous contracted partners in natural resource management. These include:

- Zoological Society of San Diego–western snowy plover (*Charadrius alexandrinus nivosus*) monitoring and San Clemente loggerhead shrike propagation (*Lanius ludovicianus mearnsi*);
- Institute for Wildlife Studies–shrike release, predator control in support of shrike, shrike research, San Clemente sage sparrow (*Amphispiza belli clementae*) monitoring, San Clemente Island fox (*Urocyon littoralis clementae*) monitoring (a recently federally proposed species);
- Point Reyes Bird Observatory–shrike monitoring;
- San Diego Natural History Museum–Island night lizard (*Xantusia riversiana*) monitoring;
- System Ecology Research Group (SERG) San Diego State University Foundation–Island nursery development, erosion assessment;
- Santa Ana Botanic Garden–seed collection and storage;
- Santa Barbara Botanic Garden–rare plant surveys;
- National Marine Fisheries Service–marine mammal surveys;
- University of South Dakota–plant genetics;
- Bitteroot Restoration, Inc.–wetland surveys; and
- Tierra Data Systems–long-term monitoring and INRMP development.



Map2-5. Popular recreational fishing areas in the waters surrounding San Clemente Island. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).



Map2-6. Popular recreational diving spots around San Clemente Island. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

2.1.9 Scheduling and Coordination of Activities

All scheduling for access to ranges is controlled by SCORE and enforced by Security on SCI. Quarterly meetings are held to coordinate scheduling, but changes are made on a daily basis. Essentially, for natural resource personnel, a range can “go hot,” or be declared off-limits due to live ordnance activity, with very short notice and activities will need to be curtailed.

Current regulations are listed in NAS North Island (NASNI) Instruction 11015.2 (13 May 1981) (Appendix F).

A Range Users Manual is currently available by SCORE. An environmental “rules of engagement” style brochure will be produced by the NRO. The brochure will contain a condensed version of the Range Rules, as well as a map of sensitive resources to be used by the Operators. NRO distributes an orientation package “Operations Package for Natural Resources San Clemente Island, February 2000” to NRO contractors or representatives who are new to the Island, before granting them access to flights. An ordnance familiarization brief is also required once per year if a trip to SHOBA is planned.

2.2 Future Uses and Plans

Force structure changes, base closures, and civilian population encroachment on mainland military ranges have increased the demand for access to SCI’s Ranges and Training Area. As a result, the Navy contracted for an OMP and an EIS to look at the needs for and alternatives to expanding the use of the SCI. Both of these documents are subject to consultation with USFWS as regulated under section 7 of the ESA. Several proposed changes were put forward, these include:

- An overall increase in tempo over the next ten years (Figure 2-5);
- The addition of a USMC battalion size amphibious landing exercise to the training cycle;
- The addition of 16 new Training Area and Ranges (TARs) on the Island; and
- An extension of the offshore range into shallow water areas.

The three alternatives put forth in the EIS are:

- No Action: 1997 baseline, 2700 operations (excluding airfield operations);
- Alternative 1: 3000 operations; and
- Alternative 2 (preferred): 3400 operations.

Tempo Increases

Most of the seven types of operations discussed earlier (Section 2.1.2) will experience growth in the 21st century. Figure 2-4 graphically depicts this growth showing the current level, and the two growth alternatives proposed in the EIS by number and type of operations. Any tempo increases will be conditioned by the EIS.

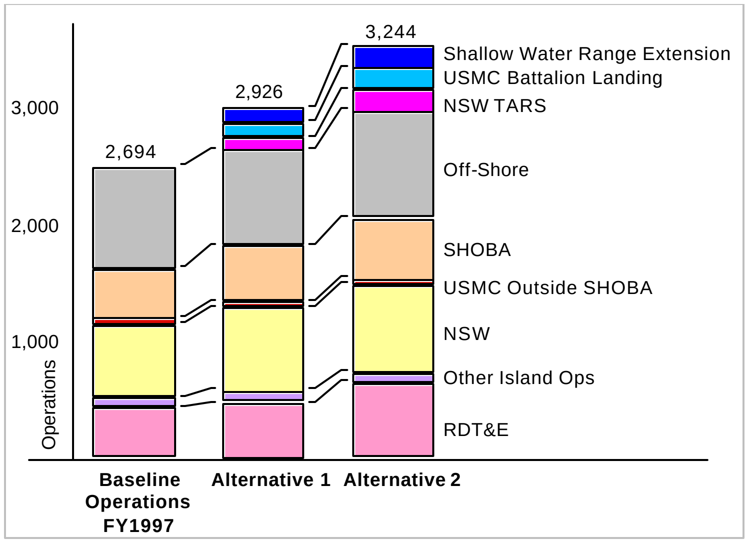


Figure2-5. Operational use level under current conditions and two alternate proposals (from preliminary draft SCIRC EIS/OEIS 2000).

Battalion Size Amphibious Landing

The addition of one annual Marine Corps Battalion Size Amphibious Landing is being proposed for the SCI training cycle. The Battalion strength, with opposing forces, is approximately 1500 personnel. This exercise would last up to five days and employ the full combined arms team used by the Marine Corps. The amphibious forces would land by helicopter on the beach. Amphibious landings on the beach would include LCAC, AAU and LCU vehicles. Once off the beach all vehicles would be restricted to established roads and off-road operations areas. To control ground disturbing activities, the battalion would be limited to NRO-approved areas near its objective after coming ashore. The only use of live ordnance would be in SHOBA for small arms, artillery fires, close air support and Naval gunfire.

A typical scenario would be as follows:

Day 1: An opposition force of one company would land by helicopter at VC-3. That evening, a small reconnaissance unit (12 Marines) would land by rubber boat at Eel Cove and proceed on foot to the outskirts of VC-3. Day 2: One boat company would land at Northwest Harbor in rubber boats, one company would land by LCAC and LCU at West Cove, one company (plus artillery) at Wilson Cove, and one company at Horse Beach in SHOBA. Day 2/3: The northern companies would assemble at the Assault Maneuver Area, and all the companies would converge in an attack on VC-3. There would be no live fire in this portion of the exercise, but blanks and some pyrotechnics could be used, depending on Fire Season restrictions. Days 3/4, all companies would move to SHOBA and conduct a SACEX with live fire. Day 4: The opposition force could be extracted from VC-3 by helicopter. Day 5: All remaining forces would redeploy off the Island. Aircraft would support all phases of the operation.

Naval Special Warfare (NSW) Training Area Ranges

Naval Special Warfare Group ONE has identified a number of Training Area and Ranges (TARs) that are needed to support continuation training for SEAL teams. (Map 2-6). Each TAR is being developed in accordance with the specifications, safety regulations, and other precautions applicable to live fire ranges and demolitions areas, including suitable fuelbreaks and wildfire control procedures.

TAR 1–NORTHEAST POINT DEMOLITION RANGE

Located in Northwest Harbor, this site has historically been used as a Naval Special Warfare training area. The proposal calls for continuing use as a demolition range, with blank fire. An EA was prepared and the Finding of No Significant Impact (FONSI) signed on 20 August, 2001. The Biological Opinion (BO) is dated 17 January, 2001.

TAR 2–GRADUATION BEACH UNDERWATER DEMOLITION RANGE

TAR 2's purpose is to provide a state-of-the-art underwater demolition area with across the beach capabilities. This area is currently in use as an underwater demolition range. The proposal is for site additions and improvements, including: erosion control on the access road and in the demolition area; a telephone communications line; a demolition staging area; and a demolition preparation area. This will be a controlled target area and a designated beach exit for TARs 1-6.

TAR 3–BUD/S BEACH UNDERWATER DEMOLITION RANGE

The purpose is to improve the current BUD/S Beach Demolition Range to a state-of-the art demolition area with across the beach capabilities. Improvements are needed to increase operational tempo, provide additional safety features, and increase communications.

TAR 4–WHALE POINT/CASTLE ROCK

This area was previously used as a demolition range and is largely disturbed. The TAR would be used for basic demolitions, over-the-beach, tactical training, and live fire Military Operations in Urban Terrain (MOUT). An EA was prepared and the FONSI signed on 20 August, 2001. The BO is dated 17 January, 2001.

TAR 5–WEST COVE AMPHIBIOUS ASSAULT TRAINING AREA

This area is adjacent to the SCORE cable termination facility and is also used for amphibious landings. Its purpose is to support nearshore reconnaissance, shallow water mine counter measures, and insertion/extraction enroute to other TARs on SCI.

TAR 6–WHITE HOUSE TRAINING AREA

This site is on a bluff overlooking Wilson Cove. It would provide a controlled target area and communications base station.

TAR 7–WILSON COVE OFFSHORE PARACHUTE DROP ZONE

This drop zone (DZ) is proposed in the offshore waters opposite Wilson Cove on the lee side of SCI. The purpose is to designate a DZ in offshore area for the parachute insertion of SEAL platoons and equipment. The transit to the beach is less than three nautical miles (nm).

TAR 8–WESTSIDE NEARSHORE PARACHUTE DROP ZONE

This DZ is located in the SCI nearshore area. It would establish a water DZ on the windward side of the Island for day and night parachute drops, personnel insertion, and underwater demolition.

TAR 9–PHOTO LAB TRAINING AREA

The proposal at this site is for operational use only, without facilities development. There are adequate buildings and facilities in the area to provide realistic simulated targets.

TAR 11–SURVEILLANCE TRAINING AREA

This is an old missile site on a bluff facing east, about one mile south of Wilson Cove. The proposal is for operational use only; no facilities will be developed.

TAR 12–RADAR SITE TRAINING AREA

This is a small target area high on the bluff overlooking NOTS Pier, on the site of an abandoned RDT&E radar facility. Its purpose would be to establish an objective in close proximity to RDT&E facilities to simulate a realistic adversary target.

TAR 13–RANDALL RADAR SITE TRAINING AREA

This site is on the Eastern Escarpment. The area contains an abandoned bunker with attendant facilities. NSW would develop the bunker to conduct tactical land demolitions training and Close Quarter Combat.

TAR 14–VC-3 ONSHORE PARACHUTE DROP ZONE

The DZ, named "Twinky," is off the north end of the VC-3 northwest/southeast abandoned runway. The proposed use coincides with the existing operational use of VC-3 that includes parachute drops, patrolling, and related tactical operations.

TAR 15–VC-3 AIRFIELD TRAINING AREA

This TAR would support SEAL platoon land raids and airfield attack training. No new facilities are proposed.

TAR 16–MISSILE IMPACT RANGE TRAINING AREA

The proposal is to develop a land-based DZ and objective area that can be used as an assembly point and also as a demolition training area for live fire. An EA was prepared and the FONSI signed on 20 August, 2001. The BO is dated 17 January, 2001.

TAR 18–CLOSE QUARTER BATTLE TRAINING AREA

The proposal is for a set of moveable target buildings that realistically simulate a terrorist camp (hostage location) for SEAL training in close quarter battle. It would support four different types of close quarter battle scenarios at one time.

TAR 20–PYRAMID COVE TRAINING AREA

This site is located in SHOBA Impact Area I. It would be used to provide a tactical firing area close to the shoreline.

TAR 22–CHINA COVE TRAINING AREA

TAR 22–Would provide an area close to the shoreline for day and night raids with live fire and stand-off weapons employment.

Shallow Water Range Extension

The Pacific Fleet Shallow Water extension has been a top priority since 1994. The proposal is to expand the underwater instrumentation from the SOAR range westward into the Tanner/Cortes Banks (Shallow Water Extension West) and eastward to the shores of SHOBA (Shallow Water Extension East). SCORE already trains in these areas, but they do not have the instrumentation to support it. The primary mission is to improve Fleet readiness in a littoral environment, in the shallow waters of choke points and near coastlines. Development of tactics and weapons in a realistic shallow water environment is critical to maintaining a technological edge over a growing and improving littoral submarine threat. The range will support the development of realistic combat exercises through weapon firings at mobile targets, measurement of time/space positional information and tactical status data in near-real-time, and timely post-exercise analysis, evaluation, and feedback. Currently there is no shallow water instrumented training range in the southern California Fleet training area. The lack of this capability to conduct frequent and routine realistic shallow water training has been a serious readiness deficiency. The littoral warfare expansion should encompass a total of at least 500 sq nm. The first phase of this SCORE Range expansion is to install underwater sensors in an area just west of SOAR, in the Tanner/Cortes Banks region. It would be a 250 sq nm extension (Map 2-7). This extension is contingent on the outcome of the EIS.

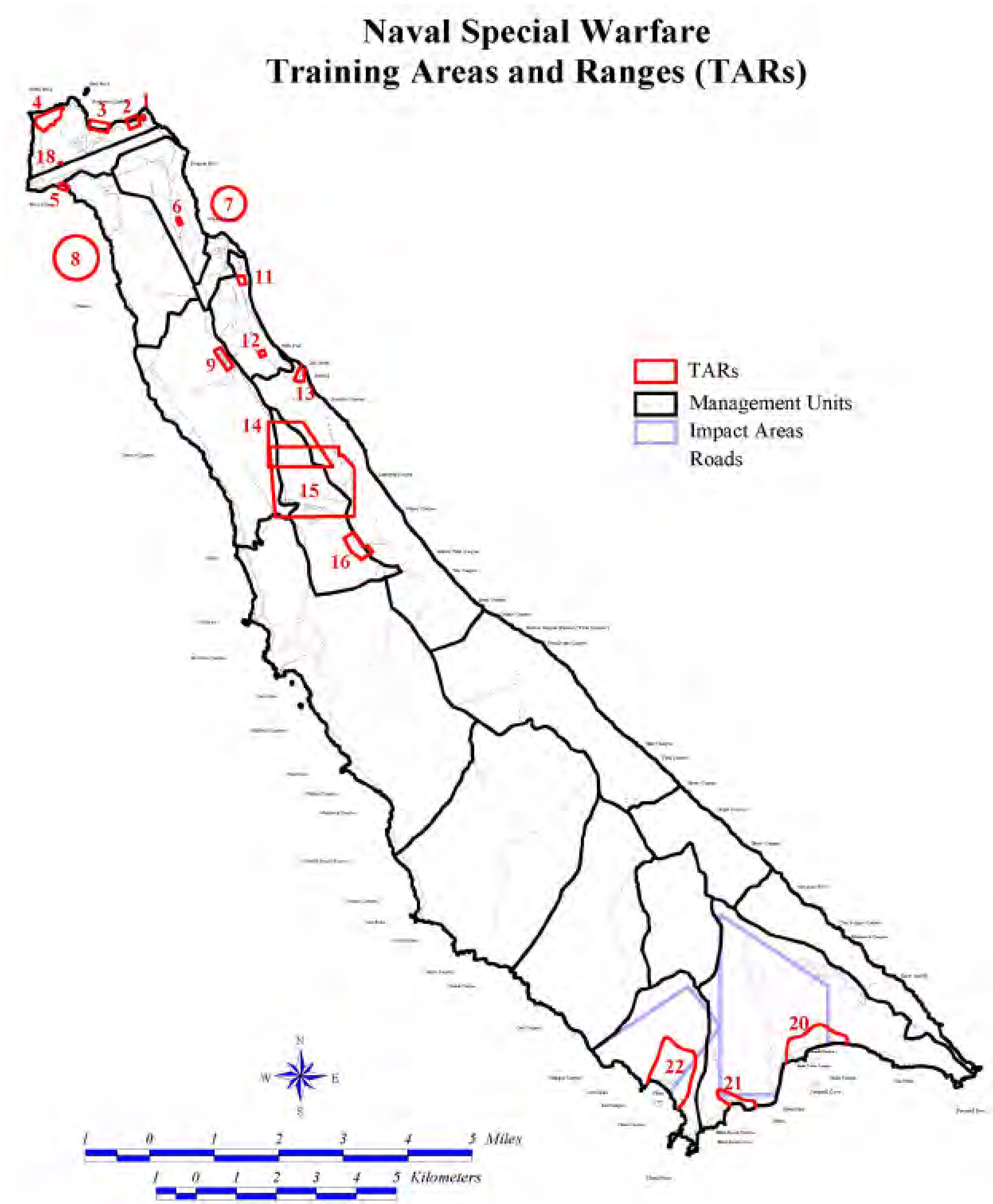
Operational Zone Concept

To analyze the impact of all proposed changes in the OMP, the Island was divided up into zones (Map). The "Operational Zone Concept" was based on the idea that, given the combination of a large variety of operations with high-value natural and cultural resources, the Island required an integrated management program. This program was intended to assure continued, timely, efficient and safe operations while meeting environmental goals and policies.

Seven primary criteria were considered in developing the zones. These were:

- Location–the geographic position of each proposed zone;
- Character–types of operations and activities;
- Intensity–number of operations and operational tempo;
- Operational Suitability - the degree to which the proposed zone met the operational requirements for combat environment representation, space, instrumentation, and other facilities;
- Historic Use–prior disturbance;
- Seasonality–the effect of climatic factors; and
- Environmental Constraints–biological and cultural resources.

Results of the analysis were presented in terms of activities in each onshore zone, primary users, and operations to operations compatibility. Figure 2-6 shows a variety of activities liable to occur in various operations and suggests whether they should be allowed, allowed conditionally or restricted. The OMP cautioned that the zones proposed do not in all cases represent the currently prescribed or historical use. In some cases additional infrastructure or programmatic mitigation might be required.



Map2-7. Existing and proposed Naval Special Warfare Training Areas and Ranges (TARs; from OMP/EIS). (Do not reproduce or distribute without Navy permission [see Document Disclaimer].)

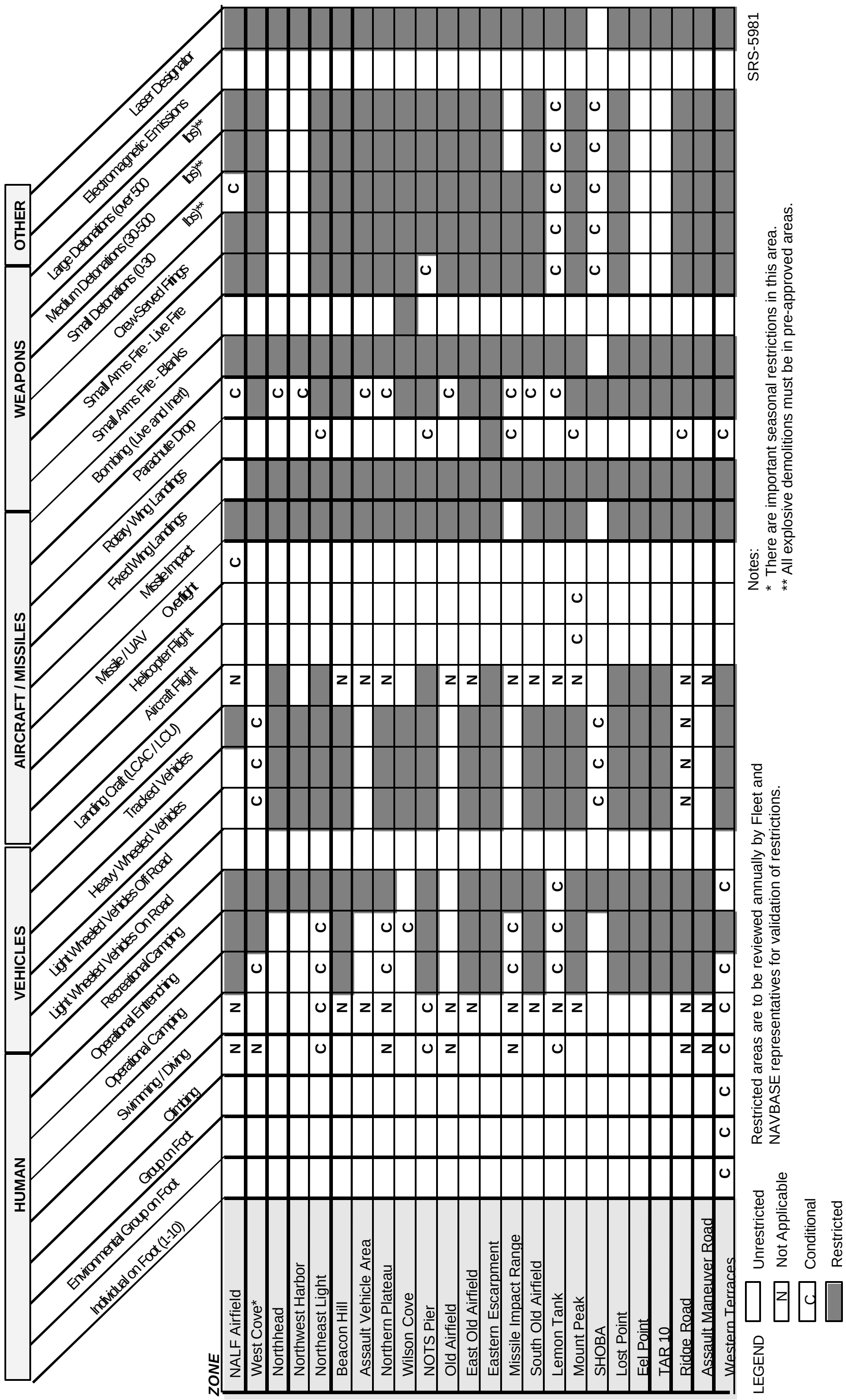
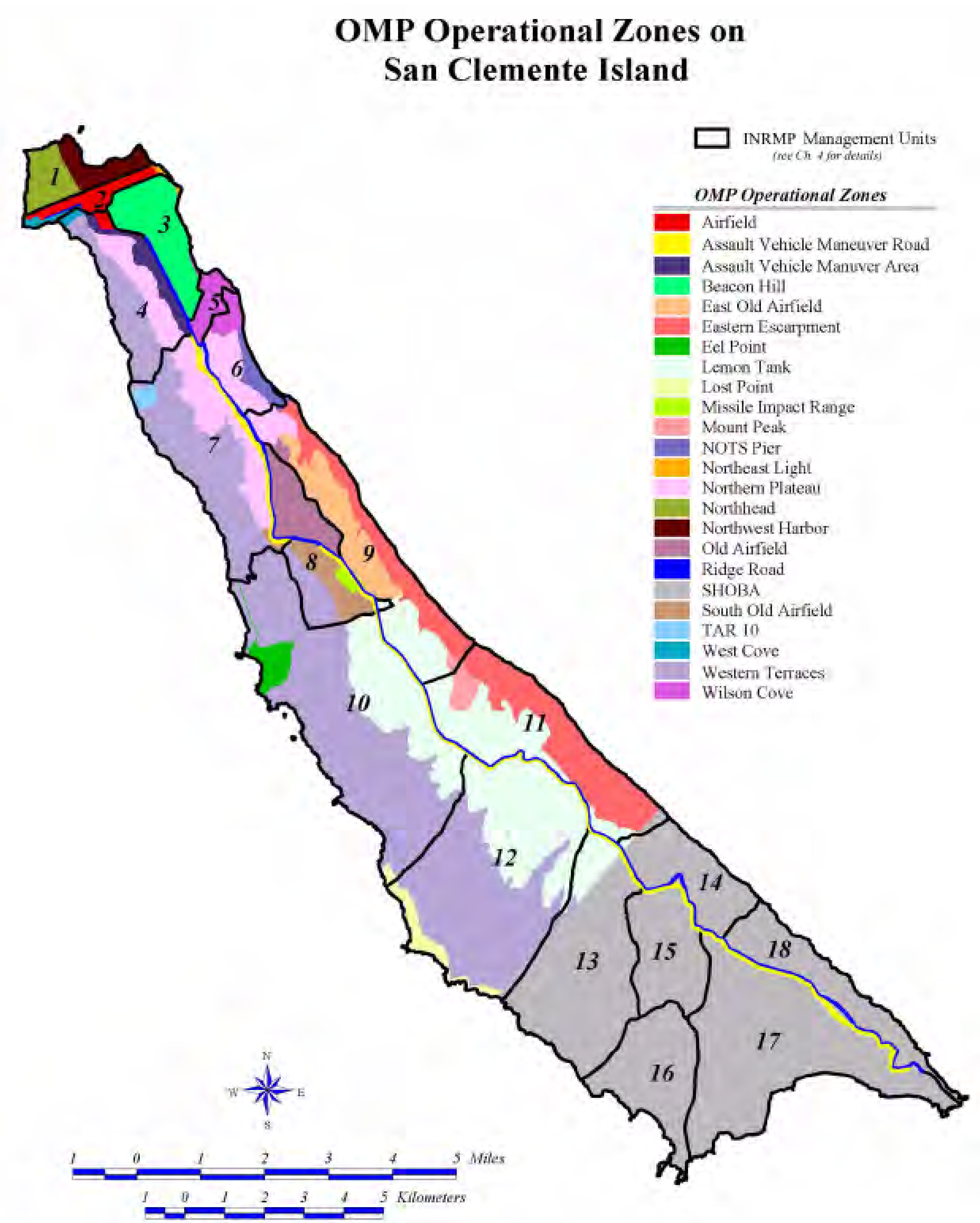


Figure2-6. Activities by zone: on-shore (from San Clemente Island Operations Management Plan).



Map2-8. Operations Management Plan Operational Zones. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

2.3 Overview of Government Regulation of Island Activities

2.3.1 Ownership and Control

President Franklin D. Roosevelt transferred control and jurisdiction of SCI to the Navy on November 7, 1934, by EO 6897. Federal ownership in fee extends to the mean high tide line. Three years later, in 1937, another EO declared 300 yd beyond the low water mark a "Defensive Sea Area" for purposes of national defense, giving the Secretary of the Navy authority to revoke access by vessels or other craft within this boundary. Additional safety and security restrictions to vessel or craft access have been added since then due to Naval exercises, and are available to mariners on the National Oceanic and Atmospheric Administration (NOAA) chart for the Island, and in the U.S. Coast Pilot Chapter 2 (also Table 2-2).

Below the Mean Lower Low Water (MLLW) mark and seaward to three nm, waters and submerged lands are owned by the state of California. Although owned by the state, the federal government has what amounts to an easement on submerged lands and navigable waters (below ordinary high-water mark), including for dredging or construction of facilities, based on an authority called navigational servitude. This authority originates from the constitutional power over interstate and foreign commerce, and the control and improvement of navigation.

For in-water construction, bulkhead lines are usually within federal property boundaries and are not at issue. However, pierhead boundary limits are defined for construction and fill planning purposes so as to avoid impacts to navigation, the protection of which is enforced by the USCG. Federal code refers to them as "federal control lines," and the U.S. Army Corps of Engineers (USACOE) refers to them as "Navigational Impact Lines." There is no precise distance from shore defined, but the USCG must concur that any construction will not affect navigation.

2.3.2 Key Laws and Regulations

The Island is subject to regulation by several federal, state, and local agencies pursuant to a number of federal environmental laws (Appendix F). Several federal laws and regulations strongly influence the potential scope and tempo of military activities on the Island. These may be considered "drivers" of environmental compliance in that non-compliance could lead to disruption to the mission, a claim against the Navy or possible range closure. These include:

- Federal Endangered Species Act;
- Clean Water Act;
- Clean Air Act;
- Migratory Bird Treaty Act;
- Marine Mammal Protection Act;
- Magnuson-Stevens Fisheries Conservation and Management Act;
- National Historic Preservation Act;
- National Environmental Policy Act; and
- Fish and Wildlife Coordination Act.

2.3.2.1 Federal Endangered Species Act

Once a species becomes listed as endangered or threatened by the federal government, regulations to protect the species from illegal "take" become applicable to any project with a federal nexus that may affect an individually listed animal or its habitat. The USFWS oversees the ESA implementation for all species except most marine species, which are under National Marine Fisheries Service (NMFS) jurisdiction. These two agencies become involved in all projects potentially affecting any of these federally listed species.

Under Section 7 of the ESA, federal project proponents must consult with USFWS or NOAA National Marine Fisheries if one or more listed species may be affected by an action. Consultation with USFWS or NOAA National Marine Fisheries may range from informal discussions to formal consultation requiring a biological assessment by the project proponent. The USFWS Final ESA Section 7 Consultation Handbook (March 1998) describes the informal consultation process. For non-federal project applicants, the USACOE takes the lead in this consultation if the issue is within their jurisdiction. Other federal agencies may appropriately be named the action agency that must conduct the consultation. With the issuance of a BO, "terms and conditions" are stated, which are measures to avoid or minimize the take of any listed species. When an "incidental take statement" is issued with the BO, the federal project proponent may be excused from incidentally taking a listed species as part of the agency's otherwise lawful activity as long as the specified taking conditions are met. The ESA section 7 applies to this INRMP only if some element triggers a consultation requirement. Elements that may trigger consultation have been qualified in this plan where they are proposed and will be consulted on separately before implementation. This INRMP is also subject to environmental review under NEPA.

A number of BOs have been issued on Island resources. These are summarized in Chapter 3 under each resource to which they pertain, as well as in Appendix G. The Navy will consult on aspects of the INRMP that may affect listed species prior to implementation. Currently, NRO is seeking to consult on SCI fire management strategies, as described in this INRMP and the SCI Fire Management Plan that is under development.

2.3.2.2 Clean Water Act

Section 404 of the CWA gave regulatory authority over Waters of the U.S., which includes jurisdictional wetlands, to the Environmental Protection Agency (EPA). The EPA delegated this authority to the USACOE, but retains veto power over permit decisions. This section of the law regulates the discharge of dredged or fill material into the "waters of the United States" including stream channels, with special consideration of vegetated aquatic sites such as wetlands (salt marsh and vernal pools on SCI), and vegetated shallows (eelgrass, for example). The USACOE is responsible for developing regulations for the Sec. 404 permit process and issuing permits, with the EPA maintaining power to veto the USACOE's decisions. USACOE's regulatory jurisdiction for tidal waters under Sec. 404 extends up to the high tide line (higher high water mark) (Figure 2-8). In this coastal zone, the USACOE requires permits for certain structures such as groins, breakwaters, marinas, piers, wharves, floats, riprap, bulkheads, boat ramps, jetties, intake and outfall pipes, pilings, as well as dredge and fill and beach nourishment activities.

The USACOE's jurisdiction in fresh waters includes the channel itself for Waters (defined by the Ordinary High Water Mark), to the outer edge of adjacent wetlands. Wetlands isolated from surface water bodies, such as vernal pools, also fall under USACOE regulation. Some water bodies are specifically exempted, such as irrigation ditches or drainage ditches excavated in uplands. Other types of waters of the U.S. are not intuitive, but are in fact regulated. These include vernal pools, desert playas, ephemeral swales, desert arroyos, desert playas, seasonal ponds, reservoirs, farm or stock ponds fed by direct rainfall or impoundment (not by pumped water), artificial wetlands that receive water without artificial controls (such as pumps, valves, or gates), and farmed wetlands.

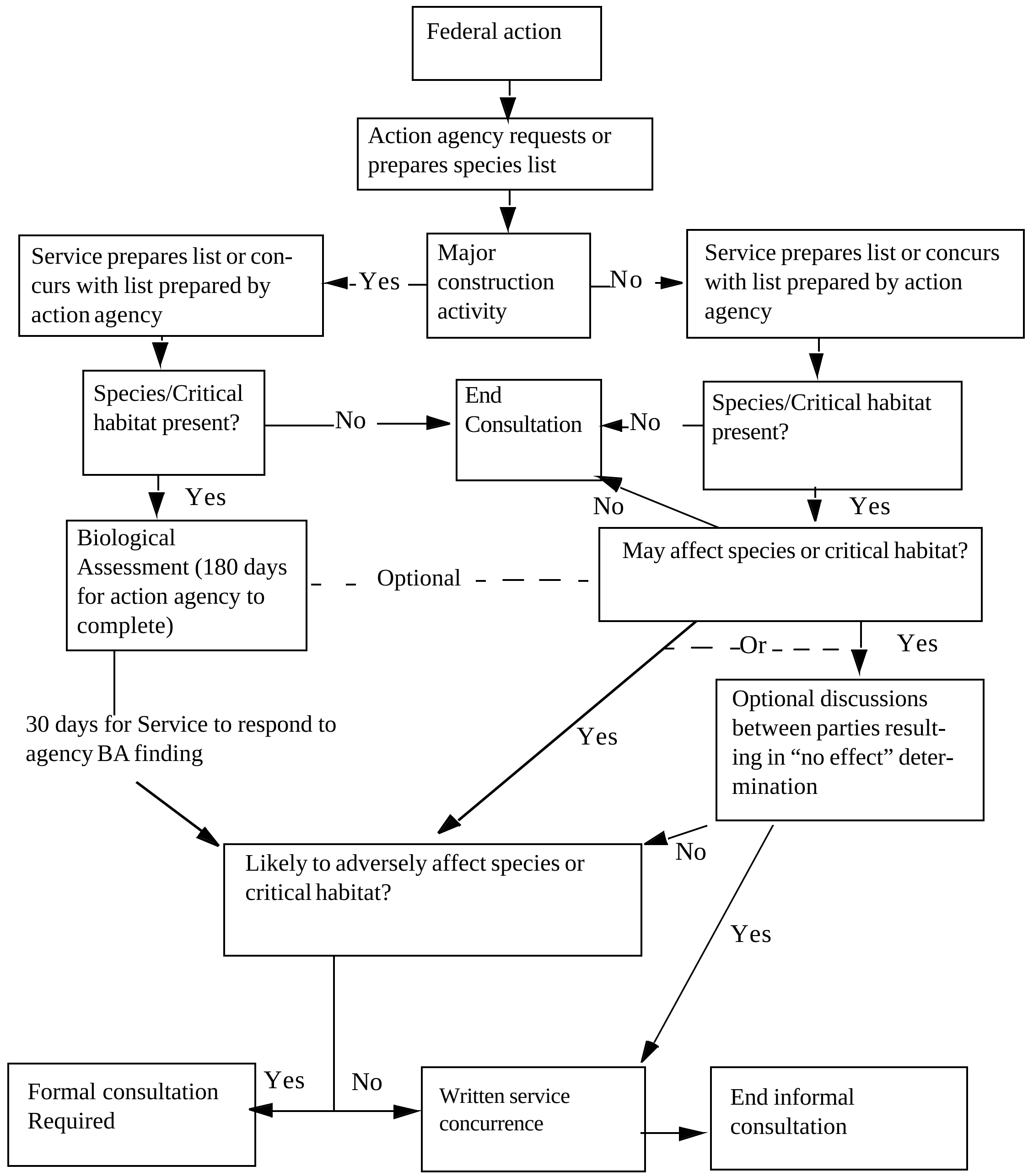


Figure 2-7. Informal consultation process, adapted from Final Endangered Species Act Section 7 Consultation Handbook, March 1998.

Recently, the United States Court of Appeals for the Ninth Circuit has concluded that, under the Supreme Court's decision in Solid Waste Agency of Northern Cook County (SWANCC) v. USACOE, there has been a change in the geographic distribution of what the USACOE may cover in its jurisdiction as water of the United States under the CWA. The ruling said that waters that are nonnavigable, isolated, and intrastate are not jurisdictional unless their use, degradation, or destruction could affect other waters of the United States, thus establishing a significant nexus between the water in question and other waters of the United States. In the past, these isolated or intrastate waters were deemed jurisdictional in part based upon their use by migratory birds which crossed state boundaries and thus were said to fall under interstate and international commerce law.

This means that vernal pools may no longer be called waters, along with other isolated waters that have been included in the past such as desert playas, prairie potholes, intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, wet meadows, or natural ponds. Each must now be evaluated for their connection to “other waters of the United States.”

As wetlands are also covered by EO 11990 and many vernal pools on DoN lands are habitat for endangered species, the fact that they are not regulated under the CWA may not make much difference as to how they are treated.

Any activities in the Pacific Ocean (including any tidal areas) are subject to Section 10 of the Rivers and Harbors Act and any discharges of dredged or fill material in waters of the United States would be subject to Section 404 of the CWA.

2.3.2.3 Migratory Bird Treaty Act and Executive Order 13186

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.) is a federal statute that implements U.S. treaties with several countries concerning the conservation and protection of migratory birds. The number of bird species covered by the MBTA is extensive and is listed at 50 C.F.R. 10.13. All on SCI are covered except, locally, rock doves (pigeons), European starlings, and house sparrows. Further, the regulatory definition of “migratory bird” is broad and includes any mutation or hybrid of a listed species as well as any part, egg or nest of such bird. (50 C.F.R. 10.12). Migratory birds are not necessarily federally listed endangered or threatened birds under the ESA (16 U.S.C. 1531 et seq.). The MBTA, which is enforced by the USFWS, makes it unlawful “by any means or manner, to pursue, hunt, take, capture [or] kill” any migratory bird except as permitted by regulation. The applicable regulations prohibit the take, possession, import, export, transport, sale purchase, barter, or the offering of these activities, except as permitted by the implementing regulations.

EO 13186, issued January 10, 2001, requires that federal executive agencies implement a MOU with the USFWS, to avoid or minimize the negative impacts of agency actions on migratory birds and to take steps to protect migratory birds and their habitats. The DoD is currently developing an MOU with the USFWS, however, the EO provides that in the interim federal executive agencies are “encouraged to immediately begin implementing the conservation measures” identified in the EO “as appropriate and practicable.”

The Deputy Assistant Secretary of the Navy for Installations and the Environment (DASN I&E) issued guidance on EO compliance in a January 19, 2001 memorandum to the Chief of Naval Operations and commandant of the Marine Corps. This guidance provides that Navy activities should comply with the “intent” of the EO until the EO required MOU is completed and:

- Provide notice to the USFWS in advance of conducting any action that is intended to take migratory birds, and ensure that the environmental analysis of actions required by the NEPA, or other established environmental review processes evaluate the effects of actions and plans on migratory birds.
- Integrate migratory bird conservation principles, measures and practices into installation activities and avoid or minimize, to the extent practicable, adverse impacts on migratory birds and migratory bird habitats.

- Identify any unintentional takings that are, or are likely to have, a measurable negative effect on migratory bird populations.
- Develop and implement standards and practices designed to lessen the amount of unintentional takings to the extent practicable and consistent with mission requirements.

2.3.2.4 Marine Mammal Protection Act

This Act enforces protection provisions for marine mammals. The Navy is responsible for determining if it is reasonably foreseeable that its actions will "take" marine mammals. Unlike the ESA, there is no consultation requirement. However, compliance with the Marine Mammal Protection Act (MMPA) can take considerable time, so determination of whether an action may result in a take should occur early in the planning process. If a take is reasonably foreseeable, then the Navy must seek authorization from NOAA as the relevant regulatory agency. The MMPA prohibits actions that harass, harm, or kill a marine mammal, whether such actions are negligent or intentional. Again unlike the ESA, the MMPA distinguishes types of harassment. "Level A" includes harassment that has the potential to injure or kill. "Level B" involves actions that cause a sustained, biologically significant disruption to critical behavior patterns, such as breeding, feeding, sheltering or migrating, so that there is an impact on the species or stock. If an action will result only in Level B harassment, then the relevant Navy command must seek an Incidental Harassment Authorization (IHA) or implement mitigation measures so that a take is no longer reasonably foreseeable. Obtaining an IHA requires up to 135 days, but it is good for only one year. If it is reasonably foreseeable that a command's actions will result in injury or death, then the command must seek a Letter of Authorization (LOA), or implement mitigation measures so that a take is no longer reasonably foreseeable. An LOA may only be approved if it will result in no more than a negligible impact on the species population. It covers five years but can take a year or more to process.

2.3.2.5 Magnuson-Stevens Fisheries Conservation and Management Act

This Act assigns to NMFS responsibility for maintaining and conserving fisheries and rebuilding overfished stocks in the area between three miles and 200 miles offshore. NMFS is also responsible for determining whether projects or activities adversely impact Essential Fish Habitat (EFH) zones, broadly defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

When projects are planned that can adversely affect EFH, NMFS can recommend conservation measures to minimize problems. While such habitat related comments (outside of ESA consultations) have had little effect in the past, new requirements for federal agency consultation on activities that may affect EFH have changed that. Once the Navy receives NMFS comments on means to better avoid or minimize habitat damage, it must respond in writing within 30 days, outlining the measures it is proposing to avoid, mitigate, and offset the impact of the activity on EFH. The Navy must also explain any inconsistencies between the avoidance and mitigative actions they propose to take and the recommendations made by NMFS.

2.3.2.6 Coastal Zone Laws

Two additional federal laws operate in the coastal zone: the Coastal Zone Management Act (CZMA) of 1972, and the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990. The CZMA provides that a state that develops a coastal zone management program that is approved by the Secretary of Commerce (NOAA), is entitled to federal financial support in administering the program, and to apply the program to some areas that otherwise would be subject to only federal regulation (16 U.S.C. Sec. 1455-1456). Federal agency activities affecting any land use or water use or natural resource of the coastal zone shall be carried out in a manner "which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs" (16 U.S.C. Sec. 1456). The term "enforceable policies" is defined by regulation as those legally binding laws, regulations, land use plans, ordinances, or judicial or administrative decisions that are part of a NOAA approved program. CCC has authority to implement provisions of the California Coastal Management Plan (CCMP). Although Navy lands are excluded from the CZMA definition of "coastal zone" as "lands held in trust by or which uses are subject solely to the discretion of the federal government," activities on these lands may require a consistency determination if there are coastal zone impacts. Federal rules for federal consistency can be found in 15 C.F.R. Sec. 930.35–37. See further discussion on CZMA consistency under state agencies and laws below.

2.3.2.7 National Historic Preservation Act

This Act created the National Register of Historic Places along with an Advisory Council on Historic Preservation. Section 106 of the Act requires that federal agencies allow the Council an opportunity to comment whenever their undertakings may affect National Register resources or resources eligible for listing in the Register. Section 110 requires federal agencies to identify, evaluate, inventory, and protect National Register resources or resources eligible for the Register on property they control. The National Historic Preservation Act (NHPA) imposes no absolute preservation requirement, as long as the Navy follows and documents mandated procedures for any Navy decision not to preserve.

2.3.2.8 National Environmental Policy Act

NEPA establishes procedures federal agencies must follow in analyzing environmental impacts of major actions within U.S. territory, which extends 12 nm offshore of the coast and coastal islands. Outside U.S. territory, EO 12114 identifies the procedures that federal agencies must follow in analyzing environmental impacts of major federal actions. The EIS in progress on SCI operations is conducted under both NEPA and EO 12114. Although NEPA has statutory authority, EO 12114 is based upon the independent authority of the President of the United States. Although EO 12114 furthers the purpose of NEPA, it is not governed by Council of Environmental Quality (CEQ) regulations. Because the current Operations Plan examines actions both within and outside U.S. territorial seas, both a NEPA EIS and EO 12114 OEIS are required. For this INRMP, only NEPA applies.

NEPA is implemented by CEQ regulations. To help with implementation, CEQ has issued guidelines in: "Forty Questions" (1981), "Scoping Guidance" (1981), and "Guidance Regarding NEPA Regulations" (1983). The most important function of agency compliance with NEPA procedure is to ensure that the environmental consequences of the agency's action have been considered. Agencies do not have to reject environmentally damaging proposals due to NEPA (Bass and Herson 1993).

NEPA has three decisional mechanisms. A proposed federal agency action is first reviewed to see if it can qualify for a categorical exclusion (usually small, routine projects with no potential significant environmental effect; categories are identified in agency NEPA policies) or other exemption to the process. If not, then an EA is prepared. If it is concluded in the EA that adverse environmental impacts will be insignificant, then the agency can file a FONSI, followed by implementing its preferred alternative. If the proposed project has the potential to "significantly affect the quality of the human environment," then the EIS process must be followed. Briefly, these steps are: Notice of Intent, Scoping Process, Draft EIS, agency/public Review and Comment, Final EIS, Record of Decision, and agency action.

Project mitigation is usually used as a means to address adverse environmental impacts through the federal (NEPA) process. However, NEPA establishes no requirement to mitigate against adverse environmental impacts. A mitigation measure is a specific, tangible action that will reduce a physical environmental effect. To be adequate and effective, mitigation measures should fit under one of five categories, defined by the CEQ as:

- Avoiding the impact by not taking certain action or parts of an action;
- Minimizing the impact by limiting the degree or magnitude of the action and its implementation;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating the impact over time by preservation and maintenance during the life of the action; and
- Compensating for the impact by replacing or providing substitute resources or environments.

An EIS must identify all relevant, reasonable mitigation measures that could lessen impacts to the human environment. However, a federal agency does not have to adopt mitigation measures included in an EIS unless agency-specific NEPA procedures require adoption of mitigation measures or the agency commits to implementing mitigation measures in the Record of Decision.

For Navy projects, DoD has issued policy and procedures, including a supplement providing policy and assigning responsibilities adopted by the DoN (32 CFR part 775). These Navy procedures meet the NEPA requirement that every federal agency adopt procedures to supplement CEQ regulations. Following the Navy directive, specific policy for compliance with procedural requirements was issued under a Navy Instruction (OPNAVINST 5090.1B, Ch.5). This latter document tasks each Naval installation with ensuring that Navy actions are in accordance with NEPA.

2.3.2.9 Fish and Wildlife Coordination Act

Agencies are granted commenting authority on federal projects even though they are not designated the regulatory agency for issuing permits. For example, during the CWA Sec. 404 permit process, commenting authority on specific projects is provided to the USFWS, NMFS, USCG, and CDFG under the Fish and Wildlife Coordination Act. If the USACOE supports these agency comments, then their proposals for project mitigation usually become conditions of the permit.

2.3.2.10 Memorandum of Agreement on Enhanced Coordination of Endangered Species Act and Clean Water Act

A recent Memorandum of Agreement (MOA) was released (February 2001) between the EPA, USFWS, and NMFS regarding enhanced coordination under the CWA and ESA. One of its key objectives is to institutionalize strong working relationships among regional and field offices with day-to-day responsibility for administering programs by providing clear and efficient mechanisms for improved interagency cooperation. It establishes local and regional review teams of senior management that meet periodically and establish priorities. The MOA also provides enhanced integration of water quality (EPA responsibility) and listed species (USFWS and NMFS responsibility) rule making and methodological guidelines.

Federal and state agencies with responsibilities for SCI are described inTable 2-4 and Table 2-5, along with their role and the laws related to their role.

2.3.2.11 State Agencies andLaws

California's natural resource laws provide another level of environmental protection. State agencies are responsible for implementing certain federal laws as well as state laws. For example, delegation has been given to the State Water Resource Control Board (SWRCB) by EPA to administer portions of the federal CWA and CZARA and also to the CCC to implement the federal CZMA and CZARA (as noted above).

California Endangered Species Act

The California Endangered Species Act (CESA) is very similar to the federal Endangered Species Act and is administered by the CDFG. The term endangered species is defined under CESA as a species of fish, wildlife or plant that is "in serious danger of becoming extinct throughout all, or a significant portion of its range." It is concerned with species and subspecies native to California. CESA prohibits the "taking" of listed species, but in addition to protecting listed species, it also applies the take prohibitions to species that are candidates for listing.

Coastal Land Use Regulation

The state of California's jurisdictional boundaries extend three nm offshore of the coast and coastal islands. The California State coastal zone is also shown in relation to the SCI in Figure 2-8. While these areas also fall within U.S. territorial boundaries, and operations within these areas are evaluated under NEPA, they are also subject to additional State regulations when federal sovereign immunity has been waived by Congress. For example, both federal Clean Air Act (CAA) and CWA requirements are implemented by state agencies and apply to areas out to three nm from shore.

Coastal land use is also controlled by the state. The CCA of 1976 implements California's Coastal Zone Management Program as required by the federal CZMA of 1972 (California Resources Agency 1997). It regulates public access, recreation, marine resources, land resources, and development within the coastal zone. Overseeing the Act's implementation is the CCC. The CCC can concur with or object to a Coastal Consistency Determination or Negative Determination submitted by a federal agency concerning a proposed federal action. The CZMA section 307 specifically provides that each "federal agency activity within or outside the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs."

The CCC requires federal agencies to provide consistency determinations on federal activities in the Federal Outer Continental Shelf that affect the state's ocean and coastal resources as part of an approved coastal management plan. Dredge disposal and the dumping of military surplus are examples of such activities covered by this federal consistency requirement under CZMA.

For federal lands, all lands that are held in trust by or which uses are subject solely to the discretion of the federal government are excluded from California's coastal zone. Most Navy projects are reviewed on a case-by-case basis with no specified criteria established to identify which types of Navy activities have no effect on the coastal zone and, therefore, do not require review for federal consistency. However, there are several options that could help make the review of minor Navy projects more predictable and less cumbersome (Delaplaine, California Coastal Commission, *pers. comm*.).

Table2-4. Federal agencies with responsibilities for natural resources on San Clemente Island. [1]

Federal Agencies and Applicable Laws	Authority and Activities
U.S. Army Corps of Engineers	
■ Clean Water Act, Sec. 404	■ Responsible for issuing Sect. 404 permits for dredged or fill material into waters of the US (up to higher high water line in tidal waters) including wetlands in compliance with EPA regulations.
■ Rivers and Harbors Act of 1899, Sec. 10	■ Regulates construction, excavation, and deposition in navigable waters of the U.S. (up to mean high water in tidal waters).
■ Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972, Sec. 103	■ Regulates transport for disposal of material into US waters.
■ National Environmental Policy Act	■ Commenting or lead agency authority for environmental review of proposed projects.
U.S. Environmental Protection Agency	
■ Clean Water Act, as amended	■ Develops Sect. 404 regulations and may veto USACOE Sect. 404 permit. ■ Regulates waste disposal in coastal waters. ■ Administers (with NOAA) the Coastal Nonpoint Pollution Control Program. ■ Administers National Estuary Program (NEP).
■ National Environmental Policy Act	■ Commenting authority on proposed projects.
■ Marine Protection, Research, and Sanctuaries Act of 1972	■ Regulates waste disposal in coastal waters.
■ Federal Water Pollution Control Act Amendments, 1972	■ Established the NPDES program.
■ Water Quality Act, 1987	■ Established the Storm Water Pollution Prevention Program.
■ Clean Air Act	■ Administered by the South Coast Air Quality Management District (Los Angeles).
U.S. Fish and Wildlife Service	
■ Federal Endangered Species Act	■ Regulates, monitors, and implements programs for protecting the ecosystems upon which freshwater and estuarine fishes, wildlife, and habitat of listed species depend. Enforces international treaties and conventions related to species facing extinction.
■ Migratory Bird Treaty Act	■ Enforces prohibition against the taking of migratory birds, their eggs, or their nests.
■ National Environmental Policy Act	■ Commenting authority on proposed projects.
■ Fish and Wildlife Coordination Act	■ Reviews and comments on federal actions that affect many habitat-related issues, including wetlands and waters considered under Clean Water Act Sect. 404 and Rivers and Harbors Act Sect. 10 permit applications.
National Marine Fisheries Service	
■ Federal Endangered Species Act	■ Jurisdiction over most threatened or endangered marine species.
■ Magnuson-Stevens Fisheries Conservation and Management Act	■ Responsible for maintaining and conserving fisheries and rebuilding overfished stocks. Responsible for determining whether projects or activities adversely impact Essential Fish Habitat zones (those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity).
■ Marine Mammal Protection Act	■ Enforces protection provisions for marine mammals.
■ National Environmental Policy Act	■ Commenting authority on proposed projects.
■ Fish and Wildlife Coordination Act	■ Reviews and comments on federal actions that affect marine fishery resources and many habitat-related issues, including Clean Water Act Sect. 404 and Rivers and Harbors Act Sect. 10 permit applications.
U.S. Coast Guard	
■ Ports and Waterways Safety Act	■ Manages maritime transportation over navigable waters. Permitting for marine events. Responsible for maritime safety/law enforcement, and environmental protection. Establishes safety standards and conducts inspections.
■ Oil Pollution Act of 1990	■ Ensures cleanup of marine oil spills and other pollutants. Responsible for oil spill responses based on Area Contingency Plan. Prepares most regulations needed for implementation of Oil Pollution Act.
■ Fish and Wildlife Coordination Act	■ Commenting authority on navigational issues, such as structures affecting navigation, USACOE Sect. 404 dredge and fill permits, and new pilings.
■ Clean Water Act/Marine Protection, Research, and Sanctuaries Act	■ Enforces standards of oil and other hazardous waste discharge in marine waters.

1. Sources: Cylinder *et al.* 1995; Bass and Herson 1993; California Resources Agency 1997.

Table2-5. State agencies with responsibilities for natural resources on San Clemente Island.[1]

State Agencies and Applicable Laws	Authority and Activities
California Coastal Commission	
■ CCA of 1976 ■ Federal Coastal Zone Management Act of 1972 ■ Federal Coastal Zone Act Reauthorization Amendments ■ California Environmental Quality Act of 1970	■ Administers state and federal coastal acts. ■ May concur with a Coastal Consistency Determination or Negative Determination submitted by a federal agency on a proposed project. For a federal agency, activities "within or outside the coastal zone" shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs. ■ Regulatory control over federal activities in the ocean, such as dredge disposal. ■ Works with SWRCB to develop Coastal Nonpoint Pollution Control Program. ■ Commenting authority.
State Lands Commission	
■ Public Trust Doctrine ■ Public Resources Code ■ California Environmental Quality Act	■ Exclusive jurisdiction over all ungranted tide and submerged lands that are state owned. ■ May preclude the use of submerged lands if inconsistent with public trust; requires Land Use Lease for encroachments, docks, crossings. ■ Establishes the ordinary high water mark and ordinary low water mark. ■ Commenting authority.
California Department of Fish and Game	
■ California Fish and Game Code ■ Public Resources Code ■ California Endangered Species Act ■ California Oil Spill Prevention and Response Act of 1990 ■ California Environmental Quality Act ■ Fish and Wildlife Coordination Act	■ Conducts biological studies on fish and wildlife, protects marine resources, regulates harvest of eelgrass and kelp. Manages marine resources of ASBSs. ■ Regulates activities resulting in alteration of lakes and streams. ■ Manages sport and commercial harvest of fish and wildlife and aquaculture. ■ Investigates pollution and toxic spills, in cooperation with SWRCB and RWQCB. ■ Enforces protection of state-listed sensitive animal and plant species. ■ Responsible for oil spill prevention, response, cleanup, and natural resource damage assessment in state waters. ■ Provides recommendations to other state agencies to prevent or mitigate adverse impacts on fish and wildlife; also has commenting authority on federal projects.
State Water Resources Control Board	
■ Federal Clean Water Act ■ Porter-Cologne Water Quality Control Act ■ California Water Code ■ Federal Coastal Zone Act Reauthorization Amendments ■ California Environmental Quality Act	■ Protects water quality and administers water rights. ■ Regionally implemented by the Los Angeles Regional Water Quality Control Board. ■ Designates beneficial uses and water quality objectives and protects beneficial uses statewide; adopts California Ocean Plan; designates ASBSs. ■ Develops statewide nonpoint source pollution control plan. ■ Works with CCC and RWQCB to develop and implement Coastal Nonpoint Pollution Control Program. ■ Commenting authority.
Regional Water Quality Control Board	
■ Federal Clean Water Act, Sec. 401, 402 ■ Porter-Cologne Water Quality Control Act ■ California Environmental Quality Act	■ Daily regulation of point source discharges, stormwater discharges, underground storage tanks, and above ground petroleum tanks. ■ Designation of beneficial uses and water quality objectives. Protection of beneficial uses. ■ Prepares public reports on condition of water bodies. ■ Commenting authority.
California Department of Pesticide Regulation	
■ Various pesticide regulations	■ Regulates antifouling paints used on boats and ships.

1. Sources: Cylinder *et al*. 1995; Bass and Herson 1993; California Resources Agency 1997; *http://ceres.ca.gov* .

A General Consistency Determination can be done with the Navy for a whole class of activities under a master review. The Navy has to clearly define the types of projects allowed and is required to notify the CCC of an activity being conducted pursuant to this Determination before the Navy awards the contract. A

Consistency Determination expires in five years. To adopt the decision, the CCC has to find that this proposed project "is consistent with the marine resource, habitat, access, recreational, and shoreline structure policies of the CCMP."

A Negative Determination, usually done on a case-by-case basis, avoids formal review. Projects can get this determination if:

1. the project clearly has no impact on the coastal zone; or
2. the project is clearly similar to another project that was previously determined by the CCC to have no impact.

Projects that could fall under the "no impact" category can often be determined using the "common sense" rule, which means "if in doubt, ask" the CCC if a similar project has been determined to have no impact, or if in their view the project would clearly have no impact. For example, projects involving modification to existing buildings are routinely exempt.

Water Quality Regulation

Water quality protection is the responsibility of the SWRCB and the RWQCB. 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 Los Angeles RWQCB carries out specific aspects of surface and coastal water regulations. A Comprehensive Water Quality Control Plan for the Los Angeles Region is intended to establish water quality objectives for coastal waters.

Implementation of the plans occurs through the issuance of permits for waste discharges under the National Pollution Discharge Elimination System (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.

With point sources under control, emphasis has turned to regulating stormwater discharges from various sources through storm drains as well as runoff sources of non-point source pollution. As the result of amendments to the CWA (Sec.402[p]) and to the Coastal Zone Act (CZARA Sec. 6217), storm drains are being treated as a point source of pollution and are required to come under NPDES permit. In the forthcoming guidelines of Phase II , any construction sites greater than 1 acre will need to be included under a stormwater permit (L. Becker, *pers. comm*. 2001). All Navy facilities are subject to the statewide General Industrial Stormwater Permit.

Enforcement of NPDES permits by the RWQCB is done when monitoring or other source indicates a violation of permit conditions. Cease and Desist Orders and Cleanup and Abatement Orders can be issued for noncompliance.

The SWRCB's Water Quality Control Plan for Ocean Waters of California established the waters surrounding SCI as an "Area of Special Biological Significance (ASBS)." This designation is intended to protect the species and biological communities of an ASBS, because of their value or fragility, from an undesirable alteration in natural water quality. Special protection consists of preservation and maintenance of natural water quality conditions to the extent practicable. The CDFG is responsible for managing marine resources of the ASBS, but no management plan is required. General regulations of all ASBS locations apply to SCI waters:

- 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 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 dredged spoil.

Ballast water controls for vessels which use ballast water is regulated under the Clean Water and invasive species laws. OPNAVINST 5090.1B describes Navy policy for ship ballast water and anchor system sediment control. The Marine Environmental Protection Committee of the International Maritime Organization (IMO) has developed guidelines for the control of ship ballast water to prevent the introduction of unwanted aquatic organisms and pathogens. The USCG published these guidelines for adoption as voluntary standards. Since Navy ships operate worldwide, the Navy has chosen to adopt the intent of the USCG standards. Here are the main points:

- Waters are considered to be potentially polluted in harbors, rivers, inlets, bays, landlocked waters, and in the open sea within 12 miles of the entrance to these waterways. Potential harmful species if taken up with ballast water and transferred to a different location are more prevalent within three nm from shore or within the polluted areas described above.
- If it is necessary for a surface ship to load ballast water in an area that is either potentially polluted (as defined in paragraph 19-10.2) or within three nm from the shore (e.g., amphibious ships operating in such waters and ballasting to operate landing craft or tankers ballasting to replace off-loaded cargo), the ship shall pump the ballast water out when outside 12 nm from shore and twice fill the tank(s) with clean sea water and pump prior to the next entry within 12 nm from shore. Surface ships will effect a ballast exchange twice in clean water, even if ballast water was pumped out before exiting the polluted waters or three nm limit, since residual water remaining in a tank after emptying it may still contain unwanted organisms, that could be transferred during the next ballasting evolution. *NOTE: Ballast water exchanged is not required during local operations or when reentering within 12 nm in the same locale as the ballast water was initially loaded* (OPNAV 5090).
- Surface ships' engineers shall record in the ship's engineering log the loading of ballast water in potentially polluted areas or within three nm from land and the flushing of ballast tanks to rid them of possible pollutants or unwanted species. The entry shall include the geographical position and the amount of ballast water taken on.
- Surface ships with seawater compensated fuel stowage systems shall also record seawater intake occurring in potentially polluted areas or within three nm of shore during routine internal fuel transfer for propulsion plant operation (but need not effect a ballast water exchange).
- Surface ships shall routinely wash down anchors, chains and appendages with seawater when retrieving them to prevent on board collection of sediment, mud and silt. Where possible following anchor retrieval, surface ships shall also wash down chain lockers outside 12 nm from land to flush out sediment, mud or silt.
- Amphibious vessels launching and recovering amphibious vehicles shall ensure those vehicles, including their treads, are washed down after completion of operations. Ships shall dispose of wash water before entering within 12 nm of the next operating area.

The DoD (with Navy as lead), the EPA, and the USCG, are leading an effort to develop national standards for controlling discharges from Armed Forces vessels. Uniform National Discharge Standards (UNDS) are currently being developed, with the purpose of providing a comprehensive system for regulating discharges incidental to the normal operation of an Armed Forces' vessel. Until the CWA was amended in 1996, there had been no such requirement at the national level. These regulations would not apply to vessels under the jurisdiction of the Department of Transportation other than those of the Coast Guard per 40 CFR section 1700.1.The development of the UNDS has several benefits:

- Enhance environmental protection of coastal waters;
- Encourage environmentally sound management practices;
- Help standardize training for crews to perform missions; and
- Determine how future ships will be built.

Phase I (of three phases), published in 1999, determined which discharges will be required to control by using a marine pollution control device (MPCD), and which discharges will not require controls (Table 4-13; 40 CFR Chapter VII). Phase II of UNDS development focuses on promulgating MPCD performance standards for those vessel discharges identified during Phase I as requiring an MPCD. Phase III of UNDS development will focus on establishing requirements for the design, construction, installation, and use of MPCDs. The DoD has the lead for this regulation and will consult with the EPA and Coast Guard. this phase will begin upon completion of Phase II. After Phase III becomes effective, states can no longer regulate discharges requiring control, as determined in Phase I. The state may, however, petition for no-discharge zones.

These standards will enhance environmental protection of coastal waters by creating protective standards for previously unregulated discharges. Also, these standards will encourage environmentally sound management practices on current vessels, help establish standardized training for crews to perform missions and help determine the way future ships will be built. Other benefits of the program include stimulating the development of innovative vessel pollution control technologies for managing a vessel's liquid discharges.

UNDS regulates discharges incidental to normal operations from:

- Army, Navy, Air Force, and Marine Corps vessels;
- Military Sealift Command (MSC) vessels; and
- Coast Guard vessels.

UNDS does not apply to:

- Army Corps of Engineers civil works vessels (for example, dredges);
- Maritime Administration (MARAD) vessels;
- Memorial and museum vessels;
- Time- and voyage-chartered vessels;
- Vessels under construction;
- Vessels in drydock; and
- Amphibious vehicles.

Marine Managed Areas and Marine Protected Areas

Assembly Bill 2800 (Shelley), the Marine Managed Areas Improvement Act (MMAIA), effective September 2000, prescribes among other things, six classifications for designating marine managed areas and changes the process to add new areas or amend existing areas. The MMAIA also makes certain conduct within these areas unlawful. The six classifications including; Marine Reserve, Marine Park, Marine Conservation Area, Marine Cultural Preservation Area, Marine Recreational Management Area, and Water Quality Protection Area. Three of these classifications, Marine Reserve, Marine Park, and Marine Conservation Area, are considered Marine Protected Areas (MPAs) as they involve "take."

Assembly Bill 993 (Shelley), the Marine Life Protection Act (MLPA), effective October 1999 deals specifically with California's MPAs both as a way to protect marine habitats, populations, and biodiversity for their intrinsic values and as part of fisheries management. CDFG, the lead implementation agency, is charged with developing a Master Plan for MPAs. The Master Plan is required to include: habitat representation including replication within each region; species likely to benefit from reserves; siting alternatives and a preferred alternative with no-take reserves in each region; a simplified classification system; recommendations for the consolidation, expansion, elimination, or reclassification of existing reserves; and recommendations for monitoring, management, enforcement, and funding. The master plan will include the three types of MPAs designated by the MMAIA: State Marine Reserves (no take allowed); State Marine Parks (no commercial take allowed, some recreational may be restricted); and State Marine Conservation Areas (some commercial and/or recreational take restricted). The new classifications are necessary to modify the existing collection of MPAs to ensure that they are designed and managed according to clear, conservation-based goals and guidelines that take full advantage of the multiple benefits that can be derived from the establishment of State Marine Reserves.

CDFG has already conducted initial siting workshops in each biogeographical region in which interested parties, such as DoD, reviewed the draft concept and provided input on preferred siting alternatives. Three proposed reserves occur in the waters off of San Clemente Island. The public comments and suggestions will be used to make changes and 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 extension (included in AB1673) has been passed by the California Assembly and is being enrolled for the Governor's action. The Governor then has 30 days to sign. Regardless of this, the Department is acting as if it has passed (hence the above deadlines).

2.3.2.12 Jurisdictional Boundaries

A summary of jurisdiction and ownership is depicted in Figure 2-8.

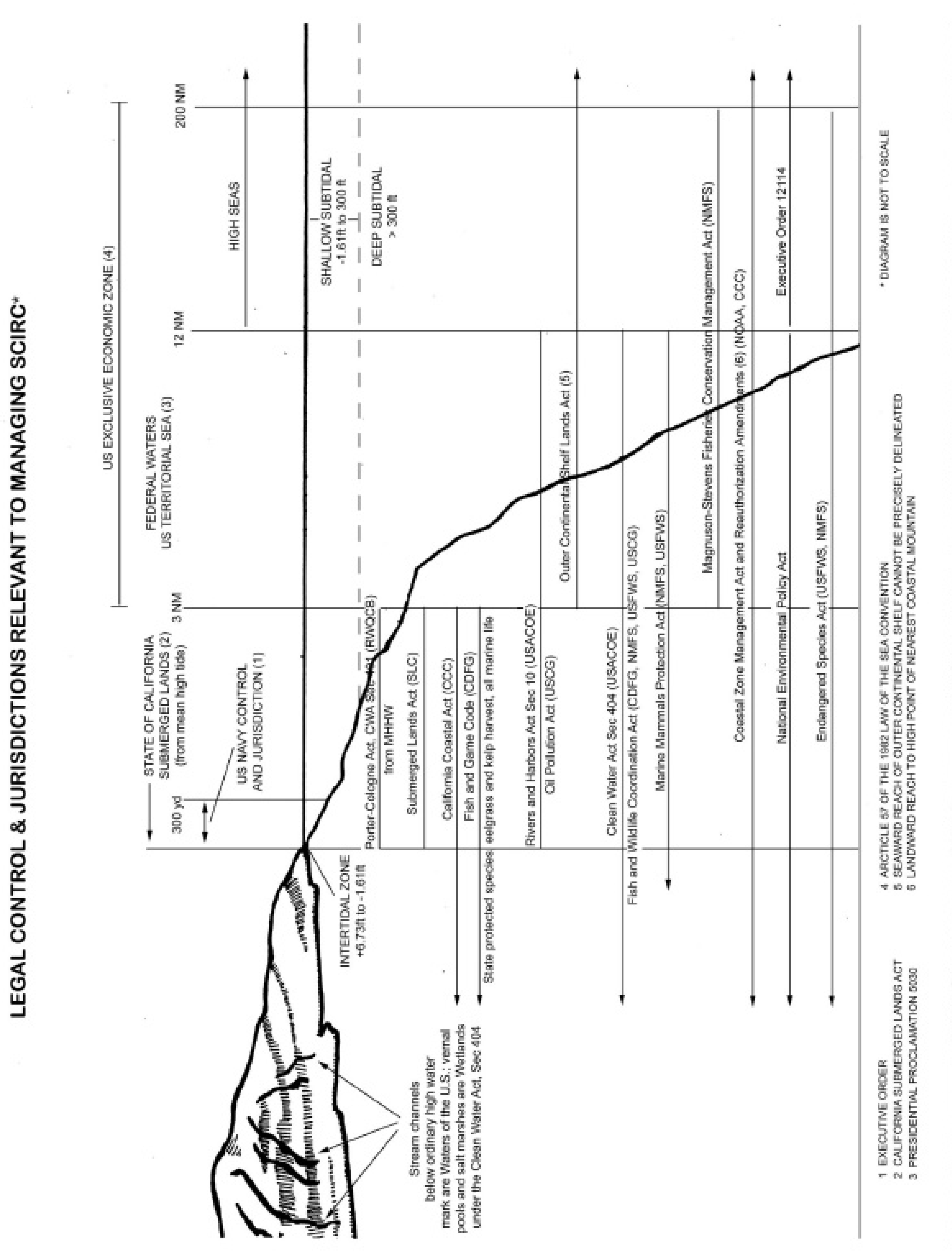


Figure2-8. Jurisdiction and ownership boundaries.

3.0 Status and Current Management of Natural Resources

Goal: Protect, maintain, and restore priority native species to reach self-sustaining levels; ensure ecosystem resilience to testing and training impacts; and maintain the full suite of native species, emphasizing the endemics.To attain this goal we need to know and understand the structure and function of the San Clemente Island ecosystem and whether it is in a healthy condition. This is the subject of this Chapter.

3.1 Setting

San Clemente Island is the southern-most member of an archipelago of eight islands called the Channel Islands off the southern California coast (Figure 3-1). The northern group includes the islands of San Miguel, Santa Rosa, Santa Cruz, and Anacapa; the southern group consists of Santa Barbara, San Nicolas, Santa Catalina, and San Clemente Islands. The islands vary in size and distance from each other and the mainland, and these sizes and distances have changed with fluctuating sea levels over the geologic history of the region.

Since SCI is an oceanic island originating from volcanic activity at the sea floor three million years ago, all of the plants and animals that populate the island had to originate from the mainland. To get to the island, plants and animals had to find a mode of transportation (flying/floating, swimming, rafting, hitchhiking) that led them to the island. Their ability to ultimately reach the island and adapt to local conditions was no doubt influenced by fluctuations in sea levels and the changing sizes of the island over time and distance from source populations on the mainland and other islands in the archipelago, and the presence or absence of favorable conditions on the island for successful establishment. The number of species on oceanic islands is relatively small compared to the mainland. Islands farther out typically have fewer species than islands closer to the mainland, but the number of species inhabiting the islands is also influenced by the size of the island. Once established in their new environment, a decrease in competition and predation along with an abundance of available resources often leads to evolutionary changes in species such that they diverge into unique forms (e.g., subspecies). SCI harbors more endemics than any other island in the Channel Islands archipelago.

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 flow up from the south eddy nearshore along the coastline while subarctic waters flow south from Point Conception to create cool offshore water conditions. For marine animals the Southern California Bight represents a mixing zone where the northern range of many tropical species and the southern terminus for many temperate species share waters.

The Bight is also the landfall terminus of very complex underwater topography—especially when compared to the long, flat shelf extending seaward from the south Atlantic coast. A system of thirteen large and nineteen smaller submarine canyons provides habitat for a full range of species with different depth and temperature preferences. Special communities such as kelp beds add habitat structure in shallow water, fostering a rich species assemblage.

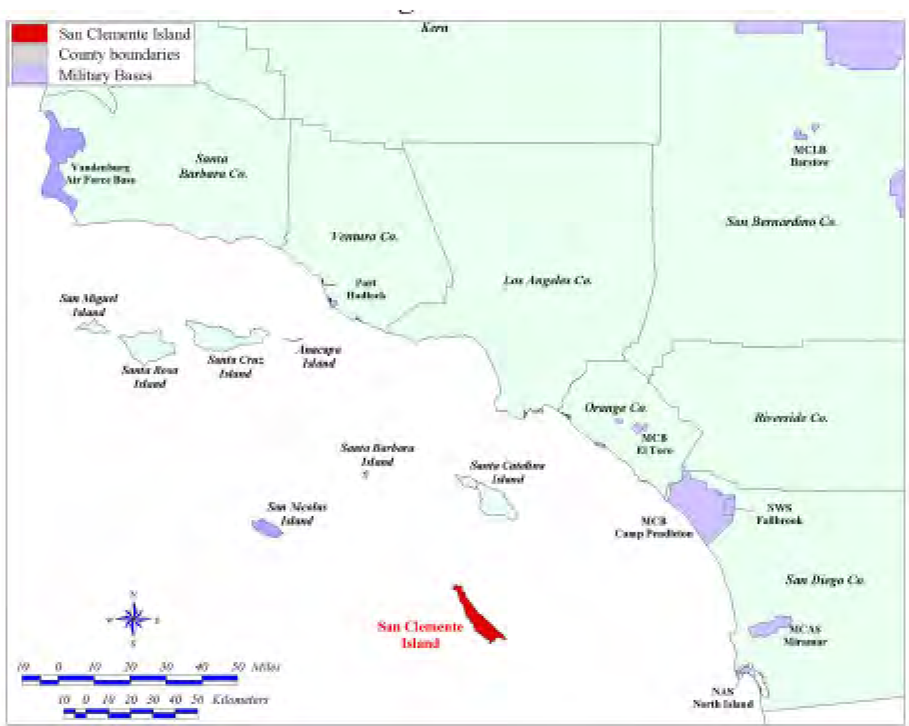


Figure3-1. The Channel Islands of California.

3.2 Chronology of Human Occupancy and Use

This section describes the history of human occupation and use of the environment on and around SCI prior to the most recent military activity. Knowledge of such past use patterns is important to understand current conditions and processes. There are currently no populations of indigenous people living on SCI. The direct effects on natural resources of these various land uses is discussed further in Section 3.3.6.

Native Americans

Some of the oldest records of human habitation in North America are found on the California Channel Islands, including a cave on San Miguel Island with items dating back to 11,700 before present (B.P.). By 7,000 years ago human inhabitants were found on all of the larger Channel Islands. When the first Europeans arrived, the southern islands were inhabited by the Gabrielinos, who were associated with tribes in the Great Basin and Mojave Desert. However, the Gabrielinos may have displaced the Chumash, a tribe found on the northern Channel Islands and much of the California coast (Schoenherr *et al.* 1999).

There are a wealth of archaeological remains on SCI. The oldest radiocarbon dating of human habitation on the island, of roughly 8,000 B.P., was verified at Eel Point (Axford and Meighan 1983). Tools, ground stones (mortars, pestles, pitted stones), modified bones and shells (beads, pendants, and fishhooks) all may be found (Noah 1987). Zahniser (1981) and Yatsko (unpubl. man.) summarize the archaeological excavations at SCI.

The first inhabitants were primarily a maritime culture that procured most of their subsistence from the ocean. Some primary food resources included abalone, mussels, mollusks, sea urchins, fish, sea otters, sea lions, harbor seals, and cetaceans (dolphins or whales). They relied primarily on shellfish. Considerably higher densities of shellfish remains in island middens compared to the mainland suggest that islanders relied much more on these intertidal resources than their coastal brethren (Glassow 1980). Approximately 2,600 years ago, fish and marine mammals became more important, perhaps due to over-harvesting of abalone in response to human population increases (Schoenherr *et al.* 1999). Tools and clothing were also fashioned from marine organisms, especially abalone shells (Noah 1987). The island inhabitants plied the ocean on unique boats, made of redwood planks lashed together with sinew and waterproofed with natural asphaltum, that could carry 20 men (Hume 1959).

Some terrestrial items were also exploited. Acorns of the island oak and fruit from the catalina cherry, toyon, laurel sumac, elderberry, boxthorn, and cactus were all used. A few land animals were also taken including land snails, sea birds, and lizards. Grasses, including needlegrass (*Nassella pulchra*), were used for constructing huts and baskets, and grain was ground with rock mortars. SCI Native American inhabitants traded with people of the other islands and the mainland (Noah 1987). Fresh water was probably the most limiting resource, and Native Americans likely relied on perennial tenajas (Noah 1987). The density of humans that the Island supported at any one time is difficult to estimate, but was probably less than 100 people (A.Yatsko, Southwest Division, *pers. comm*.).

These early human populations were probably reduced by European diseases and some may have been killed by seal and otter hunters in the late 1700s. Spanish missionaries undoubtedly had an effect on the abandonment of the Island by Native Americans whether through forced or voluntary evacuation. The Island was mostly abandoned by the Native Americans by the early 1800s.

Ranching (1850–1934)

SCI came under the authority of the U.S. government after the Treaty of Hidalgo ended the Mexican American War in 1848. SCI was used legally and illegally for sheep ranching from 1850 until 1934 when the DoN gained control of the Island.

Sheep ranching was first started in California by the Spanish missionaries, to supply both food and fiber. The Island was a particularly profitable place for grazing for a number of reasons: 1) it was free from predators such as coyotes and bears; 2) no fencing and little management was required; 3) there was ample pasture for sheep; 4) there was minimal or no cost to lease the land; and 5) the shipping of sheep and wool by sea was cheaper than by land.

Several theories abound as to how sheep and goats first arrived on the Island. Some authors suggest Franciscans may have originally brought sheep over to the island to teach the Native Americans farming and ranching techniques in the late 1700s. Others suggest that Spanish sailing ships and/or sea otter smugglers may also have left sheep behind for future food stocks. Whatever the case, sheep are well documented starting about 1850, and goats around the mid-1800s, but they could have been there earlier.

Numerous people illegally ranched on SCI and built structures, roads, fences, wells, and dams throughout the mid-1800s. During this period there were often violent struggles among the squatters. In 1881, the SCI Wool Company bought out its opposition and gained sole control over grazing rights (Andrew 1998). However, in 1891, the Department of the Interior (DoI) declared the entire Island reserved for lighthouse purposes. All persons and companies were ordered to leave. The Wool Company stayed and eventually obtained an official lease to use the Island. In 1900, the Wool Company was granted, with much controversy, a “revocable license for the period of five years at a rental of $1,000 per year.” It was suggested that the Wool Company was awarded sole grazing rights to reduce the number of people on the island, thus making it easier to remove them in the future (Andrew 1998). Estimates of the number of sheep present on the island throughout the late-1800s range from 8,000 to 40,000. In addition, up to 1,000 head of cattle were also grazed on the island during this time (Photo 3-1).

Lack of fresh water eventually caught up with the ranchers and, in 1903 and 1904, the company lost 4,000 sheep from drought. In 1906, the Wool Company was given a new five-year lease and was required to develop new water structures. An 88-foot dam was built somewhere near the middle of the Island (the exact location is unknown), and a new wagon road was built from Wilson Cove to Middle Ranch. At this time, the government sent an inspector to the Island who concluded that the Island contained 16,000 acres of grazable land. Controversy surrounded this number and indicators of overgrazing were not taken seriously enough (Andrew 1998). In 1909, the Wool Company was granted a new 25-year lease and invested in reseeding certain areas with non-indigenous annuals.

A major epidemic of sheep scab affected the California sheep industry and in 1929 the Island was quarantined until steps were taken to eradicate the disease. Dipping troughs and much new fencing were consequently constructed to isolate herds from one another. The disease was eventually eradicated by 1933.

Photo 3-1. Circa 1896 USGS photograph showing free-ranging cattle (upper left of photo) on "front edge of 480-foot terrace about 2.5 miles southeast of Seal Harbor, San Clemente Island, looking southeast" (Smith 1896).

New bids for leasing SCI were taken in 1934. Out of concern for overgrazing, limits were placed on the number of sheep that would be allowed to graze: 2,500 during the first year and no more than 8,000 on any subsequent year. However, an aerial reconnaissance of the Channel Islands performed by the Navy in 1932 determined that SCI made a good location for an emergency landing field and all ranching bids were rejected. The Island was transferred to the DoN on November 7, 1934 by an EO of the President. The Wool Company received a six-month extension during which they were ordered to remove all livestock. However, many goats, which had been used to herd the sheep, were abandoned and would eventually cause much disturbance on the Island. Interestingly, the goats were originally used for herding because of a California law which prohibited the use of dogs for herding sheep (Andrew 1998). Goats were sometimes hunted for sport by visitors in the early 1900s (Holder 1910). Because of their negative impact on the Island's ecosystem (Section 3.3.6.3), goats were eventually removed by the Navy.

Photo 3-2. Goats on San Clemente Island in the 1980s.

Use of Marine Resources

SCI has been a popular sport and commercial fishing destination for many decades. A variety of fishes have been taken by commercial fishermen and sold in Los Angeles. The north side of the Island was recognized as the best fishing area. The extreme east end and Mosquito Cove were also particularly rewarding to fishermen. The large game fishes avoid the surf and sandy beaches.

The Chinese established camps in the early 1850's and harvested abalone to supply San Francisco's Chinatown customers. Lobster fisherman also established camps on SCI. Boats would come out from San Diego once a week with supplies and take the lobsters back. SCI was also used by smugglers of Chinese workers and alcohol (Flynn 1942).

Early Military Use (1934–1984)

Early on, SCI was found to be ideally suited for Naval missions because: 1) its remoteness permits classified projects to be developed with adequate security; 2) its clear water, variety of depths, and bottom conditions around the island are perfect for testing sonar equipment, new weapons, and safety devices; and 3) there is adequate land area for separation of test ranges for different types of use (EIS for Utilization Plan 1974). Soon after SCI came under Navy control, many new facilities were developed, especially in Wilson Cove. Throughout the next four decades, the number of personnel on SCI would fluctuate, but the importance of the Island for training exercises and the development of new weapons systems would gradually increase (Table 3-1)

Table3-1. Chronological summary of early military use on San Clemente Island from 1934–1984. Summarized from Sturgeon (2000) and Linder (2001).

Year	Activity
1934	San Clemente Island transferred to the Department of the Navy on November 7, 1934 by an Executive Order of the President.
1935-1936	22 new facilities were constructed including the pier, fire station, and administrative buildings. Naval gunfire and bombing was first performed and a target range was developed on the west coast, south of West Cove, and at the sand dunes area.
1937	The first large-scale landing exercise was undertaken which included about 4,700 Army and Marine personnel and numerous aircraft and landing vehicles. The first permanent Marine Corps unit was also assigned to the island.
1942-1945	In response to the beginning of WWII, the use of the island for bombing exercises especially in SHOBA was greatly accelerated. A small airfield with support facilities was constructed four miles south of Wilson Cove.
1949	The island was in caretaker status with only four maintenance personnel on site, though it was still used as a testing range.
1950-1951	The first underwater test ranges were developed. The U.S. Air Force (USAF) established a radar station with about 225 personnel at Wilson Cove and were temporarily responsible for maintenance of the island.
1958	The Polaris missile launch program, which included the construction of new housing facilities at Wilson Cove, was begun.
1959	Approximately 265 personnel (mostly USAF) were stationed at SCI.
1950-1969	Numerous surface and sub-surface testing ranges were used along the west shore of the island.
1960s	The underwater range was enlarged into the Southern California Offshore Range (SCORE) for underwater tests and anti-submarine training. SEALAB and America's Man-in-the-Sea Program based off the east coast. Deep submergence rescue vehicle prototypes hosted by SCI.
1960	The USAF radar unit left SCI leaving it completely in Navy hands.
1961	A new 9,300 ft. airstrip with support facilities was completed at the north end of the island and the old WWII airstrip was deactivated. An underwater tower, the "Pop-up Variable Depth Launch Facility" was completed 2.5 miles south of Wilson Cove. The structure has a base 170 feet below the surface and is used for testing Polaris missiles. Administrative command of the island was transferred to the Naval Ordnance Test Station (NOTS), China Lake.
1962	A permanent complex for SEAL training was constructed at Northwest Harbor.
1963	The QH-50C "DASH" (Destroyer Anti-Submarine Helicopter) was tested and deployed.
1965	The Fleet Operational Readiness Accuracy Check Site (FORACS) became fully operational for testing of shipboard sonar, radar, navigation, and electronic systems.
1967	Administrative duties were transferred to the Naval Undersea Center (NUC), San Diego. The Deep Submergence Rescue Vehicle (DSRV) project was implemented and Poseidon missile testing began at the Polaris Pop-Up Range.
1968	The Poseidon test program was completed.
1970s	Test site for over-the-horizon radar that could detect environmental conditions and aircraft at thousands of miles. "Bogle" antennas were operating from the northwest shore "aimed" at the Gulf of Alaska in Project Sea Echo.
July 1984	Flight testing and development of Tomahawk cruise missile begins.

3.3 What Shapes the Island Today?

3.3.1 Climate, Weather and Hydrology

Climate and weather patterns have an enormous influence on the character and quality of natural resources seasonally and annually on the Channel Islands, including SCI. Even when all other conditions are favorable, the distribution and condition of the native plant communities so vital to holding soils in place, providing essential habitats for native animals, and representing the very foundation of SCI's food and energy chain are profoundly driven by moisture (rainfall, fog drip, relative humidity)—or the lack of it.

Natural cycles relating to SCI include diurnal, tidal, seasonal, El Niño-La Niña, and longer-term global climate shifts. Physical and biotic conditions in the water surrounding the island change with all of these cycles. While the strength and dependency of these relationships is not understood, there is widespread consensus that marine populations respond to climatic events and that major changes have taken place in the past twenty years in the marine ecosystems of the Pacific (Francis and Hare, *in* McGowan *et al.* 1998).

There have been large sea-surface temperature changes off the West Coast of North America during the past 80 years. Interannual anomalies appear and disappear rather suddenly and synchronously along the entire coastline, and the frequency of warm events has increased since 1977 (McGowan *et al.* 1998). By using sea surface temperature and sea-level pressure, scientists are finding a close relationship between large-scale, low-frequency climatic variability and community dynamics and population biology, and hopefully, over time, will understand the relationship of these variables ecosystem structure and function (McGowan *et al.* 1998).

On land, this relationship also holds but is not as close. Plant communities, especially annual and short-lived perennials, shift composition over longer-term cycles. The combination of drought and overgrazing in the late 1800s probably led to a conversion of native perennial grasslands to non-native annual grasses throughout California, including SCI. This was a period of livestock industry collapse. Droughts are known to have occurred in 1864, 1870–72, 1877, 1893–1904, 1923–1924, 1935, 1946–48, 1964 (Dunkle 1950) and most recently 1986–1991 (Halvorson 1980).

The Channel Islands region belongs to the Mediterranean Dry Summer Subtropical climatic type, where the sea has a strong moderating influence on air temperatures across all seasons (Yoho*et al.* 2000). Diurnal differences in temperature are generally small and characterized by relatively cool days and warm nights. Of the eight Channel Islands, SCI is the southern-most and driest. Yoho *et al.* (2000) described general climatic patterns in the Channel Islands region and SCI, deriving much of their regional climate information from Kimura (1974). The outer coastal waters around SCI are typically warmer than the water around the Northern Channel Islands. Air temperatures are coolest in February and warmest around September. Although days in early summer may be frequently cloudy, summer is characterized by a lack of moisture. Ninety-five percent of annual precipitation falls between November and April.

The regional distribution of precipitation varies from north to south, so that SCI as the southern-most Channel Island is considerably more arid than even Catalina Island lying just to the north (Figure 3-2). Much of the rain that falls regionally originates with frontal storms in the winter advancing from the northwest. Air flow in the region is typically northwesterly, and the northwest winds are strongest and most constant during the warm months. In advance of the winter storms, winds in the region are commonly southeasterly, then shift back northwesterly as a storm passes out of the area. Relative humidity generally varies over the course of a day, often reaching 100% at night and in the early morning hours, then declining to about 60% as the day proceeds and the drying effects of solar radiation increase. The relative humidity drops considerably lower during Santa Ana conditions in fall and winter (Yoho *et al.* 2000).

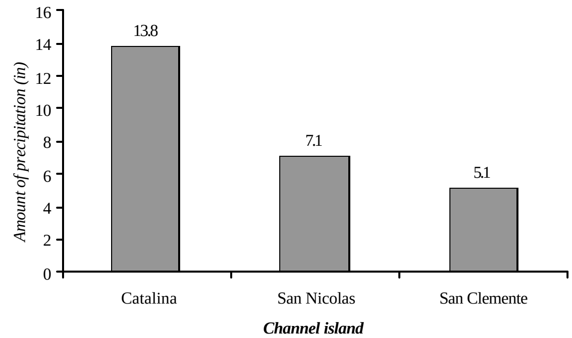


Figure3-2. Distribution of annual rainfall within the southern group of Channel Islands, California (Kimura 1974; Yoho et al. 2000).

The hydrology and distribution of water across the Island is affected by topography and human disturbance. The steep east slope has different water regimes and runoff rates than the west side, and this has implications for understanding differences in vegetation potentials and diversity between the two sides of the island.The infrastructure associated with the military use of the island, such as the road systems, affects the normal course of water and sediment movement and loss from the Island. Past overgrazing of the vegetation, as well as trampling and compaction of the soil by non-native sheep, goats, cattle, and pigs, have also affected the water regime via the removal of vegetation that intercepts moisture and holds the soil in place. Severe erosion likely took place in the canyons where overgrazing and browsing depleted the woody and herbaceous cover and resulted in extensive rilling and wasting, as was suggested for sheep grazing on slopes of Santa Cruz Island (Brumbaugh 1980). There, removal of sheep resulted in rapid vegetation recovery indicating some prospects for reversal of the deleterious effects of decades of overgrazing.

Several weather stations have been established in recent years to track weather patterns on the Island (Map 3-1), although not all are still in operation. All stations have measured wind, temperature, relative humidity, and rainfall. The former Eel Point station and all current stations also record solar radiation, soil temperature and moisture, and leaf wetness. Data are collected electronically at each station and transmitted via modem to Stone Station, where software automatically consolidates and analyzes it (Yoho *et al.* 2000). Current conditions at the OP1 station can be accessed at any time on the World Wide Web at <www.csun.edu/~hfgeg010/ sanclem.html>. Maintenance of the weather stations and the data set is administered by the Geography Department at California State University Northridge via a contract with the Navy.

Map3-1. Location of weather stations on San Clemente Island, California. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

Yoho *et al.* (2000) evaluated the weather data for 1996 through the first half of 1998 at the Nursery, Eel Point, Hoeppel, Nanny, and OP1 stations (Map 3-1). Nursery is located in a small valley on the northern end of the Island at about 190 m elevation. The Eel Point, Hoeppel, and Nanny stations are located roughly midpoint of the north and south ends of the Island. Eel Point is on the western coastal terraces at 20 m elevation, Hoeppel on the central plateau at 350 m elevation, and Nanny toward the bottom of the eastern escarpment at about 68 m elevation. OP1 and more recently OP3 are located on the southern part of the island. OP1 is at the south end of SCI at about 297 m elevation, while OP3 is located on the southwest part of the Island at about 320 m elevation and overlooking the main impact area in SHOBA. Problems developed with the Eel Point, Hoeppel and Nanny stations compromising some data such as wind measurements. However, temperature and moisture readings should still reflect conditions reported by Yoho *et al.* (2000) (J. Wall, CSU Northridge, *pers. comm.*).

Building on their data and evaluations, a relatively complete data set of weather was available for the period May 1996 through March 2001 at Nursery, October 1996 through December 2000 at OP1, and January 1999 through March 2001. It is these more complete data sets that are used for the bulk of the following discussions, although the information presentation is structured heavily after Yoho *et al.*'s (2000) work, especially with the earlier data from the Eel Point, Hoeppel, and Nanny stations. Collectively, all of the weather data are beginning to provide a better understanding of the dynamics of weather patterns and hydrology that is so important to the condition and management of natural resources on SCI.

3.3.1.1 Air Temperature

August and September are the warmest months on SCI, and January and February are the coolest months. Yoho *et al.* (2000) reported a second peak of warm temperatures in November at the central stations at Nanny and Hoeppel, which they attributed to Santa Ana wind conditions. These secondary peaks in temperature were not detected at the northern and southern stations in the current data set, possibly due to less exposure to easterly winds at these locations. From 1996 to 2001, annual mean temperature at Nursery was 59^{O}F, mean maximum was 79^{O}F, and the mean minimum was 45^{O}F (Figure 3-3). September was the warmest month at Nursery, with an average high of 88^{O}F.

The south end of the Island is warmer than the north end. At both OP1 (since 1996) and OP3 (since 1999), the annual mean temperature was 61^{O}F, mean maximum was 84^{O}F, and mean minimum was 48^{O}F (Figures 3-3). The warmest month for both stations was August at a mean temperature of about 97^{O}F, and OP3 sustained its maximum temperatures into September as well. Annual temperatures at all three stations (though to a lesser degree at Nursery) were more variable throughout the year than recorded at Eel Point, suggesting more of a moderating influence of the marine environment on temperatures at lower elevations on the island compared to higher locations on SCI (Yoho *et al.* 2000).

3.3.1.2 Relative Humidity

At Nursery annual mean relative humidity recorded was 83%, with a mean maximum of 100% and a mean minimum of 33% (Figure 3-4). Highest average humidities were in March, June and July, while the lowest mean readings were October, November and December. December consistently has the lowest mean relative humidities at Nursery. Despite no evident substantial effects of the Santa Ana winds on temperatures at Nursery (see previous section), the low relative humidities recorded at the station late in the year is consistent with drier air conditions associated with the Santa Ana season.

Relative humidity readings were at least 10% lower on average at the southern stations than at the northern station at Nursery. OP1 had a mean annual relative humidity of 73%, a mean maximum of 100%, and a mean minimum of 21% (Figure 3-4). OP3 was drier than OP1, recording an annual mean relative humidity of 65%, a mean maximum of 100%, and a mean minimum of 11% (Figure 3-413). As with Nursery on the other end of the Island, highest relative humidities were recorded in June and lowest in October, November and December at both OP1 and OP3.

The largest difference among stations was in the summertime (June to September) minimum readings, which averaged about 47% relative humidity at Nursery, 24% at OP1, and only 10% at OP3. OP3 had the least data available for analysis, so it will be interesting to see if the differences in dryness even between the southern stations remains a consistent weather theme for the Island. Finally, as Yoho *et al.* (2000) noted earlier and continues to hold true with today's larger database, SCI experiences an increase in relative humidity in September that is not evident in August or October.

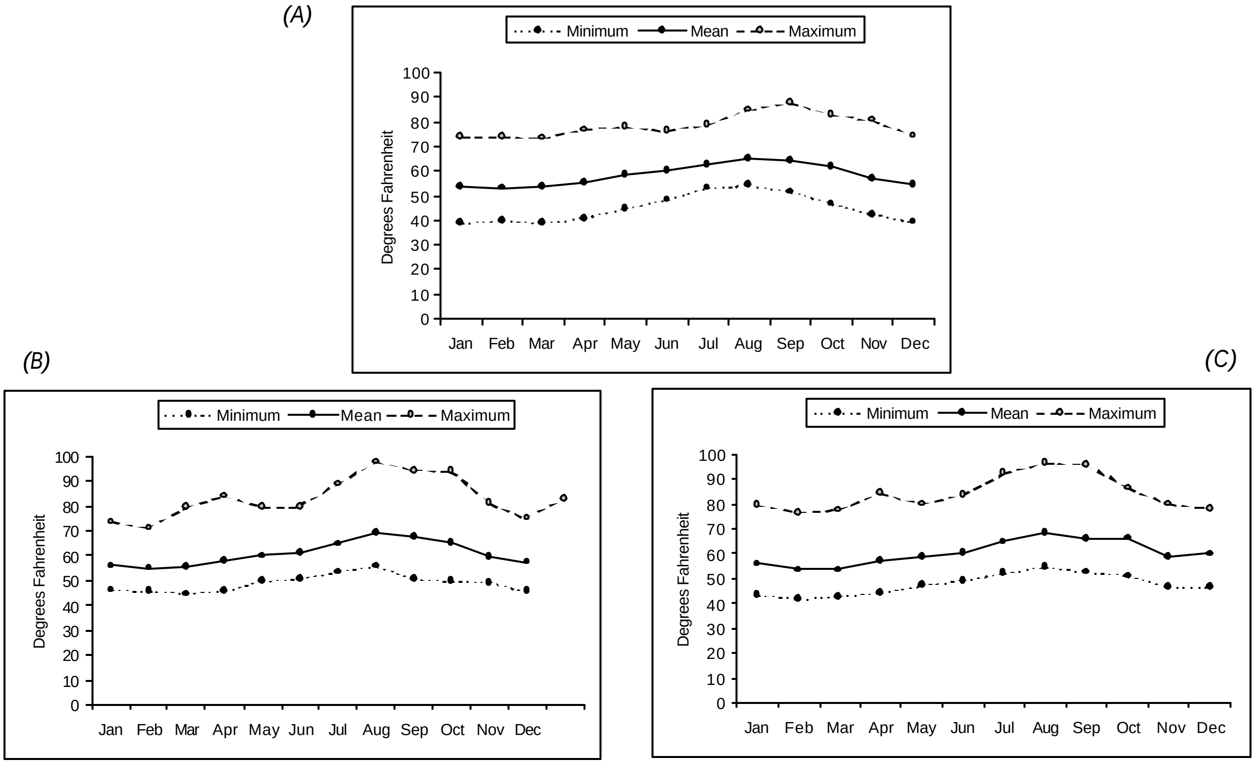


Figure3-3. Monthly temperatures at (A) Nursery (1996–2001), (B) OP1 (1996–2000), and (C) OP3 (1999–2001).

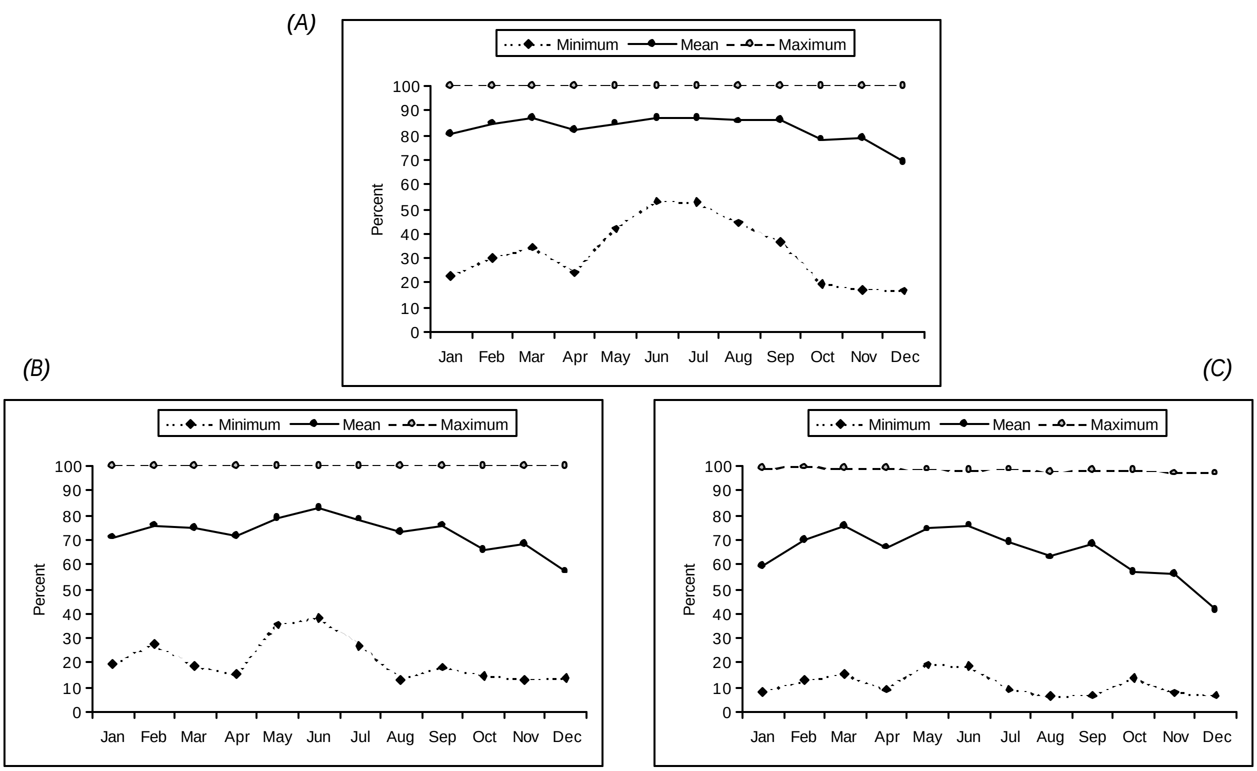


Figure3-4. Monthly relative humidities at (A) Nursery (1996–2001), (B) OP1 (1996–2000), and (C) OP3 (1999–2001).

3.3.1.3 Precipitation

Table 3-2 presents rainfall data for SCI. The rainfall numbers show that the island experiences dramatic fluctuations in annual rainfall even over relatively short time spans. Most rainfall that does occur on SCI 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 on SCI between May and October, and fog drip at that time is likely a vital source of moisture to the SCI ecosystem during this otherwise typically dry season (Photo 3-3).

Island location and topographic position have an important control on precipitation. The higher parts of the Island seem to receive more rainfall than the lowest elevations. Hoeppel received many of the highest monthly rainfall readings and likely due to orographic lifting at the station's high location (Yoho *et al.* 2000). It is not known if the more arid habitat on the southern extreme of the island is due to aspect, increased solar radiation, differences in precipitation, or a combination of these.

Photo 3-3. Summer afternoon fog blanketing the north end of San Clemente Island and pouring down the eastern escarpment to the sea.

The effects on Island-wide precipitation from higher storm frequencies during an El Niño event is 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 Hoeppel (19 inches (in) vs. 8 in) and Nursery (17 in vs. 8 in) and over three-fold at the Nanny station (16 in vs. 5 in) (Yoho *et al.* 2000). OP1 also recorded16 inches of rainfall for the period. Following that event, the rainfall levels appeared to return to the more typical dryer conditions. Rainfall values recorded at both OP3 and Nursery in the first three months of 2001 are similar to the same high rainfalls experienced for the same time of year during the last El Niño event.

Table3-2. Rainfall patterns (in inches) across San Clemente Island.

OP1	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Calendar Year	WaterYear
1996											1.58	0.97	2.55	
1997	2.62	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.21	0.02	0.79	4.13	7.78	16.09
1998	0.81	5.74	2.67	0.71	1.01	0.00	0.00	0.00	0.00	0.00	0.27	0.56	11.77	4.14
1999	0.77	0.45	1.23	0.78	0.00	0.08	0.09	0.00	0.00	0.00	0.12	0.03	3.55	4.41
2000	0.35	2.43	0.97	0.38	0.00	0.04	0.00	0.00	0.03	2.39	0.00	0.04	6.63	
OP3	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Calendar Year	WaterYear
1999	1.07	0.85	1.65	2.74	0.00	0.18	0.11	0.00	0.05	0.00	0.25	0.06	6.96	6.64
2000	0.51	3.78	1.36	0.50	0.00	0.02	0.00	0.00	0.17	1.21	0.00	0.11	7.66	
2001	1.78	6.49	1.37										9.64	
Nursery	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Calendar Year	WaterYear
1996					0.15	0.00	0.01	0.01	0.01	0.50	3.01	1.29	4.98	7.97
1997	3.00	0.04	0.03	0.06	0.01	0.00	0.01	0.03	0.13	0.11	1.40	2.38	7.20	16.67
1998	1.13	8.03	2.19	0.62	0.62	0.02	0.01	0.01	0.07	0.03	0.31	0.52	13.56	5.14
1999	0.91	0.28	1.91	0.86	0.02	0.21	0.07	0.00	0.11	0.00	0.19	0.05	4.61	6.79
2000	0.33	3.89	1.19	0.96	0.00	0.00	0.00	0.01	0.12	0.94	0.02	0.07	7.53	
2001	2.93	6.17	1.62										10.75	
Eel Point	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Calendar Year	WaterYear
1996	0.00	0.68	0.32	0.12	0.00	0.00	0.00	0.00	0.00	0.24	20.9	0.72	4.17	4.48
1997	1.39	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.56	2.72	4.71	11.25
1998	0.06	4.44	2.09	1.06	0.32	0.00	0.00	0.00					7.97	
Hoeppel	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Calendar Year	WaterYear
1996	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	2.48	1.26	4.53	7.89
1997	3.32	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.16	0.83	0.88	3.71	8.94	19.36
1998	1.52	7.17	3.35	1.10	0.64	0.00	0.00	0.00					13.78	
Nanny	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Calendar Year	WaterYear
1996	0.00	0.99	0.76	0.28	0.00	0.00	0.00	0.00	0.00	0.63	2.95	1.35	6.96	4.93
1997	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.16	1.15	2.84	4.27	16.41
1998	0.88	6.92	2.84	1.06	0.44	0.00	0.00	0.00					12.14	

*Rainfall for the OP1, OP3, and Nursery stations were summarized here from the unpublished Navy data. Rainfall at the Eel Point, Hoeppel and Nanny stations was originally reported in Yoho et al. (2000).

**Calendar year is from January 1 - December 31; Water year is from July 1 - June 30.

3.3.1.4 Wind

Annual wind speeds at Nursery on northern San Clemente Island average around 4 miles per hour (mph) (Figure 3-5), with the strongest wind speeds occurring early in the year in February and April. In summer, winds at Nursery are predominantly from the west and west-northwest, shifting to west-southwest the remainder of the year (Table 3-3). Figure 3-6 depicts a wind rose for the wind farm (U.S. Navy Southwest Division 1997).

The south end of SCI experiences stronger and more variable wind speeds throughout the year than on the north end. Annual wind speed at OP1 averages 7 mph. Summertime winds are usually the least strongest of the year and come from the south, with stronger and more southwesterly winds blowing at other times of the year (Figure 3-5).

Winds at OP3 blow the hardest of the three locations, blowing an average of 9 mph(Figure 3-5). Like OP1, the weakest winds are during the summer months (mean= 7 mph), then begin to increase in strength in the fall (9 mph). The strongest winds occur in the winter from January through April (11 mph). Wind direction does not appear to change much across seasons at OP3. Summer winds generally blow in from the south-southwest, and some small shift more toward a southwesterly wind may be happening during the non-summer months.

Table3-3. Mean monthly wind direction (degrees from North) at Nursery, OP1 and OP3 weather stations, San Clemente Island.

	Nursery	**OP1**	**OP3**
	(1996 - 2001)	**(1996 - 2000)**	**(1999 - 2001)**
January	231	230	235
February	237	216	229
March	251	218	243
April	264	218	251
May	257	201	233
June	279	185	215
July	281	175	215
August	282	190	199
September	269	189	223
October	255	216	238
November	244	228	222
December	207	218	195

0=N, 90=E, 180=S, 270=W

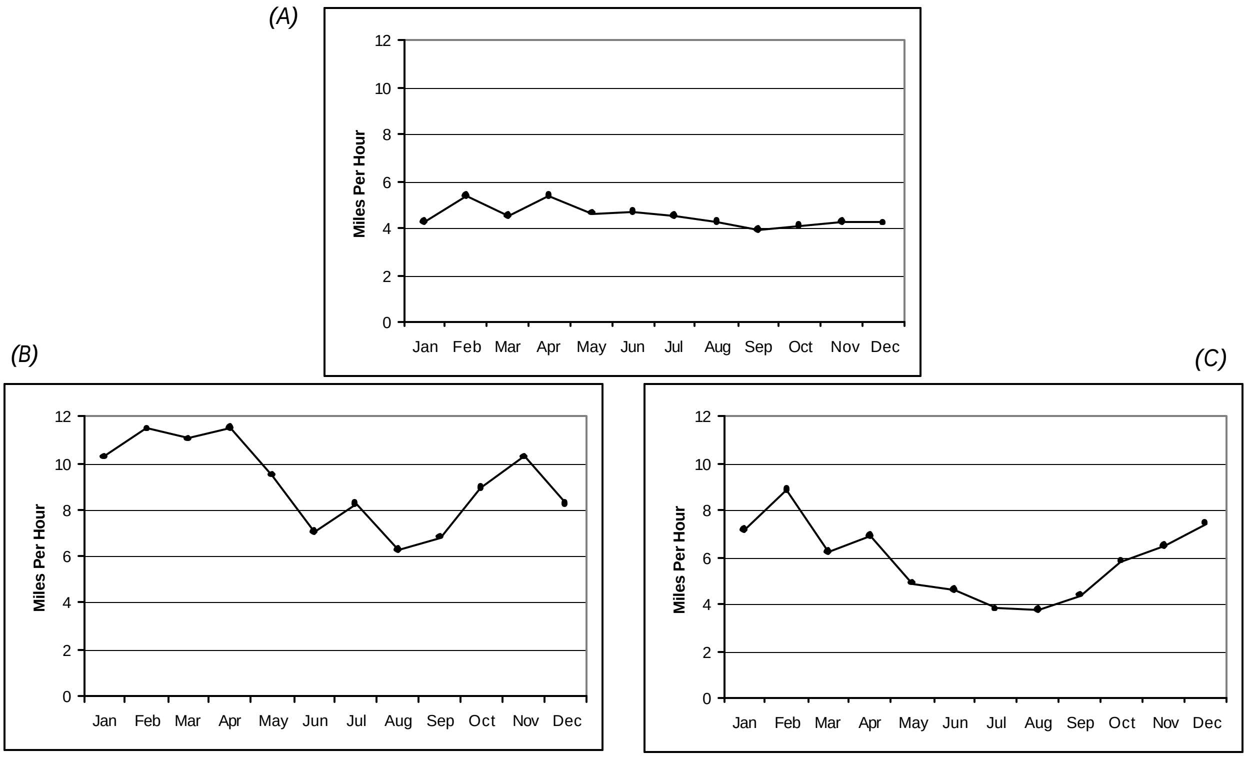


Figure3-5. Monthly wind speeds at (A) Nursery (1996 –2001), (B) OP1 (1996–2000), and (C) OP3 (1999–2001).

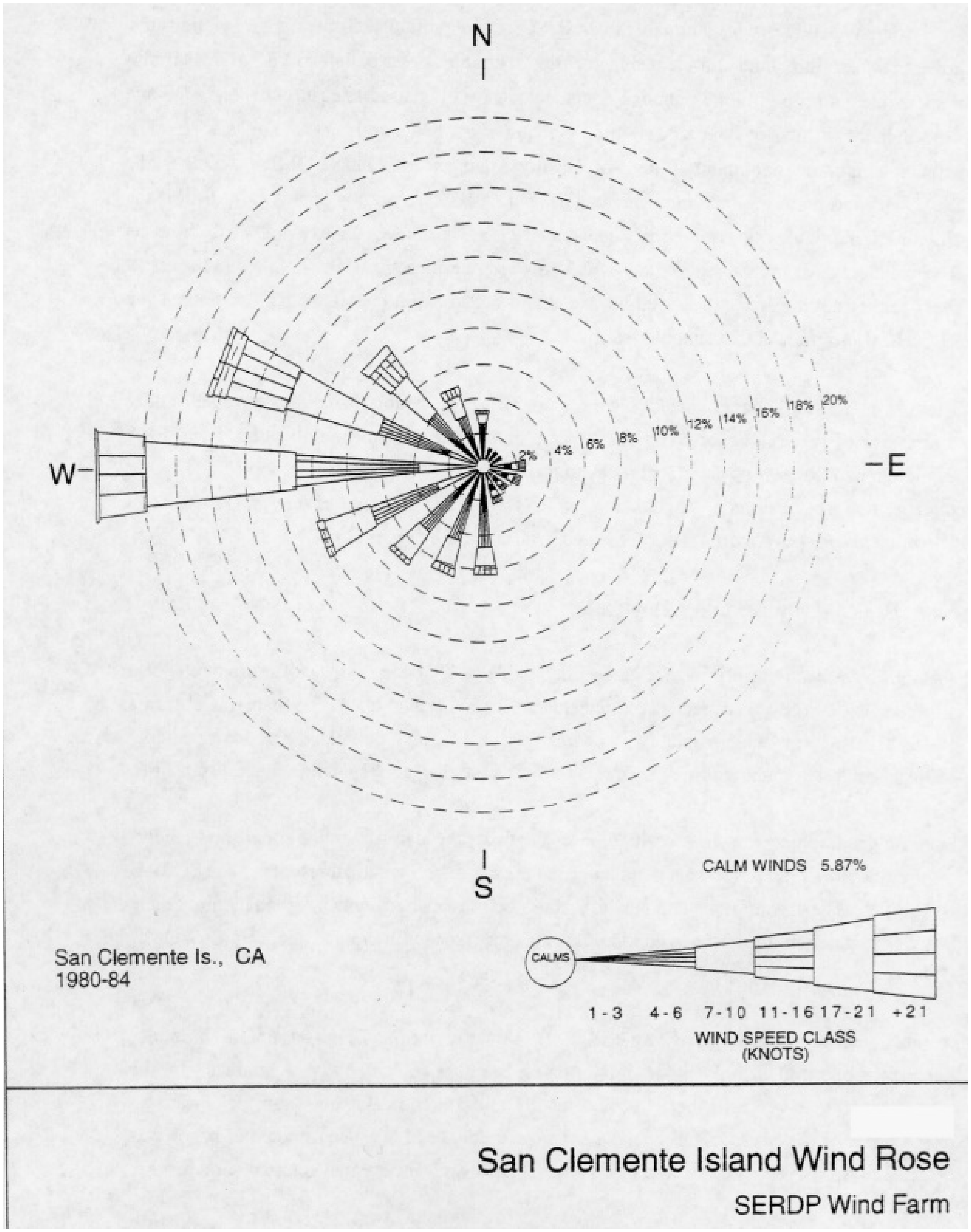


Figure3-6. Frequency of Wind Speed and Direction on San Clemente Island, taken from U.S. Navy Southwest Division (1997).

3.3.2 Landforms and Geology

SCI trends northwest and southeast. Its length is just under 21 miles (mi), with a width of 1.5 miles towards the northern end that broadens to over four miles towards the southern part of the island (Walcott 1897; Olmstead 1958). The Islands's area is about 56 square (sq) miles. The highest point of elevation, located slightly east of the center of the Island, is 1,964 ft, Mt. Thirst. Most of SCI's topographic features are preserved in the offshore bathymetry such that the island can be regarded as the tip of a 5249-foot (ft) high iceberg two-thirds submerged (Ward and Valensise 1996).

Island Origin. The volcanic and sedimentary rocks that form the bulk of SCI have been dated to the Miocene age (Ward and Valensise 1996; Olmstead 1958; Walcott 1897). The volcanics were apparently eroded before the deposition of marine sediments, indicating that the island entered a period of submergence sometime in the Middle Miocene. Walcott (1897), who gives one of the only thorough descriptions of the geologic history of the Island, believes the San Clemente volcanics to have poured over Catalina long after they reached San Clemente, forming a continuous mass during Miocene times. Based on this theory, San Clemente did not exist as a separate land mass but formed a part of a large area of low relief consisting of volcanic flows.

The San Clemente crust-block had no significant elevation during the late Miocene, this period being one of erosion. It was during the succeeding Pliocene period that further faulting occurred and the San Clemente crust-block became an island with significant elevation for the first time. This faulting created the steep eastern escarpments that we see today. The west shore remained at a low elevation. This low angle, in addition to the strong wave action coming from the west, provided favorable conditions for the formation of marine terraces (Walcott 1897).

Rock Types. The Island consists mainly of volcanic rocks extruded during the Middle Miocene. Andesite flows dominate its bedrock structure, with younger dacites and rhylolites occurring in the central part of the Island and on the west and south shores.

Dacite, a volcanic rock with a purplish hue, occupies a significant area near the center of the Island (from about Lemon Tank to Twin Dams, then west to Seal Cove) and is exposed at the summit and at the southern tip at Pyramid Head. Where present, dacite overlays andesite and is often in the form of outcrops. In the central part of the island the dacite ranges in thickness from 100 – 225 ft. Dacite is extremely resistant to weathering. Marine terraces cut in dacite are much less defined than those cut in andesite (Olmstead 1958).

The youngest of the volcanic flows on the island are rhyolite, a light colored rock with a reddish tinge. Rhyolite occurs at the northwestern end of the Island, in the uplands of Northwest Harbor and Wilson Cove) forming a band from one shore to the other, and also southeast of Wilson Cove where its width averages about 0.5 miles. There are at least two other minor occurrences on the north end of the Island. Thickness of the flows range from ten to about 150 ft. Rhyolite is found in the form of loose boulders or stacks on the terraces or more commonly at the base of the eastern escarpments where it is weathered by waves. Olmstead (1958) believes the rhyolite on SCI to be related to the dacite and andesite and describes it as a more acidic phase of these rocks.

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, Forminifera, and Mollusca, indicating that these materials were deposited in a marine environment of shallow to moderate depth during the Miocene age. Marine sedimentary rocks mostly overlay the volcanic rocks (andesite, rhyolite, and dacite), are exposed in some places on the island, and vary in thickness from 250 to 300 feet. Olmstead believes that these deposits were once much thicker and more extensive (1958).

Marine Terraces. The marine terraces are some of the most developed found along the southern california coast (Walcott 1897), 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). Distinctly cut terraces are present up to an altitude of 1,320 ft. Prominent terraces are present to about 1,500 ft but individual terraces are not so clearly cut as those below (Walcott 1897; Muhs 1980). Terraces are absent from 1,500 ft to the island’s summit at 1965 ft. The lack of terraces above 1,500 ft has led some geologists to believe that the island was never fully submerged during the Miocene age, or that the island rose steadily above sea-level rather than intermittently prior to the cutting of the highest terrace at 1500 ft (Olmstead 1958, Ward and Valensise 1996).

Dunes. Whereas marine terraces record sea level maxima, older sand dunes (Photo 3-4) may record sea level minima on SCI (Muhs 1980). During high sea level periods, terraces are cut and calcareous sands are deposited. As sea level drops, these sediments can be deflated and redeposited downwind as dunes. The oldest dunes, found extensively over the north central part of the island, formed from sand deposited above marine terraces during the early Pleistocene. Alfisols have formed on these dunes over time and have developed thick red clay horizons. 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). The presence of land-snail shells and sand molds of tree trunks, plant roots and stems within these deposits, suggest that the climate on the Island was moister in the recent geologic past and that the dunes were once densely vegetated (Olmstead 1958).

Photo 3-4. Aerial view of San Clemente Island showing dune systems ca. 1930.

Sandy Beaches. Sandy beaches (Photo 3-5) are found near the northwestern end of the Island, near China Point, and at West Cove, Northwest Harbor, Horse Beach Cove, and Pyramid Cove (Walcott 1897). 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 (Ward and Valensise 1996). 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 larger fragments consist mainly of andesite. The thickness of the alluvial deposits range from 10 – 30 ft.

Photo 3-5. West Cove Beach and the dune that supplied sand to it before construction of the airfield (Ralph Glidden Collection 1923). The beach is much narrower today as the sand has eroded away.

3.3.3 Soil Formation and Capability

Soils on the upper part of the Island are believed to have formed in place directly from volcanic parent material, while those below the high plateau were deposited under water and rest on the original volcanic parent material (USDA 1982). 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. The formation of soils with high clay content from parent materials that have very little clay stems from a combination of additions of airborne silts and clays, and mobilization of clay under high sodium conditions derived from sea spray (Muhs 1982). Vertisols, a soil with high shrink-swell clay content and the most mature soil on the island, form from Alfisols, a soil low clay content, in this manner. Soils found on older marine terraces are Vertisols, while the lower marine terraces and alluvial fan deposits are Alfisols, with clay contents lower than those in the Vertisols due to their younger age.

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 in), light colored layer with a 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 from andesitic and dacitic marine terraces and alluvial fans to calcareous dune sand, covering surfaces ranging in age from 2,760 years to greater than 1.2 million years (Muhs 1980).

There are conflicting theories regarding the origin of the surface horizon such as slopewash or deposition, formation through profile leaching, and Muhs's theory of windblown transport. The slopewash theory suggests that sediment is carried by water downhill and deposited in areas of low elevation–not a likely scenario due to the fact that the silt horizon is almost uniformly distributed throughout the island. The silt horizon does show some properties of a leached horizon, but ferrolysis, the chemical reaction responsible for such horizons, requires far more rainfall than SCI receives annually.

Muhs's theory of windblown transport is the more attractive of the three. The uniform thickness of the silty layer, its occurrence over the entire Island and on other Channel Islands, and its distinct mineralogy (quartz, biotite, and K-feldspar) suggest something other than local origin (Muhs 1980). Muhs' studies show that soils in the southwestern United States are presently eroded by wind and are transported to coastal regions of southern California, including SCI, Santa Barbara, and San Nicolas Islands. The source of windblown materials appears to be the Mojave Desert, eroding soils in the Mojave are most likely the main source of 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. In particular, the high concentrations of quartz, plagioclase, and mica in the Mojave soils are matched by the distribution in the silty surface horizons on SCI. The silty materials are transported primarily in winter but also during the fall and spring when Santa Ana winds prevail. Santa Ana winds are a result of a high pressure cell settling in the Great Basin after the passage of a cold front. The path of these winds has been well traced. Air from the high pressure fronts finds outlets to the west through the canyons of the coastal mountain ranges as well as to the south toward the Gulf of California. Wind speeds on the Mojave Desert during a Santa Ana can reach up to at least 32 mph, well within the range of velocities capable of transporting silt sized particles to SCI (Muhs 1980).

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. 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). In Map 3-2 soils are grouped by their water holding capacity, which is a measure of how much soil water is accessible to a plant. The droughtiest 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. 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 – 2,499 lbs/acre/year), with the exception of some of the heavy clay soils such as near the VC-3 old airfield which are the most productive soils on the Island (2,500 – 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 general lack of burrowing animals and low numbers of soil arthropods to turn the soil (D. Estrada, Natural Resource Conservation Service, *pers. comm.*). Soil anthropods 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 profound 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.

3.3.4 Soil Erosion and Road Maintenance

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, water quality, and sensitive species. Federal land owners are required to control and prevent erosion by conducting surveys and implementing conservation measures (Soil Conservation Act PL 74-46; 16 USC S.5901).

Past or current erosion caused by water is a concern on the high plateau loamy soils, along the drainage margins where established tree roots have been undercut, and on upper canyon soils supporting oak groves. Areas denuded by historic grazing on steep slopes have quickly become landslides. Even fairly level areas on the west side have been eroded by wind, especially on the siltier westshore soils and in sandy locations. Large storms can produce flooding and destructive wave action along the shoreline. Unpaved roads also produce areas of erosion concern on SCI.

Shoreline structures. The federal CZMA of 1972 requires that federal construction that affects any land or water use or natural resource of the coastal zone be carried out in a manner that is consistent to the maximum extent practical with the enforceable policies of California's approved coastal management program. CZMA provided federal guidelines for developing coastal zone management programs, to be implemented by each state's coastal zone management programs, but leaving participation voluntary. The CCC grants a General Consistency Determination for periodic replacement and repair of piers and shoreline structures (California Coastal Commission 1993). The CCC must find that a proposed project "is consistent with the marine resource, habitat, access, recreational, and shoreline structure policies of the CCMP."

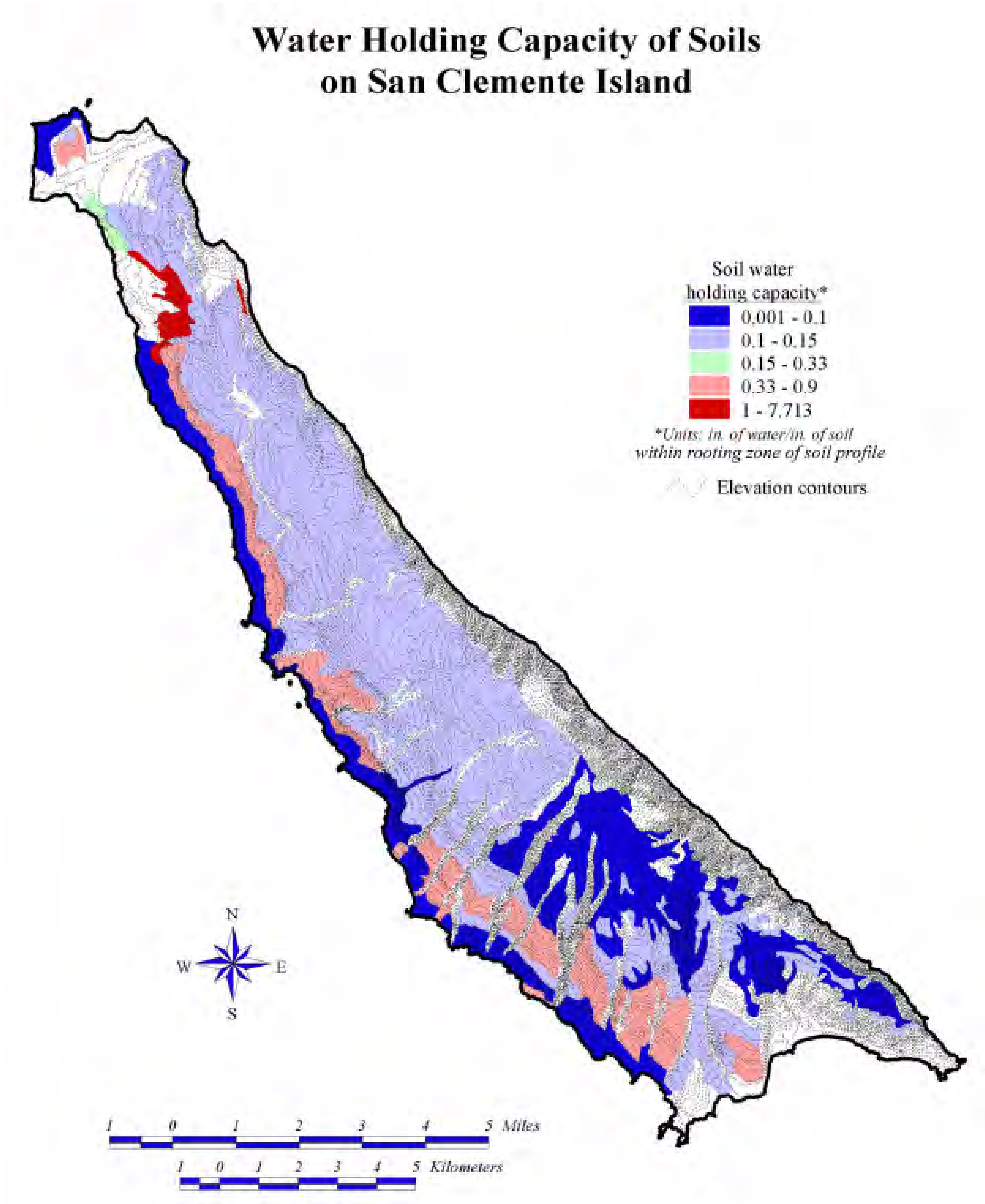
A 1978 state policy for directors of state agencies when reviewing environmental impact documents, certifying plans, issuing permits, or granting funds describes general objectives for shoreline modification projects: "When shoreline erosion control projects are necessary, they should restore natural processes, retain shoreline characteristics, and provide recreational benefits to the extent possible..." It appears that implementation is at the discretion of directors of state agencies.

The state of California has recently released a *"Draft Policy on Coastal Erosion Planning."* The policy, among other things, provides background on suitable approaches to erosion management and establishes standard procedures for planning and evaluating construction and other development projects to minimize erosion.

Upland transition areas are not protected under the CWA. However, the CCC regulates sandy beaches, plus a 300 ft buffer measured landward from the inland extent of the beach.

Current Management—Erosion Control, Road Design and Maintenance

- Locate ground disturbing activities on previously disturbed sites whenever possible.
- Assure that all project work areas, including transit routes necessary to reach sites, are clearly identified or marked. Workers shall restrict vehicular activities to identified areas.
- An evaluation of road erosion priorities is currently underway in cooperation with the San Diego State University Foundation, the results of which will be incorporated into INRMP updates.
- There is an existing borrow pit approved for construction use at SCI. Foreign soil is not brought in from off-Island for construction.
- 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.
- Erosion control is currently managed through the Site Approval Process (Figure 6-2).
- Portions of the SCI Ridge Road are paved, and portions north of VC-3 are gravelled and graded. A few other roads are paved or graded every 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 (NAS North Island Instruction). Roads routinely wash out in extreme weather.
- 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 is being considered through Public Works to widen and asphalt the roads.
- Road maintenance responsibilities come under the Public Works Center.
- 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 is the only access to primary ranges. This road has not yet been addressed in a BA, or USFWS BO, as required by Section 7 of the ESA.
- The Navy has contracted an investigation into erosion problems resulting from ATV trails related to SCLS monitoring and other activities to San Diego State University.
- There are currently no structures at SCI designed for coastal erosion control. Piers at Wilson Cove and NOTS Pier provide artificial hard substrate that functions as a specialized habitat for marine life.



Map3-2. Water holding capacity of soils on San Clemente Island. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

3.3.5 Water Quality, Pollution, and Use

Current Management—Water Quality

The waters surrounding SCI were designated an Area of Special Biological Significance (ASBS) to one nm from shore by the SWRCB in 1974. This designation is intended to protect the species or 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 Regional Water Quality Control Board Administrative Procedures, Sept. 24, 1970, Sec. XI and Miscellaneous Rev. 7-9/1/72). See Section 3.5.14 "Recent Mapping of Jurisdictional Waters and Wetlands" for a discussion of regulation of vernal pools. 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 State's 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.

Current Management—Stormwater and Non-Point Source Pollution Prevention

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 (California Coastal Commission 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 stormwater permits: the statewide General Industrial NPDES Stormwater 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 for noncompliance.

A tiered approach is used by EPA 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, smaller construction sites, and other activities and probably will not go into effect until 2002. The new regulations provide that discharges of storm water to waters of the US from construction projects that encompass 1 or more acres (as opposed to the former 5 acres limit) of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES Permit. The RWQCB's requirements for management measures also apply to those activities not covered by Phase I, including discharges from wholesale, retail, service, and commercial activities, including gas stations (SWRCB 1994; RWQCB 2001).

The storm drainage system on SCI is very limited. The majority of roads do not have a drain system to keep water off the main pathway; this causes considerable erosion. Most of the storm drainpipes on SCI culminate in the Wilson Cove area. Some of these are clogged with debris, preventing proper drainage during a storm event. Water consumed by humans for cooking, bathing, and flushing is treated at the SCI Sewage Treament Facility (Section 2.1.3 "Facilities and Developed Areas) and released into the ocean in accordance with the CWA and applicable regulations. The Navy's Sewage Treatment Plant at SCI is under NPDES permit CA0110175. Secondary treated effluent is discharged into the ocean at the Wilson Cove sewage outfall discharge pipe. This pipe terminates approximately 1.6 m above Mean Lower Low Water in a rocky intertidal environment in Wilson Cove.

As part of the NPDES permit, regular monitoring occurs at the outfall site to determine the effects of the outfall on the marine environment. In 1997, monitoring was conducted at three sites within the vicinity of the outfall site, including one at the outfall, and at a reference site located 410 meters south of the outfall (Coastal Resources Management 1998). This reference site was within the SCI ASBS as designated by the RWQCB. Results showed lower intertidal species diversity and species richness at the outfall transect than at the other sites, but greater abundance of organisms at the outfall. The outfall had its greatest influence in the mid and high intertidal zones where opportunistic algae species dominated the cover of the rocks. However, these impacts were limited to a sphere of influence which extended to ten meters in the high intertidal zone and 15 meters in the low intertidal zone. Surfgrass was also less abundant within 15 meters of the outfall (Coastal Resources Management 1998a).

Subtidal surveys showed no effect on the communities of organisms at depths of 3 and 12 meters. They did determine that the inshore edge of the kelp beds had retreated seaward since studies were conducted in the early 1970s when the sewage facility had been online for only a short time. However, this change is not attributed to the outfall as it appeared to be area-wide and not limited to the outfall vicinity. Consequently, it was determined that the effects of the outfall did not reach the ASBS or impact any federally or state listed species (Coastal Resources Management 1998a).

A new monitoring plan was developed in 1998 to assess the impacts from proposed increases in effluent discharge from 25,000 gpd to 40,000 gpd (Coastal Resources Management 1998b). However, results from recent monitoring are not yet available.

Current Management of Water Supply and Use

Gripp and Howard (1986) described the water use at SCI. Approximately 250,000 gallons of fresh water are barged to Wilson Cove weekly and pumped to a storage tank, where it is then made available for use at Wilson Cove and elsewhere. An unknown amount is lost through leakage. Water used outside Wilson Cove leaches into the ground through septic tanks.

3.3.6 Historic and Current Disturbance Regimes

This section covers pre-colonial and historical land uses relating to the current condition of SCI's natural resources (Photo 3-6). The effects of introduced exotic plants, feral goat herbivory, feral cat predation, sheep ranching, localized cattle ranching and crop production, and fire are intertwined and have cumulative impacts on the land and its components. Areas left without disturbance often become decadent and dominated by a few species, where intermediate levels of disturbance help ensure that inferior competitors can coexist. Excessive disturbance reduces the number of species, because there are few that can tolerate extreme levels of disturbance (intensity, frequency). Often disturbance is necessary to provide appropriate habitats. Therefore, composition of natural communities is viewed as being greatly influenced by the history of disturbance, and understanding these historic disturbance patterns and incorporating them where possible is an integral part of managing for the sustainability of the land and its resources.

Photo 3-6. Conditions in 1930 on the eastern escarpment and slopes near Pyramid Head , showing more shrub and tree cover than currently exists (Reproduced at the National Archives 1930).

3.3.6.1 Wildland Fire

Natural or pre-European fire regimes are a conservative estimate of the resilience of a natural community, so it is useful to explore what is known about this regime. There is little direct evidence to know the extent of fire that occurred in the past on the Island. Lightning-caused fire appears to be rare in recorded history for the Channel Islands (three documented fires over the past 140 years). However, there is evidence to suggest that fire in fact has been more frequent than has been documented, including two recent lightning fires on Santa Catalina Island (P. Schuyler, Catalina Island Conservancy, *pers. comm*.) and has played at least some role in shaping the island's natural resources. During habitation by the Gabrielino people, it can be assumed that residential fires occasionally escaped, and that these aboriginal occupants probably also set fires systematically. Prehistoric manipulation of the botanical environment has been clearly demonstrated in the results of archaeological, ethnographic, ethnohistoric and paleobotanical research in the American Southwest.

Evidence of these activities by California tribes has recently been compiled by Blackburn and Anderson (1993). Although none of their assembled data derive specifically from SCI, the Island's late prehistoric Island Gabrieleno occupants were socially, economically, and linguistically integrated with their mainland counterparts, who did use fire as a tool to draw out seed yields from plants important to them.

In their introductory chapter, Blackburn and Anderson state why such technology must have been necessary:

"...California's various rich, diverse and carefully managed habitats supported (through the medium of an especially effective extractive and storage technology) the highest population densities, as well as some of the largest population concentrations, in all of North America; in fact, it now appears that the population levels present in California prior to European contact possibly may have been the highest to have ever characterized societies without a well-developed and relatively intensive agricultural subsistence base."

"The most powerful, effective, and widely employed tool in the native repertoire for directly manipulating the environment was undoubtedly fire. Indigenous groups used fire for a variety of purposes, including stimulating new plant growth and inducing early stages of succession; creating and sustaining vegetational mosaics with numerous ecotones beneficial to animal life; controlling plant diseases and insect infestations; increasing the frequency and range of useful plant species; eliciting desirable plant growth characteristics; minimizing the severity and number of uncontrolled wildfires; and facilitating hunting by the reduction of undergrowth."

No direct archaeological evidence of intentionally-set aboriginal fires has been examined for the Island, although sedimentary deposits there containing charcoal could be investigated with this in mind. However, because prehistoric Island dwellers would have had immediate knowledge for this use of fire, it can be inferred that they most likely followed the mainland pattern and frequently burned selected vegetation communities. Although these aboriginal residents depended to a large degree on the sea for subsistence, archaeological evidence from their groundstone seed processing tools suggests a certain reliance on terrestrial plant resources as well. Some species commonly used by Native Americans including *Nassella*, *Calandrinia*, *Dichelostemma*, and *Datura* are known to be favored by fire over other species (Menke 1992; Keeley 1991).

Fires continued to be set at least intermittently after sheep ranching commenced, from about 1862 to 1934. There is written documentation of three instances when sheep ranchers set fire to increase forage for their herds (Andrew

1996). The intention would have been to favor forbs and grasses over shrubs, which are less palatable to sheep. It is at least conceivable that such fires were ignited more often. This may have had a detrimental impact particularly because the fires were set during periods of drought or overgrazing when the vegetation was stressed to begin with.

A change in fire behavior patterns had to have occurred with the introduction of exotic, European annual grasses and forbs to the ecosystem, which had by the turn of the century forever transformed most of California's grasslands. After sheep grazing leases were cancelled in 1934, use of SCI began to take on the pattern it has today, with the airfield and other localized developments for human occupation, and areas of live ordnance use.

Another change in fire pattern developed coincidentally with the use of ordnance. The use of live ordnance has changed the frequency, footprint, or intensity of island fires. In Shore Bombardment Area (SHOBA), unless a fire threatened human life or facilities, it was usually allowed to burn itself out. (Fires in the northern portion of the Island were usually suppressed before they spread very far.) Early records are meager, but many fires apparently covered only a small area and did burn themselves out without serious impact on wildlife or plants. However, some fires such as the 1980 fire from Stone Gate south, have spread over much of the Island. Canyons and most coastal areas probably escaped in this instance, but the grasslands burned (Resnick 1988). Until helicopter resources became available for fire-fighting, most fires were allowed to burn themselves out. Currently, fires in the SHOBA impact areas are still allowed to continue burning because of the danger of fighting fires near unexploded ordnance.

Map 3-3 shows what we have been able to determine about fire frequency, while Map 3-4 describes the age of burned areas on SCI.

Current Management—Wildland Fire

The SCI Federal Fire Department (FFD) is responsible for fire suppression and management on the Island. The FFD falls under the Assistant Chief of Staff for Security and Force Protection for CNRSW.

Two fire stations, one at the airfield and one at Wilson Cove, are manned 24 hours a day, seven days per week. Existing FFD resources on-Island are designed and staffed for airfield and structural fire protection only. They consist of one Class 3 wildland fire (brush) engine that can be manned by four personnel. A similar reserve engine is available but only if the airfield is shut down since it can be manned only by staff assigned to airfield crash response.

In SHOBA, the Fire Department will currently suppress only a structural fire accessible by the SCI Ridge Road. Elsewhere fires cannot be suppressed on the ground, due to danger from unexploded ordnance. There is a no-fly-over zone (minimum 1000 ft altitude separation) in place over SHOBA impact areas. Air attack is safe and effective in SHOBA outside the boundaries of the two Impact Areas.

Under the current level of fire protection, the most appropriate method of initial ground attack would be to back-burn and hold the wildland fire along a road, fuelbreak, or other fuel treated area. This method of allowing a fire to continue to burn until it reaches a road or other fuel treated area may involve more burned acres than is desirable; however, it has the highest probability of fire containment and the least amount of overall burned acres.

Cooperative resources agreements have supported the Island's ability to respond to fire incidents. SCI maintains an interagency MOU with Cleveland National Forest. Follow-up resources from the mainland U.S. Forest Service or other federal wildland firefighting units are, at a minimum, four to six hours away under the best of conditions.

Over the past three years a number of new fire management policies and practices have been instituted. A Wildland Fire Instruction provides policy and guidelines for the prevention, suppression, reporting, and monitoring of fires. The most significant of these new practices is the presence of a firefighting helicopter during periods of military training in SHOBA. Military CH-53 helicopters from Reserve Unit HC-85 serve as the primary firefighting asset when present on the Island for other duties. When military assets are not available a private contractor provides these services using a Bell Jet Ranger 206, which is staged on ground alert from the main airfield. In the year 2000, an average of 72 acres burned per fire, while in 1999 and average of 248 acres burned prior to initiation of the helicopter firefighting services.

While at the Island, one Navy helicopter is assigned to mission support while the other is assigned to "training." The latter is always divertable for a fire call from Southern California Offshore Range (SCORE), the exception being a medical emergency. The decision process of whether to send a helicopter to fight fire in SHOBA involves the following steps: 1) High priority vs. low priority area (e.g. does fire threaten shrike nests?); 2) The number of helicopters at station (If two, then one can go to fire. If there is only one, can that helicopter complete its task, drop off whatever it needs to, and re-fuel all within 60 minutes to get to fire?); and 3) weather conditions. The Navy helicopter is currently meeting this Plan's proposed 15-minute response time since it only takes 5 minutes to be diverted from training, and another 10 minutes to get down to SHOBA. A private helicopter is still needed for times when HC-85 is unavailable. HC-85 is currently available Monday through Thursday, and will routinely stay over to Friday for an exercise. HC-85 is not on the Island outside of an Operations assignment, and does not routinely stay an extra day because of a fire. The decision about when HC-85 is available is made quarterly when SCORE schedules operations. When HC-85 is used, there has been no financial obligation since they are already assigned to an operational mission on-Island. Outside the Impact Areas the HC-85 helicopter flies 60-100 ft above ground level (agl), which is necessary to drop water effectively (i.e attain the wetting footprint needed). Its maximum capacity for water buckets is 410 gal. External load capacity is 6,000 lb, and 2-1/2 hours of fuel are standard. HC-85 has less frequent refueling requirements then the private helicopter and can carry a bigger bucket.

Limitations on the use of incendiary devices as per BO 1-6-F-97-21, and further limitations on the types of ordnance used during Naval Gunfire events and Naval Surface Fire Support exercises during the fire season have reduced the chances of fires caused by ordnance. A reduction in the size of the target area is also enforced during fire season, as well as other scheduling restrictions on tenants and users. Fire season usually extends from June throughout October. Additionally, weather recording systems were installed in the target areas which are linked via satellite to provide hourly weather data in SHOBA. Eventually, these weather recording systems will allow operators to monitor real-time weather to avoid high fire danger conditions when weapons are more likely to ignite fires.

Firebreaks were installed in Impact Areas I and II in accordance with BO 1-6-F-97-21 and the boundaries were revised in discussion with the USFWS prior to the start of the 2000 and 2001 fire seasons. Currently a fuelbreak exists in Impact

Area II to prevent fires from spreading into shrike territories primarily in China Canyon. In 2001, fire retardant (rather than herbicide) was the primary means of maintaining the fuelbreak, after NRO successfully tested its use as a fuelbreak on the Island. This is especially helpful in areas with unexploded ordnance concerns and is also a benefit to natural resources compared to disking firebreaks through vegetation because no biomass is removed and erosion is avoided.

In 2001 new copper transmission lines were installed in SHOBA to reduce the chances of fires starting from downed power lines. The old lines were aluminum and more likely to break. In 1999 and 2000, prior to the installation of the new power lines, three fires due to downed aluminum power lines burned a total of 1811 acres. In 2001, there were no fires due to downed copper lines. Additionally, electric system improvements included use of blank load and plug in power lines in SHOBA during fire season such that when a power line goes down it reduces the chance of a fire starting. A restart charge will not be automatically sent to restart the power; the system will have to be manually reset.

SCORE reports fires, and NRO has been responsible for mapping them. Fire incident reports are only filled out by FFD if an asset was used to respond to the fire.

The NRO has been financing the private helicopter to be on call during fire season. The private helicopter now costs $3,000–$4,000/day and is paid for from environmental funds from Commander-in-Chief U.S. Pacific Fleet (CINCPACFLT). The cost of pre-suppression measures such as fuelbreaks and prescribed fire has also been absorbed by NRO. Mitigation costs for the effects of wildfires on listed species can be extraordinary and remain the responsibility of NRO.

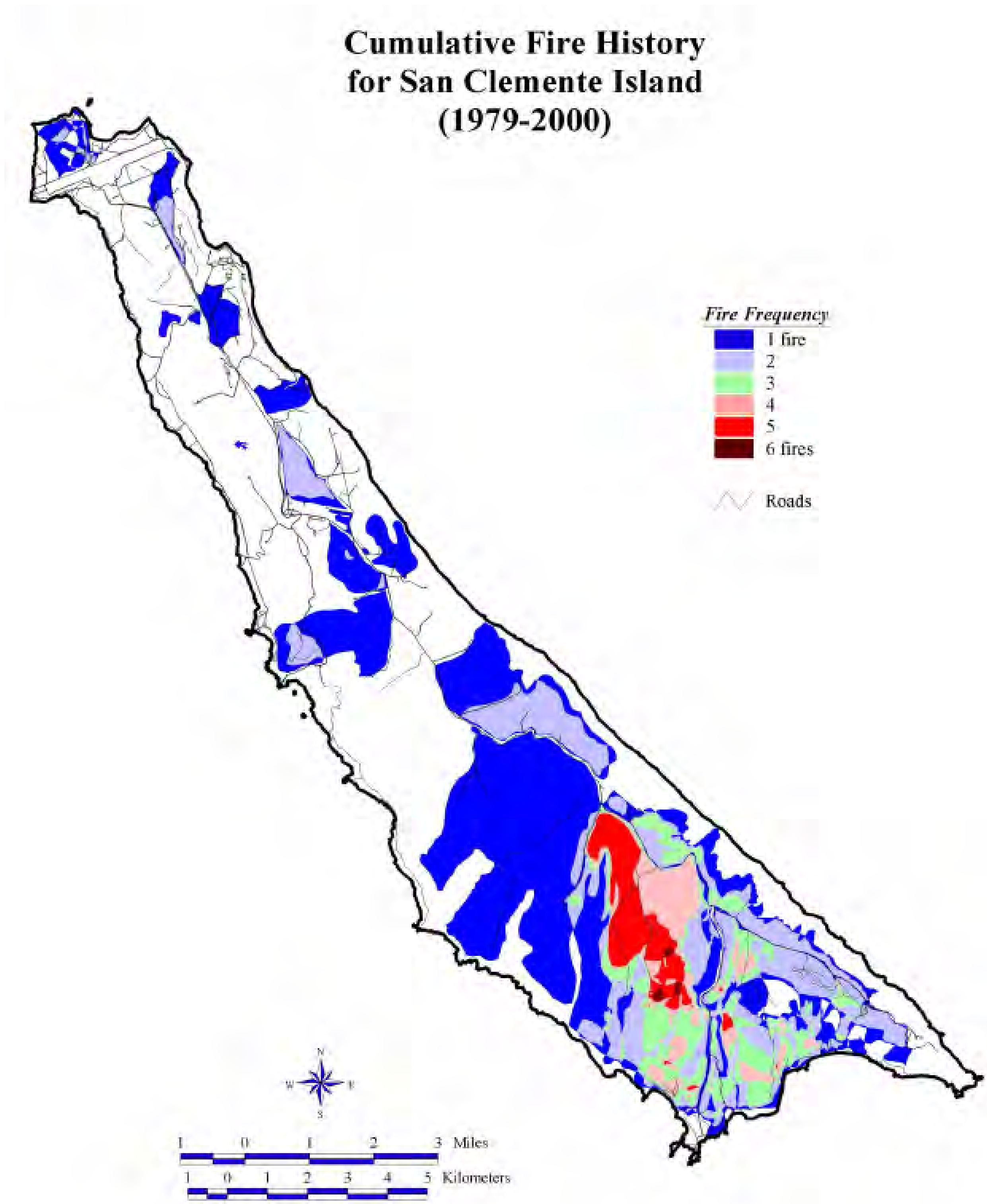
Access road upkeep costs are borne by Public Works Department through the use of road equipment and labor. Public Works also has a water tender and nurse truck that can be brought into play. Current road improvements have been through self-help (free labor) projects with materials funding through AirPac. For example, Construction Battalion (Seabees) are available to Public Works to help with road building and maintenance.

3.3.6.2 Introduction of Exotic Plant Species

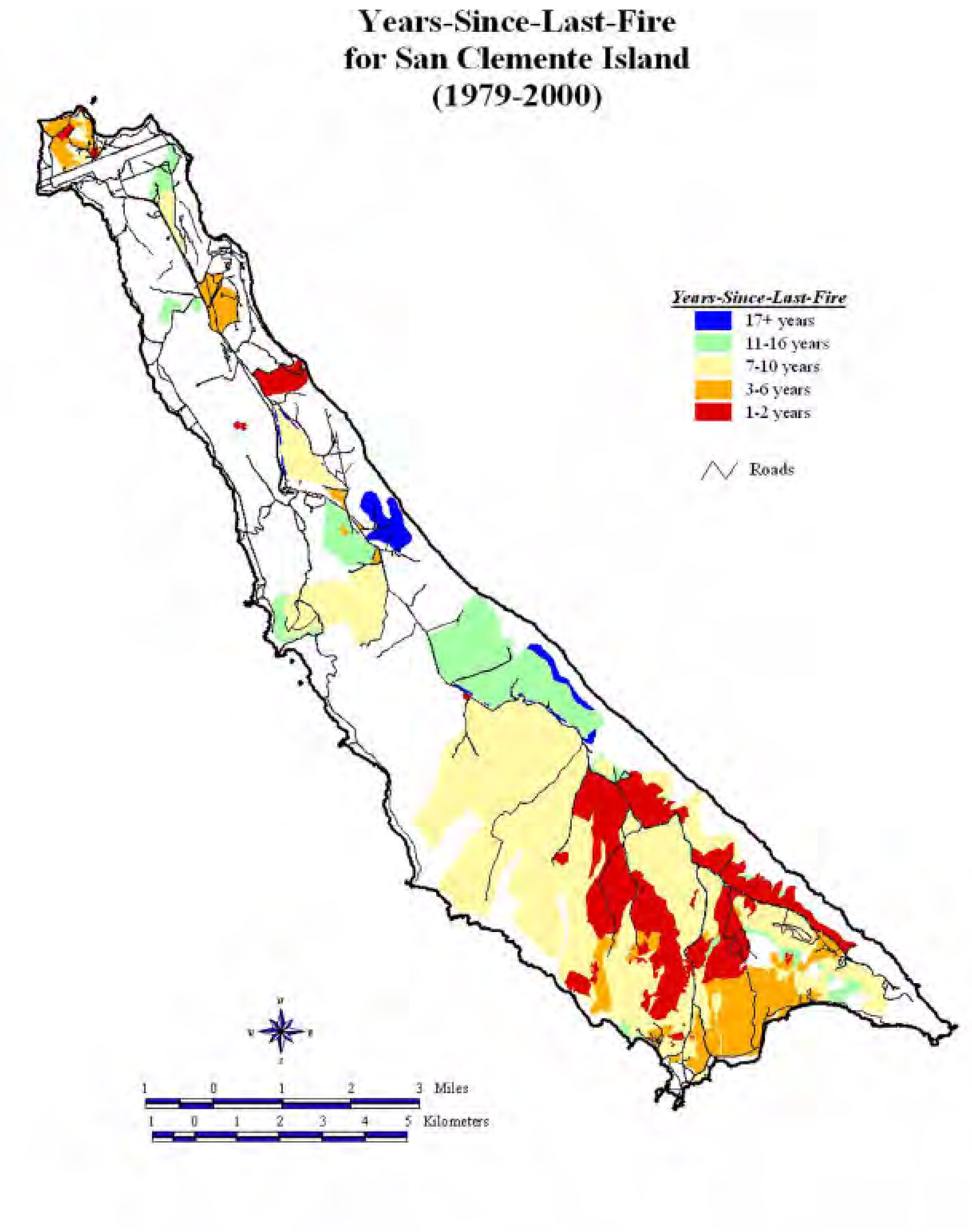
Exotic species were introduced into the Island ecosystem (as they were on the mainland) beginning roughly 200 years ago. These aggressive colonizers, mostly annuals, probably took permanent hold during periods of drought and heavy grazing, such as occurred in the late 1800s. The changed composition and structure resulting from these introductions is most noticeable in the grassland on the northern part of the island, and on the dunes, where they out-compete native forbs and grasses.

In terms of fire, exotic annual grasses create more flash fuels than previously existed. They fill interstitial areas with fuel that ignites and carries a fire quickly. For grasses, a key factor is the short time it takes for fuel moisture to drop to low levels, even during a diurnal cycle (P. Zedler, UW Madison, *pers. comm.*). Exotic grasses also extend the fire season by a month or more, creating a hazard earlier in the spring by drying out sooner than the native herbaceous flora (J. Keeley, Occidental College, *pers. comm.*). These factors are noticeable in the grasslands and in the boxthorn community, as well as in the flats which are largely dominated by exotic annuals now.

While exotic weed control efforts can be successful if populations are caught early enough and the problem is still localized, ecosystem-wide changes due to invasive exotics are considered to be permanent on SCI, as they are elsewhere in southern California. (See Section 3.7.1 for Current Management.)



Map3-3. Fire frequency map for San Clemente Island. This represents all documented fires for the Island, but many fires less than five acres are undocumented. Map is probably accurate in terms of relative pattern and frequency. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).



Map3-4. Map depicting the age of fires on San Clemente Island. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

3.3.6.3 Feral Goats

During much of the 1800s the goat population on SCI was kept under control because they were hunted for their hides. With the advent of commercial ranching in the 1860s, the goats were fenced off the plateaus in favor of sheep herds, and were apparently shot by the herders themselves. For many years, then, the goats were confined to canyons or other locations where ranching was not active. Sheep ranchers maintained small numbers of goats for herding sheep, and these were left on the island when sheep ranching was abandoned in 1934 (Andrew 1996). The goat population skyrocketed at this time, probably peaking in the early 1970s.

Goats foraged all over the Island in all habitats, but were heavily concentrated on the south end, including the eastern escarpment, deep western canyons and upper marine terraces. They were "essentially absent from the relatively open and gently sloping north end, and apparently not numerous along the lowermost marine terrace along the middle and southern edge of the island" (Chambers Consultants and Planners 1981). Apparently, the goats tended to spend days in canyons, coming onto the plateaus to graze in the early morning, late afternoon, and to bed down adjacent to the canyons (Resnick 1988).

Coblentz (1976, 1977, 1980) evaluated goat grazing on Santa Catalina Island and found it reduced vegetative cover, diversity, productivity, and individual plant vigor. Soil erosion was triggered when goats were allowed to increase in numbers beyond the system's carrying capacity. Coblentz found goat diets to be very opportunistic, varying seasonally. In the winter, they browsed on shrubs, while in spring they concentrated on herbs and grasses. They tenaciously went after whole plants, sometimes digging into the ground to get at the roots. Coblentz observed the goats to occupy home ranges of one to two square miles, with only rare travel outside, usually limited to males travelling to the next herd during the breeding season (Coblentz 1976). Coblentz concluded that the goats essentially bring themselves to the brink of starvation without leaving the familiar area, even when better forage is nearby (Coblentz 1976).

During the period of uncontrolled goat numbers, there was essentially no reproduction of woody species in the canyon woodlands, and woodland cover was reduced dramatically. This directly affected numerous rare plant species, and directly affected habitat for several avian species.

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. The Fund for Animals contributed about $180,000 for goat netting. San Clemente Island is now free of feral grazers.

3.3.6.4 Other Introduced Animals

Today, domestic cats are the largest feral mammal remaining on the Island, although other introduced mammals have occurred or still occur, including mule deer (originally introduced by CDFG but now extirpated), pigs (also introduced by CDFG in 1951), domestic dog (*Canis familiaris)*, black rat (*Rattus rattus*), house mouse (*Mus musculus*), meadow mouse (*Microtus californicus*), and harvest mouse (*Reithrodontomys megalotis*) (Schoenherr *et al.* 1999). The cats and rats have been the subject of a control program in recent years that is described in Section 3.7.3. Pigs were eradicated as part of the goat removal program.

Relatively recent birds to the Island include the rock dove (*Columba livia*), house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), cattle egret (*Bubulcus ibis*), chukar (*Alectoris chukar*), Gambel's quail (*Callipepla gambelii*), and California quail (*Callipepla californica*) (Schoenherr *et al.* 1999). Individual brown-headed cowbirds (*Molothrus ater*) have occasionally been noted on SCI in the winter, but have not remained to breed (Jorgenson and Ferguson 1984; K. Brock, CNRSW, *pers. comm*.).

3.3.6.5 Ranching

While the impacts of goat herbivory were concentrated in the canyons, sheep ranching mostly affected the plateaus and terrace flats. There were clearly periods of diminished water or feed that resulted in overgrazing and large animal die-offs (Table 3-1). Island grasslands and coastal boxthorn (*Lycium californicum*) habitat were the most affected, apparently including the loss of large areas of *Dudleya virens* within the boxthorn community. It has also been suggested that sheep and goats contributed to an artificially wide range for prickly pear and cholla cactus (*Opuntia littoralis, Opuntia oricola* and *Opuntia prolifera*) dispersing the cactus segments on their fur.

Important sheep ranching sites were described by Andrew (1996) at Howland's near Northwest Harbor, Don Alonzo's at the west end, Chinetti's at Pyramid Cove, and Middle Ranch in the central and western plateau (Map 3-5).

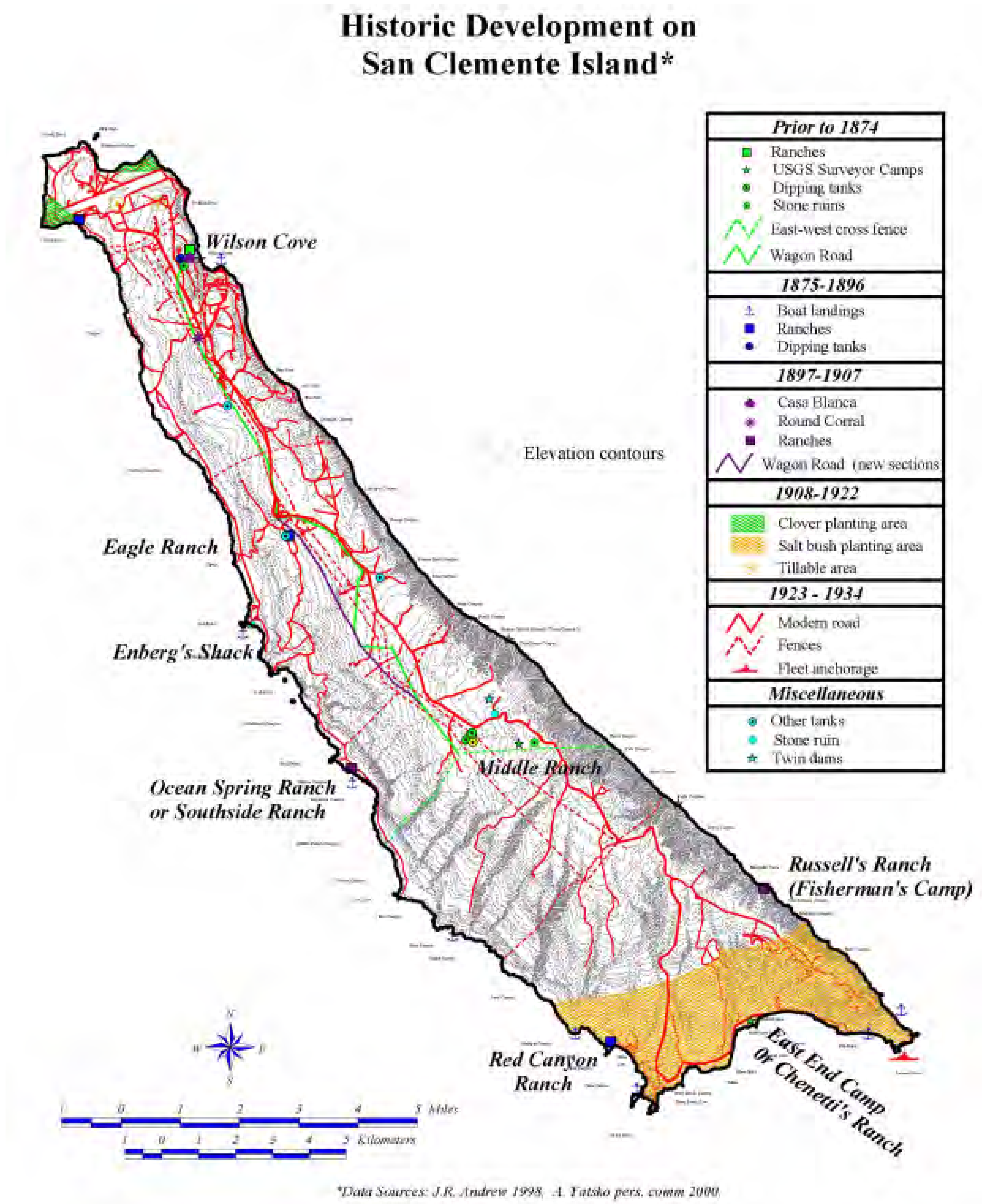
An intensively used site for cattle and sheep that included wells and windmills, was located on the immediate coast between Lost Point and Mail Point. Some roads were established to support these activities (Andrew 1996).

At Howland's over 1,000 acres of beans, wheat and barley were farmed from 1918 to 1922. Areas near the old airfield were also cultivated. Other parts of the island were seeded during the years 1914–1915. Dunes were seeded with “saltbush” (most likely *Atriplex semibaccata*) and “water grasses” over about 600 acres to stabilize them. Salt bush was planted by one man at “Round Corrals” (south of Wilson Cove) for 60 days, clover for 30 days at Isthmus (near Northwest Harbor), and saltbush and clover for 30 days at the extreme south end of the Island (Andrew 1996, citing expenditure reports from the San Clemente Wool Company). As discussed above, sheep ranchers also apparently systematically burned the island vegetation in order to favor the forbs and grasses fed on by sheep.

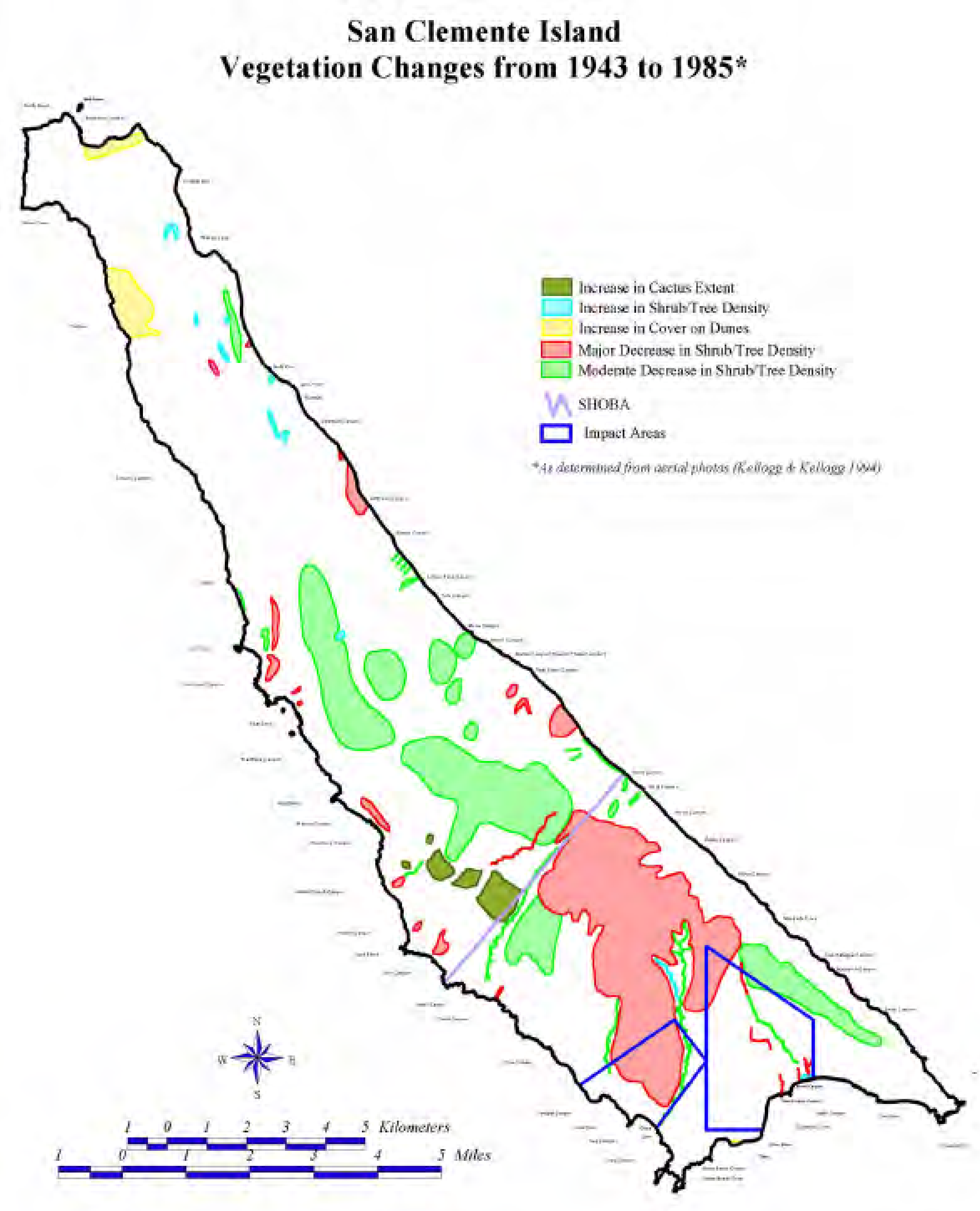
3.3.6.6 Cumulative Effect of Historic Disturbance on Island Vegetation

The cumulative effect of the historic disturbance to the SCI ecosystem has been altered species composition, especially in the grasslands, and a general loss of trees and shrubs due most directly to feral goat overgrazing. The excessive removal of the vegetation and trampling effects have likely contributed to contemporary erosion problems in some areas of the Island.

Map 3-6 is the result of a review of vegetation changes on the Island based on aerial photos from 1943, 1971 and 1985 (Kellogg and Kellogg 1994). During this time period there was probably also a corresponding reduction in species diversity which is not revealed by this map; rather, this map shows changes to plant community dominants. The poor quality of the 1943 photos was a limiting factor in much of the assessment, particularly when evaluating changes in cactus cover. Conclusions from this aerial photo comparison are summarized as follows:



Map3-5. Historic development of San Clemente Island. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).



Map3-6. Areas of vegetation change (1943-1985) on San Clemente Island as determined from aerial photos (Kellogg and Kellogg 1994). (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

1. The map shows areas of change determined from the photo sets. The graininess of 1943 photos makes it difficult to make conclusions about changes in cactus cover. In an area south of Middle Ranch Canyon, however, one can clearly see a dramatic increase, about 100 percent, in *Opuntia littoralis* and probably *Opuntia oricola* on the westshore terrace faces, and an increase of about 20 percent on the terrace flats. Low-altitude helicopter photos, plot photos and ground visits helped clarify and confirm observations on the historic photos. The green polygons depicted represent only areas where changes in cactus cover were clearly visible in the photos. Other areas of the island were probably also affected.
2. The farther south one travels on the plateau, the more the shrub density has changed. There were many more shrubs, probably *Rhus integrifolia* based on the dark color and the presence of a few in that area today, on the SHOBA plateau in 1943. *Artemisia californica* may have also been a more prominent component of the plateau shrub community in some cases. Scattered populations of *Baccharis pilularis* evident today in areas north of Stone Station are not visible in 1985 aerial photos. The presence of abundant, though dispersed shrubs on the plateau confirms several turn-of-the-century accounts of the area dominated by “cacti, low shrubs and herbaceous plants.”
3. There has been a general decrease in cover on the eastern escarpment since 1943. A very rough estimate of this decrease would be 20 percent. Locally the plant cover losses are much greater; in some cases trees or shrubs have completely disappeared.
4. In isolated areas on the island's north end there have been increases in shrub cover since 1943. Increased cover on the dunes may be due to exotic species such as *Carpobrotus edulis*.
5. *Artemisia californica* on southern aspects appears to be about the same cover in 1985 as in 1943, but appears much reduced in 1971 (the presumed peak period of goat overgrazing).
6. Where there were losses of trees, there was usually (not always) associated erosion scour. Erosion appears to be either a primary or secondary cause of tree losses in several cases. Large patches mapped in green on the plateau had associated erosion with shrub loss.
7. Changes in canyons between 1943 and 1985 are variable. It is common to see general decline of shrub and tree cover in the canyons and dramatic declines in the few westshore canyons that develop alluvial fans at their mouths, such as Waymuck and Warren (also the site of ranch corrals and intense grazing pressure by sheep and possibly cattle (Bruce 1994). Shrub cover in canyons with alluvial fans at the mouth was close to 100 percent in some cases, where it is negligible today. Canopy cover was generally much higher in these areas than on the plateau.
8. Overall ground cover was sparse in 1943, much worse than the current condition. Active erosion is evident in the older photos while such cases are isolated today.

Due to these past disturbances, the Island ecosystem seeks 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 perturbating agent is removed (George *et al.* 1990).

3.3.7 Competition and Predation

A fundamental way to understand the processes that link organisms is to describe food webs. A food web must have primary producers to capture energy from the sun (algae, vascular plants, phytoplankton), a means of energy transfer by feeding, and nutrient cycling between the biotic and abiotic environment by excretion, bacteria, fungi, and detritus to provide nutrients back to primary producers.

Powered by the sun, primary producers are at the base of the food web, transforming solar energy and combining simple nutrients from the soil and water into the organic compounds that form consumable biomass. Some plant tissue is consumed directly, such as fish that consume kelp directly, or dune beetles consuming ragweed leaves on the dunes. However, most vegetation dies uneaten. The dead vegetation is attacked by decomposing bacteria and eventually breaks down into small, nutrient-rich, bacteria-coated detrital particles. In the water, these are then combed from the water column by filter-feeders or gleaned off the bottom surface by deposit-feeders. Zooplankton feed on phytoplankton. Young predatory fish, shrimp, and benthic invertebrates feed on zooplankton. Invertebrates are then fed upon by carnivorous molluscs, leopard sharks, bottom feeding fish like flounder and halibut, and shorebirds.

On SCI, food chains have been disrupted by the introduction of feral mammals, exotic species and other effects of human disturbance. Competition from non-native annual grasses and the presence of short fire intervals that Island species are not adapted for have altered or disrupted present vegetation communities. This in turn affects the ability of primary and secondary consumers to locate food and cover. One of the key reasons for the decline of the loggerhead shrike on SCI is believed to be the lack of suitable woody vegetation used for nesting sites during a period when unmanaged grazing by goats and other herbivores decimated the island. In the marine environment, humans have over-harvested populations of primary consumers such as abalone and secondary consumers, including most large fish species, which could have an unknown effect on populations of both producers and higher consumers.

Current Management–Native Predators

Presently on SCI the loggerhead shrike is heavily managed for and its native predators are controlled. These include the island fox, ravens, and raptors (which may include the red-tailed hawk, sharp-shinned hawk [*Accipiter striatus*], Cooper's hawk [*Accipiter cooperii*], and peregrine falcon).

- Non-lethal control of raptors from shrike territories is being performed.
- Population surveys and Island-wide monitoring of the productivity of native raptor and corvid populations is ongoing. Individual raptors and ravens that may pose a threat to nesting shrikes are identified. Raptor or raven nests within 400 m of a shrike nest are either torn down or the eggs are destroyed. As shrikes begin nest building, bait stations are established to lure ravens away from the shrike territories.
- Surveys for raptors which breed on SCI or winter there are currently being performed as part of the loggerhead shrike recovery program. Raptors are monitored at shrike release sites to assess their interactions with shrikes. Raptors are also surveyed throughout the Island. These surveys are important not only to gauge the effects raptors may have on sensitive species such as the shrike, but to monitor the health of raptor populations on SCI.
- Ravens and raptors are monitored near shrike nests and nests of these shrike predators are removed from the vicinity.
- Foxes are deterred from entering the vicinity of active shrike nests.
- Ongoing monitoring and study of island fox demographics and ecology as part of the loggerhead shrike recovery program; the subject of management is to minimize the possibility of predation on shrikes. The island fox is listed as Threatened by CDFG.
- Garcelon (1999) and collaborators with the Institute for Wildlife Studies have used a combination of trapping/mark-recapture and radiotelemetry (1988–1997) to evaluate fox population demographics on the Island, including estimating population effects of fox control associated with the shrike recovery program. A fourth trapping grid has recently been added that

would expand the scope of Island-wide population estimates from mark-recapture sampling.

3.3.8 Speciation and Endemism

San Clemente Island has a large number of species that are found nowhere else or only on the Channel Islands (Table 3-4). This phenomenon of high "endemism" is apparent in many island systems, and is often the result of long periods of isolation. Unlike most of the Channel Islands, SCI has not been entirely inundated as a result of geologically recent water level fluctuations because of its relatively high relief. Consequently, many species currently inhabiting the island have been present for millions of years. Most species probably originally arrived through various methods including flying, swimming, rafting on debris or attached to other structures, or by wind dispersal.

According to traditional island biogeography theory (MacArthur and Wilson 1967), the distance of an island from other land masses and the size of the island will determine the diversity of species present. If an island is sufficiently close to the mainland, so that it frequently receives infusions of individuals and species, then more species may become established there. In addition, the requirements of each organism will determine if an island is sufficiently large enough to harbor a self-sustaining population. Consequently, the number of species present on an island is a balance between immigration and extinction (MacArthur and Wilson 1967; Quammen 1996).

The geographical guidelines of this theory may help explain the patterns of diversity found on some islands, but each island's composition should be viewed individually (Simberloff 1994). Other factors such as the diversity of habitats contained on an island and the types of species already present will also affect the diversity of an island (Quammen 1996). Detailed studies of the species and habitats on individual islands are still needed before general statements about extinctions and declines are made (Simberloff 1994).

When an organism reaches an island it is often presented with slightly different conditions than are found on the nearby mainland. For example, the island may have a different climatic pattern or a different geologic history, which in turn will affect the island's soil types and vegetation. In addition, because island communities support fewer species overall than their mainland counterparts, competition and predation are often less prevalent. If there are vacant niches to occupy or new habitats to expand into, this lack of competition will allow organisms to become established and diversify. This diversification can lead a species down a different evolutionary path than its mainland or neighboring island counterpart, resulting in one or more new species. This process is referred to as adaptive radiation. The relatively high number of endemic land snail species, 17 out of 23 total species (Cohen 1978), found on the Channel Islands is a good example of adaptive radiation. Even though terrestrial snails cannot disperse easily across the ocean, they have diversified once becoming established on an island.

Islands may also contain "relictual" endemic species, which are the ancestral remnants of a species that has become extinct on the mainland. On three Channel Islands, including SCI, the island ironwood tree (*Lyonothamnus floribundus* ssp. *floribundus*) represents the last surviving individuals of the species, which was formerly widespread on the mainland. After the last ice age, the mainland individuals were presumably unable to cope with the new warmer and drier climate present in California. While on the islands, the species survived in what remained a slightly cooler and foggier climate (Schoenherr *et al.* 1999).

Table3-4. Number of endemic species on San Clemente Island within identified taxonomic groups. Species counts also include subspecies. Does not include species extirpated from San Clemente Island or introduced species.

Group	Total No. Species on SCI [a]	SCI Endemics	Channel Islands Endemics [b]	No. Federally or State Listed
Terrestrial Invertebrates (3.6.1)	83	30	19	0
Reptiles, Amphibians (3.6.2)	2	0	1	1
Native Resident Breeding Birds (3.6.3, 3.6.4, 3.6.5)	23	2	5	2
Terrestrial Mammals (3.6.6, 3.7.3)	6	2 [c]	1	1
Marine Invertebrates (3.6.7)	92	0	0	0
Marine Vertebrates (3.6.8, 3.6.9)	55	0	0	5
Vascular Plants (3.5)	272	14	29	8
Total	533	48	55	17

[a] Total number of species currently identified. Some taxonomic groups may not have been adequately surveyed at this time.

[b] No overlap of SCI endemics and Channel Island endemics unless stated.

[c] Subspecies of island fox and deer mouse are endemic to SCI. Fox species is endemic to Channel Islands, counted in both columns.

Endemic island populations are often considered high priority for conservation because of their vulnerability to extinction. Small, isolated populations are particularly vulnerable to extinction for a number of reasons. Demographic stochasticity (references in Simberloff 1988) that occurs in all populations will have more profound consequences for smaller populations than larger ones. Also because the gene pool of a small population is correspondingly small, the population is susceptible to certain genetic processes. High rates of inbreeding, which are often prevalent in island populations (Frankham 1998), can cause the frequency of expression of fatal genes to increase causing a decrease in fitness, known as inbreeding depression. In addition, rare alleles may be lost to a population through genetic drift, further shrinking the gene pool.

A resulting population with little genetic variability may be unable to respond to a relatively sudden environmental change or the introduction of a disease (Simberloff 1988, 1994). The greater variety of forms present in a population, the better chance that at least some individuals will be adaptable to changing conditions. Small populations are also vulnerable to extinction from singular catastrophes. Large-scale, catastrophic events such as hurricanes, devastating fires, or droughts can affect an entire island and leave few places untouched. Extinction may be the direct result of a catastrophe or an indirect result of the further shrinking of an already small gene pool. Disappearance may merely reflect inter-island movements of individuals of larger regional populations (e.g. some birds; Simberloff 1994). For example, song sparrows and Bewick's wrens believed to be extirpated from San Clemente Island for several years have been sighted on the island during loggerhead shrike surveys in March and November 2000 (U.S. Navy, unpublished data).

Island species may also be particularly susceptible to the introduction of exotic species. Frequently, island species evolve without the presence of many predators or competitors that inhabit the mainland. Consequently, when a new species is introduced to an island ecosystem, native species may not have defenses to protect themselves from predation or have the ability to compete with this new threat. The new threat may also come in the form of a disease. The introduction of non-native species to islands by humans has been devastating to many island species both as a direct result of predation and competition, and indirectly from habitat destruction. The replacement of entire plant communities with exotic species and the overgrazing of habitats by domestic stock have been dramatic on many islands including San Clemente Island. In reality, it is often a combination of factors acting in conjunction that leads a species to extinction, and the disappearance of some birds from islands may reflect merely inter-island movements of birds in larger regional populations rather than strict “extinction” (Simberloff 1994).

3.4 Island Vegetation

The flora of San Clemente Island is similar to that of the mainland with some important exceptions. The Island is rich in endemics, most of which are relictual but some are a result of divergent island evolution (Axelrod 1967). The ironwood tree (*Lyonothamnus floribundus* ssp. *asplenifolius*), for example, is found on SCI and Santa Catalina Island, but exists only in fossilized forms today on the mainland. A counterpart for the white-flowered paintbrush (*Castilleja grisea*) has never been found on the mainland or any other Channel Island.

Raven (1963) noted also 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. A partial explanation is that a much more mesic climate 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, more moderate conditions. Examples of plants found on SCI and northern California but not the nearby mainland are *Linanthus bicolor,* beach evening primrose (*Camissonia cheiranthifolia), Lathyrus vestitus*, and beach burr (*Ambrosia chamissonis* ssp. *chamissonis*). Examples of plants found on SCI and areas south are cliff spurge (*Euphorbia misera*), goldenbush *(Isocoma menziesii*) and island ragweed (*Senecio lyonii*). See appendix B for a complete list of plants.

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 Euphorbiaceeae). See Appendix B for a comprehensive species list of the Island.

3.4.1 Rare Plant Populations

San Clemente Island’s isolation has resulted in the presence of numerous endemic plant species, many of which had been declining due to overgrazing by introduced herbivores. However, recent transect data suggest that much of the native vegetation has begun to recover from past declines (Kellogg and Kellogg 2000). 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. Several plant species formerly located on the Island are now presumed extinct or extirpated on SCI (Table). Six species are listed as endangered by USFWS (Map 3-7), all but one of which are also considered endangered by CDFG (Table 3-5):

- San Clemente Island broom (*Lotus dendroides traskiae*)
- San Clemente Island bush mallow (*Malacothamnus clementinus*)
- San Clemente Island Indian paintbrush (*Castilleja grisea*)
- San Clemente Island larkspur (*Delphinium variegatum* ssp. *kinkiense*)
- San Clemente Island woodland star (*Lithophragma maximum*)
- Santa Cruz Island rock cress (*Sibara filifolia*)

Another 22 species were formerly on the USFWS Category 2 list as species of concern, but this list is no longer maintained. In total, there are 42 species endemic to SCI or the Channel Islands found on SCI (Table 3-5). The Island-wide distribution of rare plants are shown in Map 3-8.

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.

- A number of woody perennials occur on SCI that do not neatly fit into community categories. Their occurrence is isolated and relictual, or in such diverse habitats that their role in a particular community is unclear.

It is possible that some woody perennials may be remnants of a harder chaparral component to island flora that existed before the introduction of feral herbivores, similar to such plant communities on neighboring islands. Examples are *Malosma laurina, Dendromecon harfordii* ssp. *rhamnoides, Rhamnus pirifolia, Ceanothus megacarpus* ssp. *insularis, Ceanothus megacarpus* ssp. *megacarpus, Adenostoma fasciculatum* var. *fasciculatum*, and *Quercus chrysolepis.* All of these are fire adapted and require animals for dispersal of seed. The shrub *Crossosoma californicum* is an important chaparral component on Santa Catalina Island. On SCI it currently occurs on rocky outcrops throughout, quite often in *Lycium* scrub.

Table 3-5. Endemic plant species and species of concern on San Clemente Island. Plants are listed in taxonomic order according to The Jepson Manual.

Scientific Name	Common Name	USFWS, CDFG Status	CNPS Status	Global, State CNDDB Rank
SCI ENDEMICS				
Delphinium variegatum ssp. *kinkiense*	San Clemente Island larkspur	FE, SE	1B	G4T1, S1.1
Delphinium variegatum ssp. *thornei*	Thorne's royal larkspur	FC2	1B	G4T1, S1.1
Eriogonum giganteum var. *formosum*	San Clemente Island buckwheat	FC2	1B	G2T2, S2.2
Malacothamnus clementinus	San Clemente Island bush mallow	FE, SE	1B	G1, S1.1
Lithophragma maximum	San Clemente Island woodland star	FE, SE	1B	G1, S1.1
Lotus dendroideus var. *traskiae*	San Clemente Island broom	FE, SE	1B	G4T2, S2.1
Lotus argophyllus var. *adsurgens*	San Clemente Island silver hosackia	FC2, SE	1B	G5T1, S1.1
Astragalus nevinii	San Clemente Island milkvetch	FC2	1B	G2, S2.2
Camissonia guadalupensis ssp. *clementina*	San Clemente Island evening primrose	FC2	1B	G2T1, S1.2
Castilleja grisea	San Clemente Island Indian paintbrush	FE, SE	1B	G2, S2.2
Galium catalinense ssp. *acrispum*	San Clemente Island bedstraw	FC2, SE	1B	G4T2, S2.2
Stephanomeria blairii	Blair's Stephanomeria	FC2	1B	G2, S2.2
Brodiaea kinkiense	San Clemente Island brodiaea	FC2	1B	G2, S2.2
Triteleia clementina	San Clemente Island triteleia	FC2	1B	G1, S1.2
CHANNEL ISLAND ENDEMICS				
Dendromecon harfordii var. *rhamnoides*	Channel Island tree poppy	FC2, Presumed extinct on SCI	1B	G4T1, S1.1

Table 3-5. Endemic plant species and species of concern on San Clemente Island. Plants are listed in taxonomic order according to The Jepson Manual. (Continued)

Scientific Name	Common Name	USFWS, CDFG Status	CNPS Status	Global, State CNDDB Rank
Eschscholzia ramosa	island poppy		4	G3, S3.3
Quercus tomentella	island oak		4	G3, S3.2
Eriogonum grande var. *grande*	island buckwheat		4	G3T3, S3.2
Lavatera assurgentiflora ssp. *glabra*	southern island tree mallow (malva rose)	FC2	1B	G2T2, S2.1
Sibara filifolia	Santa Cruz Island rock cress	FE	1B	G1, S1.1
Dudleya virens ssp. *virens*	island green dudleya	FC2	1B	G2T2, S2.2
Jepsonia malvifolia	island jepsonia	FC2	4	G4, S3.3
Lyonothamnus floribundus ssp. *asplenifolius*	Santa Cruz ironwood	FC2	1B	G2T2, S2.2
Heteromeles arbutifolia var. *macrocarpa*	Christmas berry or toyon	No official status but of local concern.		
Astragalus miguelensis	San Miguel milkvetch		4	G3, S3.3?
Lupinus guadalupensis	Guadalupe Island lupine	FC2	1B	G2, S2.2
Trifolium gracilentum var. *palmeri*	Palmer's clover		4	G5T3, S3.2
Ceanothus megacarpus var. *insularis*	island big-pod ceanothus		4	G5T3, S3.3
Rhamnus pirifolia	island redberry		4	G3, S3.2
Lomatium insulare	San Nicolas Island lomatium	FC2	1B	G2, S2.1
Calystegia macrostegia ssp. *amplissima*	island morning-glory	FC2	4	G4G5T3, S3.3
Gilia nevinii	Nevin's gilia		4	G3, S3.2
Linanthus pygmaeus ssp. *pygmaeus*	pygmy linanthus		1B	G4T2, S1.2
Phacelia floribunda	San Clemente Island phacelia	FC2	1B	G2, S1.1
Amsinckia spectabilis var. *nicolai*	seaside fiddleneck	No official status but of local concern. this subspecies is no longer recognized.		
Cryptantha traskiae	Trask's cryptantha	FC2	1B	G2, S2.2
Galvezia speciosa	island snapdragon	FC2	1B	G2, S2.2
Scrophularia villosa	Santa Catalina figwort	FC2	1B	G2, S2.2
Artemisia nesiotica	island sagebrush		4	G3, S3.3
Hazardia cana	San Clemente Island hazardia	FC2	1B	G2, S2.2
Malacothrix foliosa ssp. *foliosa*	leafy malacothrix		4	G4T3, S3.2
Hemizonia clementina	island tarplant		4	G3, S3.3
Eriophyllum nevinii	Nevin's eriophyllum	FC2	1B	G2, S2.3
Dissanthelium californicum	California dissanthelium	Presumed Extinct	1A	GH, SH
OTHER NATIVES				
Aphanisma blitoides	Aphanisma		1B	G2, S1.1
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass		1B	G5T2?, S?
Crossosoma californicum	island apple-blossom		1B	G3, S3.2
Lycium brevipes var. *hassei*	Santa Catalina Island desert thorn	Presumed extirpated on SCI	1B	G4T1, S1.1
Microseris douglasii ssp. *platycarpha*	small-flowered microseris		4	G4T3, S3.2

USFWS and CDFG Codes: FC2 = Former Category 2, FE = Federally Endangered, SE = State Endangered;

California Native Plant Society (CNPS) Codes: 1A = Presumed extinct in California, 1B = Rare or Endangered in California and elsewhere, 2 = Rare or Endangered in California, more common elsewhere, 4 = Plants of limited distribution;

Global and State California Natural Diversity Database (CNDDB) 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 = 6-20 EOs 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 with the addition of threat categories: 0.1 = very threatened, 0.2 = threatened, 0.3 = no current threats known.

3.4.2 Genetic Studies

Currently ongoing are studies to determine the amount of genetic variability in selected plant species on San Clemente Island (Helenurm, University of South Dakota, *pers. comm*. 2001). Among the parameters being measured are total amount of variation on SCI, amount of inter-population variation, and the nature of that variation (i.e. populations may differ from one another in the alleles they contain and yet possess similar overall levels of genetic variation). The potential implications of genetic variability for management are:

- More variable populations are more valuable to the species as a whole and therefore may require greater protection.
- If populations of a species possess different alleles it may be beneficial to protect as many of the separate populations as possible.
- More variable populations can provide good sources for reintroduction of a species.

Table 3-6 provides a summary of the genetics research undertaken thus far. Blank cells indicate species for which data is not yet available. Table 3-7 provides a summary of population trends for each species in Table 3-6.

Table3-6. Genetic variability in selected plant species on San Clemente Island.

	Amount or type of genetic variation		
SPECIES	**Total amount of variation on SCI**	**Population diffs, amount of variation**	**Population diffs, type of variation**
Amsinckia spectabilis nicolai	*No longer recognized as a taxon*		
Astragalus nevinii	Low	Medium	Low
Camissonia guadalupensis clementina	Low	High	High
Castilleja grisea	Medium	Medium	Medium
Crossosoma californicum	None detected	?	?
Cryptantha traskiae	Very low	Low	Very Low
Delphinium variegatum ssp. kinkiense	Medium	Very low	Very low
Delphinium variegatum ssp. thornei	Medium	Very low	Very low
Jepsonia malvifolia	High	Low	Low
Lavatera assurgentiflora glabra	Very low	?	?
Lithophragma maximum	None detected	?	?
Malacothamnus clementinus	Very low	?	?
Phacelia floribunda	Low	Medium	Medium
Scrophularia villosa	Low	Medium	Medium
Sibara filifolia	Very low	?	?
Triteleia clementina	Low	Low	Low

Three Genetic Criteria:
1. Amount of variation in the taxon on SCI:
2. Amount of variation among populations on
3. Kind of variation among populations on SCI: Low, Medium, High

Management Implications:
1. More variable populations are more valuable, and require more protection.
2. If populations have different alleles, then should protect many populations.
3. Helps identify best sources for reintroduction.

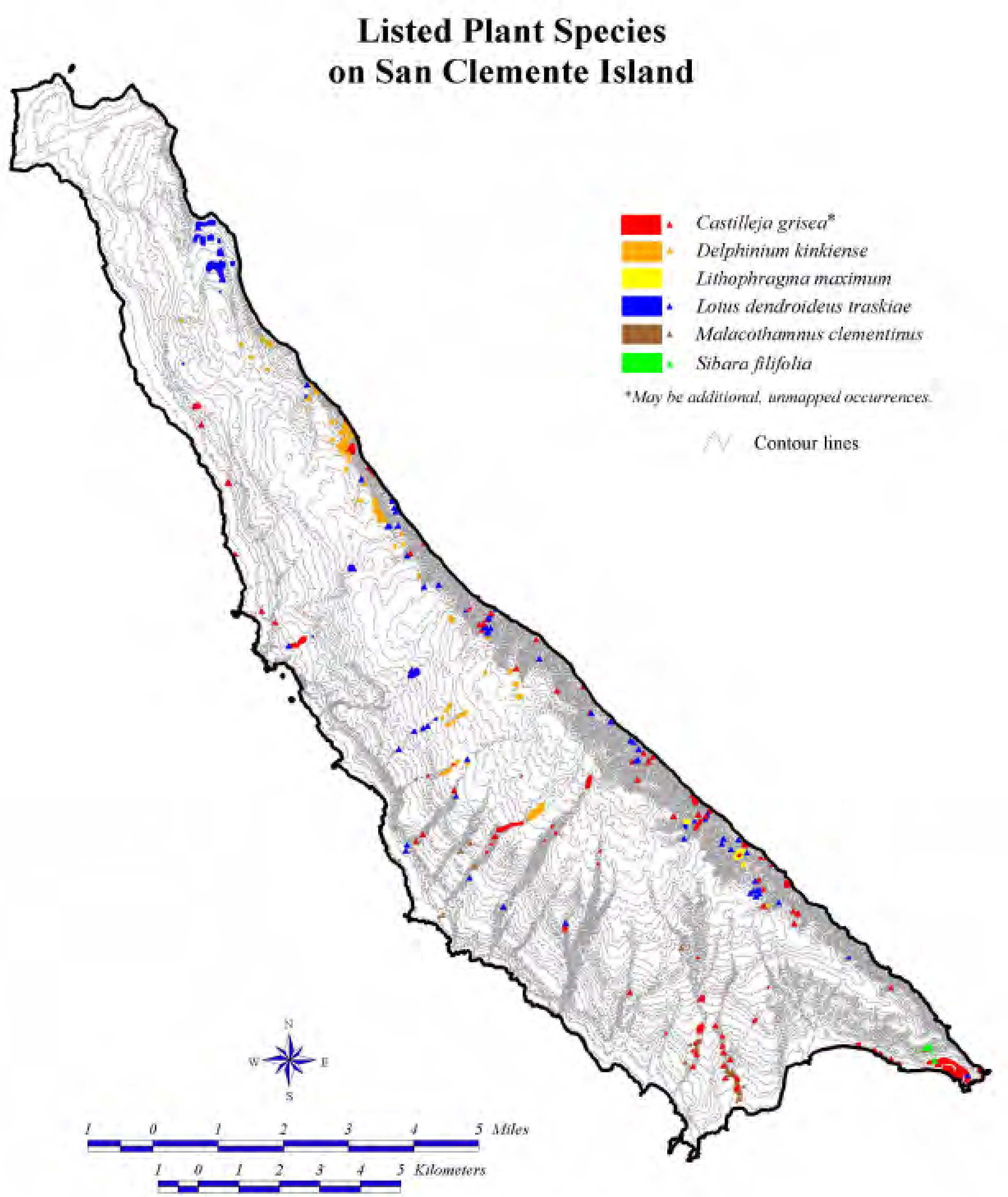
Example: *Delphinium* populations are almost completely equivalent genetically…none more valuable than another.
First Step: Ensure populations with diverse
Second Step: Ensure populations with different allele groups are protected.

Table3-7. Population trends in selected plant species on San Clemente Island.

	population trend (approximately 1980-present)*			
SPECIES	**Previous Status**	**96/97 Status (SBBG)**	**Occurrences Observed Since 96/97**	**Apparent Recent Change (1980-Present)**
Amsinckia spectabilis nicolai	*No longer recognized as a taxon*			
Aphanisma blitoides		21 occ (1-200) 915 ind		annual-hard to detect trend
Artemisia nesiotica		52 occ (4-500) 2500 ind		?
Astragalus miguelensis		common on active dunes		increasing
Astragalus nevinii	2200 outside main dune complex, many 1000s on dunes (1986)	34 occ (up to 2000) >6000 ind	3 additional	stable or increasing
Atriplex pacifica		14 occ (5-15) <100 ind		?
Bergerocactus emoryi		too common to map		stable
Brodiaea kinkiensis		70 occ 21000 ind	4 additional, many >21,000 seen in May, 2000	increasing
Calandrinia maritima	few on Willy's Ridge	not recorded		?
Calystegia macrostegia amplissima		very common		stable or increasing
Camissonia guadalupensis clementina	>6000 outside of main dune complex, many 1000s on main dune complex (1986)	33 occ (10-1000) 6570 ind	7 additional, many indiv.	stable
Castilleja grisea	6 occ <1000 ind (1980,86)	77 occ (4-600) 3500 ind	at least 12 additional	increasing
Ceanothus megacarpus insularis	1 ind (1980)	12 occ 20 ind		increasing?
Coreopsis gigantea	1 ind (1990)	few ind.	est. 1500 plants in 2001	increasing
Crossosoma californicum	5 ind (1980)	41 occ 60 ind	3 additional	increasing
Cryptantha traskiae	11000 ind (1986)	10 occ (150->10000) 23000 ind	4 additional	increasing
Delphinium variegatum ssp. kinkiense	13 occ 1500 ind (1986)	17 occ (7-1400) 5700 ind		increasing
Delphinium variegatum ssp. thornei	3 occ 1000 ind (1986)	17 occ (2->1000) 5000 ind		increasing
Dudleya virens virens	20 occ 8000 ind (1986)	268 occ (2-1900) 17000 ind		increasing
Eriogonum giganteum formosum	4 occ <2000 ind	106 occ (2-500) 3500 ind		increasing
Eriogonum grande grande				stable
Eschscholzia ramosa		50 occ (1-450) 2300 ind	many seen May, 2000	annual-hard to detect trend
Eriophyllum nevinii		very abundant on canyon walls, sea bluffs, rocks		stable or increasing
Galium catalinense acrispum	4 occ 225 ind (1986)	144 occ (1-75) 1300 ind		increasing
Gambelia speciosa	6 occ 4200 ind (1986)	common on canyon walls and in woodlands		increasing
Gilia nevinii	too common to map			stable
Hazardia cana	3 occ 106 ind (1986)	83 occ (3-85) 1300 ind		increasing
Hemizonia clementina	too common to map	common		increasing
Heteromeles arbutifolia macrocarpa				stable?
Hordeum intercedens	not recorded	too common to map		stable

Table 3-7. Population trends in selected plant species on San Clemente Island . (Continued)

	population trend (approximately 1980-present)*			
SPECIES	**Previous Status**	**96/97 Status (SBBG)**	**Occurrences Observed Since 96/97**	**Apparent Recent Change (1980-Present)**
Jepsonia malvifolia			18 occurrences	stable
Lavatera assurgentiflora glabra	24 ind (1986)	5 occ (3-37) 78 ind	4 occ, fewer ind.	decreasing
Lepidium virginicum robinsonii		3 occ 200 ind		?
Linanthus pygmaeus pygmaeus		fairly frequent in mesic grsslnd		stable
Lithophragma maximum	37 (1980) 9 (1986)	10 occ 465 ind		stable
Lotus argophyllus adsurgens	30 ind (1980) 66 ind (1986)	70 occ (3-150) 2400 ind		increasing
Lotus dendroideus traskiae	9 occ 1340 ind (1980)	64 occ (5-750) >3000 ind		stable or increasing
Lupinus guadalupensis	2750 ind (1986)	49 occ (10->500) 6300 ind	14 additional	increasing
Lyonothamnus floribundus aspleniifolius	927 ind (1986)	85 occ (5) unk.number ind	1 additional. Fires have killed a few ind., no reprod. known	stable or decreasing
Malacothamnus clementinus	28 ind (1980) 808 ind (1986)	18 occ (3-50) 290 ind	3 additional	stable or increasing
Malacothrix foliosa foliosa		too common to map		stable
Microseris douglasii platycarpha				annual-hard to detect trend
Mimulus flemingii				
Phacelia floribunda	5325 ind (1986)	37 occ (5-1500) 1600 ind	4 additional	stable or decreasing
Phacelia lyonii		30 occ (1-53) 270 ind		?
Quercus tomentella	77 ind (1986)	29 occ 37 groves		stable or decreasing
Rhamnus pirifolia	2 occ (1980)	12 occ (1-10) 44 ind		stable or increasing
Scrophularia villosa		8 occ (1-60) 100 ind		?
Sibara filifolia		5 occ 758 ind	2 additional, a few plants each	annual-hard to detect trend
Stephanomeria blairii	3 occ 263 ind	266 occ (1-500) 6000 ind		increasing
Trifolium palmeri		too common to map		?
Triteleia clementina	2 occ 315 ind (1986)	62 occ (4-385) 3600 ind	9 additional	increasing
Native taxa thought extirpated /extinct:				
Anemopsis californica, Batis maritima, Calystegia soldanella, Dendromecon harfordii (rigida?) rhamnoides, Dissanthelium californicum, Lomatium insulare, Lycium brevipes var. hassei, Malacothrix incana, Mimulus floribundus, Senecio flaccidus var. douglasii, Trifolium fucatum				



Map3-7. Known and mapped locations of federally endangered plant species on San Clemente Island. There may be additional, unmapped occurrences for some species. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

Map3-8. Mapped locations of rare plants on San Clemente Island (1996-2000). Some additional occurrences may be unmapped due to wide distribution and abundance across the island. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

3.4.3 Restoration and Nursery Propagation

The SCI Native Habitat Restoration Program is a relatively new program on the Island. It was developed with the goal of restoring the structure and function of SCI's ecosystems and thereby reduce the need for intensive single species management. The restoration program utilizes information collected through other Navy programs including the Vegetation Condition and Trend Analysis Program (Section 3.8.1.1), ongoing genetic studies (Section 3.4.2), and exotic weed control efforts (Section 3.7).

An important component of the restoration program is the newly developed native plant nursery. Located near the Natural Resources Facility in Wilson Cove, the nursery consists of an operations yard, a storage structure, a 24 X 48 ft greenhouse (Photo 3-7), a shade house, and outdoor benches. All plants to be used in habitat restoration, plant research, and landscaping projects will be grown in this facility. Most plants will be grown from seed, but other techniques such as stem and root cuttings will also be used. Records are kept of propagation techniques and success rates. Species currently grown in the nursery are listed in Table 3-8. Seed has been collected from a total of 47 species and is ongoing. The nursery has facilities for seed cleaning and storage.

Photo3-7. San Clemente Island native plant nursery greenhouse . Photo courtesy of Jonathan Dunn.

Table3-8. Plant species currently grown in San Clemente Island native plant nursery.

Artemisia californica	*Lavatera assurgentiflora ssp. glabra*
Ceanothus megacarpus ssp. megacarpus	*Lycium californicum*
Coreopsis gigantea	*Prunus lyonii*
Encelia californica	*Quercus tomentella*
Hazardia cana	*Rhamnus pirifolia*
Heteromeles arbutifolia	*Rhus integrifolia*
Isomeris arborea	

One of the primary focuses of the restoration program is restoring San Clemente loggerhead shrike habitat. Current habitat enhancement efforts include the clearing of exotic vegetation and the planting of native shrub species. Grazing by non-native herbivores in the recent past has reduced the cover of native shrubs preferred by shrikes, and has also resulted in the invasion of exotic annual grasses into areas formerly inhabited by bunch grasses or left bare. To improve bare ground characteristics at shrike release sites, several methods are to be employed including temporarily covering areas with plastic tarps and using string cutters to remove annual grasses. Native shrub species will be grown in the nursery and outplanted at sites with a lack of shrub cover and low habitat diversity. Sites selected for outplantings in coming years are shown in Table 3-9. In addition, treated sites will be planted with plugs of native bunch grass, primarily purple needlegrass *(Nassella pulchra)*.

Table3-9. Native shrub and grass species to be planted at selected sites in coming years.

Site	*Artemisia californica*	*Artemisia nesiotica*	*Encelia californica*	*Eriophyllum nevinii*	*Heteromeles arbutifolia*	*Malosma laurina*	*Nassella pulchra*	*Prunus lyonii*	*Rhus integrifolia*	Total
Lemon Tank	100	40	50	50	35	25	225	10	40	575
Burns Canyon	75	0	30	30	20	20	210	5	20	410
Horton Canyon	75	0	30	30	20	20	0	5	20	200
Boulder South	50	0	25	25	15	15	150	0	20	300
Boulder North	50	0	25	25	15	15	150	0	20	300
Total	350	40	160	160	105	95	735	20	120	1,785

Projects currently in the planning stages for island restoration include island oak (*Quercus tomentella*) reforestation, San Clemente sage sparrow habitat restoration, native grassland enhancement, sensitive species preservation and propagation, and an interpretive garden. Oak reforestation will involve the propagation and outplanting of oak seedlings to appropriate habitat. Sage sparrow habitat enhancement will involve the decompaction and seeding of roads that are no longer utilized and improving the cover of the maritime desert scrub community. To restore native grasslands, exotic grasses will be reduced, possibly through the use of controlled burns, in conjunction with the planting and seeding of native species. The Navy is currently seeking to obtain a permit from USFWS to collect seeds or propagation material from federally-listed Island plant species to grow in the nursery, then plant on the Island, improving population numbers. The goal of this kind of intensive management would be the eventual delisting of the species. Lastly, a demonstration garden is to be developed adjacent to the nursery for the education of Island personnel.

Current Management—Restoration and Enhancement

- Native plant species are being grown at the SCI native plant nursery for use in restoration programs.
- Seed of native plant species is being collected Island-wide for nursery propagation and revegetation projects.
- San Clemente loggerhead shrike habitat restoration is being conducted through the clearing of exotic vegetation and planting of native shrub species.
- Genetic studies to understand the reproductive biology of the island ironwood and improve recruitment of this declining species have begun.
- Projects currently in the planning stages for Island restoration include island oak reforestation, San Clemente sage sparrow habitat restoration, native grassland enhancement, sensitive species preservation and propagation, and an interpretive garden.

3.4.4 Landscaping and Grounds Maintenance

Current Management—Landscaping and Grounds Maintenance

Current direction from CNRSW and NRO requires that all landscape plants be grown at the on-Island nursery. Only native plants from seeds collected on the Island are allowed for landscaping purposes. All landscape plans and plant choices must be approved by the CNRSW botanist.

Current management complies with all federal regulations relating to invasive species, water use efficiency, and landscaping. The President has directed that federal agencies shall implement the following landscaping policies where cost-effective and to the extent practicable (EO 13112 1999):

- Use native plants for landscaping.
- Design, use, or promote construction practices that minimize adverse effects on the natural habitat.
- Seek to prevent pollution by among other things, reducing fertilizer and pesticide use, using integrated pest management techniques, recycling green waste, and minimizing runoff. Landscaping practices that reduce the use of toxic chemicals provide one approach for agencies to reach reduction goals established in EO 12856 “Federal Compliance with Right-To-Know Laws and Pollution Prevention Requirements.”
- Implement water-efficient practices, such as the use of mulches, efficient irrigation systems, recycled or reclaimed water, audits to determine exact landscaping water-use needs, and the selecting and planting of vegetation in a manner that conserves water and controls soil erosion. Landscaping practices, such as planting native shade trees around buildings to reduce air conditioning demands, can also provide innovative measures to meet the energy consumption reduction goal established in EO 12902, “Energy Efficiency and Water Conservation at Federal Facilities.”
- Create outdoor demonstrations incorporating native plants, as well as pollution prevention and water conservation techniques, to promote awareness of the environmental and economic benefits of implementing this directive. Agencies are encouraged to develop other methods for sharing information on landscaping advances with interested non-federal parties.
- Naval commanders approved these directives and issued guidelines for landscaping on Navy lands (DoN 1994). In keeping with these federal standards, U.S. Navy policy requires minimizing disturbance to native habitats and using integrated pest management practices, xeriscape landscaping, and recycled water in arid environments. To the extent practical, SCI must use native, drought-tolerant plants for landscaping and other beneficial water conservation techniques. Federal agencies are restricted in the use of exotic (non-native) plant species in any landscape and erosion control measures, as indicated by EO 11987. Care should be used in the renovation of existing landscape areas to ensure that non-native plants in the landscape do not have the propensity to escape into and threaten the native plant habitat.

3.4.5 Current Vegetation Mapping

The current SCI vegetation map was created in the late 1970s, and includes thirteen categories using the Thorne classification (1976) as adapted by Sward and Cohen (1980) based on mapping from aerial photos flown on March 11, 1977 at 15,000 ft altitude. Vegetation descriptions were based on sampling 11 study sites twice, in the dormant and growing seasons, representing four dominant plant communities and four physiographic habitats were sampled in 1976. Table 3-10 shows the mapping units, acreages, and percentages of the island area covered by them. This compares to maps of Santa Cruz Island (albeit a somewhat richer environment for plant communities) which include 36 communities or species combinations based on a minimum 20 percent cover criterion (Minnich 1980). Eighteen plant communities were mapped for Santa Catalina Island. The National Park Service (1991) has delineated 15 groupings on Santa Rosa Island, which for comparison include: bare ground, grassland, coastal sage scrub, mixed chaparral, Baccharis scrub, Lupine scrub, coastal bluff scrub, coastal marsh, caliche scrub, torrey pine woodland, coastal dune scrub, mixed woodland, island oak woodland, pond, closed-cone pine woodland, riparian woodland, eucalyptus, and cypress.

It is important to note that in the time since this vegetation map was created there may well have been shifts in distribution of some of the mapping units. In addition, shrub recovery in many parts of the island may also have altered the mapping units. Discrepancy between the total number of acres presented in Table 3-10 and the total acres presented in Section 1.4.3 are due to mapping error. The correct acreage total of the Island is 37,200 plus 54 acres in off-shore islands and rocks, as presented in Chapter 1.

Table3-10. Vegetation mapping units, acreages, and percentages of island area for San Clemente Island.

Vegetation mapping units	Acres	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

3.5 Ecological Units

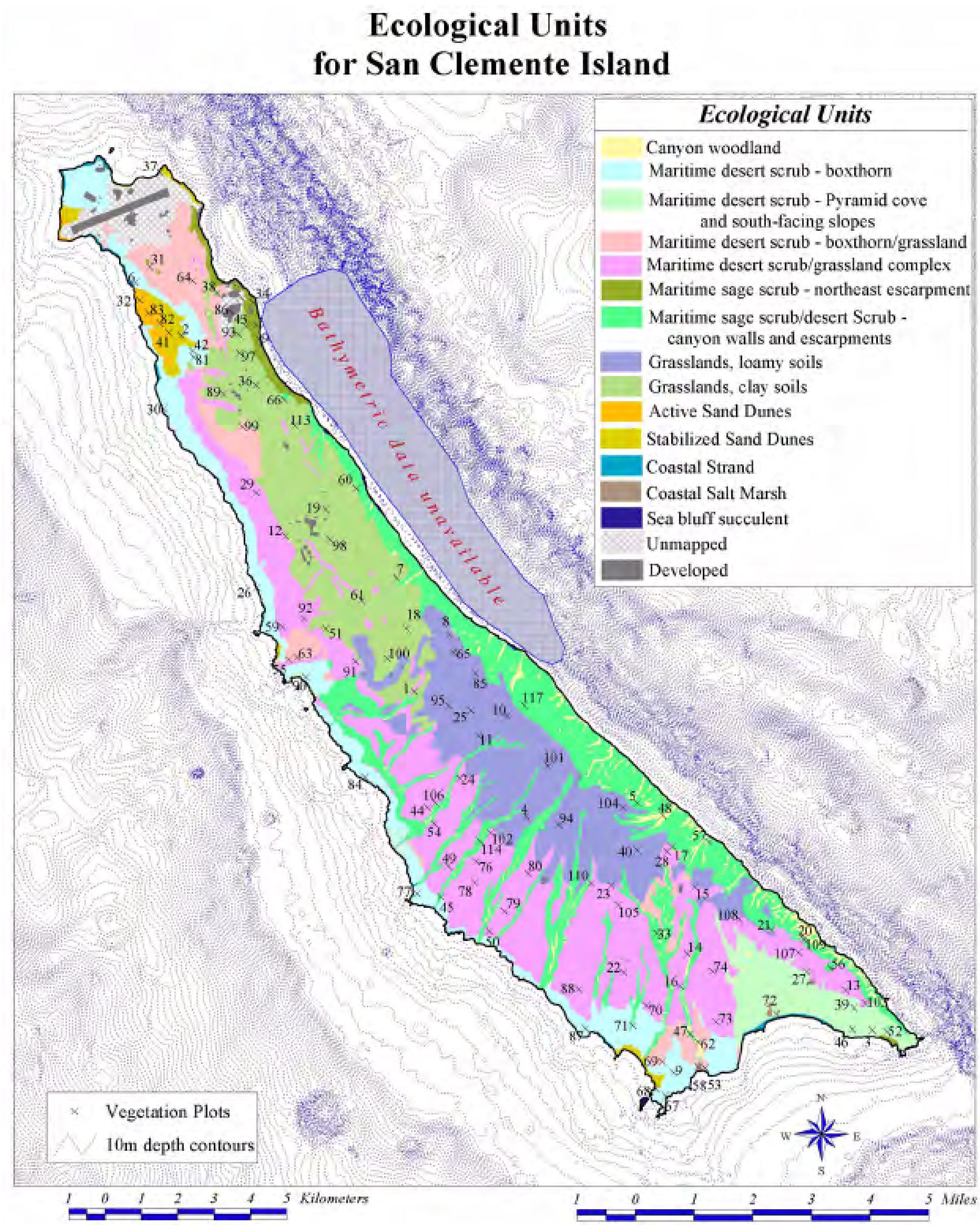
The vegetation mapping units currently used are generalized plant associations. Since an important goal for managing SCI's natural resources is preservation of the full range of ecological niches that occur, these units, by themselves, cannot be used to fulfill this purpose. For the purposes of this Plan, landform, soils, and vegetation maps were brought together to define new ecosystem management units that could better address management goals. In all, fourteen unique ecological units were identified (Table 3-11; Map 3-9). The map is followed by descriptions of the baseline status of these units as derived from long-term monitoring plot data from 1992-1993, the first year these plots were sampled. In each case we attempt to describe the range of species mixes typical within the mapping unit. These baseline years, following several years of drought, experienced twice the normal rainfall on the Island. So, the annual forb component of the community descriptions may be exceptional. For a detailed description of the vegetation condition monitoring program, see Section 3.8.1.2.

The vegetation mapping units labeled as 'disturbed' in the original vegetation mapping were re-designated with an appropriate ecological unit label where possible. Outside of known developed areas (360 acres of buildings and other structures), each area was assigned to the ecological unit closest to it and verified by the 2000 aerial photo as indistinguishable from the surrounding area. All but approximately 900 acres of the more than 2,600 acres originally labeled as 'disturbed' was easily assigned to an ecological unit, the remaining areas requiring some level of on-site field observation. The remaining areas are currently marked as 'unmapped' and can eventually be re-designated as opportunity permits.

Table3-11. Ecological units, acreages and percentages of Island area for San Clemente Island.

Ecological units	Acres	% of Island area
Canyon woodland	696.2	1.9
MDS - Boxthorn	3621.0	9.7
MDS- Boxthorn/Grassland	2188.8	5.9
MDS/Grassland complex (terrace faces and flats)	8921.4	23.9
MDS - Pyramid Cove and south-facing slopes	1611.5	4.3
Maritime Sage Scrub (MSS)- northeast escarpment	369.9	1.0
MSS/Desert scrub- canyon walls and escarpments	5858.3	15.7
Grasslands, loamy soils	5275.9	14.2
Grasslands, clay soils	5383.7	14.5
Active sand dunes	223.8	0.6
Stabilized sand dunes	412.9	1.1
Coastal strand	166.8	0.4
Coastal salt marsh	19.3	0.1
Sea bluff succulent	36.0	0.1
Developed	359.1	1.0
Unmapped	916.1	2.5

Heteromeles are frequently found on low riparian benches adjacent to and parallel to the drainage. (All Island streams are ephemeral.) The *Lyonothamnus* groves tend to follow rock ledges where water accumulates and deeper soil prevails.



Map3-9. Proposed ecological units for San Clemente Island, showing long-term monitoring locations for collecting baseline vegetation condition and trend data (Section 3.8.1.1). (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

3.5.1 Canyon Woodland (696.2 acres)

- While the canyon woodlands occupy only about two percent of the Island area, most of the vegetative structure, floral and wildlife diversity is contained in them.

Canyon Woodland Status Summary

While the canyon woodlands occupy only about two percent of the Island area, much vegetative structure and floral and wildlife diversity are contained within them. Vegetation within canyons is strongly affected by aspect. The hotter aspects are scantily vegetated with *Artemisia californica* and *Opuntia littoralis*. The upper canyons can be mostly grassland, with a patchwork of shrubs or trees grouped in rock outcrops, seepy areas, or pockets of water concentration and deeper soil.

Many southwestern canyons and most canyons on the southern half of the east escarpment (from about Stone Station south) harbor groves of trees and shrubs. *Quercus* stands tend to be on upper north canyon slopes, while the *Prunus* and *Prunus lyonii, Quercus tomentella, Lyonothmanus floribundus* ssp. *asplenifolius, Sambucus mexicana, Rhus integrifolia* and *Heteromeles arbutifolia* are the common tree species. Other species are characteristic of canyon walls and cliffs: *Gambelia speciosa, Galium catalinense* ssp. *catalinense, Eriophyllum nevinii, Dudleya virens* and the long, snaking, tangled arms of *Bergerocactus emoryi* "snake cactus." Understory is variable, depending partly on canopy closure. *Bromus diandrus* often dominates the more open groves, with occasional shrubs of *Opuntia* spp., *Artemisia californica*, *Encelia californica* or *Rhus integrifolia. Zauschneria californica, Lotus dendroideus* var. *traskiae* and *Castilleja grisea* are showing up more commonly in the canyons since goats have been removed. *Malacothamnus clementinus* occurs as a shrub component on several sites. The understory is also rich in many diverse perennial herbs or subshrubs such as *Stephanomeria blairii, Bowlesia incana, Adiantum jordani,* a local, red-flowered form of *Mimulus aurantiacus (previously known as Diplacus parviflorus), and Phacelia floribunda.*

The woodlands provide the most important structural component of habitat and food for Island birds. They provide watershed protection. They create microsite diversity for several sensitive plant species.

Many groves, especially of the oak and ironwood trees, appear senescent. Reports from all but the most recent years tell of barren soil layered with goat droppings beneath these trees. There has been much root exposure in oak groves as precious soil is lost and subsequent death of the trees. Browse lines are evident everywhere. However, many ironwood trees that appeared dead are sprouting abundantly after the successful goat removal program and abundant rains of 1992 and 1993. Most stands now have at least some understory. There are beginning to be reports of seedlings: a few *Quercus tomentella, Rhus*, and abundant *Prunus lyonii*. There is some thought that historically most of the eastern escarpment was covered with trees, with a report of up to 1,000 trees on slopes due east of Mt. Thirst (Raven, 1963 citing *pers. comm*. with Murbarger). *Lyonothamnus* trees have historically been reported in all eastern canyons from Mt. Thirst south.

Soils: Soils on the escarpment and canyon slopes are mapped coarsely. They are very shallow and weakly developed, but deeper pockets are sufficient to support large trees. The surface soil texture is a silt loam to clay loam with some cobble or gravel content. Steep slope has prevented significant soil development in these areas. Where subsoil does exist, it is a cobbly clay underlain by extremely cobbly sediments or hard volcanic rock. Deeper soils are found on the less severe slopes or in deposition areas. Areas of exposed rock outcrop are common.

Range of Variation: Dominance varies among *Quercus tomentella, Heteromeles arbutifolia* ssp. *macrocarpa, Prunus ilicifolia* spp. *lyonii, Lyonothamnus floribundus* ssp. *aspleniifolius* and *Rhus integrifolia* .

Sensitive Plants: *Castilleja grisea, Ceanothus megacarpus* ssp. *insularis, Delphinium variegatum* ssp. *thornei, Dendromecon harfordii* ssp. *rhamnoides* (if still on Island), *Dudleya virens* var. *virens, Eriogonum giganteum* var. *formosum, Eriophyllum nevinii, Galium catalinense* ssp. *acrispum, Gambelia speciosa, Hazardia cana, Heteromeles arbutifolia* ssp. *macrocarpa, Jepsonia malvifolia, Lithophragma maximum, Lotus dendroideus* var. *traskiae, Lyonothamnus floribundus* ssp. *aspleniifolius, Malacothamnus clementinus, Phacelia floribunda,Quercus tomentella, Phacelia lyonii, Rhamnus pirifolia, Scrophularia villosa, Stephanomeria blairii, Triteleia clementina.*

Sensitive/Endemic Animals (actual and potential use): San Clemente loggerhead shrike (*Lanius ludovicianus mearnsi*), Island night lizard (*Xantusia riversiana*), house finch (*Carpodactus mexicanus clementis*), orange-crowned warbler (*Vermivora celata sordida*), Allen's hummingbird (*Selasphorus sasin sedentarius*), horned lark (*Eremophila alpestris insularis*), San Clemente Island fox (*Urocyon littoralis clementae*).

Range of Species Richness based on plots: 21-79 species

Vegetation Monitoring Plots: 5, 20, 33, 45, 47, 48, 56, 57, 109, 114

Potential Threats: stand-replacing, frequent, or large fires that delay re-occupation by native wildlife; storm flows in excess of ability to process without root scour; ongoing erosion; lack of reproduction / age class structure to oaks, ironwoods.

***% Cover of Top 10 Cover Species in Baseline Years 1992**-1993 (10 plots)*

Bromus diandrus	30.2
Prunus ilicifolia lyonii	27.2
Avena barbata	10.8
Rhus integrifolia	9.5
Lyonothamnus floribundus asplenifolius	8.4
Quercus tomentella	7.2
Clayotonia perfoliata mexicana	5.3
Bromus madritensis rubens	5.1
Pholistoma racemosum	3.4
Heteromeles arbutifolia	3.2

Many recent reports of new shrub sightings represent the return of structural integrity to the woodlands. The community trend is improving. However, potential long-term viability of these woodland is only moderate because of the decadent state of many woodland components and threat of decline or even extinction of some. Some restoration efforts are needed to assure recovery.

3.5.2 Maritime Desert Scrub: Boxthorn (3621.0 acres)

Maritime Desert Scrub: Boxthorn Status Summary

This community occurs in a band of well-drained soils on the first few terraces of the west shore adjoining the coast. It represents about 16 percent of total island area. It is home to the San Clemente sage sparrow (*Amphispiza belli clementae*), a federally threatened species, and habitat for other wildlife. It harbors a number of endemic plants. The terrace flats function as depositional areas for the eroding slopes and terrace faces above them.

Lycium californicum (a low, spiny shrub), *Malacothrix foliosa, Bergerocactus emoryi, Hemizonia clementina, Atriplex californica, A. semibaccata, Opuntia littoralis* and *Amblyopappus pusillus* are plentiful. On the more disturbed sites *Amblyopappus* *pusillus*, *Bromus madritensis* ssp. *rubens*, *Mesembryanthemum nodiflorum* and *M. crystallinum* predominate. The best developed sites feature a nearly complete cover of the perennials with sometimes the endemic annual *Lupinus guadalupensis* creating a violet and yellow show with *Malacothrix foliosa*, *Lasthenia californica*, other lupines, *Trifolium palmeri*, *T. tridentatum* and occasionally *Senecio lyonii*. Interspaces between the shrubs are commonly protected by a lichen layer and a varying cover of annual species such as *Crassula connata*, *Filago californica* and the exotic iceplant *Mesembryanthemum* spp., depending on seasonal rains and local site conditions. Commonly tangled within the shrubs themselves are the vine-like annuals *Pterostegia drymarioides* and *Pholistoma racemosa*.

Lycium californicum is the a major structural component of the type. Its fruits provide food for wildlife including the San Clemente sage sparrow, which uses the cactus species such as *Bergerocactus emoryi* for perching and nesting. The bird also has been shown to favor the interface or edge between *Lycium californicum* and *Artemisia nesiotica* or *A. californica*. Birds are required for seed dispersal of *Lycium*.

The *Lycium*, *Bergerocactus* (and the *Opuntia* cacti) and endemic *Hemizonia clementina* can be considered indicators of habitat structural quality for this community. Diversity can be indexed by *Lupinus guadalupensis*, *Aphanisma blitoides* and *Senecio lyonii*.

The responses to fire of the dominant species of this community are unknown. Presumably the type is not well-adapted because of the succulent nature of plants such as the velvet cactus, *B. emoryi*. There is no evidence any of the dominant species is fire dependent.

Soils: On the lowest marine terraces, deeper soils, classified as the Westshore Series, have formed. These soils have a stony silt loam surface horizon that can extend to six inches and subsoil that extends to forty-two inches, making them one of the more developed soils on the Island. Like many soils on the Island, these soils have a loamy surface horizon unrelated to the profile beneath. The subsoil is primarily clay and has thick brown argillic horizons. Westshore soils were formed in a fine alluvium that was deposited over sandy marine sediments.

Range of Variation: Approximately twice the average cover of boxthorn occurs on lowest-terrace soils Westshore silt loam compared to other soils underlying this plant community.

Sensitive Plants: *Aphanisma blitoides*, *Bergerocactus emoryi*, *Dudleya virens* var. *virens*, *Eschscholzia ramosa*, *Gilia nevinii*, *Hemizonia clementina*, *Hordeum intercedens*, *Lupinus guadalupensis*, *Malacothrix foliosa* ssp. *foliosa*, *Trifolium palmeri*.

Sensitive/Endemic Animals (actual and potential use): Island night lizard (*Xantusia riversiana)*, San Clemente sage sparrow, San Clemente house finch (*Carpodactus mexicanus clementis*), horned lark (*Eremophila alpestris insularis*), San Clemente Island deer mouse (*Peromyscus maniculatus)*.

Range of Species Richness based on plots: 20–44 species

Vegetation Monitoring Plots: 6, 9, 26, 55, 63, 67, 68, 69, 71, 77, 81, 84, 87, 90, 99

Potential Threats: stand-replacing, frequent, or large fires that delay re-occupation by native wildlife; ground-disturbing activities.

% Cover of Top 10 Cover Species in Baseline Years 1992-1993 (15 plots):

Bromus madritensis rubens	24.1
Lycium californicum	21.8
Amblyopappus pusillus	18.1
Opuntia littoralis	10.7
Avena barbata	10.5
Atriplex semibaccata	9.1
Lotus argophyllus var. argenteus	9.1
Trifolium gracilentum var. palmeri	6.1
Hordeum intercedens	5.9
Pterostegia drymarioides	5.1

The shrub interspaces of this community are eroded in places where the protective lichen cover on the silty loam soils is disturbed and the subsoil exposed to wind erosion. The lichen crust is frequently pedestalled. The cryptogams are needed to protect the highly erodible soil from strong Island winds.

Current Management—Maritime Desert Scrub: Boxthorn

- Under the Island Night Lizard Management Area (INLMA) BO (1-6-97-F-58), the Navy coordinates with USFWS regarding projects or training activities proposed in Maritime Desert Scrub Lycium Phase or Maritime Desert Scrub Prickly Pear Phase throughout the INLMA. See Section 3.6.2 for details on this BO. Also, a BO on TARs 1, 4, and 16 in Northwest Harbor limits disturbance to boxthorn without compensation. Otherwise, this community is managed through the site approval process and fire season controls on ignitions to prevent fires.

3.5.3 Maritime Desert Scrub: Boxthorn/Grassland (2188.8 acres)

Soils: On hills and terraces located farther inland are the San Clemente clays. These soils differ from the clay soils found closer to the west shore in that the subsurface horizons contain a significant amount of clay but no argillic horizons. The sub-soil is a dark brown and is quite deep, extending to 52 inches. San Clemente soils were formed in alluvium resting on andesite as opposed to marine sediments. The surface soil is a silt loam that extends to two inches. The San Clemente clays cover a large portion of the Island and have a wide range of characteristics. Included in the series are areas that have cobbly clay in the subsurface soil, small inclusions of other soils that do have clay horizons, and severely eroded and gullied areas.

Current Management—Maritime Desert Scrub: Boxthorn/Grassland

- Under the INLMA BO (1-6-97-F-58) that addressed the creation of the INLMA, the Navy coordinates with USFWS regarding projects or training activities proposed in Maritime Desert Scrub Lycium Phase or Maritime Desert Scrub Prickly Pear Phase throughout the Island. See Section 3.6.2 for details. Otherwise, this community is managed through the site approval process and fire season controls on ignitions to prevent fires.

3.5.4 Maritime Desert Scrub: Complex (8921.4 acres)

Maritime Desert Scrub: Complex Status Summary

The ecological unit Maritime Desert Scrub (MDS): Complex is a combination of various habitat types. It occurs along the western side of the Island, spanning terraces as it climbs from sea level to higher elevations. It occurs in a band inland from the boxthorn habitat, reaching its peak generally at lower elevations than the main plateau. The flat steps of the terraces are populated by a grassland community that was heavily grazed during the epoch of feral animals on the Island. Since the removal of feral grazers, the grasslands have been in a dynamic state. The terrace slopes are characterized by more rocky soils than their flat counterparts; they are home to maritime desert scrub community. On the southern part of the Island, this community is dominated by the cholla phase, which transitions into the prickly pear phase as it moves northward up the coastline. The northern scrub community is dominated by prickly pear.

The natural extent of cactus before grazing animals were introduced may never be known. Sheep, cattle, and goats probably spread the cactus with heavy grazing. The cactus patches acted as havens for palatable shrubs and herbaceous species when goat grazing was at its peak.

The following description of the MDS Complex unit is presented in two main sections, one describing conditions on the terrace faces, the other describing the terrace flats. The first section is further sub-divided into a cholla phase and a prickly pear phase.

3.5.4.1 Terrace Faces (not mapped separately)

MDS-Cholla Phase

This variation of the Maritime Desert Scrub type is dominated by *Opuntia prolifera*. It is most pronounced on the southern Island slopes and terraces, and grades into dominance by *Opuntia littoralis* as it progresses northward. It may have spread beyond its natural range via cactus segments clinging to goats as they moved about, and by the artificial suppression of competing shrubs and herbs by heavy grazing and fire. The type represents about 14 percent of the Island flora.

The clusters of *Opuntia prolifera* vary greatly in density and can be found in a matrix of grassland, annual herbs, or shrubs such as *Artemisia californica*, *Euphorbia misera*, or *Encelia californica*. Other associated species are *Mirabilis californica*, *Rhus integrifolia*, *Lotus argophyllus* ssp. *ornithopus* and *Gnaphalium* spp.

The shrubs associated with the type (i.e. *Artemisia* and *Encelia*), while sparse, harbor insects that serve as a food source for wildlife, or are a food source themselves (i.e. *Rhus*). Raven reported in 1963 an unusual *Encelia californica* shrub growing to 12 ft tall in ‘Chalk Cliff Canyon’. The cactus itself is used as a perch or for nesting or roosting. Cactus fruits are a seasonal source of food for birds and the Island fox. With the exception of *R. integrifolia*, most of the occasional shrubs occurring in the type are short-lived.

The occasional shrubs are the indicator species for this plant community. Diversity is represented by the herbaceous matrix between the cactus patches and depends on microsite conditions and seasonal rainfall patterns. *Castilleja grisea*, *Lotus argophyllus* ssp. *adsurgens* and *Sibara filifolia* are sensitive species found within this plant community.

This community can tolerate fire but is not a fire type, like its relative Diegan coastal sage scrub. *Opuntia prolifera* and *Euphorbia misera* are presumably not adapted to fire because of their succulent nature. Excessive fire frequency may be detrimental. Seeds of the shrub species are self- or wind-dispersed, with the exception of *Rhus integrifolia* which requires birds for dispersal.

MDS-Prickly Pear Phase

This community, which occurs from Santa Catalina to islands off the coast of Baja California, appears to be a southern variation of the mainland's coastal sage scrub (Philbrick and Haller 1977). This plant association ranges from dense clumps obscured by a matrix of tall annual grasses to, especially on the terrace faces, dense thickets with shrub species such as *Artemisia californica, Artemisia nesiotica,* and *Mirabilis laevis* mixed in with herbaceous plants like *Pterostegia drymarioides*, and *Antirrhinum nuttallianum* ssp. *subsessile*. The community covers about 20 percent of the Island area, grading into grassland, Maritime Desert Scrub: Lycium Phase, Maritime Desert Scrub: Cholla Phase and Maritime Sage Scrub at its various extremes.

Typical species are *Opuntia littoralis, Mirabilis californica, Lotus argophyllus* ssp. *ornithopus, Gnaphalium bicolor,* and *Perityle emoryi. Aphanisma blitoides*, a sensitive species because of loss of habitat, is sometimes found in this type as well as that dominated by *Lycium californicum*. Winding in and out of the cactus pads are *Pterostegia drymarioides, Calystegia macrostegia* ssp. *amplissima* and *Pholistoma racemosa*. Occasional shrubs are *Baccharis pilularis, Artemisia californica, Isocoma menziesii* and *Rhus integrifolia*. In some places on the Island, such as the southern plateau, it appears that *R. integrifolia* and possibly *Heteromeles arbutifolia* were historically more abundant in this type than is currently found. Vines like *Calystegia macrostegia* ssp. *amplissima* can now be seen overtaking the patches unencumbered by grazing.

The prickly pear has been important for community structure and for sheltering succulent species and shrub seedlings from herbivores. With the exception of *R. integrifolia,* most of the occasional shrubs occurring in the type are short-lived and considered seral in other locales. The wildlife value of *Baccharis* is not known, although on rare occasions the shrike has been reported to nest in this species. *Artemisia* supports insects utilized by wildlife for food. It remains to be seen how the shrub component of this community will change over time now that feral herbivores are removed. It may be that the prickly pear has been artificially abundant due to its tolerance of grazing and its ability to withstand fire and benefited by the demise of its competitors with fire.

The occasional shrubs are the indicator species for this plant community. Diversity is represented by the herbaceous matrix between the cactus patches and depends on microsite conditions. It can include native grasses such as *Nassella lepida, Deschampsia danthonioides, Agrostis pallens* or *Bromus carinatus,* or herbaceous annuals such as *Gilia nevinii, Layia platyglossa, Lupinus guadalupensis,* and *Microseris douglasii*.

The type is capable of sustaining itself without fire. The shrub species are wind-pollinated and self-dispersed except for *Rhus integrifolia* which requires birds for seed dispersal. *R. integrifolia* resprouts after fire but not vigorously, so excessive fire frequency may be detrimental to it.

Soils. As slope increases on the west coast, soils become less deep. The Eel Cove soils have a shallow surface horizon, with an average depth of four inches and subsurface soil that extends to about thirty- three inches. The texture of the surface soil is a stony silt loam, similar to the soils found closer to the shore. Subsurface soils have clay horizons and are a deep reddish brown in color. Similar to the Westshore soils, these soils formed in mixed alluvium resting sandy marine sediments. Eelcove soils are found in steep areas but do not extend down into the canyons. In very steep areas, such as on the sides of canyons, subsoil may not be present. Some areas can be as shallow as two inches in the surface horizon, and contain clay in the subsurface horizon but no clay horizons and overlay andesite as opposed to a marine deposit. At the northern end of this soils' range, there are areas of severe erosion.

Range of Variation: Most southern Island areas are dominated by cholla rather than prickly pear.

Sensitive Plants: *Aphanisma blitoides, Artemisia nesiotica, Castilleja grisea, Crossosoma californicum, Dendromecon harfordii* ssp. *rhamnoides* (if still on Island), *Dudleya virens* var. *virens, Eschscholzia ramosa, Gilia nevinii, Hazardia cana, Heteromeles arbutifolia* ssp. *macrocarpa, Lotus argophyllus* var. *adsurgens, Lupinus guadalupensis, Malacothamnus clementinus, Stephanomeria blairii.*

Sensitive/Endemic Animals (actual and potential use): San Clemente loggerhead shrike, Island night lizard, house finch, horned lark, San Clemente Island deer mouse, San Clemente Island fox.

Range of Species Richness based on plots: 18–64 species

Vegetation Monitoring Plots: 12, 13, 14, 29, 44, 79, 80, 88, 102

Potential Threats: stand-replacing, frequent, or large fires that delay re-occupation by native wildlife.

% Cover of Top 10 Cover Species in Baseline Years 1992–1993 (9 plots)

Opuntia littoralis	16.0
Bromus madritensis rubens	15.6
Avena barbata	11.6
Vulpia myuros	11.6
Nassella pulchra	10.1
Amblyopappus pusillus	8.1
Lycium californicum	6.4
Bromus hordeaceus	5.4
Nassella lepida	5.4
Pterostegia drymarioides	4.0

This community is in a dynamic state on SCI. The removal of feral grazers and abundant rainfall in 1999 and 2000 has released many previously suppressed species that had been sheltered by the prickly pear. Species composition shifts are expected and should be monitored. Overall, the type is expected to have high long-term viability with some changes in relative cover of indicator species.

Current Management—Maritime Desert Scrub: Complex

- Under the INLMA BO (1-6-97-F-58) that addressed the creation of the INLMA, the Navy coordinates with USFWS regarding projects or training activities proposed in Maritime Desert Scrub Lycium Phase or Maritime Desert Scrub Prickly Pear Phase.

3.5.4.2 Terrace Flats-Grassland Phase

This community occurs on the terrace flats and contains varying amounts of grasses and cacti. It intergrades with the Terrace Face variety of the MDS Complex.

Range of Variation: presence of cholla, prickly pear, boxthorn or other shrub in a matrix of mostly exotic annual grasses.

Sensitive Plants: *Hemizonia clementina, Hordeum intercedens, Lavatera assurgentiflora* ssp. *glabra?, Trifolium palmeri.*

Sensitive/Endemic Animals (actual and potential use): San Clemente loggerhead shrike, Island night lizard, horned lark, San Clemente Island deer mouse, San Clemente Island fox.

Range of Species Richness based on plots: 14–48 species

Vegetation Monitoring Plots: 16, 19, 22, 27, 39, 49, 50, 51, 54, 59, 60, 64?, 66, 70, 73, 75, 76, 78, 89, 91, 92, 93, 97, 98, 106, 113 (like high plateau clay?)

Potential Threats: erosion; excessively frequent, stand-replacing, or large fires to allow shrub regrowth?

% Cover of Top 10 Cover Species in Baseline Years 1992–1993 (26 plots)

Avena barbata	18.6
Bromus madritensis rubens	17.5
Amblyopappus pusillus	14.8
Bromus hordeaceus	10.6
Vulpia myuros	8.5
Avena fatua	7.7
Lycium californicum	6.0
Atriplex semibaccata	4.7
Nassella pulchra	4.5
Opuntia littoralis	4.4

3.5.5 Maritime Desert Scrub: Pyramid Cove and Other South Slopes (1611.5 acres)

This community occurs almost solely in the Pyramid Cove area, with a few scattered pockets elsewhere (approximately 4% of Island acreage). Areas designated as MDS-Pyramid Cove are unmapped for both soils and vegetation, it is identified separately here due to the unique soil conditions and plant species assemblages seen there. There are also many rare plant species that occur in these areas, some of which represent a large percentage of the Island populations.

Range of Variation: Some sites have substantial *Encelia californica* or *Euphorbia misera.* Primary grass is *Bromus madritensis rubens.*

Sensitive Plants: *Calandrinia maritima, Crossosoma californicum,* possible habitat of *Disanthelium californicum?* (believed extinct), *Dudleya virens* var. *virens, Euphorbia misera, Lepidium virginicum* var. *robinsonii, Lotus argophyllus* var. *adsurgens, Phacelia floribunda, Sibara filifolia.*

Sensitive/Endemic Animals (actual and potential use): San Clemente loggerhead shrike, Island night lizard, San Clemente Island fox.

Range of Species Richness based on plots: 43–44 species

Vegetation Monitoring Plots: 3, 46

Potential Threats: excessively frequent or large fires that delay re-occupation by native wildlife.

% Cover of Top 10 Cover Species in Baseline Years 1992–1993 (2 plots)	
Bromus madritensis rubens	16.0
Malacothrix foliosa	15.5
Lotus argophyllus var. argenteus	8.5
Encelia californica	7.5
Atriplex semibaccata	7.0
Lasthenia californica	7.0
Opuntia littoralis	6.5
Opuntia prolifera	6.0
Avena barbata	4.5
Amblyopappus pusillus	3.5

Current Management—Maritime Desert Scrub: Pyramid Cove and Other South Slopes

- Under the INLMA BO (1-6-97-F-58) that addressed the creation of the INLMA, the Navy coordinates with USFWS regarding projects or training activities proposed in Maritime Desert Scrub Lycium Phase or Maritime Desert Scrub Prickly Pear Phase.

3.5.6 Maritime Sage Scrub (6228.2 acres)

- There are several ways that communities with high cover of *A.californica* or *A.nesiotica* occur on the Island. These are lumped as Maritime Sage Scrub. There is some thought that Maritime Sage Scrub on SCI may at one time have included harder chaparral components that now are isolated individuals about the Island. These include *Heteromeles arbutifolia, Ceanothus megacarpus, Adenostoma fasciculatum, Crossosoma californicum, Dendromecon harfordii* ssp. *rhamnoides*, and *Malosma laurina*. The vector for seed dispersal of these hard chaparral species is birds, so their occurrence may be due simply to random visits from birds, for example, from Santa Catalina Island.

Maritime Sage Scrub Status Summary

There are several ways that *Artemisia californica* and *A. nesiotica* present themselves in the plant communities of San Clemente Island. The first is the dense scrub type most commonly found on precipitous northeastern escarpments on the Island, thought to be in a remnant condition on SCI by some botanists. There is some thought that this may at one time have included harder chaparral components that now are isolated individuals about the Island. These include *Heteromeles arbutifolia, Ceanothus megacarpus, Adenostoma fasciculatum, Crossosoma californicum, Dendromecon rigida* ssp. *rhamnoides*, and *Malosma laurina* (Beauchamp and Radtke 1989). *Adenostoma fasciculatum* (chamise), in contrast, is wind disseminated and just as scarce on SCI. However, the presumed-extinct SCI Bewick's wren subspecies reportedly favored a chaparral community (S. Vissman, USFWS, *pers. comm.* 2001) which suggests the community may have been more widespread on the Island.

The second sagebrush association on the Island occurs on the hot, dry aspects of canyon slopes. *Artemisia californica* now dominates these sites along with *Opuntia littoralis*, whereas only 12 years ago Resnick (1988) reported the sagebrush to be "uncommon" and isolated in the centers of prickly pear patches. In 1950 Dunkle reported the coastal sagebrush community, characterized by *Artemisia californica*, as occurring in only small areas of the southern third of the Island.

The third occurrence of *A. californica* is in clumps on west shore and southern terrace escarpments. On the north end of the Island these areas are similar to the acres of scrub on the northeast escarpment but with more prickly pear. Further south the abundance of *Encelia californica* increases.

Important structural components are *Artemisia californica, Artemisia nesiotica, Rhus integrifolia, Encelia californica, Lycium californicum, Mirabilis laevis, Opuntia littoralis, Eriophyllum nevinii* and *Eriogonum giganteum* var. *formosum*. The type as it occurs on terrace escarpments is characterized by nearly continuous shrub cover. The understory contains plentiful herbaceous perennials, except in the case of the *Artemisia-Opuntia* patches on southern-exposure canyon slopes.

A. californica, A. nesiotica and other woody perennials are the indicator species for this type. The northeast escarpment and some westshore terrace faces include the endangered shrub *Lotus dendroides* var. *traskiae.* Additional indicators of diversity are *Aphanisma blitoides, Eschscholzia ramosa, Stylomecon heterophylla,* and *Gilia nevinii.*

Shrub cover needs to be maintained because of slope steepness and an erosion hazard. The animal vectors of seed dispersal for the hard chaparral components require protection. If it is true that the type once contained many more hard chaparral components, then these need to be reintroduced or the connectivity with existing specimens restored.

Range of Variation: Dominance shifts from *Artemisia californica* to *Encelia californica* on hotter slopes of south Island. Northern Island sites tend to have *Artemisia nesiotica.*

Sensitive Plants: *Aphanisma blitoides*, *Artemisia nesiotica, Eriogonum giganteum* var. *formosum*, *Lotus dendroideus* ssp. *traskiae, Bergerocactus emoryi, Castilleja grisea, Eriophyllum nevinii, Galium catalinense* ssp. *acrispum*, *Hazardia cana, Malacothamnus clementinus*, *Stephanomeria blairii.*

Sensitive/Endemic Animals (actual and potential use): San Clemente loggerhead shrike, Island night lizard, San Clemente Island fox.

Range of Species Richness based on plots: 37–52 species

Vegetation Monitoring Plots: 17, 21?, 28, 31?, 34, 35, 38, 43, 96, 108?

Potential Threats: stand-replacing, frequent, or large fires that delay re-occupation by native wildlife.

% Cover of Top 10 Cover Species in Baseline Years 1992–1993 (10 plots)

Vulpia myuros	13.1
Bromus madritensis rubens	10.8
Avena barbata	10.5
Opunita littoralis	8.2
Nassella pulchra	7.7
Calystegia macrostegia	4.5
Lycium californicum	3.7
Crassula connata	3.5
Artemisia nesiotica	3.0
Bromus hordeaceus	3.0

This community is in a dynamic state. It seems to be playing an important role in the return of plant community structure to the Island. It currently covers approximately 17% of the Island. The removal of feral grazers and abundant rainfall in the last two years have allowed many previously suppressed species to occur. Species composition shifts, especially on sites other than the northeast escarpment which appears more stable, are expected and should be monitored.

3.5.7 Grasslands

- On the high plateau above about 240 m elevation a *Nassella pulchra* grassland thrives on shallow, loamy soils. The community contains several sensitive and at least one endangered species.

- Portions of the grasslands, such as areas near the brows of canyons, are in a state of transition as they experience the establishment of shrub seedlings emerging from the canyons onto the plateau.

About one-third of the Island, 10,660 acres, is covered by grasslands. The high-elevation plateau supports a grassland dominated by native perennial grasses with annual forbs in the interspaces. Mid- and low- elevation grasslands tend to be less diverse and dominated by introduced annual grasses, but this is not to say that stands of *Nassella pulchra* are not found in this area.

On the topographic map, the high plateau begins above about 790 ft elevation and a *Nassella pulchra* grassland thrives on shallow, loamy soils. On deeper soils with higher clay content the annual grasses such as *Avena barbata* and *Vulpia myuros* fill the commonly lichen-covered interspaces, while on shallow sites a colorful array of annual herbs are characteristic: *Crassula connata, Lasthenia californica, Cryptantha intermedia* and *Microseris lindleyi.* Special inhabitants of the high plateau grasslands are the Island endemics *Delphinium variegatum* ssp. *kinkiense* (listed as endangered) and *Brodiaea kinkiense* (“Kinki” is thought to be the Indian name for the Island). *Calystegia macrostegia* ssp. *amplissima* is common among rocks, emerging from occasional prickly pear patches and on the sides of gullies. *Baccharis pilularis* is increasing its presence in the mid- to high-plateau areas. *Hemizonia clementia* is also scattered about the grassland. On mid-elevation sites the grasslands become increasingly dominated by *Avena barbata, Avena fatua* and *Hemizonia fasciculata.* In shady understory patches, the dominant grass is *Bromus diandrus.*

Nassella pulchra is the most important native grass on the Island. Important diversity indicators are *Delphinium variegatum* ssp. *kinkiense, Delphinium variegatum* ssp. *thornei, Microseris douglasii, Gilia nevinii, Jepsonia malvifolia* on mesic sites, *Lupinus guadalupensis* and *Linanthus pygmaeus.*

Occasional fire or other disturbance may enhance *Nassella* grasslands over introduced annual grasses. Soil erosion is a threat. Protection is needed from invasion by exotics such as *Oryzopsis miliacea* that arrive along the main road corridor that cuts through the plateau grasslands.

The open grasslands provide corridors for fox movement and some foraging for wildlife species such as birds and lizards. The probability of long-term viability for the grasslands is high, although it is unclear how much of the Island was originally grassland compared to its current distribution. Portions of the grasslands, such as areas near the brows of canyons, are in a state of transition as they experience the establishment of shrub seedlings emerging from the canyons onto the plateau. This needs to be monitored.

3.5.7.1 Loamy Grassland (5275.9 acres)

Soils: Soils found towards the southern end of this landform differ from the majority of soils on the Island in that they formed directly from the parent material, volcanic andesite or dacite. These soils are relatively shallow, with silty loam surface soil that extends to about four inches. Surface texture becomes more stony towards the southern end of this landform. The underlaying soil is a reddish brown with thick argillic horizons, and can vary in depth from 4–37 in. Soil depth becomes more shallow towards the southern end of the landform, subsoil depth decreases to about 14 inches towards the southern range of the Thirst soils.

Range of Variation: Openness and presence of exotic annual grasses is affected by fire regime and depth of soil.

Sensitive Plants: *Brodiaea kinkiensis*, *Delphinium variegatum* ssp. *kinkiense, Delphinium variegatum* ssp. *thornei, Gilia nevinii, Hordeum intercedens, Linanthus pygmaeus* ssp. *pygmaeus, Microseris douglasii* ssp. *platycarpha, Trifolium palmeri.*

Sensitive/Endemic Animals (actual and potential use): San Clemente loggerhead shrike, Island night lizard, horned lark, San Clemente Island deer mouse, San Clemente Island fox.

Range of Species Richness based on plots: 22–49 species

Vegetation Monitoring Plots: 1, 4, 10, 11, 15, 23, 25, 36?, 40, 65, 74, 85, 95, 101, 104, 105, 107, 110, 117.

Potential Threats: erosion, exotics.

% Cover of Top 10 Cover Species in Baseline Years 1992–1993 (19 plots)

Avena barbata	31.3
Vulpia myuros	29.3
Nassella pulchra	24.1
Bromus hordeaceus	8.5
Crassula connata	7.8
Bromus madritensis rubens	7.6
Lasthenia californica	4.6
Erodium moschatum	3.7
Trifolim gracilentum	3.1
Lotus argophyllus var. argenteus	3.1

3.5.7.2 Clay Grassland (5383.7 acres)

Soils: Chinapoint, Eelpoint, Lostpoint, Notspier, and Usterts are all series found on this landform. Soils found towards the north end of the High Plateau Grassland and also in some southern areas, have a high clay content but no clay horizons. Surface soils are loams or silt loams with some cobbles and stones approximately three inches deep. Subsurface soils are dark brown and extend to between thirty-six and fifty inches. These soils were formed in mixed alluvium and rest on either andesite/dacite or weakly consolidated sandy marine sediments.

Range of Variation: none identified

Sensitive Plants: *Brodiaea kinkiensis, Delphinium variegatum* ssp. *kinkiense, Hordeum intercedens, Jepsonia malvifolia, Microseris douglasii* ssp. *platycarpha, Trifolium palmeri.*

Sensitive/Endemic Animals (actual and potential use): San Clemente loggerhead shrike, Island night lizard, horned lark, San Clemente Island deer mouse, San Clemente Island fox.

Range of Species Richness based on plots: 24–56 species

Vegetation Monitoring Plots: 7, 18, 24, 61, 94, 100.

Potential Threats: erosion, exotics, *Baccharis* invasion?

% Cover of Top 10 Cover Species in Baseline Years 1992–1993 (6 plots)

Vulpia myuros	28.3
Avena barbata	27.8
Avena fatua	14.8
Nassella pulchra	14.8
Lasthenia californica	10.8
Bromus diandrus	8.7
Bromus hordeaceus	6.3
Atriplex semibaccata	6.2
Trifolium gracilentum var. palmeri	5.5
Spergularia macrotheca	5.0

3.5.8 Sand Dunes

Dunes are best developed on the Island's northwest shore but are scattered elsewhere. About 650 acres or two percent of the Island flora is occupied by active or stabilized dunes. However, the sensitivity and importance of the dune community belies its small area. The dunes harbor several sensitive species that are restricted to their sandy substrate. Numerous archaeological sites occur in the dunes.

The dunes on San Clemente are currently threatened by the invasive exotic *Carpobrotus edulis*. Off-road damage has been adequately controlled; however, severe erosion of dune roads is a threat to habitat stability, both in the dunes north of the airfield and those on the northwest shore.

3.5.8.1 Active Sand Dunes (223.8 acres)

Active Sand Dune Status Summary

The active areas of the dunes typically support *Ambrosia chamissonis* ssp. *chamissonis, Astragalus miguelensis, Camissonia micrantha, Camissonia guadalupensis* ssp. *clementina, Abronia umbellata* and *Abronia maritima*. *Carpobrotus edulis* is a weedy exotic pest invading most of the northern dune sites. Bermuda grass (*Cynodon dactylon*) is also becoming problematic. They comprise less than one percent of the Island’s acreage.

Astragalus miguelensis and *Ambrosia chamissonis* var. *bipinnatisecta* are representative of this community. *Camissonia guadalupensis* ssp. *clementina* and *Cryptantha traskiae* occur in pockets and add diversity.

Soils: Sand dunes are found on the north and south ends of the Island in sloping and hilly areas. Younger dunes are recently stabilized or still active (Muhs 1980). The majority of dunes on the Island have become increasingly vegetated over the past few decades. Younger dune soils consist of very deep calcerous sand and have minimal profile development. In some areas, sands are cross-stratified and have large hardened discontinuous caliche layers in the form of sheets or chunks.

Range of Variation: some sites much more stable than others.

Sensitive Plants: *Astragalus miguelensis, Camissonia guadalupensis.*

Sensitive/Endemic Animals (actual and potential use): San Clemente Island fox, Channel Islands dune beetle, San Clemente Coenonycha beetle.

Range of Species Richness based on plots: 11–21 species

Vegetation Monitoring Plots: 32, 41, 83, 82

Potential Threats: exotics

% Cover of Top 10 Cover Species in Baseline Years 1992–1993 (2 plots)

Ambrosia chamissonis var. bipinnatisecta	19.3
Astragalus miguelensis	8.0
Atriplex leucophylla	3.3
Mesembryanthemum crystallinum	3.0
Bromus diandrus	2.7
Carpobrotus edulis	2.7
Camissonia guadalupensis clementina	0.7
Lycium californicum	0.3
Salsola australis	0.3

Current Management—Active Sand Dune

Dunes are off-limits to vehicle and foot traffic.

3.5.8.2 Stabilized Sand Dune (412.9 acres)

Stabilized Sand Dune Status Summary

On more stabilized sites, dunes usually from the Pleistocene era, a number of species add to the floral diversity. *Rhus integrifolia* and *Baccharis pilularis* are prominent. *Distichlis spicata* is common on the southern dunes, while *Amblyopappus pusillus*, *Mesembryanthemum nodiflorum* and *Mesembryanthemum crystallinum* are widespread. The endemics *Astragalus nevinii, Cryptantha traskiae, Camissonia guadalupensis* ssp. *clementina,* and *Eschscholzia ramosa* can also be found. A stand of *Lavatera assurgentiflora* has been planted on the stabilized dunes and survives well. The stabilized sand dunes comprise approximately one percent of the Island's total acreage.

Structure and diversity are added to the dunes as they become more stabilized, generally as they progress inland away from the shore. With the exception of *Lavatera,* the rare species while restricted to the dunes are generally abundant within the type. A few shrubs begin to enter the ecosystem at the edges of the dunes: *Lycium californicum*, *Opuntia littoralis, Rhus integrifolia,* and *Baccharis pilularis.* These add structure and corresponding wildlife benefits.

Plants of the southern foredunes may require insect pollination (*Astragalus* spp.) and sometimes symbiotic bacterial and fungal associations. They require protection from invasion by exotics, from road erosion and from off-road vehicle damage.

Soils: Older dunes have long been stabilized and are very well developed. They have thick red argillic horizons, some carbonate cementing, and are in the soil order Alfisol.

Range of Variation: dominance of exotics

Sensitive Plants: *Astragalus nevinii, Camissonia guadalupensis, Cryptantha traskiae, Lavatera assurgentiflora* ssp. *glabra, Malacothrix foliosa* ssp. *foliosa.*

Sensitive/Endemic Animals (actual and potential use): SCI fox.

Range of Species Richness based on plots: 18–36 species

Plots: 2, 53

Potential Threats: exotics

% Cover of Top 10 Cover Species in Baseline Years 1992–1993 (2 plots)

Erodium cicutarium	7.7
Astragalus miguelensis	5.7
Amblyopappus pusillus	4.3
Ambrosia chamissonis var. bipinnatisecta	4.0
Abronia umbellata	3.3
Bromus madritensis rubens	3.3
Carpobrotus edulis	2.3
Camissonia guadalupensis clementina	2.0
Abronia maritima	1.7
Melilotus indicus	1.7

Current Management—Stabilized Sand Dune

Dunes are off-limits to vehicle and foot traffic.

3.5.9 Coastal Salt Marsh (19.3 acres)

Coastal Salt Marsh Status Summary

Two salt marshes occur at the mouths of Horse Beach and Chinetti canyons in the SHOBA impact area. Another type of saline habitat occurs behind rock berms along the western shore. These marshes occupy less than one percent of the Island area.

Typical are *Suaeda taxifolia, Frankenia grandiflora, Distichlis spicata, Atriplex spp., Abronia umbellata, Isocoma menziesii,* limited *Salicornia subterminalis, Spergularia macrotheca* and *Cakile maritima*. The composition of this plant association tends to grade into that of the dunes or of Maritime Desert Scrub: Lycium phase, and is more diverse at this interface. Shrub structure is contributed by *Suaeda taxifolia, Isocoma menziesii* and *Frankenia grandiflora*. *Salicornia* and other low-growing species form dense mats close to the ground. *Suaeda taxifolia* is representative of the type. Indicators of diversity include *Eschscholzia ramosa.*

Sensitive Plants: None.

Sensitive/Endemic Animals (actual and potential use): SCI fox

Range of Species Richness based on plots: 28–29 species

Plots: 58, 72, Plot 30 (rock berm salt marsh)

Potential Threats: None

% Cover of Top 10 Cover Species in Baseline Years 1992–1993 (2 plots)

Distichlis spicata	28.5
Bromus madritensis rubens	21.5
Suaeda taxifolia	20.5
Mesembryanthemum nodiflorum	14.0
Avena barbata	11.0
Bromus diandrus	9.5
Atriplex semibaccata	4.5
Sonchus oleraceus	4.5
Lycium californicum	4.0
Encelia californica	2.5
Medicago polymorpha	2.5
Vulpia myuros	2.5

Good water quality and protection from excessive sedimentation from upslope sources are needed to protect these areas.

3.5.10 Sea Bluff Succulent (36.0 acres)

Sea Bluff Succulent Status Summary

Little is known about this community's distribution, extent, and importance on the Island. *Eriophyllum nevinii* is the most abundant and showy representative of the sea bluff succulent type on the Island. It can form a monotypic plant association in the salt spray. *Eriogonum giganteum* var. *formosum* and *Eriogonum grande* add diversity to the type, with *Calystegia macrostegia* ssp. *amplissina* and an occasional remnant *Castilleja grisea. E. nevinii* creates habitat for birds and other wildlife in the intertidal zone.

Sensitive Plants: *Lomatium insulare* (not seen in recent years), *Calandrinia maritima, Castilleja grisea, Dudleya virens* var. *virens, Eriophyllum nevinii.*

Sensitive/Endemic Animals (actual and potential use): SCI fox.

Potential threats: None.

3.5.11 Sea Stacks

Sea stacks are off-shore rock outcrops that are important habitat for many species of plants and wildlife. Numerous species of birds including California brown pelicans (*Pelecanus occidentalis californicus*) and double-crested cormorants (*Phalacrocorax auritus*) use the outcrops to forage from, and other species may nest on the larger rocks. Underwater, the outcrops contain the same intertidal and subtidal communities described below.

California hydrocoral (*Stylaster californica*) is not a true coral, but rather a member of Class Hydrozoa that inhabits certain of the sea stacks at SCI. It forms branching colonies up to 30 cm high and 60 cm wide and can be found in a variety of colors ranging from pink to dark blue. The growth rate is slow, requiring over 20 years to grow to 30 cm. In general, hard corals such as this are rare in the colder temperate waters. This species can be found, however, in the clear water on the "backside" of San Clemente and Catalina Islands. Its rarity makes it much sought after by recreational scuba divers who can look, but not touch as it is a protected species. Elevated sea temperatures during El Niño events can cause significant decline of hydrocorals.

3.5.12 Intertidal

The intertidal zone at Wilson Cove is that part of the sea floor that lies between the highest high tides and the lowest low tides (+2.05 m to 0.49 m MLLW). It is unique among marine environments in that its inhabitants are regularly exposed to air and must have some way to adapt to extremes of temperature and desiccation, as well as salinity stress, mechanical wash and backwash of waves. Due to the recent geologic activity of the area, the substrate of most Pacific coast intertidal communities is hard rock.

Most intertidal organisms are unable to burrow into the rock to escape the stress of their continually changing environment. Non-sessile animals, those not attached to the rock, are able to run and hide when the tide goes out, or they live in moist areas all the time, i.e. shady areas. Others, like mussels, have a protective covering that they can close to hold in water. Still others, like some chitons and seaweeds, can tolerate significant water loss, recovering quickly when the tide returns.

For those animals that are able to adapt to all of the stresses of this community, the rocky intertidal can be a good place to live. The nutrient-rich, shallow water allows for high primary production of plants. The abundance of plants and the high concentration of plankton, seaweed and detritus brought in by the waves provides a rich food supply for intertidal residents. In fact, space, not food, is the limiting factor for populations in this zone. Nearly all the space along the rocky coast is occupied and when space does open up it is quickly colonized. Some plants and animals will even attach themselves to other plants or animals, when there is no rock available.

The complex interaction of physical and biological factors in this community result in vertical zonation of intertidal species. A species is generally not found throughout the intertidal, but only within a particular zone, a certain distance from tide lines. The upper limit of a species zone is determined by physical factors, while the lower limit is determined by biological factors, like competition and predation.

Upper Intertidal. The organisms in this highest zone are most exposed to the air, staying wet mainly by wave splash. The dominant plants are lichens and cyanobacteria. Large numbers of periwinkle graze on the algae and they are the most abundant animal. Few marine predators occupy this area, but it is visited by more land animals, such as shorebirds, rats, and people.

Middle Intertidal. This zone is covered and uncovered by the tides on a regular basis. The upper part of this zone is dominated by barnacles that will extend as far up as they can before drying out. Their lower limit is determined by competition from other barnacles and mussels and by predation from whelks. Below the barnacles, mussels are the dominant organisms, smothering or crowding out other organisms. Their lower limit is set by sea stars that come in with the tide to prey on mussels. In addition, the sea stars eat whelks, thus benefitting the barnacles. Sea stars are known as keystone predators, because of their importance in removing dominant mussels and thus making space available for other species.

Lower Intertidal. This zone is submerged most of the time. Plants that cannot tolerate dessication grow profusely here. The lower intertidal is dominated by seaweeds, including red, green and brown algae. Sea urchins, sea anemones, polychaetes, and snails are among the many small animals that live among the seaweeds. Most intertidal fishes live in this zone and include gobies, clingfishes, pricklebacks, and sculpins.

Soft-bottom communities. Occasionally along the Pacific coast, soft-bottom intertidal communities occur where sediment has accumulated over the rocks. The sediment is constantly shifting in response to the waves and currents. Therefore, few plants and animals can attach themselves to the substrate, as they did in the rocky communities. Most of the animals burrow into the substrate, and seagrasses, with their more extensive system of roots and underground stems, can establish themselves in sheltered areas. The challenges of soft-bottom intertidal life are different than those of hard-bottom. Soft bottoms stay wet after the tide goes out, so desiccation is not as much of a problem. However, the decay of organic matter and the respiration of burrowing fauna uses up oxygen. Therefore, the animals living beneath the sediment surface must adapt to depleted oxygen levels. Zonation, while not as obvious, does exist on the sandy beaches, where upper slopes are drier than the lower. In muddy areas, however, the fine sediments retain water and zonation is absent.

Current Management—Intertidal

Unvegetated Intertidal and Subtidal Areas

For intertidal habitat other than salt marsh, unvegetated shallows, and deep subtidal habitats in the USACOE jurisdiction (below higher high water), compliance with EPA Section 404(b)(1) Guidelines is essentially evaluated qualitatively and involves exercise of the judgment of the USACOE in each permit application. The USACOE is required to deny the permit if the findings show that the proposed discharge, even with mitigation, would result in “significant degradation,” to include consideration of effect of the fill on the water bottom, water flow and circulation, turbidity, the aquatic ecosystem and organisms, contamination of the water, and downstream resources (40 CFR 230.10[c]). The Guidelines apply an additional burden of proof requirement covering special aquatic sites such as salt marsh, mudflats, and eelgrass beds—to demonstrate that no practicable alternatives exist that will meet the project purpose (40 CFR 230.10[a]).

Within the restrictions of EPA Section 404(b)(1) Guidelines, the USACOE will grant a permit unless the permit is determined to be contrary to public interest. To determine effect on public interest, the USACOE is required to balance the benefits expected against the foreseeable detriments of the proposed project. The factors considered in this review are conservation, economics, aesthetics, environmental quality, historic values, fish and wildlife values, flood control, land use, navigation, recreation, water supply and quality, energy needs, safety, food production, and the general public and private need and welfare (33 CFR 320.4).

Under authority of the CCA and the federal CZMA, the CCC has jurisdiction over permits for development in the coastal zone within wetlands, tidelands, submerged lands (below mean low tide), beaches, estuaries, riparian habitat, streams and public trust lands. The definition of wetlands used by the CCC differs from that of the ACOE in that it includes nonvegetated areas such as mudflats and an additional 100 ft (30 m) wide terrestrial buffer measured from the upland edge of the wetland.

3.5.13 Nearshore Shallow Subtidal

Vegetated

Map 3-10 shows the substrate types and locations of seagrasses and kelp around SCI.

Seagrasses (Surfgrass and Eelgrass)

The shallow subtidal vegetated zone occurs at -10 m MLLW to approximately -20 m MLLW. Occasionally in sheltered, shallow coves seagrasses carpet the ocean floor. Eelgrass is widely distributed in temperate and cold waters of the Pacific. It is sometimes exposed at low tide and also has been found as deep as 30 m. Seagrasses can grow into thick luxuriant beds. In fact, they rank among the most productive communities in the ocean. Their roots and stems help stabilized the soft bottoms. Their leaves reduce wave action and currents. This reduces turbulence, causing greater and finer sediment deposition, thus affecting colonization by other organisms. While primary production is much greater in this community, few animals eat seagrasses. It is used primarily as a nursery for many fishes which attach eggs to leaves and consume invertebrates living in the beds. Many animals feed on the large amounts of detritus produced by decomposition of seagrass. These include some polychaetes, clams and sea cucumbers. The dense seagrasses also offer shelter to many animals that do not feed on vegetation or detritus.

Eelgrass policy is found in the Southern California Eelgrass Mitigation Policy, first approved in 1991by NMFS, USFWS and CDFG, (Appendix F) and last revised in 1999. The Policy is endorsed by the USACOE and the CCC, and the USACOE uses it as regional guidance to conserve eelgrass under Clean Water Act Section 404 projects. The policy has helped standardize the resource agencies' response to projects such as dredging, pile-driving, in-water military training and operations, and research and development work. Also, under California state code (CCR Title 14, Sec. 165-165.5) no eelgrass or surfgrass may be cut or disturbed.

Eelgrass is reported incidentally from Wilson Cove (M. Perdue, US Navy, *pers. comm*.). Dr. Jack Engle, Marine Science Institute, University of California-Santa Barbara, has conducted periodic subtidal and intertidal surveys at San Clemente Island since the 1980s. He notes relatively deep eelgrass beds at depths of up to about 20 meters off SCI's eastern escarpment between about White Rock and Bryce Canyon (Map 3-10) (J. Engle, UC Santa Barbara, *pers. comm*.).

Kelp Beds

Hard bottom portions of the continental shelf are usually just submerged extensions of rocky shores. These communities are generally rich and productive; their most obvious feature is the abundance of seaweeds. Unlike seagrasses, which have true roots and can absorb nutrients from the sediments, seaweeds must depend on nutrients dissolved in the water. One of the main problems for seaweeds in this environment is finding a place to attach. There is intense competition for living space on the rocks. Seaweeds must compete for space not only with each other, but also with a variety of sessile animals such as sponges, hydroids, sea anemones, soft corals, bryozoans, some polychaetes, barnacles and sea squirts. Different seaweeds are adapted to different temperature, light, and grazing regimes. They also vary in their life history strategies. Some species grow fast but only for a short time, while others grow more slowly and live longer.

Unlike seagrasses, seaweeds are also subject to a greater number of grazers. Perhaps the most important herbivore in this community are sea urchins. Chitons, sea hares, limpets, and abalones are also important grazers. As in soft-bottom communities, grazers and their predators have a strong influence on composition as they remove residents from the rocks and open space for other organisms.

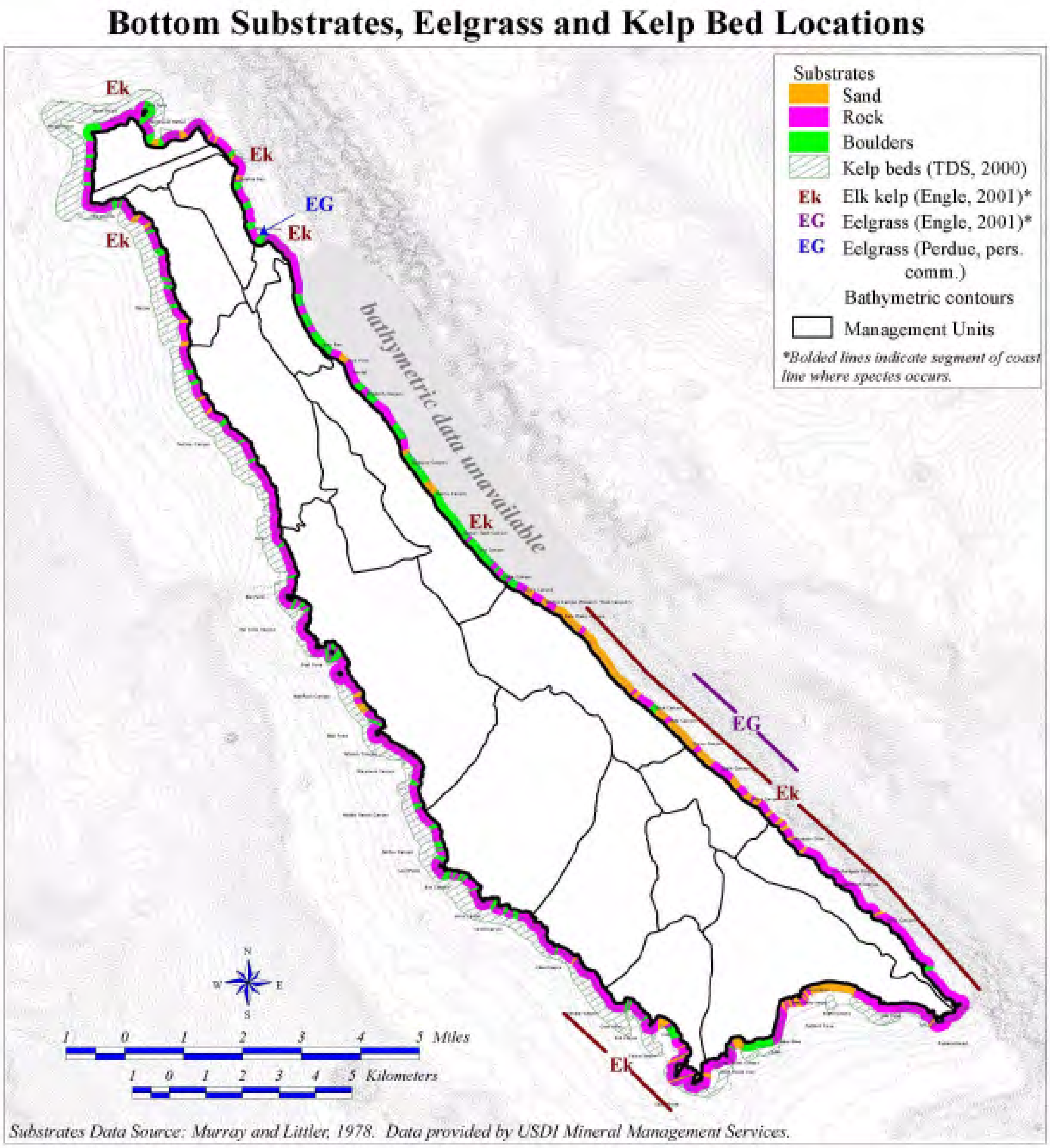
Kelp forests throughout the Southern California Bight differ in structure, with the physical settings around the southern Channel Islands being more variable than those along the mainland. The steepness of the bottom profile around

Santa Catalina Island restricts kelp forests to a narrow band adjacent to shore. Other islands have broader and more shallow rocky extensions and thus wider kelp beds. The structure of kelp forests between and around the islands can also depend on their exposure to oceanic swells, with the more protected waters providing for larger and more stable forests.

Extensive stands of kelp occur along the coastline of San Clemente Island. Attached to the rocky bottom by a large holdfast, "kelp forests" extend their fronds to the surface where they form a thick mat. Kelp forests form a multi-storied, complex environment, not unlike that of a rainforest. A dense floating canopy of giant kelp, *Macrocystis,* develops where the water is deep enough to reduce wave action, but shallow enough for light to reach the bottom. Under this canopy there may be as many as four layers of kelp including: 1)smaller erect kelps, 2) prostrate, low-growing kelps, 3) bottom-dwelling species, and 4) calcified forms such as *Lithophyllum and Lithothamnion*.

SCI is also home to unusual forms of elk kelp (*Pelagophycus porra*) that establish in relatively deep water between 20–50 meters deep. The elk kelp on the exposed west side of SCI is similar to the mainland coastal form which is tall and attaches to rocky substrates, while on the east side of SCI the elk kelp is relatively short and attaches to soft bottom sand (Engle, *pers. comm.*). It is not known if these represent two distinct species of elk kelp or merely different forms of the same species (Miller and Dorr 1994). Forests of elk kelp have been known for northern SCI in waters off of West Cove, Bird Rock, Dolphin Bay and Wilson Cove Canyon; for eastern SCI in deep water between Twin Dams and Pyramid Head; and western SCI between about Kinkipar Canyon and China Canyon (Engle, *pers. comm*.).

Under normal conditions, sea urchins feed only on the drift kelp and understory seaweeds of the kelp forest and not the giant kelp plants themselves. At times, however, their populations explode and this has a devastating effect on the kelp bed community, as they eat and kill the giant kelp plants. It is unclear what causes such dramatic increases in sea urchin populations. Heavy fishing of urchin predators, such as lobsters, crabs and fishes, and urchin competitors, such as abalone, may contribute to urchin "plagues." A second possibility is that the amount of available drift kelp, the preferred food of urchins, decreases due to either an increase in sewage pollution or temperatures or a decrease in plant nutrients. It could be that urchin "plagues" are really just natural fluctuations in population size and they do not always result in destruction of kelp forests. Rosenthal *et al.* (1974) have reported a long term coexistence between sea urchins and giant kelp beds around SCI. Kelp communities can also be severely disrupted by El Niño events that produce severe storms and warm currents.



Map3-10. Bottom substrates and location of kelp and seagrasses in the nearshore shallow subtidal zone around San Clemente Island. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

Unvegetated

The shallow subtidal unvegetated zone occurs at -10 m MLLW to approximately 100 m MLLW. Continually submerged, these habitats extend from the low tide level to the outer edge of the continental shelf. Physical factors that influence life in this zone include: type of substrate, depth, turbulence, temperature, salinity and light.

This community's substrate is mud or sand, as is most of the continental shelf. These unstable substrates shift in response to currents, winds, waves, tides and activities by humans and other organisms. Few plants and animals are able to attach themselves to this soft substrate. Therefore, this community is dominated by animals that can burrow or dig into the sediment, along with their predators. The number of species living in subtidal soft bottoms is usually higher than the number of species on intertidal soft bottoms. This is due to more stable temperatures and salinities and the absence of the threat of desiccation in the subtidal habitats.

The main primary producers are diatoms and microscopic algae growing on sand or mud particles. Due to this almost complete absence of plants, detritus is a very important food for many inhabitants of this community. This dead organic matter and the decomposers that live on it are brought in by currents from more productive coastal communities. It is also generated by the bottom dwellers themselves. The detritus is used by microscopic animals that live among sediment particles. In muddy areas, larger benthic invertebrates also feed on detritus. They are mostly burrowing deposit feeders, such as trumpet and bamboo worms, some sea urchins, sand dollars, echiurans, peanut worms, sea cucumbers and ghost shrimps. Along the sandy bottoms, where oxygen is more concentrated, filter feeders actively filter the water to obtain the detritus and plankton drifting in the water column. Some of these animals include razor clams, quahog, cockles, soft-shelled clamps, amphibious, parchment worms and terebellids. Many of these invertebrate species serve as food for predatory invertebrates and bottom-dwelling fishes such as rays, skates, halibuts, flounders, soles and turbots. The presence of predators in this community is very important as they remove individuals and cause sediment disturbance that then allows recolonization by different types of organisms. This results in a range of successional stages that enhance biodiversity in space and time.

Current Management—Nearshore Shallow Subtidal

The kelp beds surrounding San Clemente Island not only provide food and habitat for numerous organisms, from plankton to marine mammals, but they also provide scenic, recreational, and commercial opportunities to humans. These kelp beds are composed primarily of giant kelp (*Macrocystis pyrifera*), which is subject to both recreational and commercial harvest and therefore managed by the CDFG. In the 1990s, an average of 84,104 tons of kelp were commercially harvested per year from open and lease beds along the coast of California (Collins *et al.* 2001). The SCI kelp beds are numbered by CDFG and many are leased to Kelco Corporation for harvest. The company conducts monthly flyovers to take infrared photography to monitor the expansion and contraction of the beds. The Navy is currently partnering with the National Park Service to develop a protocol for monitoring kelp forests and to establish kelp forest monitoring sites at SCI.

The maximum extent of the beds, which occurred most recently in the 1970s, is a good indicator of the extent of rocky bottom substrate offshore. Their extent contracted considerable when El Niño conditions brought warmer waters, and they have still not recovered completely. However, San Clemente's beds have recovered far better than those of the northern Channel Islands, which suffer greatly from grazing by urchins.

There are several management techniques available to regulate commercial and sport use of kelp. Temporary closures, up to one year, may be recommended if it is found that harvesting activities are causing damage to any kelp bed, or part thereof, or are tending to destroy the supply of food for fish. The Commission also has the authority to close selected kelp beds to commercial harvesting. Currently there are only four such kelp beds along the coast, covering a combined area of 5.29 sq mi. Giant kelp must be cut and not pulled, although the harvester may pick up drift kelp. Only the upper four feet of giant kelp plants may be harvested. Commercial harvests are restricted by limiting the amount of kelp beds that may be leased to 50% of the state's total resources. Individual leases are limited to no more than 25 square miles or 50% of the total area of the kelp resource, whichever is greater. The Commission can also stipulate harvest limits as part of a lease agreement. Recreational harvest is limited by the establishment of a daily 10 pound wet-weight bag limit.

In addition to the above regulatory programs, kelp restoration has also been used to increase populations that were negatively impacted by natural and/or human activities. In the 1950s and 1960s kelp forests along the California coast began to deteriorate due to a combination of the following: pollution, siltation, storms, increased sea urchin grazing, which was caused by a reduction in urchin predators, and high temperature/low nutrient conditions of El Niño. Efforts to restore kelp beds began in 1963 off Point Loma and proved to be dramatically successful. Over the years improved restoration techniques have led to an increase in size of several kelp beds along the coast. The techniques vary depending on the type of substrate where restoration is desired. Along a hardbottom substrate, transplanting and securing individual adult, sub-adult and young kelp plants has proven successful when combined with control of sea urchins and competitive seaweeds. Along a softbottom area near Santa Barbara, restoration efforts involved providing substrate, transplanting juvenile and adult plants, and using rebar staples to secure the plants in the sand.

3.5.14 Recent Mapping of Jurisdictional Waters and Wetlands

Wetlands provide many vital ecological functions and support a high diversity of resident and migratory wildlife species. Wetlands filter nutrients and sediments and are among the most impacted habitats in the world. Some important functions include water quality enhancement, flood control, nutrient cycling, sediment capture, and groundwater recharge. In addition, freshwater marshes are essential to migrating birds and vernal pools are home to numerous invertebrates including fairy shrimp. Saltwater wetland habitats also provide important foraging habitat for birds and provide nurseries for many fish and aquatic invertebrates. Wetlands also act as corridors for movement of other species, linking other habitat types.

Wetlands are unique ecosystems that vary in complexity due to hydrology, soils, climate and animal and plant interactions. Despite their relatively small area, more wildlife depend on riparian areas and wetlands than any other habitat. As the focal point of the fluvial system, high quality habitat will support wildlife numbers and diversity across a landscape far beyond its borders. Delineation of existing wetlands on SCI is currently ongoing.

- Jurisdictional wetlands are regulated under Section 404 of the CWA.

Riparian areas can be regulated as either Jurisdictional Waters of the U.S. or wetlands (small areas). Both require permits for ground disturbing activities and possible mitigation. Questions about site-specific impacts must be addressed to the USACOE. Jurisdictional delineations should be performed at each installation to show which wetlands or water bodies are subject to regulatory jurisdiction under Section 404 of the CWA or Section 9 and 10 of the Rivers and Harbors Act of 1899. Private consultants, who are certified in wetlands delineation by the USACOE, may conduct the surveys. Each of three criteria must be met for wetland vegetation to be jurisdictional:

- *Vegetation*: prevalence of vegetation adapted to saturated soils
- *Soils*: existence of soil that is saturated, flooded or ponded during the growing season long enough to create anaerobic soil conditions
- *Hydrology*: evidence of permanent or periodic inundation to shallow levels under normal circumstances

The EO, "Protection of Wetlands," (EO 11990) requires federal agencies to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands when:

- Acquiring, managing, and relinquishing of federal lands and facilities;
- Providing federally undertaken, financed, or assisted construction and improvements; and
- Conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Since the issuance of this EO, the focus of national policy has shifted from "minimizing" destruction, loss, and degradation of wetlands to "no net loss" of wetlands in carrying out the above federal activities.

- Under Navy policy (OPNAVINST 5090.1B), there shall be "no net loss" of wetland habitat.

Under Navy policy (OPNAVINST 5090.1B), there shall be "no net loss" of wetland habitat on SCI. Any action significantly affecting wetlands shall require an environmental review. Placement of fill or movement of earth of any kind is prohibited unless under permit. If it is demonstrated that wetlands impacts are unavoidable, then mitigation shall be required. Loss of wetland function shall be mitigated through wetlands enhancement, restoration, or creation.

Current Management—Wetland Protection

During normal, or above average, rainfall years, runoff collects in drainages or vernal pools on SCI. Currently, delineations of jurisdictional wetlands and waters of the U.S. are being conducted on SCI. These delineations are being performed in accordance with USACOE Wetland Delineation Manual of 1997–98. As of August 2001, wetland delineations had been conducted at 622 pools. The majority of the pools were considered "dry" pools because they did not hold water beyond the end of April. The jurisdictional status of these dry pools is pending.

Concurrently with the wetland delineations, surveys for fairy shrimp are also being conducted. There are five species of federally endangered fairy shrimp which could potentially occur at SCI. Wet and dry season surveys were begun in February 2001, and as of April, over 500 pools had been surveyed. During one

March sampling period, fairy shrimp were found within 289 different pools. The only species located was the versatile fairy shrimp (*Branchinecta lindahli*), which is not a listed species. At the time of this report's preparation, wetland surveys could not be completed as adequate funding was not secured.

3.6 Status and Trend of Animal Populations

3.6.1 Terrestrial Invertebrates

The status of most invertebrates on SCI is not well known. Invertebrates are found throughout all habitats and most have not been adequately inventoried on SCI. However, invertebrates play ecologically crucial roles in the ecosystem. They are important food items for many birds, small mammals, and lizards and are also essential for decomposition and soil formation processes. As pollinators, insects are vital to the reproduction of many island plant species.

Insects of the Channel Islands typically are found on the mainland as well, but differences in insect assemblages exist between the northern and southern Channel Islands. The southern islands tend to have higher numbers of California endemics and greatest affinity with insects of more arid climates, such as the southern coastal and foothill habitats and the desert environs of the Mojave and Colorado deserts (Powell and Hogue 1979).

Over 600 species of terrestrial insects may ultimately be confirmed for San Clemente Island pending an updated review and consolidation of databases (S. Miller, Smithsonian, *pers. comm*. 2001). Currently, there are 10 species of Coleoptera (beetles), 2 spp. of Diptera (flys), 10 spp. of Hemiptera (true bugs), 2 spp. of Dermaptera (earwigs), and 2 spp. of Chelicerata (spiders) identified as endemic to San Clemente Island (Table 3-12). Additionally, there are 7 spp. of Coleoptera, 9 spp. of Hemiptera, and one spp. of Chelicerata (a tick) endemic to the Channel Islands. The endemic San Clemente Island Coenonycha beetle (*Coenonycha clementina*) is a federal Species of Concern originally proposed for listing under the ESA in the 1970s. It was withdrawn from consideration due to a lack of information about its status. The Channel Islands dune beetle (*Coelus pacificus)* is also a federal Species of Concern.

The eight Channel Islands are home to 23 different species of snails, making it one of the richest clusters of land snails in the western United States. San Clemente Island has the largest population of all the Channel Islands; it has eight extant and two extinct species of snails. Four of the extant species are endemic to SCI (Cohen 1978), one of which, Gabb's snail (*Micrarionta gabbi*), is a federal Species of Concern. The high incidence of endemism in land snails of the Channel Islands may reflect the low frequency of inter-island dispersal and the relatively long isolation of the Islands (Chambers 1998). Appendix D contains a more thorough profile of land snails on SCI, and Appendix B contains a comprehensive species list of the SCI.

In conjunction with a recent wetland delineation on SCI, surveys for fairy shrimp were also conducted. A single species, the vernal pool fairy shrimp (*Branchinecta lindahli*), was found in numerous temporary pools. These small crustaceans can be important food sources for migrating birds and other wildlife.

Current Management—Terrestrial Invertebrates

- There is no active management of invertebrates on SCI.
- There have been periodic invertebrate surveys in the past but none focusing on endemics.

- Extensive invertebrate surveys were performed by Dr. Scott Miller (Smithsonian Institute) and Dr. Jerry Butler (U.C. Berkeley), but the data has yet to be analyzed.
- Some invertebrate surveys have been conducted as part of a three-year effort to understand the prey base for loggerhead shrikes.
- Surveys for fairy shrimp are being conducted in conjunction with the wetland delineation currently being performed.

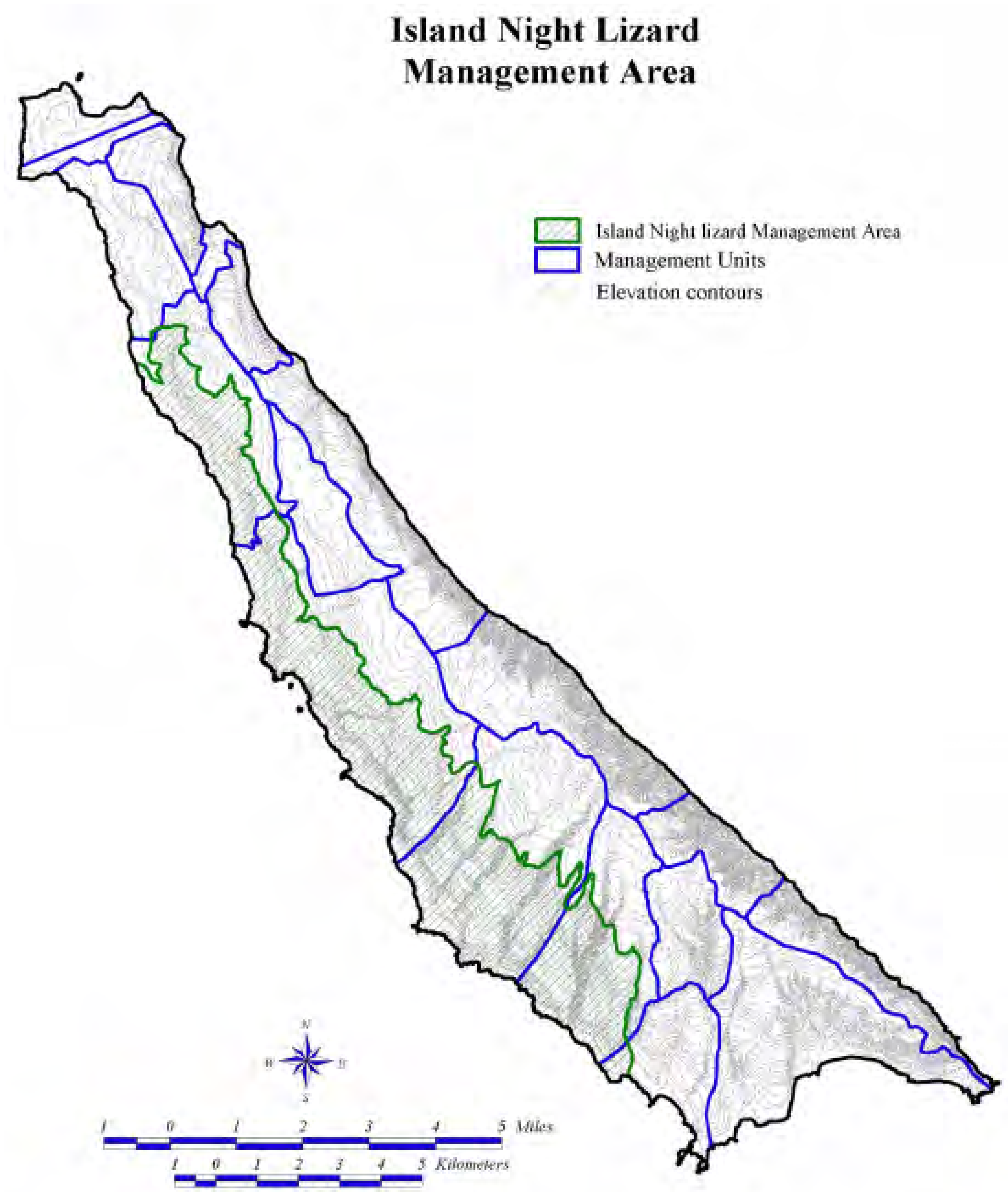
3.6.2 Amphibians and Reptiles

There are only two species of reptile—side-blotched lizard (*Uta stansburiana)* and Island night lizard —and no amphibians on SCI (Schoenherr *et al.* 1999). The night lizard is endemic to only three of the Channel Islands and is federally listed as threatened under the ESA. The estimated population size for Island night lizards at SCI is over 21 million lizards (see Appendix D for a profile of this species). Both species feed primarily on invertebrates and some plant material. Lizards may be important prey items for many bird species on SCI, including the loggerhead shrike.

Current Management—Amphibians and Reptiles

Current management for amphibians and reptiles on SCI is synonymous with the terms and conditions of BOs arising from Section 7 consultations on military use impacts to the Island night lizard. Many terms and conditions have been advanced over time and will not be consolidated here. However, as part of consultation and a BO on fire management on the Island, a special INLMA of about 9,653 acres has been outlined (Map 3-11). The terms and conditions from this consultation and concept of an INLMA are the most sweeping conservation measures yet for the Island night lizard on the Island and are summarized here:

- Designating the INLMA and incorporating it into the Navy land use planning process by zoning it as an area of limited disturbance in the OMP.
- Directing disturbance due to military construction projects or operational training exercises to areas outside the INLMA to the maximum extent practicable.
- Allowing continued use and maintenance of the South Sonobouy Tracking and “Little Rock” stations in the INLMA.
- Allowing continued use of the Marine Terrace Grade and West Shore roads in the INLMA.
- Allowing continued operational training within the INLMA by:
    - Navy SEAL covert landings by small (less than 10 individual) pedestrian units that traverse the MDS habitat on foot en route to final destinations. Such activity occurs up to 3 times per month;
    - Marine amphibious landings of 30-50 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 MDS habitat.
- Conducting Island night lizard surveys within the INLMA at least once every five years.
- Preparing an Island Night Lizard Management Plan.
- Preparing an annual report quantifying the cumulative area affected by military construction and operational training activities.
- Notifying the USFWS concerning projects or operational training exercises planned to occur within the INLMA.



Map3-11. Island night lizard management area on San Clemente Island.

Table3-12. Endemic and sensitive invertebrates of San Clemente Island.

Scientific Name	Common Name	USFWS, CDFG Status	Global, State CNDDB Rank
EXTINCT/EXTIRPATED			
Micrarionta feralis	land Snail		
Micrarionta agnesae	land Snail		
SCI ENDEMICS			
Amara insularis	beetle		
Pterostichus gliscans	ground beetle		
Celia clementina	beetle		
Colaspidea subvittata	leaf beetle		
Coenonycha clementina	SCI Coenonycha beetle	FSC	G1?, S1?
Melanopthalma insularis	beetle		
Dasytes clemente	beetle		
Attalus transmarinus	beetle		
Sciopithes insularis	root weevil		
Cleonus basalis	beetle		
Efferia clementi	robber fly		
Mythicomyia discreta	fly		
Heliococcus clemente	mealybug		
Pheidole clementensis	harvester ant		
Bembix americana dugi	wasp		
Ammophila azteca clemente	wasp		
Scrobipalpula n. sp. nr. chiquitella	moth		
Scrobipalpula n. sp.	moth		
Pergama near giganteus	moth		
Pterotaea crinigera	moth		
Argyrotaenia fraciscana insulana	moth		
Agonopterix toega	moth		
Tigolene clementius	millipede		
Cnemotettix pulvillifer	cricket		
Protolphus cockerelli			
Lutica clemntea	spider		
Micrarionta intercisa	land snail		
Micrarionta gabbi	Gabb's snail	FSC	G1, S1
Micrarionta redimita	land snail		
CHANNEL ISLAND ENDEMICS			
Xarifa insularis	beetle		
Trichochorus pedalus	beetle		
Apsena grossa	beetle		
Coniontis lata	darkling beetle		
Eleodes laticollis apprimus	darkling beetle		
Eusattus robustus	beetle		
Coelus pacificus	Channel Islands dune beetle	FSC	G?, S?
Cerostoma lyonothamnae	moth		
Stigmella n. sp.	moth		
Coleotechnites n. sp.	moth		
Ypsolopha lyonothamnae	moth		
Zosteropoda clementei	moth		
Aphaenogaster patruelis	ant		
Camponotus bakeri	harvester ant		
Palmodes insularis	wasp		
Ixodes peromysci	shield tick		
Vertigo californaica longa	snail		
Vertigo californica catalinaria	snail		
Sterkia clementina	SCI blunt-top snail		G1, S1

USFWS and CDFG Codes: FSC = Federal Species of Concern
Global and State CNDDB Rank: G1 = Less than 6 viable element occurrences (EOs) or less than 1,000 individuals or less than 2,000 acres, S-rank = the status within California using same definitions as G-rank.

- Re-initiating formal consultation with the Service if two consecutive status surveys indicate declining lizard populations.
- Research on the distribution of the Island night lizard in postburn areas as part of scheduled Island night lizard surveys.
- Conducting management efforts to hasten the recovery of disturbed areas within the INLMA and to assure the continued suitability of the area to the Island night lizard.
- Mitigating for impacts to the Island night lizard on all projects proposed outside of the INLMA but within superior Island night lizard habitat, as defined by vegetation characteristics or habitat maps. As mitigation, degraded habitat would be enhanced at a ratio of one acre treated for each acre of disturbance to superior habitat outside the INLMA. Additional enhancement strategies through native plant establishment or other means may be identified in the INL Management Strategy and pursued as mitigation (BO).
- Appropriately timed exotic plant removal in the INLMA.
- Installing gates or barricades on unused roads within the INLMA roads to prevent use of unauthorized routes and to allow the area to recover.
- Removing unused roadways within the INLMA and restoring to native vegetation (this pertains specifically to fishing area access roads spurred along West Shore Road).
- Brief annual surface disturbance monitoring report in the form of a letter to the USFWS by January 31 of each year and include the actual acres of Island night lizard habitat disturbed, numbers killed, injured, moved or otherwise taken, and recommendations for modifying or refining terms and conditions to enhance protection of the Island night lizard or reduce needless hardship on the Navy.
- Feral cat control expanded to include the INLMA.
- Assuring that all operators operating aircraft or conducting training activities near habitat shall receive training and education on the Island night lizard and the importance of avoiding ignition.
- Seeking concurrence with the USFWS on projects or new activities proposed within the INLMA to assure that such projects do not threaten the integrity of the INLMA or pose additional impacts that could require re-initiation of consultation.

3.6.3 Land Birds

Approximately 150 species of birds that spend the majority of their life cycle above shoreline have been observed on SCI. Many of these species have recently declined on SCI probably due to habitat degradation and the introduction of non-native predators. There has probably been a decline in potential nest sites due to a decrease in tree and shrub cover. The introduction of feral cats and rats likely reduced reproductive success of many species. These declines may affect other species on SCI because landbirds often play a significant role as prey items for larger vertebrate species, such as raptors, and as predators on insect and small mammal populations. Most birds typically nest between January and August. Birds can nest in buildings, trees, shrubs, and on the ground. See Jorgensen and Ferguson (1984) for a more complete discussion of bird observations at SCI. Currently, there are efforts to produce updated inventories of the birds of SCI and the Channel Islands.

The Channel Islands and SCI have recently been identified as important bird locations in California and globally. The American Bird Conservancy designated the Channel Islands as one of the first 100 Globally Important Bird Areas (http://www.abcbirds.org/iba/aboutiba.htm). The Audubon Society of California designated SCI as one of California's Important Bird Areas (www.audubon.org/chapter/ca/ca/IBA.htm). Recognition by these organizations increases public awareness for the sites but does not confer any legal status upon them.

Resident Land Birds. There are currently 24 resident (year-round) landbird species that breed on SCI, including five introduced species, and an additional five species are believed extirpated, at least as breeders. Two resident species, San Clemente loggerhead shrike and San Clemente sage sparrow, are endemic subspecies of SCI and are currently listed as federally endangered and threatened, respectively, by the USFWS (Table 3-13). An additional four species are endemic to the Channel Islands, all at the subspecies level. Profiles of the San Clemente loggerhead shrike and San Clemente sage sparrow are in Appendix D.

SCI may represent significant portions of the populations of four Channel Islands endemic subspecies: house finch, horned lark, Allen's hummingbird (*Selasphorus sasin sedentarius*), and orange-crowned warbler (*Vermivora celata sordida*). House finches typically feed on seeds and can be found in a variety of habitats including scrub, canyon woodlands, cultivated fields, and around human developments. Horned larks feed and nest on the ground in very open habitats. Allen's hummingbirds nest in shrubs, especially lemonade berry (*Rhus integrifolia*), on steep slopes. They feed on nectar, and may be important to the pollination of the federally-endangered San Clemente Island indian paintbrush. On SCI, the orange-crowned warbler nests on the ground in maritime sage scrub and on canyon slopes. All of these species, especially the ground nesters, are vulnerable to predation from non-native feral cats and rats.

At least three former resident species of raptors have been extirpated as breeders at SCI: bald eagle, peregrine falcon, and osprey. The bald eagle and osprey were both common breeders on SCI in the early 1900s, and the peregrine falcon also probably bred on the Island (Jorgensen and Ferguson 1984). Ospreys were known to breed on the southwest side of the Island and up to twenty pairs were observed in 1907. Reasons for their decline could have included: DDT poisoning, shooting by fisherman, loss of woody vegetation used for nesting, increased competition from fishing vessels, or bombardment of sea stacks used as perches for foraging. Peregrine falcons feed on seabirds which may also be declining. Bald eagles and osprey have been the focus of re-introduction efforts on nearby Santa Catalina Island in recent years.

Table3-13. Endemic and sensitive landbird species observed at San Clemente Island.

Scientific Name	Common Name	USFWS, CDFG, PIF Status	Global, State CNDDB Rank
SCI ENDEMICS			
Lanius ludovicianus mearnsi	San Clemente loggerhead shrike	FE	G4T1, S1
Amphispiza belli clementae	San Clemente sage sparrow	FT, PIF	G5T1, S1
CHANNEL ISLANDS ENDEMICS			
Selasphorus sasin sedentarius	Allen's hummingbird		
Empidonax difficilis insulicola	Pacific-slope flycatcher		
Eremophila alpestris insularis.	horned lark		G4G5, S3
*Vermivora celata sordida**	orange-crowned warbler		
Carpodacus mexicanus clementis	house finch		
OTHER RESIDENTS AND MIGRANTS			
Ardea herodias	great blue heron		G5, S4
Egretta thula	snowy egret		G5, S4
Nycticorax nyxticorax	black-crowned night-heron		G5, S3
Circus cyaneus	northern harrier	CSC	G5, S3
Accipiter striatus	sharp-shinned hawk	CSC	G4, S3
Accipiter cooperii	Cooper's hawk	CSC	G4, S3
Falco columbarius	merlin	CSC	G5, S3
Falco peregrinus anatum	peregrine falcon	SE	G3, S2T2
Athene cunicularia hypugea	burrowing owl	FSC, CSC	G4, S2
Asio flammeus	short-eared owl	CSC	G5, S3
Asio otus	long-eared owl	CSC	G5, S3
Selasphorus rufus	Rufous hummingbird	PIF	G5, S1S2
Chaetura vauxi	Vaux's swift	CSC	G5, S3
Contopus borealis	olive-sided flycatcher		G5, S4
Empidonax trailii	willow flycatcher	SE	G5, S1S2
Riparia riparia	bank swallow	ST	G5, S2S3
Toxostoma bendirei	Bendire's thrasher	CSC, PIF	G5, S3
Dendroica occidentalis	hermit warbler	PIF	G4G5, S3?
Icteria virens	yellow-breasted chat	CSC	G5, S3
Piranga rubra	summer tanager	CSC	G5, S2
Spizella passerina	chipping sparrow		G5, S3S4
Spizella breweri	Brewer's sparrow	PIF	G5, S3
Spizella atrogularis	black-chinned sparrow	PIF	G5, S3
Xanthocephalus xanthocephalus	yellow-headed blackbird		G4G5, S3S4
Carduelis lawrencei	Lawrence's goldfinch	PIF	G3, S3

USFWS and CDFG Codes: FE = Federally Endangered, FT = Federally Threatened SE = State Endangered, ST = State Endangered, CSC = CDFG California Species of Concern;
PIF = Partners in Flight Watch List
Global and State CNDDB 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 = 6-20 EOs 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.
* also found on the Palos Verdes peninsula and Point Loma

Migratory Birds. Migratory birds use SCI as a temporary stopover point or spend either the winter or summer season on SCI. Islands are often important stopover points for migratory birds, especially during storms.

The majority of the species observed on the Island, approximately 129 species, are present only part of the year and some have only been observed a few times. Nine migrants breed on the Island. The subspecies of Pacific-slope flycatcher (*Empidonax difficilis insulicola*) that breeds on the Island is endemic to the Channel Islands. On SCI, Pacific-slope flycatchers use canyon areas and nest on depressions in rock faces. The peregrine falcon, a rare migrant on the Island, is listed as endangered by the CDFG and is a former federally-listed species. The burrowing owl (*Athene cunicularia*), which only winters on SCI, is considered a species of concern by USFWS. Burrowing owls have declined dramatically on the mainland, and SCI may represent an important wintering location for this species. It is unknown where individuals that winter on SCI breed. The Island populations of the remaining species are probably not significant portions of their western populations.

As a result of documented population declines, migratory birds are the subject of an international conservation effort. The Migratory Bird Treaty Act (MBTA) (Section 2.3.2.3) provides the USFWS the opportunity to comment on projects potentially affecting bird species, and their habitats, that are not protected under the ESA. Therefore, if a project has the potential to affect nesting birds or nesting substrate (including the trimming of nest trees) a qualified biologist from the CNRSW, Environmental Department, NRO should be contacted to determine if there will be any violations of the MBTA. Recent EO 13186 of January 11, 2001 also requires agencies to control the establishment of exotic species that may endanger migratory birds and their habitat. An MOU between the USFWS and DoD concerning migratory bird conservation is forthcoming; a draft has recently been released.

DoD policy currently states that neotropical migratory bird programs shall be established in support of and consistent with the military mission. DoD's strategy focuses on inventory, on-the-ground management practices, education, and long-term monitoring (DoD 4715.DD-R 1996). A means of achieving these strategies is offered through the Partners In Flight (PIF) cooperative program. PIF is an international effort involving partnerships among federal, state, and local government agencies, professional organizations, conservation groups, and all other interested parties to improve monitoring, research, management, and education programs involving birds and their habitats. PIF offers DoD the opportunity to participate in an international program to enhance stewardship of natural resources and implement conservation objectives on a landscape level.

The DoD is an active participant in the PIF Program. DoD's PIF policy is to promote and support a partnership role in the protection and conservation of migratory birds and their habitat by protecting vital habitat, enhancing biodiversity, and maintaining healthy and productive natural systems consistent with the military mission. Appendix B contains a comprehensive species list of SCI.

Current Management—Land Birds

- As part of consultation on construction activities associated with the wind farm, post-construction surveys of avian mortalities birds were conducted during the first migration season following initial operation of the wind turbines.
- For the listed birds under BO terms and conditions and section 10(a) permitting, the Navy is to provide the USFWS with annual reports on activities affecting the species (BO 1-6-97-F-21 on Training Activities).
- The MBTA provides the USFWS the opportunity to comment on projects potentially affecting bird species, and their habitats, that are not protected under the ESA.
- Under the MBTA, prior to any project that has the potential to affect nesting birds or nesting substrate (including the trimming of nest trees), a qualified biologist from the Navy Region Southwest, Environmental Department NRO should be contacted to determine if there will be any violations.
- Recent EO 13186 of January 11, 2001 also requires agencies to control the establishment of exotic species that may endanger migratory birds and their habitat.

- DoD policy currently states that neotropical migratory bird programs shall be established in support of and consistent with the military mission.
- Osprey and bald eagles have both been released in recent years on nearby Santa Catalina Island.
- Surveys for raptors which breed on SCI or winter there are currently being performed as part of the loggerhead shrike recovery program. Raptors are monitored at shrike release sites to assess their interactions with shrikes. Raptors are also surveyed throughout the Island. These surveys are important not only to gauge the effects raptors may have on sensitive species such as the shrike, but to monitor the health of raptor populations on SCI.
- Terms and conditions related to San Clemente sage sparrow:
  - Minimize habitat loss to and take of San Clemente sage sparrows.
  - 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 and water is to be the primary suppression agent used in sage sparrow habitat.
  - Avoid training activities in San Clemente sage sparrow habitat to the maximum extent practicable.
  - Coordinate with the USFWS on a San Clemente sage sparrow survey protocol and conduct annual surveys, including work in previously unsurveyed potential habitat to better ascertain the status of the species.
  - Operators operating aircraft or conduction training activities near sage sparrow habitat shall receive training and education on the sage sparrow and the Island night lizard and the importance of avoiding ignition.
- 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 (BO 1-6-97-F-21 Training Activities).
  - The captive breeding program is handled by the Zoological Society of San Diego and includes a rearing facility on the Island. Birds in captivity are bred to produce young birds for release into the wild, and the captive flock is managed to maintain maximum genetic diversity.
  - Island-wide surveys are conducted semiannually 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 which deters them from entering the area near a nest.
  - Nest locations are enhanced through supplemental feeding and rodent deterrence.
  - Shrikes are monitored throughout the year and training activities may be modified if shrikes are nearby.
  - In addition, research projects are underway to study various aspects of shrike ecology.
- Potential shrike release sites have been identified and selected using specific criteria developed by the Endangered Species Release Council (ESRC 1997), and modified on 21 August 1998 by field biologists from Point Reyes Bird

Observatory (PRBO) and the Institute for Wildlife Studies (IWS), to select release sites for the San Clemente loggerhead shrike. These criteria are used to identify features and characteristics used by endangered SCLS for wintering and breeding habitat. This criterion is based upon habitat parameters that are currently being used by San Clemente loggerhead shrikes. Thus, this criterion does not necessarily identify optimum habitat for San Clemente loggerhead shrikes, but the best available habitat presently.

- The release site selection criteria are listed below by category, followed by the point range allotted to each category, and the definition of each category including how to score each criterion. The definitions below are subjective, and there are no clearly defined percentages or amounts associated with the scores. This is because the exact requirements and preferences of the San Clemente loggerhead shrikes have not been identified. Until they are, biologists on SCI believe this is the best way to evaluate potential release sites. Three current members of the monitoring crew have worked on the project for over two years, monitoring shrikes on a daily basis. With this experience, they were considered the most qualified to judge each potential release site. For each site, the scores of these three people were averaged to derive a total score out of 80 possible for each site. Any site that receives a score of zero for any category, with the exception of SHOBA and historic nest site categories, is presumably unsuitable and was automatically eliminated.
- The highest score of those sites on SCI that have been evaluated, which includes potential release sites and territories held by wild shrikes, is a 68 (out of a possible 80). The three family and two juvenile release sites selected in 1999 had scores that ranged between 68 and 59. Most of the bonded, family and juvenile sites selected for releases in 2000 have scores that range between 58 and 50, with one bonded-pair site receiving a score of 43.

■ The release site selection criteria are:
  - 1) Vegetation (0-45): There are seven vegetation categories:
  - *a* - Shelter (0-5): the availability of trees or shrubs that provide shelter from predators, and a viable location for roosting. In general, the more shelter, the higher the score. For escape cover, lemonade berry *(Rhus integrifolia)* is preferable to island cherry *(Prunus lyonii)* and other open shrubs.
  - *b* - The presence of impaling stations (0-5): shrubs such as California sagebrush *(Artemisia californica)*, coyote bush *(Baccharis pilularis)*, lemonade berry and cholla (*O. prolifera)* stalks. In general, the more impaling stations, the higher the score.
  - *c* - The presence of morning glory (0-5): this appears to enhance the prey base by attracting insects and possibly providing shelter for mice. This is based on an optimum amount and distribution of morning glory, not a maximum.
  - *d* - The presence of perches to hunt from (0-5): shrikes appear to use shorter perches, especially cholla stalks, rather than trees or higher shrubs for hunting. In general, the more hunting perches, the higher the score.
  - *e* - The presence of bare ground or short grass (0-5): shrikes appear to use areas with less ground cover to hunt, presumably potential prey is

more visible in these areas. This is based on an optimum amount and distribution rather than a maximum.

- *f* - General habitat diversity (0-10): biologists believe that the more diverse the habitat is, the more likely all needs will be provided.
- *g*- Steepness/space (0-10): biologists believe that a canyon that is less steep would be more efficient with respect to energy expenditure. Also, the more area available, i.e. more space in the canyon bottoms, the more foraging area there would be, and more options, in general, for all activities. This is based on a combined optimum level of steepness and space, not a maximum.
- 2) Predators/competitors (0-5): The presence of predators and/or competitors is important when considering a release site, however; this category is given only 0 to 5 points total, because predators and competitors are controlled at a release site pre- and post-release.
- 3) Access to site (0-5): This is a factor that must be considered because if a site cannot be reached on a daily basis, or takes longer than 1 h to reach, this could hinder set up, control, and monitoring efforts.
- 4) Ability to observe (0-5): This is a factor that is considered because the monitors' ability to observe can vary depending on the topography of a site. Better viewing could provide a more accurate assessment of a released birds' success or failure.
- 5) Historic nest site (0/5): If the site evaluated is a historic nest site, that site was given five additional points. Biologists believe that releasing birds in areas that have been documented as previous nesting sites is advantageous.
- 6) SHOBA (0/5): If the site evaluated is not in SHOBA it was given five additional points. Sites in SHOBA will present access and observation problems.
- 7) Proximity to bombardment (0-5): The further away from either of the bombardment areas within SHOBA a release site is, the higher the score.
- 8) Proximity to wild shrike (0-5): This is based on an optimal distance from other shrikes on the Island. The optimal distance would be far enough away from other shrikes so that there would be no territory disputes, and the released birds would have room to disperse from the site without harassment.

- In 2001, a significant increase in the shrike population may result in the need for new Section 7 consultations with the USFWS. In that regard, an incidental take allowance for loggerhead shrikes will be pursued.
  - It is anticipated that current military operations and proposed changes in exercises could have an adverse impact on loggerhead shrikes if historical breeding territories are reoccupied in SHOBA Impact Areas 1 and 2. However, the anticipated level of incidental take would be minor, and will not appreciably reduce the survival or recovery of the loggerhead shrike.
  - The number of historical breeding territories within the SHOBA Impact Areas is small, currently less than 10% of all identifiable breeding territories. Only one of those historical breeding territories has been occupied in recent years, representing only 4% of all active territories. Further, current and proposed new fire minimization and

avoidance practices are likely to decrease the probability of impacting shrike territories outside of the Impact Area fire breaks.

- Terms and conditions related to San Clemente loggerhead shrike:
  - Continue to implement the recovery program to protect and augment the population of shrikes through: 1) captive propagation and rearing, 2) monitoring of the wild shrike population, 3) predator control, 4) genetics research, and 5) habitat evaluation.
  - As part of this program the island fox is to be monitored from shrike nesting sites. Additional research on fox demographics is also performed. The island fox may be considered by USFWS as a candidate for listing under the ESA.
  - Establish 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 firebreaks to assure that shrikes are not impacted by installation activities.
  - 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.
  - 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.

3.6.4 Shorebirds

Twenty-nine bird species that rely primarily on intertidal habitats for feeding, shorebirds, have been observed at SCI, including four with sensitive status (Table 3-14). One of these species, the western snowy plover (*Charadrius alexandrius nivosus*) is listed as threatened by USFWS. Winter observations of this species are common at SCI but only a handful of breeding records exist for the Island (Appendix D). There is only one other shorebird known to breed on the Island, the black oystercatcher (*Haematopus bachmani*). The mountain plover (*Charadrius montanus*), a federally protected species, has not been observed on SCI for many years. They use heavily grazed areas frequented by sheep, and probably used the grasslands during the sheep-grazing era.

Many shorebirds spend the winter on SCI or use it as a migration stopover point. Shorebirds are highly specialized predators of intertidal invertebrates and are easily disturbed by human activities. See Jorgensen and Ferguson (1984) for a more complete discussion of bird observations at SCI. Appendix B contains a comprehensive species list for the Island.

Table3-14. Shorebirds with sensitive status observed at San Clemente Island.

Scientific Name	Common Name	USFWS, CDFG, PIF Status	Global, State CNDDB Rank
Charadrius alexandrinus nivosus	western snowy plover	FT, CSC, PIF	G4T2, S2
Charadrius montanus	mountain plover	FPT, CSC	G3, S2?
Nemenius americanus	long-billed curlew	CSC, PIF	G5, S2
Haematopus bachmani	black oystercatcher	PIF	G5, S2

USFWS and CDFG Codes: FT = Federally Threatened, FPT = Federally proposed for listing as Threatened, CSC = CDFG California Species of Concern;
PIF = Partners in Flight Watch List
Global and State CNDDB Rank: 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.

Current Management—Shorebirds

- The Navy supports monthly western snowy plover surveys through 2003 and reports results to the USFWS.
- According to the western snowy plover draft recovery plan (USFWS 2001), the Navy is required to provide protection and management of all breeding and wintering locations of western snowy plovers on their land.

3.6.5 Seabirds

Approximately 52 species of birds that spend the majority of their life cycle on the water have been observed on SCI or in the waters surrounding the Island. Examples include loons, cormorants, ducks, pelicans, terns, gulls, petrels, and murrelets. Several species are considered sensitive by the CDFG or USFWS (Table 3-15) because of disturbance to their breeding grounds.

Table3-15. Seabirds considered sensitive that have been observed at San Clemente Island.

Scientific Name	Common Name	USFWS, CDFG, PIF Status	Global, State CNDDB Rank
Gavia immer	common loon	CSC	G5, S1
Oceanodroma homochroa	ashy storm-petrel	FSC, CSC, PIF	G2, S2
Oceanodroma melania	black storm-petrel	CSC, PIF	G3, S1
Pelecanus occidentalis Californicus	California brown pelican	FE, SE, FP	G4T3, S1S2
Phalacrocorax auritus	double-crested cormorant	CSC	G5, S3
Larus californicus	California gull	CSC	G5, S2
Sterna caspia	Caspian tern		G5, S4
Sterna elegans	elegant tern	FSC, CSC	G5, S1
Sterna forsteri	Forster's tern		G5, S4
Synthliboramphus hypoleucus	Xantus' murrelet	FSC, CSC, PIF	G4?, S3
Cerorhinca monocerata	rhinoceros auklet	CSC	G5, S3

USFWS and CDFG Codes: FE = Federally Endangered, FSC = Federal Species of Concern, SE = State Endangered, CSC = CDFG California Species of Concern
PIF = Partners in Flight Watch List.
Global and State CNDDB Rank: G2 = 6-20 EOs 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.

Most seabirds are observed from shore and many are known from only a few records. However, some species, such as gulls and terns, will congregate near boats and at Wilson Cove. Sheltered coves on the Island are often used for feeding and for relief from severe storms that can have significant impacts on seabird populations. Gulls may be predators on nests of some landbirds, however, most seabirds feed primarily on fish and invertebrates which may be more plentiful near islands than in the open ocean.

Most seabirds prefer rocky shores of isolated islands for breeding. There are breeding records for five seabird species at SCI: Double-crested cormorant (*Phalacrocorax auritus*), Brandt's cormorant (*Phalacrocorax penicillatus*), Xantus' murrelet (*Synthliboramphus hypoleucus*), ashy storm-petrel (*Oceanodroma homochroa*), and the western gull (*Larus occidentalis*). More seabirds probably do not breed on the Island because of the abundant terrestrial predators such as foxes and cats, and because of the lack of suitable offshore rocks. See Jorgensen and Ferguson (1984) for a more complete discussion of bird observations at SCI. See Appendix D for a profile of Xantus' murrelet.

The California brown pelican is considered endangered by both the USFWS and CDFG. This species is commonly seen year-round at SCI; however, there are no breeding records. Basic requirements for communal night roosts include: 1) they must be within energetically efficient distances from foraging areas, 2) they must be buffered from mammalian disturbance, and 3) they must provide shelter from strong winds and surf spray (USFWS 1983).

Water temperatures and patterns can have a profound influence on seabird populations. From approximately 1978 to 1998, the eastern Pacific experienced a shift from a cold-water regime to a warm-water regime. This shift and associated declines in zooplankton and some fish species, led to a measurable decline in seabird populations. In 1999, there was a dramatic decline in water temperatures which may signal a shift back to a colder regime (Orthmeyer *et al.* 2000).

Current Management—Seabirds

- A study is currently being performed on Brandt's cormorants in the Channel Islands and pellet collections for this work are occurring at SCI. The study focuses on the cormorant's diet and its reliance on specific fish species around the Islands, including economically important species. This information will eventually be correlated with reproductive success and population surveys for Brandt's cormorants and inferences may be made about oceanographic conditions in the region (Walgren 2000).
- The U.S. Geological Survey started a four-year study in 1999 of seabird populations off the coast of Southern California, including the shores of SCI.
- 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.

3.6.6 Native Terrestrial Mammals

There are six native terrestrial mammals on SCI: San Clemente Island deer mouse, San Clemente Island fox, fringed bat (*Myotis thysanodes*), California bat (*Myotis californicus*), Townsend's big-eared bat (*Plecotus townsendii*), and free-tailed bat (*Tadarida brasiliensis*). A bat survey has been funded for 2002. The deer mouse and island fox, both found throughout the Island, are endemic subspecies of SCI, and the fox species is unique to the Channel Islands. See Appendix D for profiles of the island fox and rodents on SCI. The bats are largely migratory and feed primarily on insects. They inhabit caves, rock crevices, and human habitations around the Island.

Little is known of the current status of most of these mammals, with the exception of the Island fox. The fox is currently being monitored as part of the loggerhead shrike recovery program, and is the subject of management to minimize the possibility of predation on shrikes. The Island fox is listed as Threatened by CDFG, and is a federal Species of Concern. The northern four Channel Island populations have been petitioned for federal listing under the ESA based on dramatic population declines, possibly from raptor predation and disease. The San Nicholas and San Clemente Island populations were not included in the petition, but the San Clemente Island population may be considered in future candidate notices.

Eleven mammal species have been introduced to SCI in the recent past, though many are no longer present. Goats and sheep were introduced by early Europeans. Cattle, pigs, and mule deer were introduced in the 1950s–1960s, all resulting in severe habitat degradation. After intensive and costly removal programs, SCI is now free of these animals but their impacts are still visible. The black rat, house mouse, harvest mouse, California vole, and house cats still roam the Island, though a predator control program in conjunction with shrike management is currently trying to remove all feral cats. Although not allowed on the Island, domestic dogs have occasionally had access to the Island through ranchers and recreational boats that land on the Island. Appendix B contains a comprehensive species list for the Island.

Current Management—Native Terrestrial Mammals

- In August 2001, a court settlement agreement was reached between the USFWS and environmental groups, and the Island fox was identified as a species in need of immediate proposed listing under the ESA.
    - The USFWS is proceeding with a proposed listing of the four northern Channel Island fox subspecies, as petitioned in 2000 by the Center for Biodiversity and the IWS, but did not include the San Clemente Island fox on the Candidate Notice of Review or on the proposed final rule. The NRO is working with the USFWS on a conservation agreement to protect the San Clemente Island fox and to preclude its listing.
    - Because there are potential threats and stressors to the San Clemente Island fox population, a Candidate Conservation Agreement between the Navy and the USFWS will be proposed. The Candidate Conservation Agreement, a voluntary action initiated by the Navy, will outline 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.
- A lower speed limit has recently been posted on SCI to reduce fox mortalities caused by vehicle collisions.
- In conjunction with San Clemente loggerhead shrike management programs:
    - Feral cats are tracked and removed from areas used by shrikes throughout the year.

- Garcelon (1999) and collaborators with the IWS have used a combination of trapping/mark-recapture and radiotelemetry (1988 - 1997) to evaluate fox population demographics on the Island, including estimating population effects of fox control associated with the shrike recovery program. A fourth trapping grid has recently been added that would expand the scope of Island-wide population estimates from mark-recapture sampling.
- Foxes are deterred from entering the vicinity of active shrike nests.
- Rodent deterrence is employed around shrike nests and black rats and mice are removed from shrike nesting areas (Section 3.7.3). It is unknown what the impact is on native rodent populations.
- 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.
- The IWS has collected data on shrike prey base, including rodents.

■ Bat surveys are planned for the Island in 2002.

3.6.7 Marine Invertebrates

The southern California Bight is perhaps the richest marine environment in the world. It is estimated that more than 5,000 marine invertebrate species can be found in the region. The variety of depths and bottom conditions around SCI provide habitat for a large number of these species including 51 mollusk spp., 17 arthropod spp., 10 spp. of cnidaria, 5 spp. of porifora, 5 spp. of polychaetes, and 4 echinoderm spp. Many more undoubtedly occur around the Island.

Historically, SCI has been a popular location for harvesting many marine invertebrates including abalone and lobsters. Due to severe over-harvesting, white abalone have recently been listed as endangered by NMFS and black and green abalone are also candidate species for listing. Appendix D shows a profile of abalone populations at SCI. Commercial harvest data for marine invertebrates in the waters around San Clemente Island in the 1990s are presented in Table 3-16. Particularly striking is the dramatic increase in harvest of red urchin from 1990 to 1995, coinciding with an increased demand in Japan for this species. Harvest of red urchin declined in 1990 almost as dramatically. There is currently a moratorium on abalone harvesting, and catching lobsters is regulated by the state of California.

Marine invertebrates play a significant role in shore ecosystems both as important prey items for fish, mammals, birds, and other invertebrates, but also for nutrient cycling. Most marine invertebrates are filter feeders eating detritus, though some species eat primarily vegetation or other invertebrates. Relatively little is known about the ecology of marine invertebrates. Appendix B contains a comprehensive species list for the Island.

Table3-16. Most abundant marine invertebrates harvested commercially (reported as pounds harvested) in waters around San Clemente Island at three time periods in the 1990s (CA Department of Fish and Game data).

SPECIES	POUNDS HARVESTED		
	1990	1995	1999
red urchin	803,854	4,689,406	1,436,450
market squid	537,000	295,011	3,707
California spiny lobster	103,960	45,317	152,561
pink abalone	5,446	9,228	no report
green abalone	5,397	534	no report
black abalone	3,541	no report	no report
ridgeback prawn	317	no report	no report
rock crab (unspecified)	315	1,642	390
white abalone	17	no report	no report
red abalone	4	728	no report
spot prawn	no report	20,407	372,245
purple urchin	no report	5,477	no report
sea cucumber	no report	329	8,382
thornyheads	no report	no report	280
box crab	no report	no report	162
spider crab	no report	no report	159

Current Management—Marine Invertebrates

- The Navy participated in cooperative abalone surveys by the National Park Service (NPS) in 2000.
- SCI has provided seed red and green abalone for artificial propagation and outplanting at the Point Loma abalone hatchery operated by SSC SD and Dr. David Lapota.
- The California Game and Fish Department conducts annual regional abalone surveys, including the waters around SCI.
- Navy has developed draft scope of work to partner with NPS to conduct baseline intertidal/subtidal surveys and inventories for SCI.
- Currently, the Navy has no management restrictions in place directed toward marine invertebrates.

3.6.8 Fishes

The Southern California Bight contains 481 species of marine fishes, the majority of which probably have at least potential to occur off SCI. The variety of warm and cold water currents which converge along southern coastal California result in a rich assemblage of fishes, and the changing weather conditions between years results in a constantly changing marine fauna. A summary of the most prominent larval fishes sampled in waters off SCI during the California Cooperative Oceanic Fisheries Investigation (CalCOFI) surveys over the years is presented in Figure 3-7.

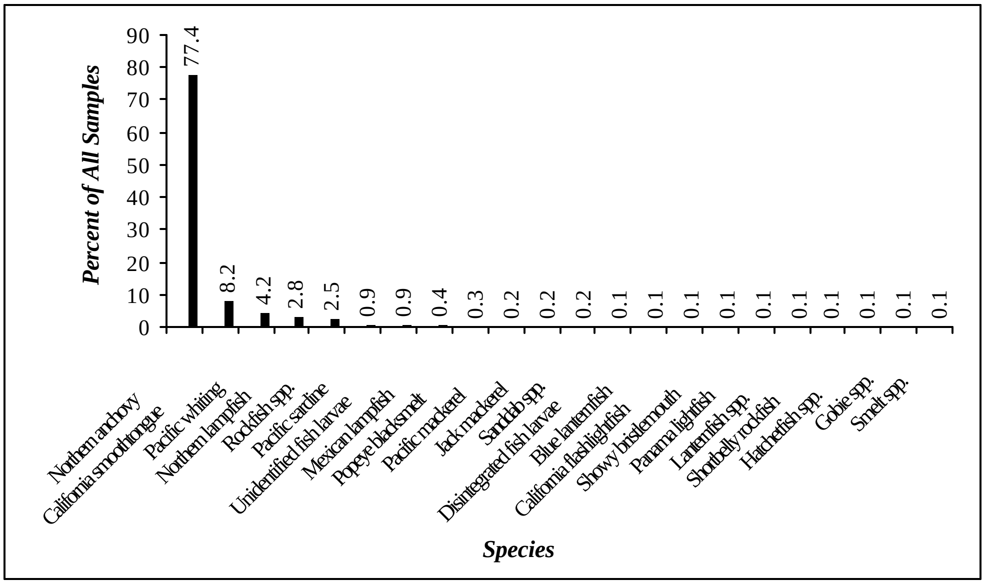


Figure3-7. Representation of larval species detected over 50 years at CalCOFI sampling sites off San Clemente Island. Species lacking visible bars represented 0.3% or less of all sample counts.

The waters around SCI have long been known as a particularly rich fishing location. This results, at least partially, from the variety of depths and bottom conditions around the Island. At least 30 species have been recorded and undoubtedly many more are present. Examples include yellowtail, northern anchovy, garibaldi, sardines, rays, and sharks.

The shores and reefs of islands provide important feeding and breeding habitat for both fish and marine mammals and birds which feed on the fish. Kelp beds can be particularly high in fish diversity. Smaller fish, which feed primarily on plankton, use the kelp for refuge and larger fish are attracted by the presence of these smaller species. Many species also feed on the abundant invertebrates, such as starfish, common on the rocky shores of SCI.

In August of 2000 Pondella *et al.* collected fish data in two ways. First, overnight gill net sets were used at Pyramid Cove, Purse Seine Rock, and Northwest Harbor. Gill net fishing is not a comprehensive fishing method. Surveys were conducted in conjunction with the Ocean Resources Enhancement and Hatcery Program monitoring program (Table 3-17). In addition, diver transects were conducted at three locations: lil flower, purse seine rock and reflector reef. The lil flower location was unique and perhaps should be managed separately. Pondella found a warmer fauna on the lee of the east end of the Island, with most sampling revealing species and abundances typical of kelp/reef fauna. He did not work on the back side of the Island due to the large swells.

Table3-17. Fish abundances from surveys in 2000 using six variable mesh gill nets were set overnight as an extension of the Ocean Resources Enhancement Hatchery Program white seabass monitoring program at the locations below.

Scientific name	Common name	Northwest Harbor (Aug, 11, 2000)	Purse Seine Rock (August 10, 2000)	Pyramid Cove (August 9, 2000)	Grand Total
Anisotremus davidsonii			69		69
Atherinopsis californiensis	jacksmelt	1	2	4	7
Atractoscion nobilis		10	8	3	21
Brachyistius frenatus	kelp surfperch	2			2
Caulolatilus princeps	ocean whitefish		3	5	8
Chromis punctipinnis	blacksmith	7	3	1	11
Embiotoca jacksoni	black surfperch	5	8	6	19
Galeorhinus zyopterus	soupfin shark	3	1	1	5
Girella nigricans	opaleye	8	12	8	28
Halichoeres semicinctus	rock wrasse	1	5	17	23
Hermosilla azurea	zebraperch		11		11
Heterdontus francisci	horn shark		11	10	21
Heterostichus rostratus	giant kelpfish	5		1	6
Hyperprosopon argenteum	walleye surfperch	3		9	12
Hypsypops rubicundus	garibaldi		5		5
Medialuna californiensis	halfmoon	28	42	14	84
Myliobatis californica	bat ray	1	3	1	5
Paralabrax clathratus	kelp bass	44	29	46	119
Phanerodon furcatus	white surfperch			1	1
Rhinobatos productus	shovelnose guitarfish		1		1
Scorpaena guttata	sculpin	16	7	26	49
Sebastes rastrelliger	grass rockfish			1	1
Sebastes serraniodes	olive rockfish			1	1
Semicossyphus pulcher		5	5	7	17
Sphyraena argentea	Pacific barracuda		6	1	7
Squatina californica	Pacific angel shark			1	1
Trachurus symmetricus	jack mackerel	9	7	8	24
Triakis semifasciata	leopard shark		4	4	8
Umbrina roncador	yellowfin croaker		25	19	44
Xenistius californiensis	salema	2	12	7	21

No fish species at SCI are listed as sensitive. However, it is illegal to possess giant sea bass (*Stereolepis gigas*), and the status of the Pacific red snapper (*Sebastes paucispinis*), or Bocaccio, is currently being reviewed by NMFS. Commercial fishing is not prominent in the waters around SCI, but it does occur. SCI is a popular destination for recreational fishing, and sportfishing boats can be seen on any given day. There are catch limits and regulations for many sport fish and fishing vessels are required to document what they catch. Fishes most frequently landed commercially and recreationally from waters around San Clemente Island are described for 1990, 1995, 1998 and 1999 in Figures 3-8, Table 3-16, Figure 3-9,and Table 3-19, respectively. Appendix B contains a comprehensive species list of the Island.

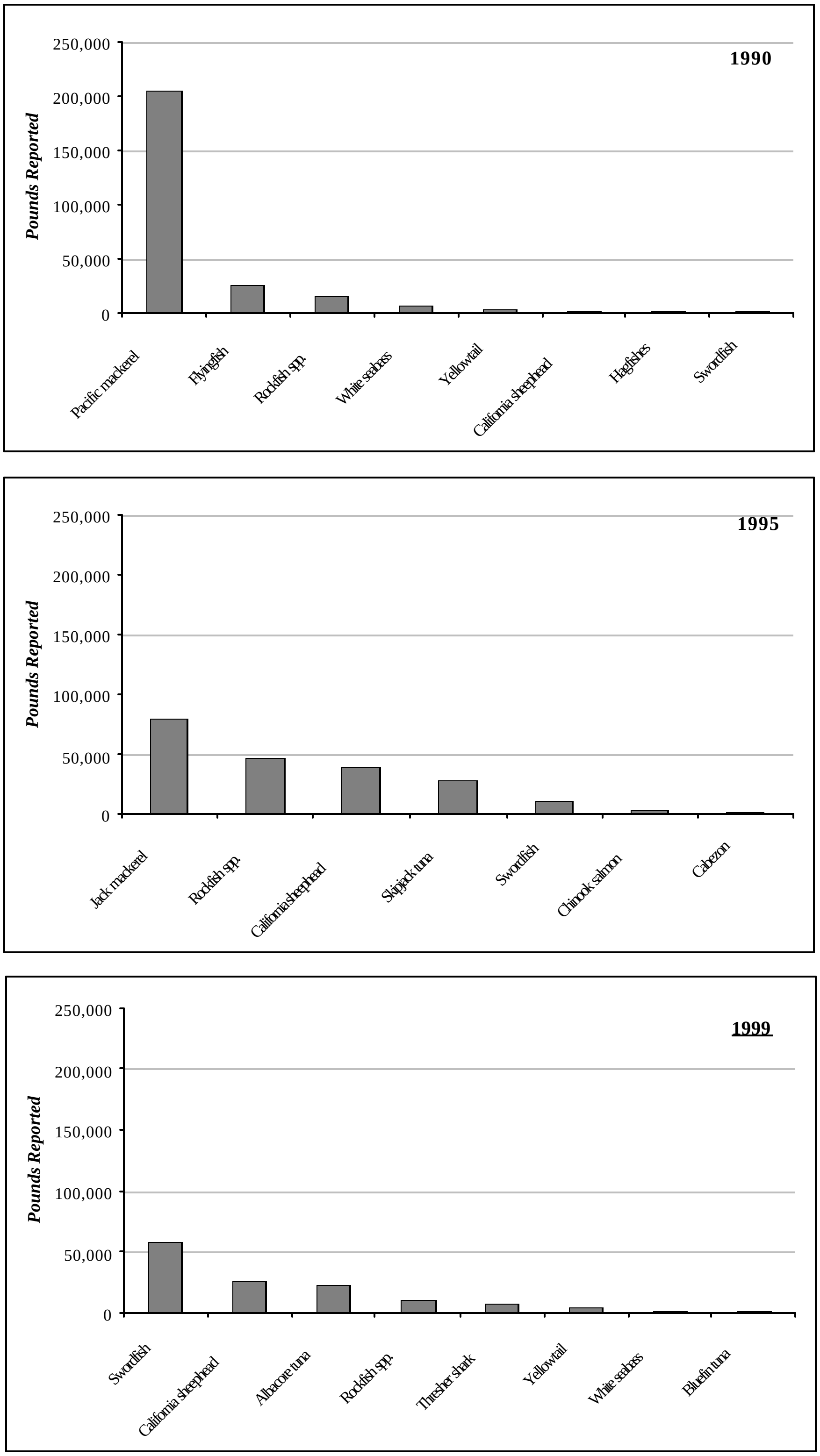
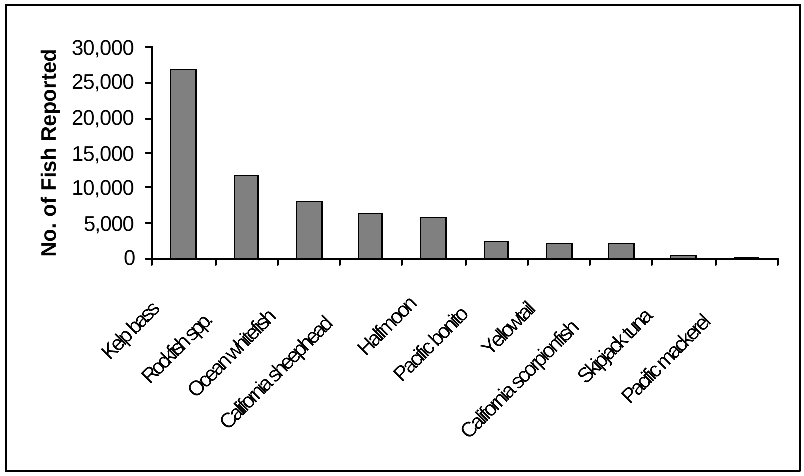
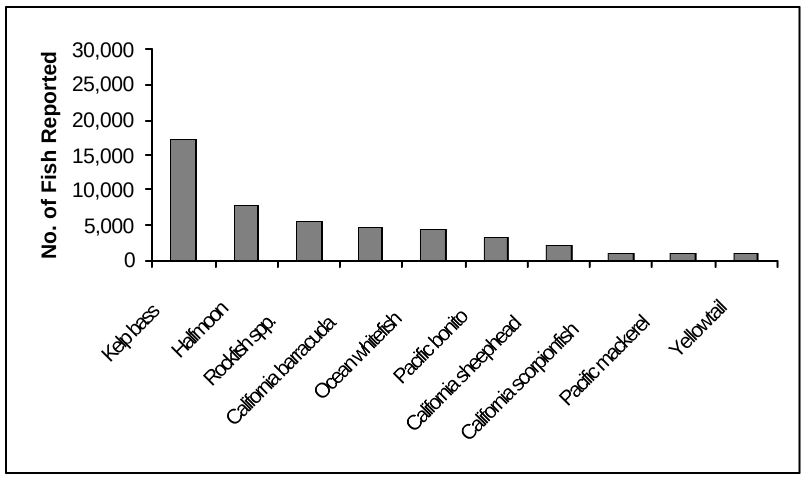


Figure3-8. Abundance of fish reported by pound from commercial harvest in waters around San Clemente Island in 1990 (top), 1995 (middle), and 1999 (bottom) (CA Department of Fish and Game data).

Table3-18. Top ten (by pound) species of fish and marine invertebrates harvested commercially from reporting blocks around SCI.

	1990		1995		1999	
Block	**Pounds**	**Species**	**Pounds**	**Species**	**Pounds**	**Species**
North San Clemente (829)	146,779.57	Red urchin	123,165.4	Red urchin	320,229.0	Red urchin
	58,350.11	California spiny lobster	13,110.0	California spiny lobster	11,432.1	California spiny lobster
	6,527.50	Pacific mackerel	2,156.0	Spot prawn	7,565.0	Bocaccio rockfish
	3,842.55	White seabass	1,926.4	Chinook salmon	5,469.1	Sea cucumber
	1,009.50	Rockfish (group, red)	953.8	Rock crab (unspecified)	1,901.2	California sheephead
	706.25	Swordfish	671.9	Pink abalone	588.0	Rockfish (group red)
	613.50	California sheephead	457.5	Rockfish (group, red)	303.0	Albacore tuna
	557.90	Yellowtail	374.5	California sheephead	129.0	Spider crab
	374.40	Green abalone	162.5	Shortfin mako shark		
	314.45	Rock crab (unspecified)	14.0	White abalone		
East San Clemente (849)	197,846.00	Pacific mackerel	40,632.0	Red urchin	169,255.6	Spot prawn
	24,359.00	Flyingfish	26,147.0	Blackgill rockfish	48,129.8	Swordfish
	7,646.00	Blackgill rockfish	14,708.9	Spot prawn	5,553.4	Albacore tuna
	4,915.00	Red urchin	12,434.9	California sheephead	1,973.6	Sea cucumber
	3,648.00	Rockfish (group, red)	8,224.0	Swordfish	1,573.0	California sheephead
	1,233.00	Rockfish (group, bocaccio/chili	7,129.8	Rockfish (group, red)	1,363.4	California spiny lobster
	1,055.00	Starry rockfish	4,939.8	California spiny lobster	955.2	Shortfin mako shark
	871.00	Shortfin mako shark	891.1	Rockfish (unspecified)	700.0	Thresher shark
	760.00	Pacific bonito	775.0	Sablefish	501.3	Pacific mackerel
	611.00	Thresher shark	747.9	Pink abalone	354.0	Louvar
West San Clemente (850)	537,000.00	Market squid	4,276,536.0	Red urchin	948,249.3	Red urchin
	486,923.00	Red urchin	281,311.0	Market squid	125,951.8	California spiny lobster
	28,385.70	California spiny lobster	79,223.0	Jack mackerel	79,299.9	Spot prawn
	4,872.86	Green abalone	18,994.4	California spiny lobster	10,039.9	California sheephead
	4,664.52	Pink abalone	7,522.6	California sheephead	1,885.0	Swordfish
	3,354.14	Black abalone	6,320.8	Pink abalone	1,136.9	White seabass
	1,360.00	White seabass	5,280.0	Purple urchin	955.9	California halibut
	1,121.00	Rockfish (group, bocaccio/chili	1,175.0	Swordfish	939.6	Sea cucumber
	995.00	California sheephead	860.6	Rockfish (group, red)	674.9	Rockfish (unspecified)
	903.00	Rockfish (unspecified)	821.9	Yellowtail	425.0	Rockfish (group red)
South San Clemente (867)	165,236.00	Red urchin	249,073.0	Red urchin	167,972.0	Red urchin
	17,224.00	California spiny lobster	28,124.0	Skipjack tuna	123,689.3	Spot prawn
	1,540.00	Hagfishes	17,445.5	California sheephead	17,214.9	Albacore tuna
	1,024.00	Yellowtail	13,700.0	Market squid	13,813.3	California spiny lobster
	906.00	White seabass	8,273.0	California spiny lobster	12,538.6	California sheephead
	529.16	Pink abalone	5,134.0	Rockfish (group, red)	8,431.5	Swordfish
	133.00	Soupfin shark	3,542.0	Spot prawn	6,851.1	Thresher shark
	64.58	Green abalone	3,195.5	Rockfish (unspecified)	3,707.3	Market squid
	61.00	California sheephead	1,487.5	Pink abalone	2,951.5	Yellowtail
	19.00	Rockfish (group, bocaccio/chili	1,025.0	Ocean whitefish	1,579.5	Bluefin tuna
All Blocks	803,853.57	Red urchin	4,689,406.4	Red urchin	1,436,450.3	Red urchin
	537,000.00	Market squid	295,011.0	Market squid	372,244.8	Spot prawn
	204,373.50	Pacific mackerel	79,223.0	Jack mackerel	152,560.6	California spiny lobster
	103,959.81	California spiny lobster	45,317.1	California spiny lobster	58,446.2	Swordfish
	24,359.00	Flyingfish	37,777.4	California sheephead	26,052.7	California sheephead
	7,646.00	Blackgill rockfish	28,124.0	Skipjack tuna	23,352.2	Albacore tuna
	6,108.55	White seabass	26,792.0	Blackgill rockfish	8,382.3	Sea cucumber
	5,445.46	Pink abalone	20,406.9	Spot prawn	7,738.6	Bocaccio rockfish
	5,397.26	Green abalone	13,581.9	Rockfish (group, red)	7,551.1	Thresher shark





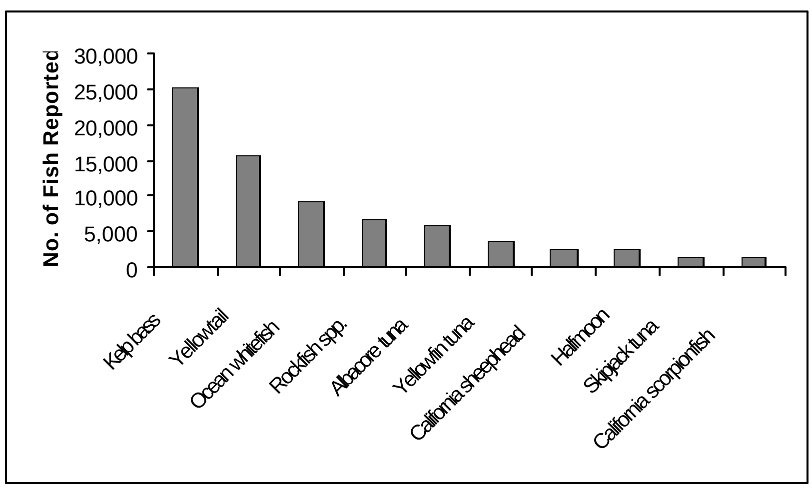


Figure3-9. Most abundant fish harvested from recreational charter boats in waters around San Clemente Island in 1990 (top), 1995 (middle), and 1998 (bottom) (CA Department of Fish and Game "party boat" data).

Table3-19. Top ten (in number reported) fish and marine invertebrates harvested recreationally on party (charter) boats from three reporting blocks around San Clemente Island.

Block	1990 No. of Fish	1990 Species	1995 No. of Fish	1995 Species	1998 No. of Fish	1998 Species
East San Clemente (849)	18,378	Kelp bass	10,064	Kelp bass	11,239	Yellowtail
	5,692	Rockfish spp.	4,402	Halfmoon	4,631	Kelp bass
	3,326	Halfmoon	3,163	Pacific bonito	1,611	Ocean whitefish
	3,278	California sheephead	3,133	California barracuda	1,367	Rockfish spp.
	3,203	Ocean whitefish	1,153	Ocean whitefish	1,126	Pacific bonito
	1,997	Pacific bonito	926	Rockfish spp.	886	Halfmoon
	1,954	Yellowtail	866	Yellowtail	677	California barracuda
	1,250	California scorpionfish	721	California sheephead	572	California sheephead
	371	Skipjack tuna	571	California scorpionfish	268	California scorpionfish
	339	California barracuda	274	Pacific mackerel	124	Bullet mackerel
West San Clemente (850)	5,108	Rockfish spp.	2,219	Kelp bass	769	Kelp bass
	3,860	Ocean whitefish	1,430	Rockfish spp.	191	Albacore tuna
	3,822	Kelp bass	937	Halfmoon	175	California sheephead
	2,302	California sheephead	765	Ocean whitefish	151	Yellowfin tuna
	880	Halfmoon	521	California sheephead	132	Yellowtail
	492	California scorpionfish	482	California barracuda	122	Ocean whitefish
	125	Pacific mackerel	228	California scorpionfish	119	Rockfish spp.
	90	Lingcod	83	California spiny lobster	58	Skipjack tuna
	79	Pacific bonito	52	Rock scallop	57	Halfmoon
	53	Yellowtail	43	Green abalone	50	Cucumber, sea
So. San Clemente (867)	4,664	Kelp bass	4,811	Kelp bass	19,991	Kelp bass
	1,685	Halfmoon	3,352	Rockfish spp.	7,689	Ocean whitefish
	1,290	Ocean whitefish	2,665	Ocean whitefish	5,870	Albacore tuna
	1,009	Rockfish spp.	2,410	Halfmoon	5,274	Rockfish spp.
	838	California sheephead	1,291	California barracuda	4,374	Yellowtail
	348	Pacific bonito	897	California sheephead	3,521	Yellowfin tuna
	210	California scorpionfish	709	Pacific mackerel	1,905	California sheephead
	201	Yellowtail	439	Abalone, green	1,707	Halfmoon
	39	Skipjack tuna	439	California scorpionfish	1,657	Skipjack tuna
	33	Pacific mackerel	315	Pacific bonito	1,086	California scorpionfish
Overall	26,864	Kelp bass	17,094	Kelp bass	25,391	Kelp bass
	11,809	Rockfish spp.	7,749	Halfmoon	15,745	Yellowtail
	8,353	Ocean whitefish	5,708	Rockfish spp.	9,422	Ocean whitefish
	6,418	California sheephead	4,906	California barracuda	6,760	Rockfish spp.
	5,891	Halfmoon	4,583	Ocean whitefish	6,061	Albacore tuna
	2,424	Pacific bonito	3,478	Pacific bonito	3,672	Yellowfin tuna
	2,208	Yellowtail	2,139	California sheephead	2,652	California sheephead
	1,952	California scorpionfish	1,238	California scorpionfish	2,650	Halfmoon
	410	Skipjack tuna	983	Pacific mackerel	1,715	Skipjack tuna
	191	Pacific mackerel	866	Yellowtail	1,354	California scorpionfish

Current Management—Fishes

Management of marine fish stocks is a dual responsibility of the state and federal governments. Within the state's three-mi offshore jurisdiction, CDFG provides the lead, while the NMFS oversees ocean stocks between the three- and 200-mi limits.

State Regulation

California's management of its marine fisheries was fundamentally changed in 1998 with the passage of AB 1241, under which fisheries management authority was transferred from the legislature to the California Fish and Game Commission (UCCE 1998). Fishery management plans are now mandated to be developed by the CDFG, with the Fish and Game Commission authorized to adopt regulations implementing those plans. The plans will be the primary basis for managing the state's marine recreational and commercial fisheries, and must include measures needed for a sustainable fishery. A status report must be submitted to the Commission by September 2001.

The harvesting of fish and shellfish in SCI waters is managed directly by CDFG. Ocean fishing regulations are drafted by the Marine Resources Division, reviewed in public hearings, revised if needed, and adopted by the Fish and Game Commission. Emergency actions to close a fishery temporarily can be taken on short notice, following approval by the Commission and the Office of Administrative Law. Such action was taken recently to close the red abalone fishery in California (California Department of Fish and Game 1997b).

Harvest regulation seeks to manage sustainable populations through a combination of techniques: area and seasonal closures; gear limitations; and size, catch, and possession limitations. If no specific limit is listed in the CDFG sport fishing regulations for a species, then the general daily limit is ten finfish of any one species (or 20 in combination) and 35 shellfish (California Department of Fish and Game 1997b). Some species are listed in the regulations as having no limit: grunion, topsmelt, jacksmelt, starry flounder, and most clams, among others. Zero take applies to a few protected species, such as garibaldi, black sea bass, and speckled (bay) scallops. Several species of marine plants are also prohibited from being cut or disturbed: eelgrass, surf grass, and sea palm. Seasonal restrictions apply to a few species: white sea bass, grunion, and California spiny lobster, among others. Wardens from the Department's Wildlife Protection Division enforce the sport and commercial regulations. Sport fishing licenses are required for everyone except those fishing from certain public fishing docks.

Three new marine protected areas are proposed under Assembly Bill 993 (Shelley), and the Marine Life Protection Act (MLPA) (Section 2.3.2.11). 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.

Federal Regulation

The health and productivity of fish populations is very dependent on the quantity and quality of their habitat. Ocean and nearshore habitat conditions are now being addressed through the Essential Fish Habitat (EFH) effort of NMFS. As defined by the Magnuson-Stevens Fishery Management and Conservation Act, EFH are "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." One species may require multiple habitats, depending on its life history, abundance, competition from other species and environmental variables. These habitats must be identified for all commercially and recreationally harvested species that are listed in the Fishery Management

Plans adopted by the Pacific Fisheries Management Council, a federally appointed regional body of managers and fishermen whose area of oversight includes SCI waters.

Under the EFH program, all federal agencies must consult with NFMS on any action or proposed action that may adversely affect EFH. An adverse affect may include direct (e.g. contamination), indirect (e.g. loss of prey), site-specific or habitat-wide impacts. Consultations are generally done in conjunction with other federal statues, such as NEPA, CWA, or ESA. The NFMS provides recommendations to minimize, offset or mitigate these impacts. Within 30 days the federal agency should respond with a description of the measures that will be taken or with a scientifically sound explanation for not following the recommendations. NMFS has no regulatory authority to enforce EFH compliance. However, private citizens still have the option to take legal action to ensure adequate compliance with environmental laws.

The Pacific Fishery Management Council has identified seven major habitat types that are designated as EFH:

1. Estuarine– Those waters, substrates, and associated biological communities within bays and estuaries of the coasts of Washington, Oregon, and California, seaward from the MHHW or extent of upriver saltwater intrusion.
2. Rocky Shelf– Those waters, substrates, and associated biological communities living on or within 10 m overlying rocky areas, including reefs, pinnacles, boulders and cobble, along the continental shelf, excluding canyons, from the MHHW to the shelf break.
3. Non-Rocky Shelf– Those waters, substrates, and associated biological communities living on or within 10 m overlying the substrates of the continental shelf, excluding the rocky shelf and canyon composites, from the MHHW to the shelf break.
4. Canyon– Those waters, substrates, and associated biological communities living within submarine canyons, including the walls, beds, sea floor, and any outcrops or landslide morphology, such as slump scarps and debris fields.
5. Continental Slope/Basin– Those waters substrates, and associated biological communities living on or within 20 m overlying the substrates of the continental slope and basin below the shelf break and extending to the westward boundary of the exclusive economic zone.
6. Neritic Zone– Those waters and biological communities living in the water column more than 10 m above the continental shelf.
7. Oceanic Zone– Those waters and biological communities living in the water column more than 20 m above the continental slope and abyssal plain, extending to the westward boundary of the exclusive economic zone.

SCI Species Covered Under Essential Fish Habitat Regulation

The following 28 species (Table 3-20) are known from SCI waters based on published accounts, and are covered in the various Fishery Management Plans. Table 3-19 lists cumulative marine fishes and invertebrates harvested commercially from reporting blocks around SCI, along with their habitat association and status under EFH. Their habitat needs and biological interactions are described in

Appendix E, along with those of a number of other marine species which may be considered for special monitoring or "focus management species" status in this INRMP planning process.

Table3-20. Twenty-eight species known from San Clemente Island waters based on published sources for which Essential Fish Habitat must be reviewed for projects that may affect them under the Magnuson-Stevens Act.

Coastal Pelagics Fishery Management Plan	
market squid (*Loligo opalescens*)	jack mackerel (*Trachurus symmetricus*)
chub mackerel *(Scomber japonicus)*	Pacific sardine *(Sardinops sagax)*
northern anchovy *(Engraulis mordax)*	
Pelagic Fishery Management Plan	
albacore *(Thunnus alalunga)*	bluefin tuna *(Thunnus thynnus)*
swordfish *(Xiphias gladius)*	yellowfin *(Thunnus albacares)*
thresher sharks (family Alopiidae)	
Pacific Groundfish Fishery Management Plan	
sablefish *(Anoplopoma fimbria)*	widow rockfish *(Sebastes entomelas)*
lingcod *(Ophiodon elongatus)*	petrale sole *(Eopsetta jordani)*
rex sole *(Glyptocephalus zachirus)*	spiny dogfish *(Squalus acanthias)*
Pacific hake *(Merluccius productus)*	Dover sole *(Microstomus pacificus)*
leopard shark *(Triakis semifasciata)*	soupfin shark *(Galeorhinus zyopterus)*
blue rockfish *(Sebastes mystinus)*	bocaccio (Pacific snapper) *(Sebastes paucispinis)*
grass rockfish *(Sebastes rastrelliger)*	kelp rockfish *(Sebastes atrovirens)*
olive rockfish *(Sebastes serranoides)*	cabezon *(Scorpaenichthys marmoratus)*
Pacific Salmon Fishery Management Plan	
pink salmon (*Oncorhynchus gorbuscha)*	chinook (king) salmon *(Oncorhynchus tshawytscha)*

There are two main categories of adverse impacts of EFH, fishing and nonfishing activities. Measures to minimize fishing effects include: fishing gear restrictions, time/area closures and harvest limits. Since fishing does not occur under Navy purview except minimal recreational fishing by personnel from shore, it is not addressed in this INRMP.

Nonfishing activities that have the potential to adversely affect EFH quantity and/or quality include: dredging, fill, excavation, mining, impoundment, discharge, water diversions, thermal additions, non-point source pollution and sedimentation, introduction of hazardous materials, introduction of exotic species and the conversion of aquatic habitat. If these activities may result in significant adverse affects to EFH they should be avoided where less environmentally harmful alternatives are available. If there are no alternatives, the impacts should be minimized. If adverse affects cannot be avoided or minimized, compensatory mitigation to conserve and enhance EFH should be recommended.

For the waters of SCI within 300 yards of shore, the area covered in this INRMP, the following activities may merit a closer look in order to assess effects on EFH species. These include existing activities and those planned under the current draft Operations Management Plan (OMP).

Table3-21. *Cumulative marine fishes and invertebrates harvested commercially from the reporting blocks around SCI in 1990 and 1995, along with their habitat association.*

Spec#	Common Name	Scientific name	Type	EFH Species	Habitat	Depth	Other
5	Albacore tuna	*Thunnus alalunga*	fish		Pelagic/oceanic	20-600 m	
97	Bigeye thresher shark	*Alopias superciliosus*	fish		*Pelagic*	-	
701	Black abalone	*Haliotis cracherodii*	invertebrate		Benthic	-	rocky intertidal, shallow subtidal
252	Black rockfish	*Sebastes melanops*	fish	Y	Most habs	0-370 m	
667	Blackgill rockfish	*Sebastes melanostomus*	fish	Y	Most habs	87-768 m	
479	Blacksmith	*Chromis punctipinnis*	fish		Pelagic/neritic	0-45 m	over shallow reefs, rocks, and in kelp beds
4	Bluefin tuna	*Thunnus thynnus*	fish		Pelagic/neritic	0-200 m	
253	Bocaccio rockfish	*Sebastes paucispinus*	fish	Y	Most habs	0-480 m	
261	Cabezon	*Scorpaenychthys marmoratus*	fish	Y	Benthic	0-75 m	rocky bottoms & kelp beds
130	California barracuda	*Sphyraena argentea*	fish		Pelagic/neritic	0-20 m	
222	California halibut	*Paralichthys californicus*	fish		Benthic/neritic	0-185 m	
452	California moray eel	*Gymnothorax mordax*	fish		Benthic	1-40 m	rocky reefs
260	California scorpionfish	*Scorpaena guttata*	fish	Y	Benthic	0-180 m	rocky reefs
145	California sheephead	*Semicossyphus pulcher*	fish		Pelagic/neritic	1-90 m	in kelp beds, rocky bottoms
820	California spiny lobster	*Panulirus interruptus*	invertebrate		Benthic	0-80 m	intertidal
254	Chilipepper rockfish	*Sebastes goodei*	fish	Y	Most habs	0-440 m	
245	Cowcod rockfish	*Sebastes levis*	fish	Y	Most habs	0-360+ m	
481	Dolphin fish	*Corypahaena hippurus*	fish		Pelagic/neritic	0-6 m	kelp forest
999	Fish (unspec'f)	Osteichthyes	fish		Most habs	0-300+ m	
445	Flyingfish	*Exocoetidae sp.*	fish		Pelagic/oceanic	0-10 m	
280	Giant sea bass	*Stereolepis gigas*	fish		Pelagic/neritic	6-45 m	over rocky bottoms & kelp beds
703	Green abalone	*Haliotis fulgens*	invertebrate		Benthic	0-20m	rocky intertidal, subtidal
457	Hagfishes	*Eptatretus sp.*	fish		Benthic	20-900 m	
478	Halfmoon	*Medialuna californiensis*	fish		Pelagic/neritic	0-40 m	over reefs & in kelp beds
55	Jack mackerel	*Trachurus symmetricus*	fish	Y	Pelagic	0-403 m	often near kelp
710	Jumbo squid	*Doscidicus gigas*	invertebrate		*Pelagic*	-	
153	Leopard shark	*Triakis semifasciata*	fish	Y	Pelagic/neritic	0-100 m	
195	Lingcod	*Ophiodon elongatus*	fish	Y	Benthic	6- 475 m	sub-tidal
191	Louvar	*Luvarus imperialis*	fish		Pelagic/oceanic	-	
711	Market squid	*Loligo opalescens*	invertebrate	Y	Pelagic/neritic	0-460 m	
490	Ocean whitefish	*Caulatilus princeps*	fish		Pelagic/neritic	1-140 m	over reefs, rocky substrates, and in kelp beds
467	Opah	*Lampris guttatus*	fish		Pelagic/oceanic	0-512 m	
475	Opaleye	*Girella nigricans*	fish		Pelagic/neritic	0-30 m	over rocky reefs & in kelp beds
165	Pacific angel shark	*Squatina californica*	fish		Pelagic/neritic	3-180 m	
3	Pacific bonito	*Sarda chiliensis*	fish		Pelagic/neritic	0-90 m	
51	Pacific mackerel	*Scomber japonicus*	fish	Y	Pelagic/neritic	0-300 m	
100	Pacific sardine	*Sardinops sagax caeruleus*	fish	Y	Pelagic/neritic	0-10 m	
704	Pink abalone	*Haliotis corrugata*	invertebrate		Benthic	0-60 m	sub-tidal, kelp beds
753	Purple urchin	*Strongylocentrotus purpuratu*	invertebrate		Benthic	0-10 m	intertidal to subtidal
702	Red abalone	*Haliotis rufescens*	invertebrate		Benthic	30+ m	low intertidal

Table 3-21. Cumulative marine fishes and invertebrates harvested commercially from the reporting blocks around SCI in 1990 and 1995, along with their habitat association. (Cont'd)

752	Red urchin	*Strongylocentrotus franciscai*	invertebrate		Benthic	0-90 m	intertidal to subtidal
813	Ridgeback prawn	*Eusicyonia ingentus*	invertebrate		Benthic/neritic	5-300 m	soft bottoms
801	Rock crab (unspec'd)	*Cancer sp.*	invertebrate		Benthic/neritic	0-50 m	
956	Rockfish (group, bocacc	*Sebastes spp.*	fish		Most habs	0-300+ m	
959	Rockfish (group, red)	*Sebastes spp.*	fish		Most habs	0-300+ m	
250	Rockfish (unspec'd)	*Sebastes sp.*	fish		Most habs	0-300+ m	
190	Sablefish	*Anoplopoma fimbria*	fish	Y	Pelagic/oceanic	150-1000+ m	over deep reefs
755	Sea cucumber	Holothuroidea	invertebrate		Benthic	0-90 m	intertidal to subtidal
151	Shortfin mako shark	*Isurus oxyrinchus*	fish		Pelagic/oceanic	0-60 m	
2	Skipjack tuna	*Katsuwonus (=Euthynnus) pe*	fish		*Pelagic*	-	
200	Sole (unspec'd)	Pleuronectiformes	fish	Y	Benthic	0-300+ m	sandy bottoms
159	Soupfin shark	*Galeorhinus zyopterus*	fish	Y	Pelagic/neritic	0-471 m	
803	Spider crab	*Loxorhynchus sp.*	invertebrate		Benthic/neritic	6-150 m	
815	Spot prawn	*Pandalus platyceros*	invertebrate		Benthic	0-530 m	intertidal
256	Starry rockfish	*Sebastes constellatus*	fish	Y	Benthic	25-275 m	on deep, offshore reefs
91	Swordfish	*Xiphias gladius*	fish		*Pelagic*	-	
155	Thresher shark	*Alopias vulpinus*	fish		*Pelagic*	-	
705	White abalone	*Haliotis sorenseni*	invertebrate		Benthic	4-65 m	rocky sub-tidal
400	White seabass	*Atractoscion nobilis*	fish		Pelagic/neritic	0-122 m	
1	Yellowfin tuna	*Thunnus albacares*	fish		Pelagic/oceanic	1-30 m	
40	Yellowtail	*Seriola lalandi*	fish	Y	Pelagic/neritic	0-70 m	

- Sedimentation emanating from mouths of drainages due to erosion of terrestrial habitats from historic grazing of feral animals, from roads and other sources.
- Passive introduction of exotic species by boat traffic.
- Boat maintenance operations, for introduction of toxic substances.
- Military uses. The primary uses in the nearshore environment are concentrated at coves and beaches, NOTS Pier, offshore areas near Northhead. These uses are:
  - Shore assault training (small boats at Northhead and all coves, that is, Wilson Cove, West Cove, Northwest Harbor, BUD/S Beach, Pyramid Cove, Horse Beach Cove, China Cove, and Eel Cove)
  - Shore assault training associated with US Marine Corps LCAC landings (West Cove, Pyramid Cove)
  - Explosive charge testing (Pyramid Cove, Northwest Harbor, West Cove, Wilson Cove, SWAT-1, SWAT-2, Eel Point)
  - Combat swimmers ship attack (Northhead, Northwest Harbor, Lost Point, West Cove, Wilson Cove, SWAT-1, SWAT-2)
  - Water insertion/extraction (Northhead, Northwest Harbor, Lost Point, West Cove, Wilson Cove, SWAT-2, NOTS Pier)
  - Small boat landing (all coves, NOTS Pier)
  - Underwater demolition (at Graduation Beach Underwater Demolition Range (TAR 2), BUD/S Beach Underwater Demolition Range (TAR 3), Northeast Point (TAR 1), rustiest nearshore TAR 8)
  - Ordnance delivery (short falls from ship-to-shore gunfire that land in the water in SHOBA FSAs I and II)

Of particular concern would be soft-bottom habitats, and their proximity to any eelgrass beds in the coves, since the majority of these activities occur in coves. Areas of hard substrate may include Lost Point, Castle Rock, the reef at Pyramid Head. Maps 2-1, 2-5, and 2-6 show locations including current and proposed NSW TARs.

3.6.9 Marine Mammals

The waters around the Channel Islands have traditionally harbored a large number of marine mammals. During the early part of this century many marine mammal populations were significantly reduced by commercial hunting and habitat destruction. However, most species have made impressive recoveries and currently occupy most of their previous ranges (Cohen 1980).

Management of marine mammals at SCI is conducted in accordance with NMFS and their regulatory authority to implement the Marine Mammal Protection Act (MMPA) of 1972. The MMPA requires NMFS to ensure that activities which may have an impact upon marine mammal populations are conducted in a manner, time, and location most appropriate to minimizing potential adverse effects to those populations. An MOU between the NMFS and NAS North Island was signed in 1981 to clarify the regulations regarding the management of pinnipeds at SCI (see Current Management below for summary and Appendix F).

Pinnipeds, seals and sea lions, feed primarily on fish and squid. Annual pup counts for this group contain anomalously low years that seem to be correlated with El Niño events. The hypothesis is that the displacement of food fish species during lactation periods causes a high pup mortality and/or lowered pupping levels.

Three species of pinnipeds are seen regularly on SCI: California sea lion (*Zalophus californianus*), northern elephant seal (*Mirounga angustirostris*), and Pacific harbor seal (*Phoca vitulina*). Large numbers of sea lions (> 1,000 individuals) breed on the west side of SCI and small numbers of harbor and elephant seal pups can be seen in a given year (Table 3-22).

A fourth species of pinniped has occasionally been sighted at SCI in recent years (1975, 1997), the Guadalupe fur seal (*Arctocephalus townsendi*). This species was presumed extinct at the beginning of the 20th century after a period of overexploitation by commercial hunters. It historically bred on the Channel Islands but is now only known to breed at Guadalupe Island. Several sightings of a male Guadalupe fur seal hauled out among California sea lions have been made on SCI. This seal (if it is the same individual) has not been sighted since the onset of the 1997–98 El Niño event. The Guadalupe fur seal is listed as threatened under the ESA. In 1938, California law gave complete protection to all pinnipeds from hunting. Sport and commercial fishermen were allowed to kill sea lions and harbor seals for interfering with their operations until the 1972 MMPA.

Cetaceans live their entire lives in the water column. Whales are typically seen only during migration around the Channel Islands. At least four species of whale and six species of dolphin have been confirmed in the immediate waters around SCI, including four federally threatened or endangered species (Table 3-23).

Of the two types of whale, toothed or baleen (filter feeders), most of the local whale observations are of baleen species that rely on shrimp-like plankton (krill) and small schooling fish for sustenance. However, no baleen whales are actually resident in local waters, although all pass through on their annual migrations between feeding grounds in the Arctic and calving grounds in the tropics. Minke whales are most likely seen during the spring/summer (June) and autumn (November). Only one minke whale was observed between San Clemente and Santa Catalina islands during 1998–1999 surveys. Fin whales are most frequently observed during migration from March to October, but were seen year-round in the waters surrounding San Clemente Island in 1998 and 1999. Blue whales were detected during SCI surveys primarily from July to September, with one whale seen in November. Humpback whales occur in southern California waters during spring (March–June) and autumn (September–December) where sightings are widespread but sparse. In waters around SCI, humpback whales were seen only once each during 1998 and 1999 surveys and both observations were in April. California gray begin to appear in November as they move southward, and northbound whales with newborn calves pass through between February and May. They travel three primary routes through the Channel Islands: one close to shore, one between San Clemente and Santa Catalina, and one outside the Islands (see Table 3-22 for estimated densities). Surveys in the waters around SCI in 1998 and 1999 indicated a peak occurrence from January through April, and a significant portion of the entire population passing through these waters (Dailey *et al.* 1993; Schoenherr *et al.* 1999; Caretta *et al.* 2000).

Table3-22. Summary of information on marine mammals that may be encountered in waters adjacent to southern San Clemente Island.

Species	Estimated Density (no/km^2) May-Oct	Estimated Density (no/km^2) Nov-Apr
Common dolphin	4.65	1.78
Risso's dolphin	0.061	0.18
Pacific white-sided dolphin	no data	0.197
Northern right whale dolphin	no data	0.09
Bottlenose dolphin	0.015	0.034
*Short-beaked dolphin	4.65	11.78
Fin whale	0.0089	0.0027
Blue whale	0.0047	0.00045
Humpback whale	no data	0.0015
Gray whale	no data	0.115
California sea lion	0.75	1.19
Harbor seal	0.054	0.025

All data taken from Carretta *et at.* 2000*, except for *, which is taken from* NMFS, nd *- an aerial survey done at Horse Beach Cove and adjacent waters.*

The majority of sightings (~ 95%) of toothed whale sightings, such as sperm whales and killer whales, are north of Monterey Bay. However, some species of dolphin can be found around the Channel Islands throughout the year, though abundance numbers may fluctuate. The short-beaked common dolphin (*Delphinus delphis*) is the most frequently seen dolphin throughout the Channel Islands. Northern right whale dolphin (*Lissodelphis borealis*), Risso's dolphin (Grampus griseus), and Dall's porpoise (*Phocoenoides dalli*) are primarily observed only during cold-water months of November–April. Pacific white-sided dolphins (*Lagenorhynchus obliquidens*) and bottlenose dolphins are also occasionally seen (Table 3-22) (Caretta *et al.* 2000). Dolphins feed primarily on fish and consequently may come into conflict with commercial fishermen.

Another marine mammal which deserves mentioning is the sea otter (*Enhydra lutris*). It is currently fully protected by California State law and federally listed as Threatened by the USFWS. Sea otters feed within kelp beds and preferred food items include sea urchins, crabs, and abalone. They are seen only rarely along the coast of SCI, and no breeding activity has been observed near the Island. During 1998 and 1999 surveys three otters were observed on the west coast of SCI (Caretta *et al*. 2000). The NMFS estimated the number of sea otters present throughout the year in SHOBA to be four, and these are usually restricted to the extensive giant kelp beds located offshore. Appendix B contains a comprehensive species list for the Island.

Table3-23. Marine mammals that have been observed at or around San Clemente Island.

Scientific Name	Common Name	USFWS, CDFG Status
Enhydra lutris	sea otter	FT
Arctocephalus townsendi	Guadalupe fur seal	FT
Balaenoptera musculus	blue whale	FE
Balaenoptera borealis	seiwhale	FE
Balaenoptera physalus	finback whale	FE
Megaptera novaengiliae	humpback whale	FE

USFWS and CDFG Codes: **FE** = Federally Endangered, **FT**= Federally Threatened.

Current Management—Marine Mammals

- An MOU between the NMFS and NAS North Island was signed in 1981 to clarify the regulations regarding the management of pinnipeds at SCI. This MOU states:
  - NMFS will consult with NAS North Island prior to authorizing the taking of a pinniped from SCI for public display, scientific, or rehabilitation purposes;
  - NAS North Island will request comments from NMFS regarding research proposals submitted for the study of marine mammals at SCI;
  - NMFS will request comments from NAS North Island, and NAS North Island will provide comments, regarding all applications for marine mammal permits which might affect pinnipeds at SCI;
  - NMFS will cooperate with the Southwest Fisheries Center to provide a program for the education and training of NAS North Island biologists and Base police of SCI in order that they may carry out management, research, and enforcement activities as regulated by the MMPA.
  - NAS North Island will ensure all personnel conducting research at haulout areas are aware of The Standards for Access to and Behavior on Pinniped Rookeries and Haulout Areas of SCI (attached to document);
  - NAS North Island will assist NMFS in protecting pinnipeds that haulout or breed at SCI by: conducting a census to asses the population, assisting in tagging of pinnipeds as resources allow, and providing annual reports to NMFS of marine mammal management on SCI;
  - Allow access to permitted NMFS personnel to study pinnipeds at SCI; and
  - cooperate with any investigation, or report any evidence, of illegal harassment of pinnipeds at SCI.
- Marine mammals are surveyed by NOAA fisheries in the southern California Bight biennially.
- Conduct marine mammal reconnaissance and disturbance monitoring in conjunction with some ordnance delivery exercises.
- California sea lions and bottlenose dolphins (*Tursiops truncatus*) specially trained for Explosive Ordnance Removal are deployed at SCI in support of Navy training operations.
- Marine mammal strikes are reported to the CNRSW Natural Resource Coordinator, who reports them to NMFS.

3.6.10 Federally-Listed Species

Table 3-24 is a summary of federally-listed plants and animals that occur on SCI and fall under the protection of the ESA. Under Section 7 of the ESA, federal project proponents must consult with USFWS or NOAA National Marine Fisheries if one or more listed species may be affected by an action. Consultation with USFWS or NOAA National Marine Fisheries may range from informal discussions to formal consultation requiring a biological assessment by the project proponent. See Appendix D for complete discussions of each species.

Table3-24. Federally listed plants and animals.

FE/FT	Scientific Name	Common Name
Plants		
FE	*Castilleja grisea*	San Clemente Island indian paintbrush
FE	*Delphinium variegatum* ssp. *kinkiense*	San Clemente Island larkspur
FE	*Lithophragma maximum*	San Clemente Island woodland star
FE	*Lotus dendroideus* var. *traskiae*	San Clemente Island broom
FE	*Malacothamnus clementinus*	San Clemente Island bush mallow
FE	*Sibara filifolia*	Santa Cruz Island rock cress
Animals		
FT	*Xantusia riversiana*	Island night lizard
FT	*Amphispiza belli clementae*	San Clemente sage sparrow
FE	*Lanius ludovicianus mearnsi*	San Clemente loggerhead shrike
FE	*Pelecanus occidentalis californicus*	California brown pelican
FT	*Charadrius alexandrinus nivosus*	western snowy plover

3.6.11 Plants and Animals Believed Extinct

California Dissanthelium

California dissanthelium (*Dissanthelium californicum)* was collected for the first and last time on SCI by Blanche Trask in June of 1903. It was also collected once on Santa Catalina Island in 1847 and on Guadalupe Island in 1875. *Dissanthelium* is a genus encompassing 16 species, all of which are found in Mexico and South America. California's *Dissanthelium* is the northernmost member of the genus and is currently presumed extinct throughout its range. We have no knowledge of its former abundance.

Dendromecon harfordii var. rhamnoides

The Southern Island tree poppy (*Dendromecon harfordii* var. *rhamnoides*) was last reported to be on the Island by Blanche Trask at the turn of the century; it is endemic to Santa Catalina Island and SCI. *Dendromecon* is a genus that includes two species occurring in California and Baja California.

Lycium brevipes var. *hassei*

Lycium is a genus that inhabits arid and semi-arid regions around the world. the Santa Catalina Island desert thorn (*Lycium brevipes* var. *hassei*) is now thought to be extinct on Santa Catalina Island and SCI, but still exists on the Palos Verdes peninsula on the mainland of California. It once grew on SCI on coastal slopes at low elevations.

Bewick's Wren

The SCI endemic subspecies, *Thryomanes bewickii leucophrys*, was collected and described as distinctive from mainland populations by Anthony in 1895. Early observations, including Howell (1917), reported the bird as "abundant" and "evenly distributed" over the Island. The course of its decline is not well documented because of the lack of surveys from 1925–1968. The last confirmed record was a specimen collected in 1941 that is now preserved at the Los Angeles County Museum of Natural History. No observations were made during numerous surveys in the late 1960s and early 1970s. Bewick's wrens were once again observed on SCI starting in 1973, though no records have confirmed the presence of *T.b. leucophrys*. The individual observed in 1973 was captured, measured, and photographed. It was subsequently determined not to be the SCI subspecies but possibly *T.b. catalinae* from Santa Catalina.

Early observations of Bewick's wrens were most commonly in areas of dense shrubs, including cactus and cherry. On the mainland, Bewick's wrens inhabit many different habitats but have particularly high densities in thick chaparral. They nest in cavities formed in the ground, trees, rocks, or man-made structures. The extirpation of this subspecies from SCI has been attributed to the loss of shrub cover from overgrazing by goats. Consistent sightings today of individual Bewick's wrens during periodic surveys for loggerhead shrikes indicates some members of other *T. bewickii* subspecies continue to find their way to the Island.

San Clemente Spotted Towhee

The spotted towhees (formerly rufous-sided towhee), *Pipilo erythrophthalmus clementae*, observed on SCI in the early part of the twentieth century were of a distinct subspecies endemic to SCI, Santa Catalina, and Santa Rosa Island. It is still relatively common on the latter two islands but was extirpated from SCI during the 1970s. There are approximately 2,000–5,000 pairs currently on Santa Catalina Island and re-introduction of some of these individuals to SCI may be a possibility in the future. A migrant race, *P. e. oregonus,* is still observed on the Island, mainly in the fall. This species is included on the CDFG's draft Bird Species of Special Concern list as a first priority species.

Song Sparrow

Breeding populations of the San Clemente song sparrow *Melospiza melodia clemente* are believed to have been extirpated from SCI for many years, although it breeds abundantly on Santa Cruz Island (Schoenherr *et al.* 1999) and individual adults are occasionally detected during loggerhead shrike monitoring.

3.7 Invasive Species

As an island ecosystem, SCI is particularly vulnerable to the introduction of non-native, invasive species (Table 4-8). Plants and animals which evolved in other locations may have ecological advantages over native species which evolved without the levels of competition and predation present elsewhere. If conditions are hospitable, newly introduced species can become established and out compete native species. Non-native plant species have altered native plant communities and the wildlife that inhabit them (Section 3.3.6.2). Other species and habitats, including marine communities and insect populations, have undoubtedly been affected by invasive, non-native plants.

Management of invasive species nationwide is focusing on those species presently having obvious negative effects. Recent studies reveal that observed effects may range from "relatively large spatial (habitat-wide) and temporal-scale (decades) to small-scale interactions that take place in a matter of weeks" (Crooks 1998; Reusch and Williams 1998). To be effective, management actions need to understand invasions in the context of the existing and historical natural systems (L. Levin, UC San Diego, *pers. comm*.). Some species have taken decades since introduction to become a "pest," showing that it is "potentially dangerous" to predict future status of an invader from its current status (Crooks

1998). Timing is of the essence, since delays in implementing appropriate control or extirpation measures can cause the measures to be ineffective if the invading population grows too large (Levin, *pers. comm*.).

Maintaining quality habitat should also help prevent or minimize exotic species invasions. Disturbed sites, even when disturbed temporarily for restoration purposes, show an increased number of nonindigenous species (Crooks 1998). Altered hydrologic, soil, and fire regimes can also contribute to exotic plant germination and establishment.

Once exotic species are established, at least four types of management controls can be used: (a) mechanical (through physical removal), (b) chemical (through conventional pesticides), (c) biological (through introduction of known natural predator or parasite), and (d) harvest management (through promotion of a sport or commercial fishery) (e) fire. Biological controls are still in the experimental stage but hold promise. Each type has associated advantages and disadvantages, and combinations of more than one can be applied. Through adaptive management, managers can learn from experience to help identify the best tools for exotic weed control.

Targeting control of the most noxious, potentially ecosystem-damaging species in a timely fashion should also be a high priority because not all alien species create serious problems.

3.7.1 Invasive Terrestrial Plants

Terrestrial weeds are a threat to diverse and healthy ecosystems. They can alter ecosystems to the extent that they no longer support their native functions. They change ecosystem dynamics by changing soil nitrogen cycling, out-competing natives for water and light, and predisposing an area to wildfire by providing fuel where there otherwise might not be enough ground cover to carry a fire. Some species possess the ability to completely change the structure of the vegetation, making it unsuitable to most native wildlife species. Sensitive and declining wildlife and plant species are particularly at risk from these weeds.

Other weeds that occur in very low numbers or seem innocuous for years may expand their range dramatically and become a difficult pest under the right environmental conditions. These conditions might include a year with very late rains, or a flood that results in heavy sedimentation of drainages in the case of riparian weeds.

An EO was signed in February 1999 (EO 13112) directing federal agencies to identify and manage invasive species. The order stipulates that actions will be taken to prevent the introduction of invasive species, monitor for their presence, and respond rapidly to eliminate them. DoD subsequently issued a memorandum of compliance with this EO. An effective way to implement these actions is through the Federal Noxious Weed Act of 1975 that requires federal land managers cooperate with state and federal agencies to manage undesirable plants. It mandates that a program and a person be assigned to deal with unwanted plants, funding, cooperative agreements, and the use of integrated pest management systems. The military point of contact for the Act is the Armed Forces Pest Management Board (Established by OPNAVINST 6250.4A).

Some species of exotic weeds are the focus of eradication efforts. Efforts have been made Island-wide to eradicate fennel (*Foeniculum vulgare*), iceplant (*Carpobrotus* sp.), smilo grass (*Piptatherum miliaceum*), and tamarisk (*Tamarix ramosissima*). Non-native annual grasses are being targeted for removal at shrike release sites, however, the extent of these species Island-wide may prevent their total eradication. Appendix B contains a comprehensive species list for the Island.

Current Management—Invasive Terrestrial Plants

- Assure that exotic plant introduction and spread on SCI are minimized (INLMA BO 1-6-97-F-58).
- Use native species only in landscaping.
- All vehicles and equipment used in construction or training activities on SCI shall be 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 shall assure that the underside and wheel wells of all vehicles are sprayed under high pressure 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 (INLMA BO 1-6-97-F-58).
- The weed eradication plan for SCI shall be completed and implemented (INLMA BO 1-6-97-F-58).
- Wash all vehicles prior to coming onto SCI to be free of mud and weed seed (INLMA BO 1-6-97-F-58).
- Appropriately timed exotic plant removal projects shall continue in the INLMA. Proponents of projects both within the INLMA and within superior habitat outside of the INLMA shall contribute toward the exotic plant control effort within the INLMA.

Other measures:

- Current invasive weed control measures focus on eradicating newly arrived species before they become established.
- NRO maintains a program to eradicate fennel, iceplant, smilo grass, and tamarisk.
- Sections of Ridge Road have been sprayed with herbicides to remove exotic grasses.
- Efforts are currently being made to get funding to eradicate black mustard (*Brassica nigra*) in SHOBA and veldt grass *(Ehrharta calycina)* near the airfield.

3.7.2 Marine Invasives

Management is absent for controlling an important source of marine invasive species—thousands of pleasure-craft travelling from port to port. A recent survey of southern California harbors and marinas found a pattern of introductions of nonindigenous ascidians (tunicates) coming from the hulls of traveling recreational boats (Lambert and Lambert 1998). The non-native species have become fouling pests in marinas, covering docking facilities and other artificial structures in the water with a slimy coat. Without some major changes in the rules governing the movements of these boats, the researchers warn that exotic species will continue to appear at an ever-escalating rate. However, research is pursuing effective anti-fouling paints that are environmentally safe (e.g. no metals like TBT) that could help minimize the attachment of organisms to boat hulls. One experimental alternative is the use of a strong repellent made from hot chile peppers that could be applied to hull bottoms (Henry 1998). California Fish and Game Code Section 2271 and Section 6400 make it illegal to release exotic organisms into California waters via ballast dumping or any other means, with penalties up to $5,000 and one year in jail for each violation (Cohen 1998).

Prevention of new introductions is the most desirable, although most challenging, strategy. Since ballast water is the most prevalent means of dissemination, effective controls should be placed on ships coming to SCI. Uniform National Discharge Standards (UNDS) are currently being developed for Armed Forces vessels. Phase I (of three phases), published in 1999, determined which discharges will be required to control by using a marine pollution control device (MPCD), and which discharges will not require controls (Table 4-13; 40 CFR Chapter VII).

NEPA assessments of Navy projects involving marine ports or terminals should identify, discuss, and adopt mitigations for the ballast water impacts (Cohen 1998). The present ballast water exchange program of the Navy should be continued and evaluated for its effectiveness. At the minimum, the boating community needs to be aware of their role in the possible transfer of exotic species from port to port while effective preventive measures are developed.

In addition, the aquarium trade businesses and customers must become aware of the impacts and prevention of releasing non-native species into the local environs. In 1998, over 100 notable scientists petitioned the federal government to ban the use of *Caulerpa taxifolia* in American aquaria, and it was designated a prohibited species under the federal Noxious Weed Act in 1999. Importation, sale, transport, and interstate trade of the species is a federal offense. The Southern California Caulerpa Action Team (SCCAT), consisting of representatives from state, federal, local and private entities, has been organized to respond quickly and effectively to discovered patches. Efforts to control this seaweed while not furthering its fragmentation and spread nor harming surrounding environments is very costly and while initial efforts appeared successful, it appears the algae is growing back in treated areas. Appendix B contains a comprehensive species list of the Island.

Current Management—Marine Invasives

- UNDS determine which discharges require control by using a MPCD, and which discharges will not require controls (Table 4-13; 40 CFR Chapter VII). The Navy is in compliance with these standards

3.7.3 Non-Native Terrestrial Animals

All species have both beneficial and negative effects on their environment. Often the negative effect is through a feeding event, where a member of one species eats a member of another species, or less often one of its own. Although predator-prey relationships are a fundamental part of the natural order of things, occasionally the conflict is of such a sustained nature or magnitude that it must be managed to avoid unacceptable risks to a population or species. This is frequently the case—particularly in southern California—with conservation and recovery programs for endangered species. Predators have a disproportionate effect on these rare and declining species with each individual they kill. Management of the predation problem to reduce it to acceptable levels is a top priority in endangered species programs regionally.

The few species that successfully establish on oceanic islands like San Clemente usually are successful as they are often released from competition and predation pressures present on the mainland. However, as the number of species rises on the Island over time, the potential for competition and conflict between species is expected to rise. The species that become established may never be very populous on the Island or evolve proper defense mechanisms against competitors or predators that are introduced later.

- Cats and rodents are managed as part of a Predator Management Program. Feral cats and dogs were the focus of a recent CNO Policy Letter dated January 10, 2002 (Appendix G). Feeding of feral animals on Navy bases is prohibited by the Secretary of the Navy.

This is the case on San Clemente Island today. The Island is home to a number of federal- and state-listed species, including what some consider the most endangered bird in North America: the San Clemente loggerhead shrike. Many other species (Table 3-4) are not listed but are endemic only to SCI or the Channel Islands. The introduction of goats, sheep, pigs and cattle over the past century had a devastating effect on the habitat of the loggerhead shrike and the biological integrity of the entire Island. These animals have since been removed from SCI, but with continued effects on native populations of shrikes, sage sparrows and probably many other less conspicuous species. Introduction of domestic cats and black rats have exacerbated the problem of population recovery of native fauna. Cats potentially consume large numbers of Island night lizards and pose a real threat to Island bird species. Cats and rodents are managed as part of a Predator Management Program. Feral cats and dogs were the focus of a recent (January 10, 2002) CNO Policy Letter (Appendix G). Feeding of feral animals on Navy bases is prohibited.

DoD Instruction 4150.7 establishes the DoD Pest Management Program and describes its general requirements. The Instruction states the Navy's pest management policy and requires a comprehensive Pest Management Plan. The Instruction discusses the need to control pest outbreaks which affect the military mission, damage property or impact the welfare of people. OPNAVINST 6250.4B outlines the Navy's policies and procedures for implementing pest management programs. In addition to policies outlined in the DoD directive, it includes guidelines "to enhance the natural environment...to maintain optimal biodiversity." This directive, in conjunction with Chapter 17 of OPNAVINST 5090.1B, also requires that the use of pesticides comply with applicable regulations to prevent pollution.

There are still many gaps in SCI's pest management program. There is currently no baseline information or management addressing invasive ants or many other insects. Predatory reptiles and amphibians, such as alligator lizards and bullfrogs, that could decimate populations of endemic species if not immediately controlled are not adequately monitored for on incoming materials. Some mainland snail species may pose a threat to SCI's endemic snail species if introduced to the Island. The feeding of feral cats in the housing area of Wilson Cove still occurs and hinders cat control efforts in other parts of the Island. Appendix B contains a comprehensive species list of the Island.

Current Management—Non-Native Terrestrial Animals

- Predator management is conducted on SCI primarily as a facet of the San Clemente loggerhead shrike conservation and recovery program.
- There is an ongoing feral cat control program that has been conducted since 1991. Cats are removed by hunting and trapping, but this is only permitted outside (south of) the Wilson Cove area which leaves a perpetual source population for the entire Island at Wilson Cove. Funding is being sought to expand cat control around Wilson Cove.
- There is a "no pets policy" on SCI.
- The feeding of feral cats is prohibited by Navy policy (SECNAVINST 6401-1A and CNO policy letter 5090 Ser N456M/1U595820 dated 10 January 2002).
- Rodent control efforts are conducted by Pest Management around facilities in Wilson Cove and elsewhere on the Island.
- Control of rodents around shrike nesting areas is done primarily with bait stations baited with Quintox. The primary target is roof rats (*Rattus rattus*). Rodents, mainly rats, are also trapped in box traps. In addition, flashing is

placed around the base of nest trees aimed at deterring rodents from climbing the trees.

- The application of Quintox started in 1999 and more Quintox was applied in 2000 than in 1999, however, mouse abundance increased again in 2000, even though it remained less than in 1998. Research on mouse abundance in occupied and unoccupied shrike territories showed an overall declining trend from 1998 to 2000. While the application of Quintox no doubt would have some impact on the rodent population locally where it is applied, the study of all shrike prey types showed a trend towards greater abundance in 1998 than in the subsequent two years. This trend may be attributed to the increased rainfall and associated increase in primary productivity from the El Nino in 1998. 1999 was a relatively dry year.
- In 2000, the total amount of Quintox consumed was estimated to impact about 26,473 rodents.
- It is unknown what the impacts are on native rodent populations. However, the poison is used primarily in canyon bottoms where mice are not very common. Most mice are found on the plateaus according to unpublished prey research on SCI. Bait boxes are also elevated off the ground to minimize accessibility to mice while remaining effective on rats (K. Brock, *pers. comm*)

- Population surveys and Island-wide monitoring of the productivity of native raptor and corvid populations is ongoing. Individual raptors and ravens that may pose a threat to nesting shrikes are identified. Raptor predators of SCI shrikes may include the red-tailed hawk, sharp-shinned hawk, Cooper's hawk, and the peregrine falcon. Raptor or raven nests within 400 m of a shrike nest are either torn down or the eggs are destroyed. As shrikes begin nest building, bait stations are established to lure ravens away from the shrike territories.

3.8 Inventory and Monitoring of SCI Natural Resources

Most of the key management questions for managing SCI 's natural resources in the context of "no net loss" of military values cannot be answered without long-term monitoring data, with the exception of those directly tied to habitat loss. Habitat loss or degradation, and resulting species' declines, are the most direct and obvious anthropogenic impacts to the Island's resources. Currently, management is driven by direct regulatory management/control through the permitting process and mitigation. However, for many questions, the influences of changing food chains and other aspects of environmental structure may be greater than direct habitat modification. The relative importance of the effects of habitat modification versus other influences upon key species is poorly documented.

Managers concerned with ensuring the long-term health of the Island ecosystem need to know what the long-term trends are in Island populations and what is causing those trends. Some of these trends may be driven by drought, storm surges, El Niño-La Niña cycles, or climatic change rather than any local human activity. Populations fluctuate for a variety of reasons, and managers need to know what fraction of the variability is due to human influences.

There are a wealth of projects currently underway in the region which SCI could benefit from participating in. Conservatively, at least $17 million is spent annually monitoring in the southern California Bight (National Research Council 1990). However, currently the major regional time-series monitoring programs do not contain data specific to SCI. These include:

- Sport and commercial catch reported to CDFG, in which fishermen report the number and species caught (including lobster, sea urchin, and abalone), number of anglers fishing, area fished, and hours fished. However, no reporting is done specific to Island waters. Bait fish and invertebrates are not included.
- MRFSS/NMFS periodically monitors surfperch, croackers, sand bass, and halibut by boat and dock checks of sport fishermen.
- The California Cooperative Oceanic Fisheries Investigation which examines hydrology, primary production, zooplankton biomass, and larval fish distributions. It originated in response to the collapse of the sardine fishery in 1947. It is unparalleled in its spatial extent, duration, and consistency through time of its study of the ocean and fisheries biology. Sampling occurs in offshore and coastal waters.
- Data collection on sea surface temperature and other parameters from near the turn of the century at Scripps Pier, Scripps Institute of Oceanography.
- During the last two decades, a Channel Islands National Park monitoring program has been developed to evaluate and predict the present and future state of ecological resources of the Channel Islands. Established in 1981, the project was designated the Vital Signs Monitoring Program and its objectives were to:

    1) determine the present and future ecosystem health,

    2) establish empirically normal limits of resource variation,

    3) provide early diagnosis of abnormal conditions, and

    4) identify potential agents of anthropogenic change (Davis In press).

The program has become a cost-effective and collaborative effort among numerous federal, state, and private interests. Currently, SCI is the only Channel Island that does not participate in this program. Without access to long term inventory or monitoring data, the Navy lacks the ability to make proper management decisions for this habitat, including the ability to identify concerns.

The program has also produced peer-reviewed handbooks of monitoring protocols for all major taxonomic groups of the Channel Islands. Initially, a handbook was produced for surveying the rocky intertidal ecosystem based on studies conducted by Littler (1980). This handbook is currently being revised but will continue most of the protocols outlined in the original handbook. Using these protocols, monitoring locations could be established at SCI.

At other Channel Islands, surveys for rocky intertidal habitats are conducted at permanent survey sites that are clearly marked and sampled at specific time intervals. At each site, selected organisms representing common tidal zones are surveyed: the highest zone is represented by the acorn barnacle (*Chthamalus fissus/dalli*), the next lowest zone is represented by the turf-like red alga (*Endocladia muricata)*, followed by brown algae such as *Pelvetia fastigata* and *Hesperophycus harveyanus*, and finally the lowest zone is represented by the California mussel (*Mytilus californianus*). In addition, the abundance of tar, bare substratum, and black abalone are monitored. Abundance of these organisms is determined by one of two methods: fixed photogrammetric quadrats (50 x75 cm) or fixed plots (1 - 2 m^2)(Davis *et al*. 1994).

3.8.1 Current Management—Long-term Status and Trend

Most monitoring is done in response to BOs and permit requirements for discharges or construction or maintenance projects. Discharge permits are administered by a number of agencies and there is no attempt to coordinate among them except for recent attempts by the Southern California Coastal Water Research Project (SCCWRP) (Bight 1984 and Bight 1998). This organization collected and integrated data from all municipal dischargers in the Bight during these years. This program is oriented to pollution rather than broader ecological questions.

Most other ecological monitoring is mandated by regulators for project proponents to accomplish and tends to be limited in its ability to provide management guidance. It is narrowly defined and completed within parameters of the permitting process and the project proponent's cost constraints.

The existing approach is piecemeal, non-standardized, and generally not disseminated beyond the project proponent, the immediate agency in charge, and the consulting firm contracted to perform the monitoring. Project-oriented monitoring often provides little predictive insight because species abundance and diversity are inherently variable at many scales. Such monitoring typically does not allow for adequate experimentation or sampling to make it useful as a baseline for future or related studies. Furthermore, it does not provide any indication about whether the Island as a whole is being affected by cumulative effects of the multitude of projects implemented within it.

3.8.1.1 Wildlife Status and Trend Surveys

The following surveys are recurring:

- Semiannual shrike surveys (BO 1-6-97-F-21 Training Activities)
- Kelp monitoring, starting 2002
- Sage sparrow through 2003 (BO 1-6-97-F-21 Training Activities; TARS BO 1/01)
- Island night lizard status and trend surveys
- Western snowy plover status and trend surveys in breeding season (TARS BO 1/01)

3.8.1.2 Vegetation Condition and Trend Analysis Program

The Navy implemented a long term vegetation monitoring program in 1992 and 1993. Due to fluctuations in funding, surveys have been sporadic throughout the last several years; reports produced in 1994, 1996 and 2000 are based on fieldwork done in 1992–1996 and 2000. Still, these surveys have produced a set of baseline data that is critical to future work on the Island.

The objectives of the monitoring program are to:

- Implement a sampling plan that will provide an objective, quantitative baseline description of Island vegetative communities.
- Track plant community characteristics in relation to environmental and use gradients.
- Design and enact a sampling plan for documenting vegetation change with special emphasis on critical/sensitive areas and those clearly in dynamic states of transition. Provide a means to quantify how small a change could be detected at a given level of confidence given the number of plots established and a background year-to-year variation of x% for the sampled species.
- Provide a means of evaluating vegetation change with respect to management goals. That is, group species by their desirability and quantify increases and decreases with confidence intervals stated.
- Design a means of tracking the status of sensitive species.

Landscape Stratification

The Island was stratified into the following units for sampling: unique soil texture-vegetation polygons, terrace flats, terrace faces, high-plateau grasslands, mid-elevation grasslands, and low-elevation grasslands. Vegetation categories added were: *Euphorbia misera* phase of MSS-Cholla, and *Lyonothamnus* and *Quercus* woodlands. Areas dropped from sampling were Coastal Bluff Scrub, areas too steep or inaccessible, and sites mapped as woodland but without trees.

Plot Location and Design

Plots are constructed of a permanently marked, 100-meter transect with a variable belt width. Four different types of plots with the same basic design were used to lay out the one-hundred twelve total plots (Map 3-9) installed for this project:

- Inventory plots - located in a stratified random manner and are likely to represent typical conditions within each soil-vegetation category.
- Reference plots - the best example we have of a certain plant community with all characteristic species. Some of these plots were located randomly while others were places subjectively because of the presence of key species.
- Transition plots - usually located in ecotonal areas, especially along the brows of canyons where encroachment of shrubs into grassland is actively occurring.
- Rare plant plots- placed specifically because of the presence of a sensitive species.

Each plot is evaluated for these various factors:

- *Cover data*– recorded at each meter by lowering a 1/4 inch rod and recording what plant species, persistent litter, non-persistent litter (generally woody, a dead plant that is still rooted, or litter more than two inches deep), lichen, moss, bare ground and rock came in contact with it. The percentage cover is represented by the number of “hits” out of 100, and so represents the absolute cover of the species or ground cover type.
- *Density*– of woody perennials were measured for a belt of four meters from the transect line. Dead perennials were recorded if easily distinguished from live, drought-deciduous plants.
- *Seedlings*– of woody perennials were recorded as well as basal sprouting of trees.
- *Diameter at Breast Height*– for the nearest tree to the tape at each meter in plots with trees.
- *All species present*– measured within the four meter belt from the transect line.
- *Annual species*– rated for cover and density using a rating system used by the National Park Service on Santa Rosa Island.

Summary of Findings

Table3-25. Results of vegetation monitoring begin 1991–1992 to most recent sampling period, showing general improvement in ground cover.

Ground Cover Class	t-test	p-value	trend
Bare ground	2.683	0.005	-
Lichens	-0.537	0.296	+
Non-persistent litter	-6.481	0.000	+
Persistent litter	2.074	0.021	-

Table3-26. Results of vegetation monitoring begin 1991–1992 to most recent sampling period, showing general improvement in cover of perennial forbs and shrubs.

Plant Growth Forms	t-test	p-value	trend
Cacti	1.176	0.123	-
Forbs-Annuals	3.287	0.001	-
Forbs-Perennials	-3.750	0.0003	+
Grasses-Annuals	1.668	0.050	-
Grasses-Perennials	0.338	0.368	-
Shrubs	-0.117	0.454	+

Table3-27. Results of vegetation monitoring begin 1991–1992 to most recent sampling period, showing general improvement in shrubs, decline in cactus, decline due to a short-interval burn in ironwood (Lyonothamnus floribundus asplenifolius).

Species	t-test	p-value	trend
Artemisia californica	-1.369	0.107	+
Atriplex californica	1.018	0.169	-
Bergerocactus emoryi	0.931	0.185	-
Brodiaea kinkiensis	-1.706	0.093	+
Encelia californica	-1.109	0.155	+
Eriophyllum nevinii	1.633	0.089	-
Lotus argophyllus var. argenteus	1.205	0.120	-
Lyonothamnus floribundus asplenifolius	1.931	0.097	-
Opuntia littoralis	0.940	0.177	-
Rhus integrifolia	-1.265	0.126	+

3.8.2 Research to Support Management Needs

In contrast to monitoring, research is problem-solving and hypothesis-testing, and focuses on mechanisms. It requires articulation of an explicit conceptual model to evaluate its relevance to the concerns of SCI managers.

Current research programs are sponsored largely by the Navy and usually related to compliance with environmental laws and biological opinions(e.g. loggerhead shrike captive breeding and reintroduction, sage sparrow and western snowy plover monitoring). The Navy is also currently supporting a restoration ecologist position on the Island. This Plan summarizes much of the past and current research.

Research on SCI suffers from the same problems already identified. It is conducted piecemeal and project by project. Much of it results in unpublished “gray literature”, which is inaccessible because there is no mechanism for dissemination. There is little to no data integration, access, and reporting across the natural resources program for the Island, with the exception of the intensively managed and very high profile loggerhead shrike recovery program that demands a higher level of accountability.

Success of the approaches undertaken in this Plan to management, research, and monitoring depend upon public confidence. There is a broad public perception that the Island is environmentally degraded. To ensure accurate public understanding and well-placed concern and support for the Island's resources, consistent and accurate communication from managers and researchers about extraordinarily complex natural ecosystem processes is needed. Such effective reporting of monitoring and research results, as well as progress in Plan implementation, will help keep it strong, relevant, and responsive.

Current Management

Historical and current information on the SCI's natural resources is scattered throughout regional libraries as well as agency, installation, and consultant offices. In many cases, few copies are in circulation of reports funded by the Navy. Newspaper articles appear sporadically and tend to be tied to a specific event.

Existing data on the SCI are not in a form that gets used by SCI managers. Complex problems such as those described as key management questions are interdisciplinary and require interfacing across disciplines and agencies.

There should be better synthesis and analysis of the monitoring data presented to public agencies and better communication of that analysis to the public (National Research Council 1990), so that it will be used effectively as a basis to target resources.

3.9 Summary of Cultural Resource Status and Protection

San Clemente Island's rich history provides numerous sites where scientists have the opportunity to study California's past. These cultural resources are scattered throughout the Island and include fossils of the early Island fauna, historical records of Native American habitation, turn-of-the-century ranching structures, and early military use. In a recent evaluation in consultation with the State Historic Preservation Office (SHPO), the older administrative buildings of the Wilson Cove area were found to be not eligible for the National Register. The only built elements on the Island with a recommended National Register eligibility are a complex of 1950s-era structures associated with (and including) NOTS Pier, which are important under Cold War criteria for their associations with weapons research and development (Yatsko, *pers. comm.* 2001).

The Navy's Cultural Resources Management Program (CRMP) is responsible for the identification, preservation and protection of these resources. The CRMP is guided by compliance with pertinent federal historic preservation laws. These include Sections 106 and 110 of the National Historic Preservation Act of 1966 (NHPA), as amended, the Archaeological Resources Protections Act of 1979 (ARPA), and the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA). Protection and Enhancement of the Cultural Environment (EO 11503) directs federal agencies to locate and inventory all cultural resources on federal land. Other regulations which require conformance include 36 CFR 800 (Protection of Historic Properties), 32 CFR Part 229 (Protection of Archaeological Resources: Uniform Regulations), 36 CFR 79 (Curation of Federally-owned and Administered Archeological Collections), and 43 CFR 10 (NAGPRA Regulations).

Current Management—Integration of Cultural Resource Management

To meet the various cultural resource mandates, the CRMP has developed a range of different management protocols. The following summary is taken from the Operations Management Plan EIS (Draft May 2001).

- Data Verification Resurveys (Section 110 of NHPA). Since 1986, the CRMP has implemented data verification surveys of selected, previously surveyed sites. These resurveys have identified significant discrepancies in the quality of earlier survey data.

- Programmatic Site Surveys (Section 110 of NHPA). The CRMP pursues a coordinated, ongoing archaeological survey program with two broad categories of investigation. First, in anticipation of future Section 106 compliance requirements, arbitrary, area-specific site surveys are applied to selected parts of the Island. Second, to refine understanding of the distribution and character of the Island's archaeological resources, an Island-wide, topographically stratified, random sampling survey was conducted in 1991–92. This probabilistic survey documented 1,150 archaeological sites within a 15% sample of the Island. Cumulatively, these surveys have documented over 3,500 archaeological sites Island-wide.
- Programmatic National Register Eligibility Evaluations. The Navy conducts proactive testing of archaeological sites to determine their National Register eligibility. In excess of 90% of the sites tested have been determined eligible for the National Register.
- Cooperative Academic Research (ARPA). A large component of the CRMP's archaeological investigations are conducted as academic research under Cooperative Research Agreements (CRAs) with regional colleges and universities. During the period 1983–96, thirty SCI sites were tested with University of California, Los Angeles (UCLA), and California State University (CSU), Northridge faculty and students. In addition, CRAs have supported individual graduate research projects, the products of which have included a dozen M.A. theses and Ph.D. dissertations since 1985.
- Mitigative Data Recovery. To date, archaeological data recovery as mitigation for adverse effects to individual sites has been a relatively limited requirement on SCI. Proactive inventory, and early review of proposed actions, have allowed the CRMP to generally guide avoidance of conflicts with archaeological resources through redesign or relocation of proposed actions. To date, only four archaeological sites have required mitigative action.
- Management of Archaeological Collections. Since the mid-1980s, the CRMP has developed a number of Cooperative Curation Agreements (CCAs) with institutions holding SCI collections. Between 1993 and 1998 the CRMP conducted a program to progressively upgrade the curated condition of these collections. Starting with the UCLA Fowler Museum of Cultural History, this program has completed improvement of seven SCI collections, including those at CSU Northridge, the Los Angeles County Museum of Natural History, the Southwest Museum, San Diego State University, the San Diego Museum of Man, and CRMP.
- NAGPRA Inventory. SCI archaeological collections also include Native American human remains and funerary objects subject to compliance with NAGPRA. In conformance with NAGPRA, a Summary and Inventory were completed in 1993 and 1995, respectively.
- Archaeological Site Protection. Under the CRMP the Navy developed a site signing strategy to protect the Island's archaeological sites from incidental disturbance, especially those sites in close proximity to developed areas. This makes the sites visible for avoidance by vehicular and other ground-disturbing activities. Unlike on the mainland, SCI's isolated, controlled-access context provides a situation where explicitly marking sites with standardized signs puts them at little increased risk for vandalism. This approach has been generally successful in keeping vehicular traffic and other activities off marked cultural deposits.

- Endorsements. The Advisory Council on Historic Preservation's Evaluation Report for Defense Department Compliance with the National Historic Preservation Act (1994) cites the Defense Cultural Resources Council's and the National Conference of State Historic Preservation Officers' recognition of the CRMP's management of San Clemente Island's archaeology as one of the thirteen “especially good” programs across the entire DoD. The Advisory Council also singled out the CRMP's San Clemente Island program as one of five DoD programs that are “noteworthy examples of cultural resources planning and management that might serve as models for other installations, commands, and federal agencies.”

4.0 Natural Resource Management

This chapter proposes an array of management 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.

San Clemente Island is rapidly changing during this initial "post-grazing" era. Expanding shrublands and woodlands, stabilizing dunes, declining cactus stands, and recovering populations of rare plants and animals decimated by decades of overgrazing are a big part of this change. The current vegetation patterns across the Island represent merely a point on a dynamic successional path. It is unknown whether conditions are moving toward more of a historical condition or at what pace movement is occurring. We watch, document, and develop management aimed at ensuring all the physical, chemical and biological elements and processes are intact and resilient. "Saving all the parts," while fully integrating the human and biological needs for the Island, is the core underlying principle for the "ecosystem management" mandate for installations like San Clemente Island. This mandate is accomplished by applying principles of sustainability and proper, compatible use as a component of ecosystem managment. At the same time, the current wildland dynamics on the Island requires management that acknowledges the rapidly changing conditions and remains flexible and adaptive.

Unchanging among all of the dynamics are certain fundamental characteristics of the Island that make it valuable both for natural resources and military use. These include its isolation yet proximity to the mainland, clear waters, exposure to warm currents on its western shore, shallow-water shelf that allows for enhanced biological productivity as well as certain military operations, sheltered coves, shore vegetation and kelp beds that act as productive nurseries for sea life and harbor rich species assemblages, diverse topography, mild climate, and many rare and endemic species that make SCI a renowned biodiversity "hot spot."

4.1 Habitat Protection and Management

In the following sections regarding habitat management, statements are made regarding "baseline" and "reference" condition of plant communities. These statements refer to data from field plots described in Section 3.8.1.2, and shown on Map 3-8. Baseline condition is the average species cover, composition, and shrub/tree density that existed when that habitat was first described in 1992 or 1993 using long-term monitoring plots. This condition was averaged across all the plots located in a stratified-random manner for that plant community, but excludes data from plots that were located in the habitat for other purposes, such as to monitor an ecotone, to monitor a specific rare plant population, or from plots that were placed subjectively because the location was believed to be a good example of the plant community. These latter plots are called reference plots. In some instances, reference plots were selected after initial sampling, so data from them could be averaged into the baseline condition description as well as separated out to describe a "reference" condition.

Monitoring to determine if baseline or reference conditions are maintained within specific habitats would occur primarily through two methods. First, data collected at long-term monitoring plots would be analyzed to determine cover trends or changes. Additional plots may need to be added to some habitats that currently do not contain sufficient numbers or distribution of plots for such an analysis. Secondly, aerial photos should be compared between years to determine large scale changes in cover. Performing a coarse mapping of vegetation cover using digitized aerial photos should provide a reasonable estimate of cover changes between years. Updated aerial photos may not be available on an annual basis but should be analyzed when accessible. In addition, fire mapping, as currently done, will provide information about which areas may have been disturbed within a habitat.

Fire regimes are considered to be a primary ecosystem health issue in this INRMP. Both on a species and community level, fire return intervals, seasonality, size, and intensity all matter to ecosystem resilience. Each plant, by its life history, has fire or disturbance response capability based on its life history. Most resprout, and many seed prolifically after fire. Some are short-lived and thrive on canopy openings created by disturbance, while others are long-lived and have fire-resistance built into their bark, leaves, or other anatomical feature. On a community level, too-short return intervals prevent a community from proceeding through its seral stages to maturity. Too-hot fires burn reproductive structures and so slow recovery. Large fires slow recolonization by wildlife, and they tend to result in a homogeneous vegetation pattern of a uniform age class, which generally results in a decline in wildlife diversity.

The problem is, we cannot know the natural fire regime; it will remain a largely anecdotal assumption. Even in the very data-rich fire literature of the southern California mainland which has been studied for decades, natural fire regimes continue to be widely debated. It is recognized that a full range of mainland fire regimes occurred, from a few years to several hundred, with individual events ranging from slight to very severe in intensity. It is beginning to be recognized that the fire regime in general was dominated not by fuel condition but by Santa Ana weather condition, which fostered a pattern of very large fires that burned themselves out after weeks, and having variable impacts on the landscape depending upon the intensity at which they burned through. Such a regime today poses unacceptable risks. This is particularly so since the current system is permanently changed by the prevalence of European exotic grasses and forbs, and the lack of fire may pose as much a risk to overall ecosystem health as its uncontrolled extreme (Keeley 2001).

Since wildland fire is considered to be a primary disturbance agent to manage in this INRMP, and it has to be managed in a context of insufficient knowledge about natural fire regime and a changed Island ecological and fuel condition, we believe our INRMP goal is best served by focusing our attention on the specifics of fire effects on various communities and species, and the range of options we have for addressing them (see, for example, Klinger and Messer 2001). For each plant community we define the outcome condition that is sought as it relates to our INRMP goal, the risks of extremes we need to avoid, and a preliminary target is set for controls on fire interval, fire intensity, and fire size that are expected to attain that condition. We seek to prevent large-scale, stand-replacing losses which may be catastrophic to individual species. These targets are described more specifically in the draft SCI Wildland Fire Management Plan (Fire Plan), and will be consulted on under the ESA in preparation for the 2002 fire season. A program is proposed to monitor the outcome of our management approach, so that course corrections can be made along the way.

4.1.1 Canyon Shrubland/Woodland

Specific Concerns—Canyon Shrubland/Woodland

- Woodlands have contracted over the past 150 years due to historic overgrazing by feral goats.
- There is a lack of reproduction/age class structure to oak and ironwood groves. Age and age structure of the ironwoods are unknown, but they are strongly suspected to be old and even-aged. Core samples have been collected in the past but data are as yet unavailable.
- The clonal nature of ironwood groves may be reducing seed set.
- The woodlands are key to support of the San Clemente loggerhead shrike and other breeding birds, as well as the Island fox.
- Much of SCI's biodiversity is harbored in the woodlands.
- Excessively hot, frequent, or large fires will damage the health of this community. However, the recent buildup of fuel loads in the woodlands has increased the risk of damaging fires.
- Storm flows in excess of ability to process without root scour will result in erosion of the productive potential of this community.
- Sustainable populations of these sensitive plants are required in the canyon woodlands: *Castilleja grisea, Ceanothus megacarpus* ssp. *insularis, Delphinium variegatum* var. *thornei, Dendromecon rigida* ssp. *rhamnoides* (if still on Island), *Dudleya virens* var. *virens, Eriogonum giganteum* var. *formosum, Eriophyllum nevinii, Galium catalinense* ssp. *acrispum, Gambelia speciosa, Hazardia cana,*

Heteromeles arbutifolia ssp. *macrocarpa, Jepsonia malvifolia, Lithophragma maximum, Lotus dendroideus* var. *traskiae, Lyonothamnus floribundus* ssp. *aspleniifolius, Malacothamnus clementinus, Phacelia floribunda, Quercus tomentella, Phacelia lyonii, Rhamnus pirifolia, Scrophularia villosa, Stephanomeria blairii, Triteleia clementina.*

- The historic understory composition and condition of the woodland community is unknown.
- The understory condition that favors ironwood regeneration is unknown.

Proposed Management Strategy—Canyon Shrubland/Woodland

***Objective:* In woodlands dominated by Island cherry, toyon, or lemonadeberry, maintain at a minimum the existing distribution of the groves, and promote the current expansion of native woody dominants, while protecting sensitive plants of the understory and canyon margins, and reducing exotics.**

***Objective:* Initiate the recovery of ironwood trees and enhance their reproduction, abundance, and distribution of associated species.**

***Objective:* Accelerate the recovery of Island oaks.**

***Objective:* Expand shrub and woodland boundaries.**

***Objective:* Foster mixed woodlands with a native shrub layer and an understory of native grasses and herbs.**

***Objective:* Maintain natural processes and functions, including the natural role of fire, and natural abundance and diversity of wildlife.**

I. For all woodlands, promote soil recovery on eroded areas, increase water retention by soils and reduce runoff.

A. Priority erosion control should be provided to oak groves.

B. Foster recruitment in all woody species.

C. Improve the native woody cover condition by 10% from the 1992–93 baseline (Section 3.8.1.2) of 61% of total vegetative cover.

D. At a minimum, maintain the current percent bare ground cover, which averages less than two percent across all woodlands, with monitoring plots.

E. Reduce non-native herbaceous species to 10 percent less than the 1992–93 baseline (Section 3.8.1.2) of 45% of total cover in the next ten years.

F. 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.

1. 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.
2. Foster recruitment and improved age structure in woodlands, especially oak and ironwood woodlands. Crown fires of high intensity that kill adult shrubs, trees, or groves, or short fire intervals that prevent maturation, reproduction and recruitment are the biggest risks of fire.
3. Small patch size will be targeted by keeping fires to less than three acres that burn at moderate intensity or higher (Score 3 on NPS scale [Table 4-12] where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts). Moderate-intensity fires that do not become crown fires may be beneficial to reduce non-native plants and prevent future crown fires. A 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.
4. No more than a maximum targeted percentage across the Island may be burned over a 10-year period for wildfires or prescribed fires of moderate intensity or higher (Score 3 on NPS scale [Table 4-12] 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 Fire Plan in preparation for the 2002 fire season.

II. For cherry woodlands, use Eagle Canyon as a reference site to monitor composition and change.

A. 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.

III. For toyon woodlands, use Horse Beach Canyon as a reference site to monitor composition and change.

A. Use established vegetation trend monitoring plots to support development of a reference condition for toyon woodlands in which all component species are provided for.

B. Continue the current expansion of shrubs on the margins of these woodlands which is currently dramatically increasing.

IV. For oak groves, foster stands able to support germination and survival of seedlings, focusing efforts at the stand periphery and in canopy gaps.

A. Achieve seedling establishment and survival after every reproductive event, by human intervention if necessary which may include irrigation, nursery planting, moving to safe sites, or other means.

B. Improve the composition of native herbaceous plants compared to exotics from a 1992–93 baseline (Section 3.8.1.2) of 29% exotics.

C. Experiment with oak introduction on upper north slopes of western canyons such as Horse, or upper north slopes of eastern canyons.

D. Determine what is the oldest and what is the youngest tree in order to calculate the maximum length of time between reproductive events, recognizing that there may have been multiple reproductive events between the years that comprise these extremes.

E. Identify new reference sites for monitoring.

F. Develop propagation techniques for oaks.

G. Improve management of seedbed conditions so that successful, wildland acorn germination occurs in the next ten years.

V. Protect existing ironwood trees, recognizing the threat of sort-interval, excessively hot, or large acreage fires.

A. 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.

B. Allow no mortality caused by excessively hot or frequent fire.

1. Consider the use of prescribed fire to protect from the catastrophic loss of entire groves, to improve seedbed conditions, and reduce exotics.

C. 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 .5 in deep and growing.

D. 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.

E. Develop a propagation technique for ironwood, considering both seedling and vegetative approaches.

F. Identify priority outplanting sites, first within gaps of existing groves, then on their margins, then expand to new locations.

G. Determine microsite needs for ironwood seedling establishment.

1. Improve seedbed conditions in grove gaps.

H. Reduce total cover of exotic species to less than 30%.

4.1.2 Maritime Desert Scrub: Boxthorn

Specific Concerns—Maritime Desert Scrub: Boxthorn

- Boxthorn is best expressed on a single soil type unique to the first westshore terrace, although it occurs on several other soil types close to the coast. The second terrace up from the shoreline has half the cover of boxthorn compared to the lowest terrace, and it becomes an even more minor component with increasing elevation.
- Sage sparrows are most abundant where cover of boxthorn is highest and there are openings among boxthorn shrubs. For example, cover of boxthorn on the northeast escarpment and on the first westshore terrace is approximately the same, but sage sparrows apparently only occupy the area on the west shore. Obvious differences between the two sites include slope steepness and the northeast escarpment has California sagebrush and Island sagebrush as co-dominants in the interspaces among the boxthorn shrubs, rather than small herbaceous plants as is typical on the west shore. It is unknown why sage sparrows do not occupy boxthorn habitat south of approximately Seal Cove that have comparable cover values of boxthorn to the high-density area. For example long-term monitoring location 84 (Map 3-8) has about 28% cover, location 69 has 23% cover, and location 55 has 28% cover of boxthorn when last sampled.
- The sage sparrow seems to do best in larger boxthorn shrubs with greater height and foliar cover. There is a core area of boxthorn where sage sparrows are found in high densities. In this area, primarily along the first westshore terrace, boxthorn shrubs tend to have heights and foliar cover greater than on other terraces where sage sparrow densities are lower. Generally, sage sparrows retreat to this first westshore terrace north of Eel Point during periods of decline (Munkwitz *et al.* 2000; Appendix D).
- There is a need to provide sufficient territory for a self-sustaining population of the threatened San Clemente sage sparrow through drought cycles and other biological downturns. Territory size expands during drought, and possibly seasonally.
- This community has very high value to military operations due to its remoteness, shore access, and a cliff backdrop for weapons firing safety. The military would like to expand its use of this community. However, at the same time, the USFWS would like to expand the habitat to guard against population fluctuations of the sage sparrow.
- The soil surface layer on the lowest terrace is wind-deposited and easily erodible. It appears to be naturally protected by a crust of lichen and other microorganisms on the soil surface. This crust is easily broken by vehicle traffic and even repeated foot traffic. The soil is then easily transported off site by wind.
- Alien grass invasion may change the fire regime and habitat value of this community.
- There seems to be a lack of information on how the current condition and recovery of the boxthorn community is affected by historic grazing, fire or other training-related activities, drought, or the interplay of these distur-

bances. It is known that boxthorn declines in cover in the very frequent fire regime near SHOBA Impact Areas.

- The effect of fire frequency and intensity on boxthorn has not been studied, but a wide range of fire history exists now and conclusions can be drawn about fire frequency, but this is complicated by the lack of information on fire intensity.
- Fire as a management tool to avoid catastrophic loss of large swaths of this community by a stand-replacing fire is untested.
- The Island night lizard is also abundant in this habitat.

Proposed Management Strategy—Boxthorn

***Objective:* Protect a sufficient high-density area and cover of boxthorn and associated native shrubs and forbs such that the San Clemente sage sparrow population is self-sustaining.**

***Objective:* 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.**

***Objective:* Facilitate military use that is consistent with the above objectives.**

I. 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 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. Controls on the spatial area of disturbance due to fire are described in items IIB, IIC, IIIA, and IIIB, below. Evaluate the condition of exotics over at least one seven-year El Niño cycle.

II. The greatest fire effect risks in MDS-boxthorn are probably that fires will result in shrubs that are not large enough (less than 8 in) 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.

A. 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 Fire 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.)

B. 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.

1. In high-density sage sparrow habitat, fires of moderate intensity or higher should be kept to less than 5 acres. This preliminary target will be consulted on under the ESA in association with the Fire Plan in preparation for the 2002 fire season.

2. In moderate-density sage sparrow habitat, 20-acre patch size limits for fires that burn at moderate intensity or higher will be targeted. This preliminary target will be consulted on under the ESA in association with the Fire Plan in preparation for the 2002 fire season.

3. In low-density sage sparrow and other boxthorn habitat, 40 acres will be targeted. This preliminary target will be consulted on under the ESA in association with the Fire Plan in preparation for the 2002 fire season.

C. It has been shown 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). Therefore, it is recommended that the sage sparrow population be analyzed to ensure that cumulative burns of no more than 90 acres (about 10% of all high-density sage sparrow habitat) over 10 years will prevent the temporary loss of too much habitat for the sage sparrows to be self-sustaining. The impact of cumulative losses of 90 acres over a 10-year period to the continued existence of sage sparrows is subject to analysis under the Fire Management Plan.

D. 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 [Table 4-12] 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.

E. Improve fire management strategy development by evaluating the status of the boxthorn community on sites with different fire history.

1. Examine areas in boxthorn habitats and soil types throughout the Island that have varying burn histories and compare habitat values among them.
2. Conduct experimental burns to clarify the response of this community to fire, in consultation with the USFWS.
3. Conduct an experiment on boxthorn recovery by using various clearing treatments on a small site.

III. Manage disturbance in this community.

A. Natural resources managers and military operators should coordinate to ensure that the desired boxthorn condition is adhered to.

B. Minimize ground and vegetation disturbance in the high-density sage sparrow area, from the rifle range east of the dunes to Seal Cove.

C. Manage the footprint of activity in high-density boxthorn habitat.

1. Locate ground-disturbing activities on previously disturbed sites whenever possible.
2. 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.
3. Where repeated use is expected, create trails.

IV. Reduce the cover of exotic species, based on at least one seven-year El Niño cycle.

V. Improve mapping of the boundaries of this community.

VI. As a high priority, conduct studies of fire effects on boxthorn and sage sparrows.

4.1.3 Maritime Desert Scrub: Boxthorn/Grassland Transition

Specific Concerns—Maritime Desert Scrub: Boxthorn/Grassland Transition

- Management focus in this community is unclear. It may be a transition zone between grassland and shrub communities, but it is likely that objectives for the boxthorn community do not apply. It is mapped as boxthorn on the existing vegetation map, but boxthorn averages only about 6% of total cover. The community is currently dominated by exotic annual grasses on predominantly clay soils (not the soil typical of the boxthorn community), and likely functions as an annual grassland. It commonly has widely scattered shrubs or prickly pear which tend to be more common around the tops of knolls.

- Management objectives may also change with the recent trend of increasing dominance of San Clemente tarweed *(Hemizonia clementina),* which may be leading a change in the composition and structure of this community.
- This community contains populations of the following sensitive plants: *Hemizonia clementina, Lavatera assurgentiflora* ssp. *glabra, Trifolium palmeri.*
- Use by the San Clemente loggerhead shrike, Island night lizard, horned lark, San Clemente Island deer mouse, San Clemente Island fox should be maintained.

Proposed Management Strategy—Maritime Desert Scrub: Boxthorn/Grassland Transition

Objective: ***Increase the cover of native shrubs, subshrubs, and herbaceous forbs.***

I. 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.

II. Improve the mapping and description of the composition of these areas in order to improve management objectives.

III. 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.

IV. 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.

> ***A.*** Conduct restoration experiments to shift dominance towards native species.
>
> ***B.*** Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species.
>
> ***C.*** Experiment with the reintroduction of *Lavatera assurgentiflora* ssp. *glabra* in suspected historic locations.

4.1.4 Maritime Desert Scrub: Terrace Complex

Specific Concerns—Maritime Desert Scrub: Terrace Complex

- The westshore terrace complex has experienced significant loss of shrub cover due to historic overgrazing by feral goats, probably exacerbated by fire. Additional impacts to the terrace flats are due to historic sheep and cattle ranching.
- Excessively hot, frequent, or large fires may delay or prevent woody plant recovery. For example, lemonadeberry *(Rhus integrifolia)* appears to be prominent among the shrubs that have been lost from this complex. While considered a fire resistant species, it is not a vigorous sprouter and probably declined with heavy grazing along with over-frequent or over-hot fires. At the same time, 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.
- The ongoing recovery rate of these sensitive plants needs to be maintained or accelerated: *Aphanisma blitoides, Artemisia nesiotica, Castilleja grisea, Cros-*

sosoma californicum, Dudleya virens var. *virens, Eschscholzia ramosa, Gilia nevinii, Hazardia cana, Heteromeles arbutifolia* ssp. *macrocarpa, Lotus argophyllus* var. *adsurgens, Lupinus guadalupensis, Malacothamnus clementinus, Stephanomeria blairii.*

- *Dendromecon rigida* ssp. *rhamnoides* (believed extirpated from the Island) should continue to be searched for.
- These areas are important for San Clemente loggerhead shrike foraging, sustaining the Island night lizard, San Clemente deer mouse, and San Clemente Island fox.
- Exotic annual grasses dominate the plant community of the terrace flats.
- Soil erosion has gullied some areas.
- The terrace complex has military value as an ordnance hazard safety zone and for training on foot.

Proposed Management Strategy—Maritime Desert Scrub: Terrace Complex

***Objective:* Restore a mosaic of shrubs and shrub/native grassland mix to the westshore terraces at levels that enhance breeding and foraging habitat for loggerhead shrike, sage sparrow, Island fox, Island night lizard, and the endemic deer mouse.**

***Objective:* Expand shrub and woodland boundaries.**

***Objective:* Suppress prickly pear and cholla.**

I. Accelerate the recovery of shrubs on the terrace faces and flats.

A. On the flats, establish or augment existing shrub islands. Increase the cover of woody shrubs by 25% from the 1992–93 baseline (Section 3.5.4.2) of 6% of total vegetative cover in the next 10 years.

B. On the faces, manage shrub recovery primarily by controlling fire intensity so that shrubs and herbaceous perennials may compete with prickly pear and cholla thickets.

II. Reduce the percent cover of invasive plants from the 1992–93 baseline (Section 3.4.4) of 41% on the faces, 53% on the flats, as evaluated over at least one seven-year El Niño cycle.

III. 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.

IV. 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 overhot 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.

A. In the terrace face-terrace flat complex, manage for periodic, cool fires of NPS intensity 5 (Table 4-12) (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.

B. 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 Fire Plan in preparation for the 2002 fire season.

C. 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.

4.1.5 Maritime Desert Scrub: Pyramid Cove

Specific Concerns—Maritime Desert Scrub: Pyramid Cove

- This community of hot, arid slopes dominated by cholla and with minimal soil development is poorly described, yet contains the only Island populations of certain rare plants.
- Excessively frequent or large fires may affect certain sensitive species that occur in these locations, but their tolerance to fire may vary.
- Sustainable populations of these sensitive plants need protection: *Calandrinia maritima, Crossosoma californicum,* possible habitat of *Dissanthelium californicum* (believed extinct), *Dudleya virens* var. *virens, Euphorbia misera, Lepidium virginicum* var. *robinsonii, Lotus argophyllus* var. *adsurgens, Phacelia floribunda, Sibara filifolia.*
- Populations of these sensitive/endemic animals use this area: San Clemente loggerhead shrike, Island night lizard, San Clemente Island fox.
- *Euphorbia misera* occurs in a very few patchy stands on certain south slopes, and is limited in its distribution. Its sensitivity to fire is unknown.
- *Dissanthelium californicum* has been presumed extinct for many years, but may have been a component of this habitat and may still be around.
- Club moss is common in some areas and has been observed to foster seedling survival of silvery hossack, a sensitive plant. The moss may play a role in capturing moisture from fog and making it available to seedlings.
- This area has high military value for ship-to-shore bombardment and other activities. Its primary military value includes a nearby shallow water area with choke points to practice opposed littoral warfare, and weapons firing at mobile targets. Several ranges are in operation here: SHOBA Impact Area I, Fire Support Area (FSA) I, SHOBA Offshore Range East, Shallow Water Extension Training Range Nearshore, China Point to Pyramid Head Mining Range, and Beach Head Complex (on land). Major operations include FIREX (Naval surface fire, spotter services, illumination rounds); SACEX (uses artillery and

air support (tactical aircraft and helicopters); Naval ship surface fire which may have amphibious landings); and FSCEX (uses US Marine artillery support and amphibious landings). Facilities include OP 1, a fuelbreak, SCI Ridge Road, the Boundary Road, and proposed TAR 20.

Proposed Management Strategy—Maritime Desert Scrub: Pyramid Cove

***Objective:* Protect military access to ranges in a manner consistent with the following objectives:**

***Objective:* Protect habitat conditions that support *Sibara filifolia, Lotus argophyllus var. adsurgens, Euphorbia misera*, club moss, and the full array of other plant and animal species, including the grass thought to be extinct, *Dissanthelium californicum*.**

***Objective:* Expand shrub land boundaries.**

***Objective:* Suppress prickly pear and cholla.**

I. Control invasive exotic grasses using appropriate wildland fire management protocols.

II. Improve the soil and community description of this area, and its range of variability.

III. Increase cover of *Euphorbia misera* where it currently exists from its 1992–93 baseline (Section 3.4.5) of less than 1%.

IV. Reduce exotics, mostly red brome, from the 1992–93 baseline (Section 3.4.5) condition of 40% by maintaining the current pace of shrub recovery.

V. Control escape of fire from Impact Area 1 into the woodlands of east side canyons.

VI. Maintain shrub and woodland cover within the canyons at existing levels, or greater if this does not conflict with training needs.

VII. Conduct fog drip study on SCI.

VIII. In Maritime Desert Scrub of Pyramid Cove, protect rare species while allowing light fire.

- ***A.*** Protect Horse Beach Canyon from moderate intensity (NPS intensity 3) or hotter fires (Table 4-12) by applying pre-suppression and suppression tools.
- ***B.*** 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.
- ***C.*** Evaluate fire tolerance of *Sibara filifolia* seed. Compare habitat of *Sibara* 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 Sibara habitat.

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

4.1.6 Maritime Sage Scrub

Specific Concerns—Maritime Sage Scrub

- This community of steep slopes changes in dominance and diversity from the north end to the south end of the Island, and ranges from mesic to arid aspects.
- The boundaries of Maritime Sage Scrub have expanded considerably, and increased cover of sagebrush has been dramatic. A gradual decline in prickly pear is also documented. Since much of this community occurs on steep, inaccessible slopes and it was previously scarce, it is poorly described.
- Area of this community on the northeast escarpment contain over 30% cover of boxthorn, a plant tied closely to the listed San Clemente sage sparrow. This cover of boxthorn approaches that of the best sage sparrow habitat on the west shore.
- Isolated individuals of hard chaparral shrubs may have been a more prominent component of this community at one time.
- Excessively hot, frequent, or large fires may affect the health and biodiversity of this community. California sagebrush is highly flammable.
- The following populations of sensitive plants require protection: *Aphanisma blitoides, Artemisia nesiotica, Eriogonum giganteum* var. *formosum, Lotus dendroideus* ssp. *traskiae, Bergerocactus emoryi, Castilleja grisea, Eriophyllum nevinii, Galium catalinense* ssp. *acrispum, Hazardia cana, Malacothamnus clementinus, Stephanomeria blairii.*

Proposed Management Strategy—Maritime Sage Scrub

***Objective:** Foster the continued expansion and promote a full range of diversity in maritime sage scrub.*

***Objective:** Suppress prickly pear and cholla.*

I. Improve understanding of this community's natural boundaries and shifting dominance from north to south. Re-map the boundaries.

II. Evaluate the potential of this community to support sage sparrow in areas with high boxthorn cover.

III. Promote a fire regime which allows native shrubs and herbaceous species to out-compete prickly pear and cholla.

A. 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.

B. 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 Fire Plan in preparation for the 2002 fire season.

IV. 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.

V. Improve monitoring of this community, using photography in steep areas. Repeat 1992–93 photography from established photo points.

4.1.7 Loamy Grassland

Specific Concerns—Loamy Grassland

- Erosion from past land use and existing roads continues to degrade the productive potential of this soil and remove water from the system before it can be used by plants or animals.
- Exotic annual grasses and forbs continue to be pervasive within the grassland, so the natural role of fire, plant competition, and other processes is altered.
- Sustainable populations of these sensitive plants depend on the grassland: *Brodiaea kinkiensis*, *Delphinium variegatum* var. *kinkiense, Delphinium variegatum* var. *thornei, Gilia nevinii, Linanthus pygmaeus* ssp. *pygmaeus, Microseris douglasii* ssp. *platycarpha, Trifolium palmeri*.
- Sustainable populations of these sensitive/endemic animals depend on an open condition in the grassland: San Clemente loggerhead shrike, Island night lizard, horned lark, and SCI fox.
- As the loamy grasslands approach canyon margins especially along the eastern escarpment, a sagebrush and giant buckwheat component is becoming more prominent. This is beneficial for wildlife values, but increases the hazard of a wildland fire becoming hot and entering sensitive canyon woodlands.

Proposed Management Strategy—Loamy Grassland

Objective: ***Manage for an open condition of native grasses and forbs, with a mosaic of shrubs in rocky outcrops and draws, such that small mammal and reptile prey are made available to the loggerhead shrike and Island fox.***

I. 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.

II. Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage the risk of catastrophic fire.

III. Control erosion, prioritizing locations that may be lowering the water table, affecting listed species such as *Delphinium kinkiensis* or water quality in ocean waters designated an Area of Special Biological Significance.

IV. Improve the dominance of needlegrass and other native herbaceous species from the 1992–93 baseline (Section 3.4.7.1) of 29% by a favorable burning regime.

- ***A.*** Experiment with fire management to improve native dominance, protect sensitive plant populations, and achieve an open grassland condition.
- ***B.*** Reduce exotics from the 1992–93 baseline (see Section 3.4.7.1) of 58% by a favorable burning regime, as evaluated over at least one 7-year El Niño cycle.

V. Consider low elevation grasslands at the northern end of the Island as a priority area for increasing needlegrass cover.

VI. 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, but as of now which herbs cannot be identified due to lack of knowledge.

- ***A.*** Manage fire intervals and patch size to achieve openness of grasslands and enhance native plants, enhance transit and prey availability for the SCI fox, and prey availability for the shrike. As a preliminary target, a minimum 5-year return interval for wildland fires larger than 300 acres will be consulted on under the ESA in association with the Fire 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.
- ***B.*** 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.
- ***C.*** Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage the risk of high-intensity fire.

D. Experiment with fire management to improve native dominance, protect sensitive plant populations, and achieve an open grassland condition.

4.1.8 Clay Grassland

Specific Concerns—Clay Grassland

- Clay soils tend to support grasslands, but invasion of moisture-loving shrubs like coyote bush *(Baccharis pilularis)* can and has occurred within a few wet years and in the absence of fire. It is believed to be most likely to invade in years with late spring rains which is a long-term natural disturbance phenomenon (William and Hobbs 1989; White 1979). Cover of coyote bush has increased in a dramatic way in recent years, probably taking advantage of water in the soil profile unavailable to grasses and forbs.
- Invasive grasses can become so dense that prey becomes unavailable to the SCI fox and San Clemente loggerhead shrike.
- Exotic annual grasses have come to dominate this community at the expense of native grasses and forbs.
- Sustainable populations of these sensitive plants depend on a healthy native grassland: *Brodiaea kinkiensis, Delphinium variegatum* var. *kinkiense, Hordeum intercedens, Jepsonia malvifolia, Microseris douglasii* ssp. *platycarpha, Trifolium palmeri.*
- Historic locations of *Lavatera assurgentiflora* ssp. *glabra* have been documented from the knolls in this community.
- Sustainable populations of these sensitive/endemic animals depend upon an open grassland condition: San Clemente loggerhead shrike, Island night lizard, horned lark, and SCI fox.
- Many bulbous forbs thrive in the clay grasslands, but the invasion of this area by coyote bush may conflict with their spread.
- Fire suppression may allow continued dominance by exotic species.

Proposed Management Strategy—Clay Grassland

***Objective:* Manage for an open grassland matrix with shrubs in rock outcrops and on hillslopes and knolls. Increase native grasses, forbs, and associated shrubs while controlling invasive exotics.**

I. Allow patches and stands of *Baccharis* to fluctuate naturally (increase and decrease in the size and extent) within a larger mosaic of grasslands.

II. Seek a condition where alien species are not a significant factor in community structure, function, or composition.

A. Decrease exotic cover by 10% in 10 years from the 1992–93 baseline (Section 3.4.7.2) of 70% of total cover, as measured over at least one El Niño cycle.

B. Conduct restoration experiments to shift dominance towards native species.

III. Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species and native forbs.

IV. Experiment with the restoration of *Lavatera assurgentiflora* ssp. *glabra* in suspected historic locations.

V. Improve understanding of where needlegrass currently resides to help focus restoration objectives.

VI. 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.

A. 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 5-year return interval for wildland fires larger than 300 acres will be consulted on under the ESA in association with the Fire 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.

B. Manage fire for openness of grasslands and for native perennial herbs and grasses, to enhance transit and prey availability for the SCI fox, and prey availability for the shrike.

C. 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 SCLS. So, until further understanding changes this approach, no situation is identified (except nesting by SCLS) in which enhanced fire suppression would be justified due to exceeding target values.

4.1.9 Active Sand Dune

Specific Concerns—Active Sand Dune

- Active sand dune as a native community to SCI and part of the Island's diversity has been disappearing at an accelerated rate within the past few decades, apparently due to invasion of exotics and the lack of dune sand replenishment.
- Unknown consequences of active dune loss to associated plants and animals, especially endemic plants such as *Astragalus miguelensis, Camissonia guadalupensis,* and *Cryptantha traskiae* and the endemic San Clemente Coenonycha beetle (*Coenonycha clementina*) and island fox.
- The dynamics of sand replenishment may still be operating to some extent north of the airfield, so this area may be a focus for prioritizing initial protection to maintain those dynamics that otherwise cannot be duplicated through active management.
- The dunes contain many cultural resources that require protection.
- Ancient root casts are threatened as portions of the dunes are lost to road gullying.

Proposed Management Strategy—Active Sand Dune

***Objective:* Foster a mosaic of active and stabilized dunes to ensure that a network of suitable sites remains available for endemics that depend on active dunes.**

***Objective:* Reduce the cover of exotics with a focus on iceplant.**

***Objective:* Protect the integrity of active dunes with respect to cultural resources, root casts, and the natural abundance and diversity of native endemics.**

I. Protect the active dunes that now exist by controlling exotics and uses that may affect sand replenishment.

II. 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.

III. Continue to restrict access to the dunes, especially by vehicles.

IV. Control ongoing erosion of the dune roads. Use BMPs to secure all roads through the dunes from erosion.

V. Reduce the cover of exotic species by 50% in the next ten years from the 1992–93 baseline (Section 3.4.8.1) of 20% of total plant cover, based on long-term vegetation condition and trend monitoring.

4.1.10 Stabilized Sand Dune

Specific Concerns—Stabilized Sand Dune

- Stabilized dunes are experiencing degradation due to invasion by exotic plants, which may affect endemic plants such as *Astragalus nevinii, Camissonia guadalupensis, Cryptantha traskiae, Lavatera assurgentiflora* ssp. *glabra* and SCI fox.
- The dunes contain many cultural resources that require protection.
- Ancient root casts are threatened as portions of the dunes are lost to road gullying.

Proposed Management Strategy—Stabilized Sand Dune

***Objective:** Foster a mosaic of active and stabilized dunes to ensure that a network of suitable sites remains available for endemics that depend on stabilized dunes.*

***Objective:** Reduce the cover of exotics with a focus on iceplant.*

***Objective:** Protect the integrity of stabilized dunes with respect to cultural resources, root casts, and the natural abundance and diversity of native endemics.*

I. Continue to restrict access to the dunes, especially by vehicles.

II. Control ongoing erosion of the dune roads. Use BMPs to secure roads from erosion.

III. Reduce the cover of exotic species by 50% in the next ten years from the 1992–93 baseline (Section 3.4.8.2) of 35% of total plant cover, based on long-term vegetation condition and trend monitoring.

4.1.11 Coastal Strand

Specific Concerns—Coastal Strand

- West Cove beach is eroding due to the lack of sand replenishment since construction of the airfield in 1961.
- Sandy beaches without human activity are scarce in southern California, yet are important for military shore assault training as well as for certain animals.
- Wintering populations of western snowy plover depend on this habitat. Encroachment by invasive plant species may be reducing habitat for the plover.

Proposed Management Strategy—Coastal Strand

***Objective:** Protect natural resource values while facilitating use of this very high-value military habitat.*

I. Continue to monitor for activity by the western snowy plover before beach hovercraft landings, as deemed necessary by NRO.

II. Monitor and remove species, such as iceplant, that may be encroaching on the beaches. Replace with a native species.

III. Avoid shoreline construction that results in a loss of coastal strand habitat.

IV. Clean up trash and debris.

4.1.12 Coastal Salt Marsh

Specific Concerns—Coastal Salt Marsh

- About half the cover of salt marsh vegetation was exotic during 1992–1993 baseline surveys (Section 3.4.9) of vegetation condition.
- A number of upland species are well established in the salt marsh, possibly indicating a long-term shift to a more upland community.
- The salt marsh is a protected wetland under Sec. 404 of the CWA. No dredge or fill is allowed without a permit.

Proposed Management Strategy—Coastal Salt Marsh

Objective:* *Maintain the integrity of the coastal salt marsh on San Clemente Island as a viable plant community with natural abundance and composition of native vegetation.

I. Maintain the existing community boundaries, allowing no shrinkage.

A. Watch for composition shift to more upland vegetation which may result from upstream sedimentation.

B. Monitor for excessive sedimentation to keep sedimentation rates at pre-grazing era levels (ca. 1840s), if those can be determined.

C. Check for changes in boundaries on historic aerial photos.

II. Salt marshes should be periodically monitored for exotic plant species. Non-native species should be removed before they become established.

III. Periodically clean up debris.

4.1.13 Sea Stacks and Sea Bluff Succulent

Specific Concerns—Sea Stacks and Sea Bluff Succulent

- Sea stacks are important as roosting (and sometimes nesting, though not at SCI) habitat for many bird species, including the federally listed California brown pelican. They may also harbor Xantus' murrelet, a bird that may be federally listed within the next five years.
- Populations of sensitive plants form part of this community on stacks and bluffs that are terrestrial and no longer inundated. These should be protected: *Lomatium insulare* (not seen in recent years), *Calandrinia maritima, Castilleja grisea, Dudleya virens* var. *virens, Eriophyllum nevinii, and Phacelia floribunda*.
- California hydrocoral, a species protected under California law, is known from the underwater base of Castle Rock and possibly other locations.
- Sea stacks are vulnerable to introduced predators such as cats and black rats.
- While no monitoring transects have been established in this community, it appears that it has been less affected by exotic species invasion and human disturbance than others.

Proposed Management Strategy—Sea Stacks and Sea Bluff Succulent

Objective:* *Maintain the integrity of the sea stacks and sea bluffs on San Clemente Island as a viable community with natural abundance and composition of native vegetation and wildlife.

I. Survey this community for use by plants and animals, with emphasis on endemics.

II. Ensure recruitment of rare species exceeds mortality.

III. Limit disturbance to sea stacks.

IV. If feasible, do not use as military targets.

V. Survey for use by cats and rats and expand management of any predators as needed.

4.1.14 Intertidal

Specific Concerns—Intertidal

- The rocky intertidal zone of SCI sustains a rich flora of invertebrates including purple and red urchin, black abalone, red abalone, and the recently-listed, federally-endangered white abalone. Little information is available about most of these invertebrates.
- Surveys conducted in SCI intertidal areas in the 1970s and 1980s remain to be analyzed and made accessible for resource managers and users. Recent information of this habitat is needed for comparison with this older data.
- Surfgrass is essential nursery habitat for juvenile lobsters.
- The health of intertidal habitats should be monitored in areas used for military training and in areas potentially impacted by harvesting practices.
- Wood previously used for piers was commonly treated with chemicals that contained polynuclear aromatic hydrocarbons (PAHs), a potential carcinogen.

Proposed Management Strategy—Intertidal

***Objective:* Protect and monitor the attributes of intertidal sites that sustain a diverse and abundant community of invertebrates, fish, mammals, and birds.**

I. Participate in intertidal monitoring in accordance with a Southern California Bight-wide program called the Multi-Agency Resources Integrated Network Effort (MARINE).

A. Establish four permanent monitoring locations around SCI in intertidal habitats.

1. The locations will represent the fixed array of organisms and physical settings associated with intertidal habitats at SCI.

2. Establish permanent markers suited to chosen monitoring techniques at each of these locations.

B. Select appropriate species for monitoring including, if present in high numbers, those species monitored at other islands.

C. Use the published handbook for monitoring rocky intertidal ecosystems jointly developed by Dr. Jack Engle of UC Santa Barbara, the National Park Service, and the Navy to select appropriate techniques for surveying, data analysis, and report preparation.

II. Consider constructing new piers using concrete or plastic to reduce the use of PAHs.

4.1.15 Nearshore Shallow Subtidal

Specific Concerns—Nearshore Shallow Subtidal

- Eelgrass provides a productive nursery habitat in sheltered, clear waters for many invertebrates and fishes.
- Eelgrass beds are recognized as “Special Aquatic Sites” under the CWA and as such receive special attention from the USACOE and USEPA when determining mitigation measures.

- Eelgrass is also considered EFH under the Magnuson-Stevens Fishery Conservation and Management Act.
- Kelp beds grow in a limited area but harbor a large and disproportionate share of the productivity and diversity of Island waters. Harvest of kelp is managed by the CDFG by licensing and leasing of beds.
- Urchin grazing has seriously affected kelp beds on northern Channel Islands, but this has not been a problem to date in SCI beds.
- Certain aquatic exotic species may threaten the health of the nearshore community if they become established.
- With the listing of the white abalone, there may be increased interest in the nearshore waters of SCI to support recovery efforts. A Navy policy may be needed to address requests for use of SCI waters by other parties.
- The Navy is currently partnering with the National Park Service to develop a protocol for monitoring kelp forests and to establish kelp forest monitoring sites at SCI.

Proposed Management Strategy—Nearshore Shallow Subtidal

Objective:* *Protect the attributes of vegetated shallow subtidal sites that sustain a diverse and abundant invertebrate community, fish and wildlife foraging, nursery function for numerous fishes, as well as an ecological role in detritus-based food web support.

I. Continue to partner with the National Park Service on subtidal surveys around SCI.

II. Allow no net loss of shallow subtidal habitat in acreage or in existing net biological values.

III. Use the black sea bass as a management focus species for evaluating habitat condition.

IV. Using substrate and other data, identify the likely location of fish species covered under EFH regulation.

V. Keep informed on the status of recovery efforts for the white abalone.

4.2 Resource Management Units

4.2.1 Designation of Management Units

Whole-island management (including the offshore 300 yards) is appropriate for many natural resource decisions, but a finer scale focus for some issues will aid in supporting use, management, and restoration objectives, and deconflicting possible incompatibilities. A third scale incorporated into the INRMP in its ecosystem approach is the species level, with the identification and use of focus management species.

Resource management units proposed in this Plan were developed based on the following criteria:

- Existing operational controls on use.
- Natural locations for wildfire defense such as topographic breaks and existing roads.
- Uniform military use or access.

- Maximum environmental variability within unit boundaries to support the goal of "preserving all the parts" throughout the Island.
- Simple and easily recognizable boundary.
- Consider any positive or negative consequences to either military activity or sensitive resource.

The 18 management units are shown in Map 4-1.

Within each management unit, different strategies for fire suppression and natural resource management were developed based on military values and. These strategies are outlined, by unit, in Chapter 5.

Proposed Management Strategy—Resource Management Unit Designations

***Objective:** Identify management units for which land use may be controlled or adjusted, objectives or protocols may shift, and that can be physically identified on the ground or in the water.*

I. Adopt the management units depicted in Chapter 5 based primarily on natural locations for wildfire control and uniform military use or access, and secondarily based on resource values or constraints.

II. Use the boundaries of these management units to guide finer scale management decisions including fire control, habitat restoration, and military exercises.

III. Adopt the following strategies for deconflicting military and natural resource management:

- ***A.*** Highest military value: management emphasis is aimed at maximizing those military values with consideration of the resource values.
- ***B.*** High military value: management emphasis is aimed at protecting those military values with increasing flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- ***C.*** Medium military value: management emphasis is aimed at maintaining those military values with high flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- ***D.*** Low and lowest military value: management emphasis is aimed at maintaining those military values to the extent possible and with greatest flexibility for maintaining natural resource values as an integral part of day-to-day operations.

Map4-1. Land Management Units developed for managing resources at San Clemente Island. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

4.2.2 Military Values of Management Units

In conjunction with the draft EIS currently being developed for the military training activities on SCI, SRS Technologies supported the INRMP Working Group by providing an evaluation of military values of the resource management units proposed in this INRMP. This valuation is described below. Additional detail will also be provided in the forthcoming Wildland Fire Management Plan for SCI.

4.2.2.1 Military Value Scoring Factors

Ten scoring factors and a weighting factor for each were developed by SRS Technologies to calculate an estimated military value for each management unit. The scoring and weighting factors are as shown in Table 4-1, below. Table 4-2 is a list of 32 "Primary Training Elements" of the User Commands evaluated across each of the management units. A final assessment of cost by management unit and for the Island as a whole, by day and by year, will be presented in the Wildland Fire Management Plan.

Table4-1. Scoring and weighting factors contributing to military value.

Scoring Factor	Weighting Factor%
Ability to support primary training elements	20.1%
Instrumentation	14.8%
Uniqueness	12.7%
Ordnance	10.6%
Target quality and quantity	9.5%
Ease of access	9.5%
Number of warfare areas supported	9.0%
Number of training levels supported	5.3%
Utilization	4.8%
Training Media	3.7%

4.2.2.2 Results of Military Value Analysis

The scores that each management unit received by military activity are shown in Table 4-3. This table shows each factor scored against each area which, when multiplied by the weighting system, produces an overall "score." The scores for the management units were then ranked for military value into five categories; very high; high; medium; low; and lowest (Figure 4-1). Five units (China Cove, VC3, Pyramid Cove, Northwest Harbor, and Airfield) received the "Highest" designation. Lost Point, Mosquito Cove, Eagle Canyon, and Upper China Canyon received the "Lowest" scores.

Table4-2. SCI primary training element assessment matrix for military value.

SCI PRIMARY TRAINING ELEMENT ASSESSMENT MATRIX

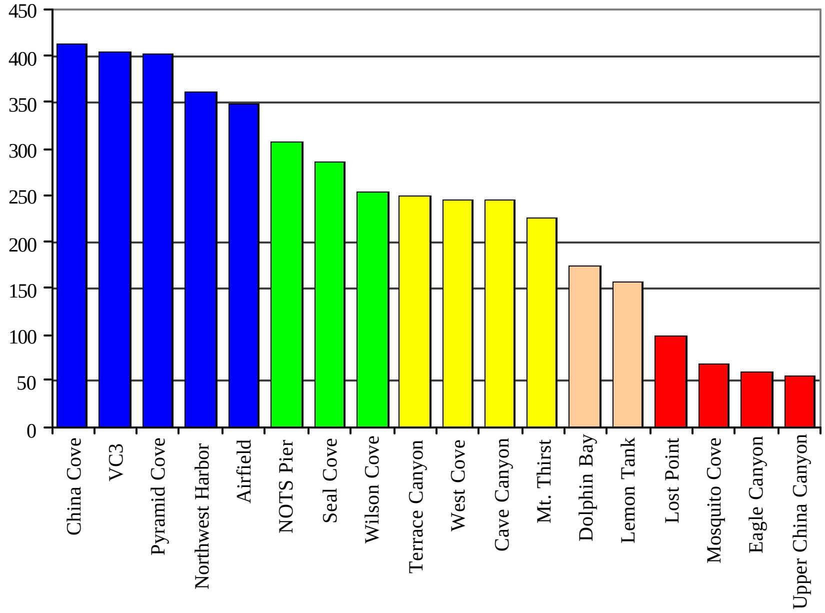
WARFARE AREA	Primary Training Element	Airfield	Cave Canyon	China Cove	Dolphin Bay	Eagle Canyon	Lemon Tank	Lost Point	Mosquito Cove	Mt. Thirst	Northwest Harbor	NOTS Pier	Pyramid Cove
AIR													
	FCLPs	X											
	Electronic Warfare		X										
	Live and Inert Ordnance			X									X
	Stand Off Weapons			X									X
	Night Operations	X	X	X									X
SURFACE													
	Surface to Air MISSILEX	X											
	FIREX			X									X
	Comprehensive EW Exercise		X										
FLEET MARINE													
AIR	Electronic Warfare		X										
	Live Ordnance			X									X
	CSAR	X						X					
	Troop Lifts							X					
	Air Command & Control	X								X			X
	Night Operations	X	X	X				X		X			X
GND	Offensive Operations			X	X	X	X	X	X	X			X
	Defensive Operations			X	X	X	X	X	X	X			X
	Fire Support Coordination			X		X			X				X
	Engineering Operations			X			X						X
	Ground Command & Control						X						X
	Gnd Reconnaissance & Surveillance						X	X					X
NAVAL SPECIAL WARFARE													
	Land Special Operations			X	X		X	X		X	X	X	X
	Maritime Special Operations			X			X				X	X	X
	Air Special Operations			X							X		X

Table4-3. San Clemente Island assessment of military value for each land management unit.

		Primary Training Elements - Number of PTEs Supported		Instrumentation - WISS/TACTS/ Strafe/EW/ Underwater/Laser		Uniqueness (Essentiality) - Low/Medium/High		Ordnance - Live and/or Inert		Targets Quality and Quantity - Low/Medium/High		Ease of Access		Warfare Areas Supported - AW/SUW/ASW/ STW/EW/AMW/ MIW/NS		Training Levels Supported - Qualification/B/I/A		Utilization - Hours per Year		Training Media - Land/Sea/ Subsurface/Air	
	*Weighting Factor * 500*	*101*		*74*		*63*		*53*		*48*		*48*		*45*		*26*		*24*		*19*	
ID	**Management Unit**	**Score**	**Pts**	**Score**	**Pts**	**Score**	**Pts**	**Score**	**Pts**	**Score**	**Pts**	**Score**	**Pts**	**Score**	**Pts**	**Score**	**Pts**	**Score**	**Pts**	**Score**	**Pts**
1	Northwest Harbor	2	40	1	15	5	63	5	53	5	48	5	48	3	27	5	26	5	24	5	19
2	Airfield	3	60	5	74	5	63	0	0	0	0	5	48	5	45	5	26	5	24	2	7
3	Dolphin Bay	1	20	3	44	3	38	0	0	1	10	4	38	1	9	1	5	0	0	3	11
4	West Cove	2	40	3	44	3	38	0	0	0	0	5	48	3	27	5	26	3	14	2	7
5	Wilson Cove	2	40	0	0	5	63	0	0	0	0	5	48	5	45	5	26	5	24	2	7
6	NOTS Pier	1	20	5	74	5	63	0	0	0	0	5	48	5	45	5	26	5	24	2	7
7	Terrace Canyon	3	60	1	15	1	13	2	21	4	38	3	29	3	27	5	26	2	10	3	11
8	VC3	5	101	0	0	5	63	5	53	5	48	4	38	5	45	5	26	5	24	2	7
9	Lemon Tank	2	40	0	0	0	0	2	21	1	10	3	29	3	27	2	11	2	10	3	11
10	Seal Cove	4	80	4	59	4	51	0	0	1	10	3	29	3	27	2	11	2	10	3	11
11	Mt. Thirst	2	40	5	74	3	38	0	0	0	0	3	29	1	9	1	5	4	19	3	11
12	Lost Point	2	40	0	0	0	0	0	0	0	0	1	10	3	27	1	5	1	5	3	11
13	Cave Canyon	2	40	5	74	3	38	0	0	0	0	3	29	3	27	3	16	2	10	3	11
14	Eagle Canyon	1	20	0	0	0	0	0	0	0	0	1	10	1	9	1	5	1	5	3	11
15	Upper China Canyon	1	20	0	0	0	0	0	0	0	0	1	10	1	9	1	5	1	5	2	7
16	China Cove	5	101	1	15	5	63	5	53	5	48	2	19	5	45	5	26	5	24	5	19
17	Pyramid Cove	5	101	1	15	5	63	5	53	2	19	4	38	5	45	5	26	5	24	5	19
18	Mosquito Cove	1	20	0	0	0	0	0	0	0	0	2	19	1	9	1	5	1	5	3	11

Figure4-1. Military value scores ranked by land management unit.

Management Unit	Total Score	
China Cove	412	Highest
VC3	405	
Pyramid Cove	403	
Northwest Harbor	362	
Airfield	348	
NOTS Pier	308	High
Seal Cove	287	
Wilson Cove	254	
Terrace Canyon	250	Medium
West Cove	246	
Cave Canyon	244	
Mt. Thirst	225	
Dolphin Bay	176	Low
Lemon Tank	158	
Lost Point	98	Lowest
Mosquito Cove	69	
Eagle Canyon	60	
Upper China Canyon	56	



4.2.3 Natural Resource Values of Management Units

Assigning numerical values to natural resources is always a somewhat subjective and difficult task. Landforms, vegetation communities, species, populations, and even individuals all have some level of value to an ecosystem. Unfortunately, the valuation process is often subjective because a resource's value to the ecosystem, including its interaction with other resources, and the resource's intrinsic value are complex and abstract ideas. In many instances, the information about the resource may be incomplete for a full evaluation.

The valuation of natural resources was undertaken during the preparation of this plan to try and determine which parts of the Island have the potential for the most conflict between military use and natural resource management. It was done with the understanding that much of the information about the Island's natural resources is incomplete. Basic ecological questions about many of the Island's species have not been studied. Even for the most intensively studied species, there remain important gaps in our knowledge. Consequently, this analysis should be viewed with caution and only in conjunction with the objectives and strategies outlined throughout this Plan. The results should not be the sole tool used for making management decisions regarding natural resources on SCI.

4.2.3.1 Natural Resources Scoring Factors

The most limiting factor in determining what natural resources would be used in the analysis was the amount and quality of information we had about the resource. Only those resources that could be tied to specific locations could be analyzed by management unit. Other factors that were considered when determining if a resource would be scored included:

- Its federal or state protective status, or potential status.
- The distribution of the resource.
- The threats to the resource.
- Its commercial value.

- Its distribution on the island.

If the resource's value changes throughout the year, such as marine mammal rookeries, its location was considered important for the entire year. Most resources were given point values based on one of the columns in Table 4-4.

Table4-4. Point scale used for determining values of natural resources on SCI.

Percent of Total Range	Low Relative Value	Medium Relative Value	High Relative Value
1-10	0.5	1	2
11-20	1	2	4
21-30	1.5	3	6
31-40	2	4	8
41-50	2.5	5	10
51-60	3	6	12
61-70	3.5	7	14
71-80	4	8	16
81-90	4.5	9	18
91-100	5	10	20

The following resources were used in the analysis:

A. *San Clemente loggerhead shrike nest locations*. Both recent and historical nest locations were used in the analysis. The percent of all the locations within each management unit was determined and points were accorded using the High Relative Value column in Table 4-4. All points were then multiplied by six to reflect the shrike's relative management importance on SCI.

B. *San Clemente loggerhead shrike potential release sites*. These are locations that the shrike recovery team has determined are suitable for future releases of captive bred shrikes. The percentage of all release sites within each management unit was determined and points were accorded using the Medium Relative Value column in Table 4-4. The points were then multiplied by three.

C. *Sage sparrow density*. The information used for this topic was a GIS coverage originally created using a "habitat quality" map developed by KEA in 1997. It was then updated based on 2000 survey data to reflect high, medium, and low densities (N. Munkwitz, *pers. comm*.). The percent of the total high, medium, and low density falling within each unit was determined and points were assigned using the High Relative Value column in Table 4-4. High density points were then multiplied by three and medium density points were multiplied by two to reflect this species' relative management importance on SCI.

D. *Island night lizard density*. Points were determined in the same manner as those for the sage sparrow except the Medium Relative Value column in Table 4-4 was used. The data was originally developed by Mautz (2000) using a vegetation coverage of the Island. Mautz found the population of island night lizards to be in excess of 20 million.

E. *Ecological units*. The ecological units at SCI are described in section 3.4 and are based on landforms, soils, and vegetation communities. The percent of each ecological unit found within each land management unit was determined and points were assigned according to the High Relative Value column in Table 4-4. Ecological units were chosen for analysis with the belief that unique habitats (e.g. dunes) and habitats used by sensitive species which we have little information about would be valued according to their relative abundance on the Island.

F. *Federally listed plants*. The percent of each federally listed species' known locations on SCI within each land management unit was determined and points assigned according to the High Relative Value column in Table 4-4. Most of the information regarding locations of listed plants was from Junak and Wilken (1998) or from more recent vegetation surveys. Also treated as federally listed species were three endemic species with severely declining populations on SCI: *Lavatera assurgentiflora glabra, Quercus tomentella,* and *Lyonothamnus floribundus aspleniifolius.*

G. *Endemic plants*. For SCI endemic plant species, points were determined in the same manner as for federally listed species. Points for SCI endemics were determined using the High Relative Value column and for Channel Island endemics the Low Relative Value column was used. If a species is federally listed and an endemic species, it received points under both topics. The information for some Channel Island endemics was not sufficient to analyze.

H. *Seabird colonies*. The presence of a regularly used roosting or breeding colony site for pelagic birds within a management unit garnered 10 points for that unit. However, a unit could only receive a maximum of 10 points. The information on seabird colonies was from Cohen (1979), Jorgensen and Ferguson (1984), and anecdotal observations by H. Carter (*pers. comm.*).

I. *Xantus' murrelet nesting*. The presence of a breeding site for this species within a management unit was worth 10 points. This species was chosen for the analysis because it is likely to be listed by the USFWS in the near future. There were only two confirmed breeding locations (Seal Cove and China Point), one provided by H. Carter (*pers. comm*.)and one by Cohen (1979).

J. *Pinniped rookeries.* Information on marine mammal rookeries was taken from Carretta *et al*. (2000). Points were determined by the percent of the population observed within each management unit. Each of the three species regularly observed on SCI (California sea lions, harbor seals, and northern elephant seals) were calculated separately.

K. *Western snowy plover observations*. The percentage of all sightings between March 2000 and June 2001 within each management unit was determined and points were assigned according to the High Relative Value column of Table 4-4. The information was from Foster and Copper (2001) and monthly survey reports provided by B. Foster (*pers. comm*.).

L. *Existing natural resource management operations*. One point was given for each existing island night lizard, sage sparrow, or fox transect location within each management unit. Five points were given for the NROs in Wilson Cove, Stone Station, and the zoo cages and rearing facility.

4.2.3.2 Results of Natural Resource Value Analysis

The results of the valuation of natural resources on SCI, by resource, are shown in Table 4-7. Table 4-5 shows the relative value of each management unit for natural resources. Seal Cove, Pyramid Cove, and Lost Point received the highest scores while Wilson Cove and VC3 received the lowest.

Table 4-6 and Figure 4-3 were developed to determine which units may have the greatest potential for conflict between military activities and natural resource management. Pyramid Cove and Seal Cove appear to have the greatest potential for conflict, however, the actual activities and locations of activities should be looked at more closely to determine if there truly is a conflict.

Table4-5. Values of selected natural resources within each land management unit at SCI.

Management Unit	Shrike nest locations	Shrike release sites	Sage sparrow density	Island night lizard density	Ecological Units	Federally listed plants	Endemic plants	Seabird colony	Xantus' murrelet breeding colony	Marine mammal rookery	Snowy plover observations	Existing NRO transects or facilities	**Total Points**
1. Northwest Harbor	0	0	10	2	18	26	6.5	10	0	7	2	3	**85**
2. Airfield	0	0	0	0	14	12	1	10	0	0	0	0	**37**
3. Dolphin Bay	0	0	0	6	24	2	1.5	0	0	0	0	1	**35**
4. West Cove	0	0	28	4	54	26	5.5	0	0	0	8	4	**130**
5. Wilson Cove	0	0	0	6	12	4	0.5	0	0	0	0	6	**29**
6. NOTS Pier	0	0	0	4	28	12	4.5	0	0	0	0	1	**50**
7. Terrace Canyon	0	0	54	10	16	24	3.5	10	0	0	0	6	**124**
8. VC3	0	0	2	4	8	4	1	0	0	0	0	1	**20**
9. Lemon Tank	12	3	0	5	26	64	6	0	0	0	0	7	**123**
10. Seal Cove	12	6	46	18	38	28	14.5	10	10	20	0	14	**217**
11. Mt. Thirst	12	9	0	5	24	62	6.5	10	0	0	0	5	**134**
12. Lost Point	48	9	2	13	28	34	13.5	10	0	0	2	3	**163**
13. Cave Canyon	24	6	2	9	16	12	9	0	0	0	0	3	**81**
14. Eagle Canyon	12	0	0	4	16	44	6.5	0	0	0	0	1	**84**
15. Upper China Canyon	24	3	0	1	10	0	0	0	0	0	0	2	**40**
16. China Cove	12	0	2	7	24	16	5	10	10	3	4	1	**94**
17. Pyramid Cove	24	0	0	5	68	44	14	0	0	4	10	3	**172**
18. Mosquito Cove	12	3	0	6	18	64	3	10	0	0	0	0	**116**

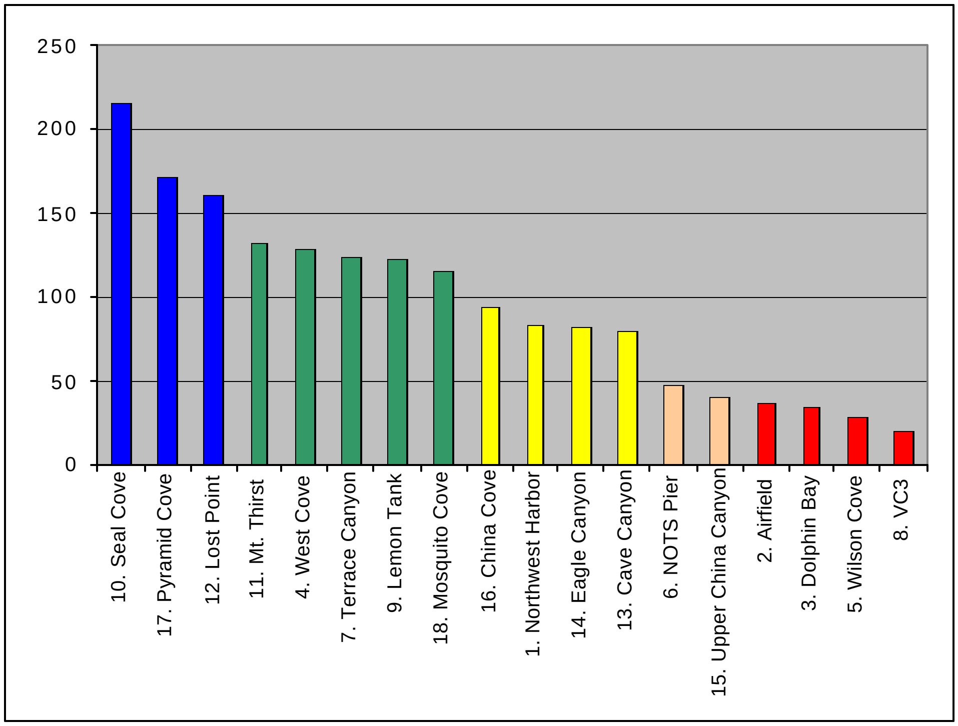


Figure4-2. Relative value of land management units to selected natural resources at SCI.

Table4-6. Comparison of military value and natural resource value of each management unit.

Management Unit	Military Value	Natural Resources Value
1. Northwest Harbor	**Highest**	**Medium**
2. Airfield	**Highest**	**Lowest**
3. Dolphin Bay	**Low**	**Lowest**
4. West Cove	**Medium**	**High**
5. Wilson Cove	**High**	**Lowest**
6. NOTS Pier	**High**	**Low**
7. Terrace Canyon	**Medium**	**High**
8. VC3	**Highest**	**Lowest**
9. Lemon Tank	**Low**	**High**
10. Seal Cove	**High**	**Highest**
11. Mt. Thirst	**Medium**	**High**
12. Lost Point	**Lowest**	**Highest**
13. Cave Canyon	**Medium**	**Medium**
14. Eagle Canyon	**Lowest**	**Medium**
15. Upper China Canyon	**Lowest**	**Low**
16. China Cove	**Highest**	**Medium**
17. Pyramid Cove	**Highest**	**Highest**
18. Mosquito Cove	**Lowest**	**High**

This table may not accurately represent the value of natural resources on SCI because of the lack of information regarding many species, communities, and ecosystem processes. This chart should not be used without the content of the entire INRMP.

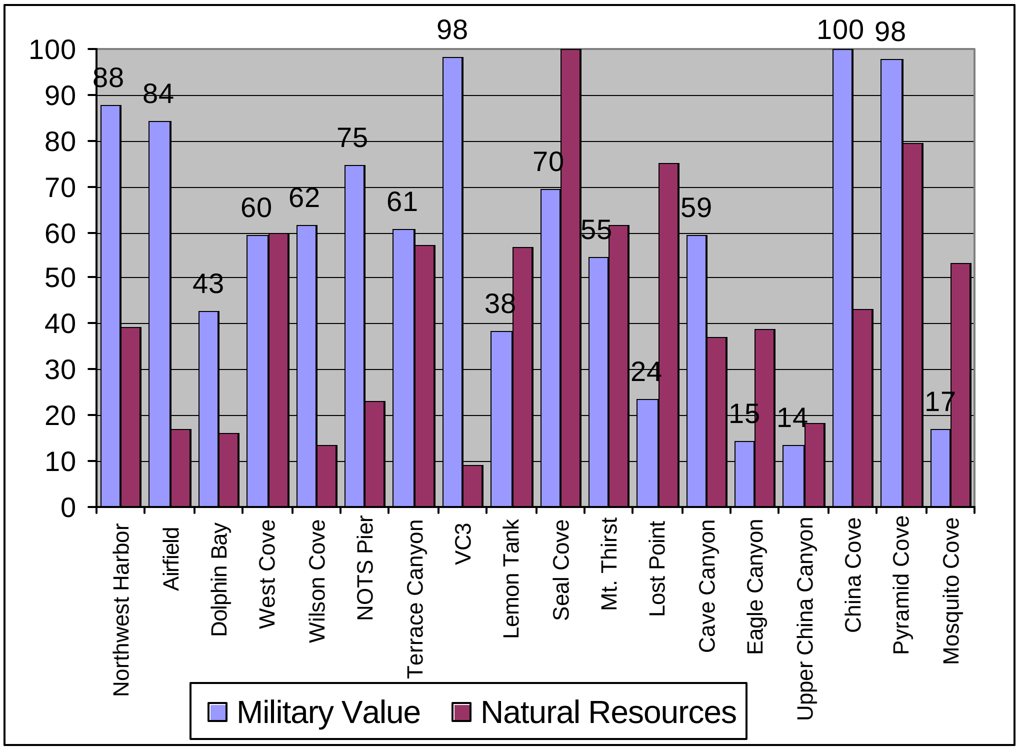


Figure4-3. Graphical comparison of the relative military and natural resource value of each management unit. This graph may not accurately represent the value of natural resources because of the lack of information regarding many species, communities, and ecosystem processes. This chart should not be used without the content of the entire INRMP.

4.3 Special Management Emphasis Areas

Specific Concerns—Special Management Emphasis Areas

- Minimum size, configuration, and management of protected sites is needed to protect and sustain natural habitat values and functions, as well as the life history needs of management focus species.
- Sometimes a temporary set-aside or "leave" area may provide long-term benefit with little effect on necessary use, but a designation is required to prevent inadvertent impacts.
- Regulatory protection does not necessarily guarantee that the value and function of a resource is secure.

Proposed Management Strategy—Special Management Emphasis Areas

Objective:** **Identify special management emphasis areas for which, in general, existing use and management are compatible, but when there is an overriding conflict, then a resource management objective takes precedence.

Objective:** **Identify the size, configuration of "leave" areas such that populations across the Island are well-distributed, connected, genetically robust, redundant, with multiple core areas, large, and buffered.

I. Evaluate the INLMA for its effectiveness as a Special Management Emphasis Area.

II. Evaluate Bird Rock and Castle Rock for their effectiveness as a Special Management Emphasis Area.

III. Consider an active restoration site a Special Management Emphasis Area.

IV. Identify major concentration of ironwoods and oaks on the eastern escarpment as a Special Management Emphasis Area.

V. Continue to restrict access to the dunes. They should not require designation as a Special Management Emphasis Area because they already receive attention with habitat protection measures.

VI. Participate in designation of three proposed State Marine Reserves off of San Clemente Island under AB993 (1999) Marine Life Protection Act and on the proposed marine reserve boundaries.

- ***A.*** Identify if "military only" areas are needed, since general public access is not restricted. Seek these designations if determined to be needed.

- ***B.*** If deemed necessary, exclude beach landings by military vessels or other military activities from the definition of "take" in the proposed reserves.

4.4 Species Population Protection and Management

Each species group is addressed at the community level or as a management group. Then, certain species are emphasized for management focus because of their legal protection or rarity, or because of their importance to the system.

4.4.1 Terrestrial Plants (and Cryptogams)

Specific Concerns—Terrestrial Plants (and Cryptogams)

- Plant communities and species need careful description and tracking for management success.
- Habitat management may be insufficient for protection of some species because of low numbers, vulnerability to disturbance, or other reasons.
- Cryptogammic crusts and mycorrhizae have a potentially significant ecological role on the Island in both the natural system and in restoration.
- There is a general lack of understanding of nutrient cycling on the Island, and the possibility of a void in typical processes due to a scarcity of soil-dwelling organisms to decompose organic material.

- While there is little thatch build-up in annual grasslands on the mainland, there is lots of such build-up on the Island. Organic matter may only become part of the soil profile only infrequently. Decomposition may be sluggish due to no nitrogen-fixing organisms, no turnover, and drought. So, the current sole method for decomposing the thatch to release its nitrogen may be fire. Shrubs may have done better with ranching and goats because of their tendency to break up and consume thatch, as well as provide nitrogen to the system. This may have a strong effect on the pattern of productivity and distribution of shrubs, grassland and trees.
- Fire suppression may result in the further accumulation of plant thatch on the surface. This may lead to extreme hazard fuel conditions and unknown effects on the ecosystem which may have an altered nutrient cycling regime.

Proposed Management Strategy—Terrestrial Plants (and Cryptogams)

***Objective:* Protect, monitor, and restore plants and cryptogams in order to manage for their long-term sustainability on the Island.**

I. Produce a new vegetation map of the Island to reflect recent significant changes in plant community boundaries and composition. Consider use of the Sawyer Keeler-Wolf system of plant community delineation.

II. Revise plant community descriptions developed in the late 1970s to account for changes in last two decades.

III. Maintain accurate and updated lists of Island plants, tracking their proper nomenclature, if a voucher specimen is on record, when and where it was first recorded, endemic status, where else found, and whether it is native or introduced.

A. Maintain a herbarium to document plants from the Island. Deposit duplicate specimens in other herbaria. Collect a herbarium specimen for each of the Island plant species.

IV. Consider the following plants as Management Focus Plants, such that they are considered independently from their plant communities for management (habitat management is not assumed to be sufficient for their protection, or they play a disproportionate role in health of the community):

San Clemente Island Indian paintbrush (*Castilleja grisea*)
San Clemente Island larkspur (*Delphinium variegatum kinkiense*)
San Clemente Island woodland star (*Lithophragma maximum*)
San Clemente Island broom (*Lotus dendroideus traskiae*)
San Clemente Island bushmallow *Malacothamnus clementinus*
Santa Cruz Island rock cress (*Sibara filifolia*)
Santa Cruz ironwood (*Lyonothamnus floribundus* spp. *asplenifolius*)
Southern California tree mallow *Lavatera assurgentiflora* ssp. *glabra*
Island oak *Quercus tomentella*
Spike-moss *Selaginella bigelovii*
Lemonadeberry *Rhus integrifolia*
Cliff spurge *Euphorbia misera*

Plants Rare on Island, but Common Elsewhere:
Chamise *Adenostoma fasciculata*
Canyon live oak *Quercus chrysolepis*
Island redberry *Rhamnus pirifolia*
California lilac *Ceanothus megacarpus*
Chaparral currant *Ribes malvaceum*
Laurel sumac *Malosma laurina*
Honeysuckle *Lonicera hidpidula* var. *vacillans*
Blue elderberry *Sambucus mexicana*
Box thorn *Lycium brevipes brevipes*

V. Conduct status surveys for endangered plants and other sensitive plant species.

VI. Ensure that management focus plants have a network of suitable sites, especially if there are few populations or they are geographically restricted.

VII. Perform studies on the following sensitive species to determine their pollinators:

San Clemente Island Indian paintbrush (*Castilleja grisea*)
San Clemente Island larkspur (*Delphinium variegatum kinkiense*)
San Clemente Island woodland star (*Lithophragma maximum*)
Trask's Island Lotus (*Lotus dendroideus var. traskiae*)
San Clemente Island bush mallow (*Malocothamnus clementinus*)
Southern Channel Island tree mallow (*Lavatera assurgentiflora glabra*)
Santa Cruz ironwood (*Lyonothamnus floribundus aspleniifolius*)
San Clemente Island bird's-foot trefoil (*Lotus argophyllus adsurgens*)

VIII. Continue to apply genetic research and management approaches to rare plant management.

- ***A.*** Survey sensitive plants for genetic diversity.
- ***B.*** Base management and restoration decisions on three genetic criteria:
  1. Amount of genetic variation in the taxon on SCI (rated none, low, medium, high)
  2. Differences among populations in the amount of genetic variation (low, medium, and high)
  3. Differences among populations in the kind of genetic variation (low, medium, and high)

IX. Protect plants of local concern. These species are not endemic to San Clemente or the Channel Islands, but they may be extirpated if management action is not taken to protect their habitat, or they are species which have been reduced to such low numbers they may disappear from the Island without management action (Table):

Table4-7. Non-endemic plant species of local concern at SCI (S. Junak, pers. comm. 2000; Ross et al. 1997).

Native Species Reduced to Very Low Numbers		
Adenostoma fasciculatum	*Leymus condensatus*	*Sambucus mexicana*
Allophyllum glutinosum	*Lonicera hispidula* var. *vacillans*	*Sesuvium verrucosum*
Aphanes occidentalis	*Lupinus hirsutissimus*	*Silene laciniata*
Aster subulatus ligulatus	*Lycium brevipes*	*Stellaria nitens*
Astragalus didymocarpus	*Madia sativa*	*Stylomecon heterophylla*
Athysanus pusillus	*Malosma laurina*	*Trifolium fucatum* var. *gambelii*
Brickellia californica	*Malvastrum exilis*	*Tropidocarpum gracile*
Calandrinia maritima	*Malvella leprosa*	*Verbena bracteata*
Callitriche longipedunculata	*Mentzelia affinis*	*Vulpia octoflora* var. *hirtella*
Camissonia micrantha	*Mentzelia micrantha*	*Yabea microcarpa*
Descurainia pinnata	*Microseris elegans*	
Ceanothus megacarpus	*Minuartia douglasii*	
Centaurium davyi	*Monolepis nuttalliana*	**Native Taxa Thought Extirpated:**
Collinsia heterophylla	*Nama stenocarpum*	*Anemopsis californica*
Convolvulus simulans	*Orobanche fasciculata*	*Batis maritima*
Cressa truxillensis	*Pellaea mucronata*	*Calystegia soldanella*
Cuscuta californica	*Phalaris caroliniana*	*Dendromecon harfordii* var. *rhamnoides*
Deschampsia danthonioides	*Phalaris lemmonii*	*Dissanthelium californicum*
Eleocharis macrostachya	*Polycarpon depressum*	*Lomatium insulare*
Emmenanthe penduliflora	*Potamogeton pectinatus*	*Lycium brevipes* var. *hassei*
Epilobium brachycarpum	*Pseudognaphalium stramineum*	*Malacothrix incana*
Eriastrum filifolium	*Psilocarphus brevissimus*	*Mimulus floribundus*
Euphorbia spathulata	*Quercus chrysolepis*	*Senecio flaccidus* var. *douglasii*
Gnaphalium palustre	*Rhus ovata*	
Grindelia sp.	*Ribes malvaceum*	
Heliotropium curassavicum	*Ruppia maritima*	
Hesperevax sparsiflora	*Salicornia virginica*	
Hutchinsia procumbens	*Salix gooddingii*	
Lepidium latipes var. *latipes*	*Salvia columbariae*	
Lepidium virginicum var. *pubescens*		

X. Evaluate the recent work performed by SDSU Foundation on mycorrhizae for its ecological and management significance.

XI. 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.

4.4.2 Terrestrial Invertebrates

Specific Concerns—Terrestrial Invertebrates

- Non-native ants like the Argentine ant (*Linepithema humile*) are increasingly prevalent on the mainland and are spreading to the Channel Islands. They could pose a serious threat to native invertebrates on SCl without proper safeguards against their establishment and spread.

- Inadequate knowledge for many years of the status of invertebrates on SCI, including endemics such as the San Clemente Island Coenonycha beetle (*Ceononycha clementia*) that was petitioned for federal listing.
- Introduction of a non-native mollusk could devastate endemic snail populations on SCI.
- Invertebrates are a significant prey item for many Island vertebrates including shrikes and sage sparrows, and unrecognized declines of invertebrates could greatly impact populations of these listed species.
- As pollinators, invertebrates are also essential to the reproductive ability of many plant populations. The pollinators of most sensitive plant species on SCI are still unknown.

Proposed Management Strategy—Terrestrial Invertebrates

***Objective:* Conserve intact native invertebrate communities and develop measures to prevent the establishment and spread of invasive invertebrates.**

I. One of the top priorities for natural resources management on SCI should be to determine the status and distribution of invasive ants on SCI.

A. Conduct comprehensive baseline surveys of ants, focusing on the distribution and impact of the Argentine ant and methods to curtail its spread (Ted Case, UCSD, is doing this with mainland invasive ants).

B. Once occurring ant fauna is known, develop identification aids to distinguish native vs. potential invasives and establish simple monitoring program using bait stations at key Island entry points.

C. Develop inspection standards for equipment, building materials, and other items coming to the Island to minimize establishment and spread of invasive ants.

II. Determine baseline information on the invertebrate community of SCI, with particular emphasis on endemics.

A. Consolidate existing information in the possession of Dr. Scott Miller (Smithsonian Institution) and Dr. Jerry Butler (UC Berkeley).

B. Support completing baseline field surveys stratified across SCI ecological units, with emphasis on determining the status and habitat affiliations of the San Clemente Island Coenonycha beetle as a dune indicator and possible compliance issue and to the other endemics [nine species of Coleoptera (beetles), two Diptera (flies), ten species of Hemiptera (true bugs), two species of Dermaptera (earwigs), and two species of Chelicerata].

III. Perform studies on all federally and state listed plants to determine which invertebrates are essential to their reproduction (see section 4.4.1 for a list of priority species).

4.4.3 Amphibians and Reptiles

Specific Concerns—Amphibians and Reptiles

- San Clemente Island has only two species of lizards and one, the island night lizard, is federally threatened.
- Management of the island night lizard on SCI, like most contemporary natural resources management programs on the Island, is ESA compliance-driven by biological opinion, and conducted in response to specific activities rather than programmatically or within an ecosystem approach.
- No surveys have been conducted for salamanders, even though they may occur on the Island.
- The island night lizard population could decline by the introduction of a non-native predator or competitor such as the alligator lizard. At least one alligator lizard has been observed on SCI (it may have arrived on a packing crate) and was subsequently removed. A similar situation occurred with a rattlesnake, which would also be a potential night lizard predator.
- Lizards are important prey items for other species including shrikes, and unrecognized declines of lizards could impact populations of this listed species.

Proposed Management Strategy—Amphibians and Reptiles

Objective: ***Manage the INLMA as a demonstration project, where emphasis is on demonstrating through an active monitoring and review program the potential for true integration of military operational needs with conserving sensitive and other species.***

I. Formally designate and implement the approximately 11,010 acre (4,457 ha) management area as an experiment and finalize a management plan (currently under development).

A. Comply with INLMA BO 1-6-97-F-58 and island night lizard provisions under TARS BO 1-6-00-F-19. The terms and conditions under these BOs are as follows:

1. Designate 10,930 ac as an INLMA (an additional 120 acres was added under the TARS BO 1-6-00-F-19) and sign an MOU with the Service to that effect.

a. Incorporate the INLMA into the Navy land use planning process by zoning it as an area of limited disturbance in the OMP. Management objectives and tasks identified in the Island Night Lizard Management Plan shall be incorporated into the OMP management strategy for the INLMA.

b. Allow continued use and maintenance of the following existing facilities within the INLMA:

1. Station "Little Rock" (0.5 acre)

2. South Sonobouy Tracking Station (0.5 acre)

c. Allow continued use of the following existing roads within the INLMA:

1. Black Point Spur

2. Marine Terrace Grade

3. West Shore Road

d. Allow continued operational training within the INLMA by:

1. Navy SEAL covert landings by small (less than 10 individual) pedestrian units that traverse the MDS habitat on foot en route to final destinations. Such activity occurs up to three times per month;

2. Marine amphibious landings of 30–50 individuals that land at Eel Cove and traverse a 656 ft disturbed area en route to the road. Such groups are restricted from transiting the surrounding MDS habitat;

e. Conduct island night lizard surveys within the INLMA at least once every five years.

f. Finalize an Island Night Lizard Management Plan.

g. Continue to individually review military construction projects or operational training exercises proposed within the INLMA for impacts to island night lizard.

h. Direct disturbance due to military construction projects or operational training exercises to areas outside the INLMA to the maximum extent practicable.

i. Prepare an annual report quantifying the cumulative area affected by military construction and operational training activities.

j. Feral cat control efforts shall be designed and applied to include the INLMA within their coverage.

k. Notify the Service concerning projects or operational training exercises planned to occur within the INLMA.

l. 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.

m. Assure that appropriately timed exotic plant removal projects continue in the INLMA. Proponents of projects both within the INLMA and within superior habitat outside of the INLMA shall contribute toward the exotic plant control effort within the INLMA.

n. Install gates or barricades on dead-end roads and unused roads within the INLMA roads to prevent use of unauthorized routes within the INLMA and to allow the area to recover.

o. Assure that unused roadways within the INLMA are removed and restored to native vegetation. This pertains specifically to fishing area access roads spurred along West Shore Road.

p. Re-initiate consultation with the USFWS for all new construction projects or training activities over five acres in size proposed within the INLMA.

q. Re-initiate formal consultation with the Service if two consecutive status surveys indicate declining lizard populations.

r. 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 re-initiation of consultation.

2. All projects proposed outside of the INLMA but within superior INLMA habitat, as defined by vegetation characteristics or habitat maps, shall mitigate for impacts to island night lizard. As mitigation, the Navy shall enhance degraded island night lizard at a ratio of one acre treated for each acre of disturbance to superior habitat outside the INLMA. Additional enhancement strategies through native plant establishment or other means may be identified in the island night lizard Management Strategy and pursued as mitigation.

3. The Navy shall 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. Vehicles must be free of mud and weed seed. The Navy shall assure that the underside and wheel wells of all vehicles are sprayed under high pressure to remove weed seed.

4. The Navy shall 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.

5. The Navy, cooperators, and tenants on SCI shall locate ground disturbing activities on previously disturbed sites whenever possible.

6. Assure that all operators operating aircraft or conducting training activities near sage sparrow habitat receive training and education on the sage sparrow and the island night lizard and the importance of avoiding ignition.

7. Assure that all Public Works Center (PWC) workers and contracted construction workers shall be briefed on the biology and status of the island night lizard, and protection measures designed to reduce potential impacts to the species.

   a. Distribute island night lizard wallet cards or similar printed information to all PWC workers. Cards or pamphlets shall include a picture of the Island night lizard and information on the biology of the species.

B. Conduct baseline plant and animal and military disturbance inventories to begin confirming the “umbrella” benefits of the INLMA to associated plant and animal communities.

1. Stratify baseline inventories under other Island management objectives to ensure that the island night lizard management area is surveyed (e.g. small mammal and invertebrate surveys recommended in other sections of this plan).

2. Conduct island night lizard surveys in the INLMA every five years consistent with the BO on training and the INL. However, seek a change in this requirement to annual monitoring of fewer, selected sites.

C. Prepare annual summaries and evaluations of conformance with the management plan terms and results of inventories.

D. After five years, evaluate projected benefits to the island night lizard and associated species of the INLMA, including:

1. Habitat protected and individuals conserved. If numbers strongly suggest a population decline, identify probable causes, take remedial measures as necessary, and expand surveys as appropriate to other Island locations to confirm status.
2. The effects of the designation on natural resources outside the INLMA due to displacement of operational activities.
3. Whether the location, size, and shape of the INLMA should continue or be adjusted to better conserve the island night lizard, provide more effective balance between the island night lizard and military needs, or to ameliorate negative effects on other resources.

E. 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.

F. 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.

G. Establish that recreational use of the west shore of SCI within the management area by Island personnel can continue.

II. Establish a “no net loss” habitat condition policy for the management area.

III. Survey for invasive weeds and prioritize annual control programs for the INLMA.

IV. Ensure that no new animals are introduced to SCI that could be a island night lizard predator, competitor, or introduce disease. Provide for aggressive control of existing invasive animals in the INLMA.

A. Continue indoctrination and participation of natural resources training of SCI personnel by installation personnel trained in identifying exotic plants and animals.

B. Have a zero tolerance policy against introduced plants and animals. Develop instruction regarding a policy to ensure no invasive species are introduced on SCI.

C. Increase emphasis of the cat and rat control program in the INLMA.

V. Manage fire to protect the integrity of the management area for the island night lizard.

A. 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.

VI. Develop, in cooperation with the USFWS, a de-listing plan for the island night lizard since its numbers appear secure and thriving, and there is no apparent threat to sustaining these numbers.

4.4.4 Land Birds

Specific Concerns—Land Birds

- San Clemente Island represents an important resting point and safe haven for many birds migrating long distances through the region.
- The San Clemente sage sparrow is a federally-listed endemic species confined to a narrow band of boxthorn-dominated habitat that is also desired by the Navy for military training.
- Because of the San Clemente loggerhead shrike's listing status under the ESA, the Navy is required to conform to existing management guidelines described in current BOs or consult with USFWS prior to any action which may affect this species.
- A Master Plan and breeding recommendations were recently developed by a group consisting of individuals from the Navy, USFWS, Point Reyes Bird Observatory, and the Zoological Society of San Diego (Wiese and Lynch 2000).
- Vegetation changes in the last century and introduced predators may be affecting other resident bird species not currently monitored, as evidenced by the relatively recent extirpations of the Bewick's wren and spotted towhee.
- Resident and migrating raptors may prey upon sensitive species such as the sage sparrow and island fox, affecting population recoveries of these species.
- Some species, such as osprey and bald eagles, could become re-established as breeders in the future. Osprey and bald eagles have both been released in recent years on nearby Santa Catalina Island.
- Contaminants from a sewage outfall at White's Point (not at SCI) are still present in nearby waters and may affect those species feeding on marine organisms.

Proposed Management Strategy–Land Birds

Objective:* *Protect adequate amounts of habitat to sustain resident landbird populations.
Objective:* *Conserve viable habitat for migratory land birds that use SCI for stopover resting, feeding, and nesting.
Objective:* *Restore missing components of the native avifauna (e.g. San Clemente spotted towhee) to San Clemente Island.

I. Community-level management guidelines:

A. 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. An example of a priority bird is the grasshopper sparrow (*Ammodramus savannarum*).

B. Use cooperative assistance from wildlife agencies, nongovernmental organizations, and volunteers to collect needed data.

C. Ensure the sustainability of these bird populations and their habitat.

D. As a high priority, minimize access into and disturbance of nesting and breeding grounds during critical periods. Incorporate this restriction as a requirement for proposed projects to comply with the MBTA.

E. Consider the following opportunities for enhancement of bird habitat:

1. Choose appropriate native foraging plants for landscaping.
2. Protect areas of dense vegetative cover.
3. Prevent noxious weeds from taking over native habitats.

F. If it is determined that a non-native species or a native brood parasite 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 pest species.

G. As a high priority, limit the use of rodenticides and herbicides, when possible.

1. If these substances are used, ensure that they do not contain secondary poisoning agents by reviewing labels for particular chemicals. Remove any dead or dying rodents from a treated area to reduce the possibility of secondary poisoning.
2. Ensure that management activities involving rodenticides have properly considered trade-offs to native wildlife in the planning and post-implementation evaluations.

H. As a high priority, take bird populations into consideration when reviewing all projects, scopes of works, contracts, and agreements associated with construction and/or vegetation manipulations or removal.

1. Projects should be phased to avoid disturbing nesting birds and/or breeding seasons (February–August).
2. 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.

I. Develop a standard format and a database to collect and maintain records of bird observations on SCI.

J. Cooperate with large-scale efforts to research, monitor, and manage migratory bird populations.

1. As a high priority, participate in 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.
2. Be aware of the regional and national bird and habitat conservation priorities under the PIF program and integrate into natural resources planning as appropriate.
3. Stimulate awareness of migratory bird stewardship strategies. Perhaps, make available a checklist of birds at SCI.
4. Be aware of and cooperate with the conservation efforts proposed through the CDFG's Species of Special Concern program.

K. Prepare educational materials regarding SCI's 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.

L. Dead birds found in areas not inhabited by humans should be left alone and reported to the NRO office. If it is within an area inhabited by humans, or near an airfield where dead birds may attract additional birds and become a BASH concern, call 524-9126 for disposal.

II. Management Focus Land Birds

A. SCI Loggerhead Shrike

***Objective:* Continue to protect and enhance the San Clemente loggerhead shrike population.**
***Objective:* Self-sustaining populations of both Island foxes and loggerhead shrikes that would eliminate the need for trapping of foxes in loggerhead shrike breeding territories.**

1. Initiate Section 7 consultation with the USFWS to establish an incidental take allowance for loggerhead shrikes.
2. Continue the captive propagation and rearing of loggerhead shrikes.
   - a. Maximize the genetic diversity of the captive population.
   - b. Manage the captive population for 60 adults entering the breeding season.
   - c. Continue to release captive-reared shrikes into the wild population.
   - d. In 2002, determine which of the four release methods used during the previous three years was most effective.
3. Continue predator management efforts.
   - a. 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.
   - b. Renew Instruction regarding feral animals and their control on SCI.
   - c. Continue to trap and radio-collar island foxes which consistently use active shrike breeding territories.
   - d. Continue to remove black rats from around shrike nesting areas.
   - e. Monitor ravens and raptors and discourage them from nesting within the vicinity of shrike nests.
4. Continue to enhance shrike nest locations and foraging areas.
   - a. Continue supplemental feeding of recently released pairs and family groups.
   - b. Propagate tree species used by shrikes for nesting and perching in the nursery, and outplant them into appropriate canyons.
   - c. Until the Island's tree species recover, continue to provide artificial perches in shrike foraging areas to increase foraging success.
   - d. Manage grasslands to encourage the reduction of non-native, annual grasses and the recovery of native bunch grasses.
5. Continue Island-wide monitoring of the wild population.
   - a. Within the limits of current funding, during the breeding season monitor, to the best of the available personnel's ability, all shrikes.
   - b. In November and March, conduct Island-wide surveys semi-annually.

6. Ensure that shrike ecology is considered in all fire management decisions.
   a. Restoration of woodland and shrub plant communities and reduction of annual grasslands should be considered in all fire management decisions.
   b. 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.
7. Reduce conflict between military activities and shrike recovery.
   a. Establish a preset flight pattern that avoids shrike breeding areas for helicopters involved in range maintenance and clean-up during the shrike breeding season.
   b. Assure that access to SHOBA is provided to predator control personnel and shrike monitor personnel when required military training is not occurring.
8. 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.

B. San Clemente Sage Sparrow

Objective: ***Protect a sufficient high-density area and cover of boxthorn and associated native shrubs and forbs such that the San Clemente sage sparrow population is self-sustaining.***

Objective: ***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.***

Objective: ***Facilitate military use that is consistent with the above objectives.***

Objective: ***Provide sage sparrow habitat that is safe from excessive predation.***

- Annual surveys are a requirement of Term and Condition 2.5 of Biological/Conference Opinion (1-6-97-F-21) on Training Activities on San Clemente Island. In addition, surveys ensure compliance with the ESA (16 USC 1531), the Sikes Act (16 USC 670), and MBTA (16 USC 1361).

1. 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 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. Monitoring of habitat condition will be performed using long-term monitoring plots and aerial photos as described in Section 4.1. Evaluate the condition of exotics over at least one seven-year El Niño cycle.
2. Minimize ground and vegetation disturbance in the high-density sage sparrow area, from the rifle range east of the dunes to Seal Cove.

a. Locate ground-disturbing activities on previously disturbed sites whenever possible.

b. 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.

c. Where repeated use is expected, create trails.

3. Reduce the cover of exotic species, based on at least one seven year El Niño cycle.

4. Improve fire management strategy development by evaluating the status of the community on sites with different fire history.

5. Conduct experimental burns to clarify the response of this community to fire, in consultation with the USFWS.

6. Continue monitoring and expand surveys to the winter time to determine seasonal changes in home ranges and habitat use.

7. Quantify attributes of wintering and breeding habitat and properly incorporate into sage sparrow management strategies for SCI.

   a. Develop a Habitat Suitability Index model for the species.

8. Ensure that cat and rat control efforts are Island-wide and properly integrated with the San Clemente sage sparrow conservation program.

9. Upon receipt of a USFWS San Clemente sage sparrow Recovery Plan, develop a sage sparrow management plan for SCI.

III. San Clemente Spotted Towhee

Objective: Determine the efficacy of re-introducing this species on SCI.

A. Consider the effects of reintroduction on other SCI species including the loggerhead shrike, sage sparrow, and Island fox.

B. Ensure that there would be no new restrictions placed on military training from the re-introduction effort.

C. Determine the ecological requirements of the species prior to re-introduction.

D. Pursue only if funding is provided by others.

4.4.5 Shorebirds

Specific Concerns—Shorebirds

- San Clemente provides wintering habitat and breeding habitat for the federally-listed western snowy plover. Beach wintering habitat for the plover is militarily very valuable as it is the only location for certain landing operations.
- There may be conflicts between placement of targets and snowy plover beach use in Pyramid Cove.
- Invasive plant species may also be encroaching on the beaches used by snowy plovers.
- The black oystercatcher (*Haematopus bachmani*), a federal species of concern, has been known to breed on SCI.
- Feral cats could potentially prey on shorebirds.

- The amount of sand at West Cove is decreasing, which could affect the amount of beach habitat available to snowy plovers and for training.

Proposed Management Strategy—Shorebirds

***Objective:* Conserve viable habitat for migratory shore birds that use SCI for stopover resting, feeding, and nesting, and continue to develop practical strategies that provide for the needs of federally-listed shorebirds and military values of the coastal strand/beach areas.**

I. Community-level management guidelines

A. Determine the status, health, and habitat use of certain target or indicator species not currently listed, including the black oystercatcher.

B. Use cooperative assistance from wildlife agencies, non-governmental organizations, and volunteers to collect needed data.

C. Protect the sustainability of these bird populations and their habitat.

D. Restrict access into and disturbance of nesting and breeding grounds during critical periods. Incorporate this restriction as a requirement for proposed projects to comply with the MBTA.

E. Prevent noxious weeds from degrading shorebird habitats.

F. 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.

G. Continue efforts to remove feral cats from the Island.

H. Develop a standard format and a database to collect and maintain records of bird observations on SCI.

I. Cooperate with large-scale efforts to research, monitor, and manage migratory bird populations.

1. Establish a standardized monitoring program for birds (Breeding Bird Survey route, or Channel Islands monitoring protocol) to track bird occurrence and trends on SCI and contribute to regional and national databases.

2. 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.

J. Prepare educational materials regarding SCI's 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.

K. Avoid shoreline construction that results in a loss of coastal strand/beach habitat, except for the currently planned MOUT facility.

L. Dead birds found in areas not inhabited by humans should be left alone and reported to the NRO office. If it is within an area inhabited by humans, or near an airfield where dead birds may attract additional birds and become a BASH concern, call 524-9126 for disposal.

II. Management Focus Shorebirds

A. Western snowy plover

- Surveys are a requirement of Biological/Conference Opinion (1-6-97-F-21) on Training Activities on San Clemente Island. In addition, surveys ensure compliance with the ESA (16 USC 1631), the Sikes Act (16 USC 670), and the MBTA (16 USC 1361).

1. Continue monthly 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.
2. Avoid promoting nesting of western snowy plovers, which would be subject to predation of nests and young by foxes (another sensitive species) and cats. Determine the extent of predation on plovers.
3. Resolve conflicts between target placement and snowy plover beach use in Pyramid Cove.
4. Avoid shoreline construction that results in a loss of coastal strand habitat (except for the currently planned MOUT facility). Loss of this habitat could also reduce beach training capabilities.
5. All snowy plover nests found will be protected with exclosures and/or symbolic fencing with interpretive signs (USFWS draft Recovery Plan appendix F).
6. Removal of feral cats should continue at all beach sites.

4.4.6 Seabirds

Specific Concerns—Seabirds

- Little is known about the value of SCI to the life history of seabirds.
- The federally-listed California brown pelican is known to use SCI.
- Sea stacks are important as roosting habitat for seabirds, including for the federally listed California brown pelican.
- SCI harbors a small breeding population of Xantus' murrelet, a bird that may be federally listed in the near future.
- Sea stacks and rocky shores are vulnerable to introduced predators such as cats and black rats.
- In the past, sea stacks and rocky shores have been used as military targets.
- Contaminants from a sewage outfall at White's Point (not at SCI) are still present in nearby waters and may affect those species feeding on marine organisms.

Proposed Management Strategy—Seabirds

***Objective:* Understand the value of SCI to seabirds and integrate into Island management as appropriate.**

***Objective:* Maintain the integrity of the sea stacks and sea bluffs on San Clemente Island as a viable community with natural abundance and composition of native vegetation and wildlife.**

I. Establish a standardized monitoring program for birds (Breeding Bird Survey route, or Channel Islands monitoring protocol) to track seabird occurrence and trends on SCI and contribute to regional and national databases.

- ***A.*** Focus surveys on sea stacks around the Island to determine location and species' use of stacks.
- ***B.*** Also focus surveys on listed species and species of concern including: California brown pelican, Xantus' murrelet, ashy storm-petrel, Brandt's cormorant, and double-crested cormorant.

II. Develop a standard format and a database to collect and maintain records of bird observations on SCI.

III. Cooperate with the USGS study of seabirds in Southern California. Maximize access to the entire Island on survey days.

IV. Identify and limit disturbance to sea stacks and rocky shores potentially used by sea birds. Known seabird colony locations include Bird Rock (Brandt's cormorant), cliffs south of Lost Point (Brandt's cormorant), Seal Cove (Brandt's and double-crested cormorants, Xantus' murrelet, ashy storm petrels), China Cove (Xantus' murrelet), Mosquito Cove (ashy storm petrels), and Castle Rock (Brandt's cormorant).

- ***A.*** Do not use sea stacks, or known colony locations, as military targets.
- ***B.*** Avoid high-intensity artifical light near Xantus' murrelets breeding sites, which may allow increased predation by barn owls.
- ***C.*** Identify and protect essential roosting habitat of the California brown pelican on SCI.
- ***D.*** Survey shorelines for use by cats and rats and continue efforts to remove feral predators from the Island.

V. Consider enhancement projects for some species including:

- ***A.*** Providing nest boxes for ashy storm-petrels; and
- ***B.*** Fencing off access points to colony locations.

VI. Prepare educational materials regarding SCI's 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.

VII. Dead birds found in areas not inhabited by humans should be left alone and reported to the NRO office. If it is within an area inhabited by humans, or near an airfield where dead birds may attract additional birds and become a BASH concern, call 524-9126 for disposal.

4.4.7 Terrestrial Mammals

Specific Concerns—Terrestrial Mammals

- Introduced animals can have substantial negative and often irreversible effects on native Island populations lacking the necessary defense mechanisms against this relatively new predation and competition pressure.
- Predation of loggerhead shrikes by island fox needs to be managed, but there is inadequate understanding of population effects of predator control efforts on the fox. There are data suggesting some decline of the fox in recent years. A petition to federally list the island fox will likely bring greater attention to the SCI population and its conservation.
- Small mammals (rodents) are an extremely important part of the SCI food chain, representing a primary prey item for the loggerhead shrike and many other animals. However, little is known of the status and habitat distribution of native populations or competition between native and introduced small-mammals.
- Black rats are a predator of native populations like the loggerhead shrike and need to be aggressively controlled. As part of the shrike program, bait stations are used to remove rats from near shrike nests. The stations are elevated to target only rats, not mice.
- In the past, unclear policies and practices toward cat control at Wilson Cove have resulted in the preservation of a source population of cats that disperses throughout the Island.
- Foxes are susceptible to being killed along roads while using them for travel lanes.
- Foxes may be susceptible to canine distemper from dogs brought ashore by recreational boaters disregarding a ban on dogs.
- Little is known about bat locations, habitat needs, and status on the Island.

Proposed Management Strategy—Terrestrial Mammals

Objective:* *Provide for healthy populations of native mammals by managing for a diversity of native habitats and habitat conditions and ensuring that trade-offs of all military and biological projects to native mammals are considered in planning.

I. Dead mammals found in areas not inhabited by humans should be left alone and reported to the NRO office. If it is within an area inhabited by humans or is a fox call 524-9067 for disposal.

II. Management Focus – Feral Rodents and Cats

A. 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.

1. 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 the urban-type setting at Wilson Cove.

B. Eliminate feeding sources that support thriving populations.

1. Continue ban on all feeding and care of feral cats by any personnel on SCI.
2. Convert all trash bins on the Island to rodent-proof and cat-proof containers.

C. Develop guidance for protecting native rodents during baiting programs for black rats and evaluate the efficacy of alternative baits.

D. 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.

III. Management Focus – San Clemente Island Fox

A. 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.

B. Continue to monitor and study fox demographics and ecology.

1. Determine current levels of reproductive success, prey abundance, and disease, and causes of mortality.
2. 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.
3. Consider establishing additional trapping grids beyond the single one 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.

C. Reduce fox mortality from vehicle collisions.

1. As funding permits, mow the vegetation within 10 feet of roadways to provide better visibility of and by foxes.
2. Educate personnel about the road kill issue and reinforce the slower speed limits instigated in 2001. A similar education program implemented at San Nicolas Island, that has been very successful, could be used as a model.

D. If specific locations are known to be used by trespassers that may bring dogs ashore, post signs in these locations stating that trespass is illegal and that the presence of dogs can threaten sensitive wildlife. Continue to disseminate the brochure made by NRO regarding this topic.

E. 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.

IV. Management Focus – Bats

A. Conduct bat reconnaissance surveys. Focus surveys around water sources and possible roosting locations (e.g. caves and buildings).

V. Management Focus – Deer Mice

A. Initiate a study of the habitat use, population dynamics and ecology of the deer mouse to better understand the prey base on SCI.

4.4.8 Marine Macroalgae, Plants and Coral

Specific Concerns—Marine Microalgae, Plants and Coral

- California hydrocoral (*Stylaster californica*), a species protected under California law, is known from the underwater base of Castle Rock and possibly other locations. It is not a true coral, but rather a member of Class Hydrozoa. It forms branching colonies up to 30 cm high and 60 cm wide and can be found in a variety of colors ranging from pink to dark blue. The growth rate is slow, requiring over 20 years to grow to 30 cm. In general, hard corals such as this are rare in colder temperate waters. Its rarity makes it much sought after by recreational scuba divers who can look, but not touch as it is a protected species. Elevated sea temperatures during El Niño events can cause significant decline of hydrocorals.
- Eelgrass provides a productive nursery habitat in sheltered, clear waters for many invertebrates and fishes.
- Kelp beds grow in a limited area but harbor a large and disproportionate share of the productivity and diversity of Island waters. Harvest of kelp is managed by the CDFG by licensing and leasing of beds.
- Surfgrass is essential nursery habitat for lobster larvae.
- The effects of current levels of harvesting on organisms of intertidal habitat need to be determined.
- Urchin grazing has seriously affected kelp beds on northern Channel Islands, but this has not been a problem to date in SCI beds.
- Erosion on SCI could affect water quality in near-shore marine habitats.
- The introduction of an invasive algae could quickly impact native marine species.
- Intertidal habitats receive a lot of vessel and human traffic during military exercises.
- See Sections 4.1.14 and 4.1.15 of intertidal and shallow subtidal habitats for additional concerns regarding the habitats of these organisms.

Proposed Management Strategy—Marine Macroalgae, Plants and Coral

Objective: Maintain healthy populations of marine microalgae, plants, and coral and prevent the introduction of invasives.

I. Community-level:

A. Participate in the Channel Islands Rocky Intertidal Monitoring Program (Section 4.1.14).

B. Monitor water quality focusing on canyon outflows and those areas used for the Monitoring Program.

II. Management Focus Marine Macroalgae, Plants, and Hydrocoral

A. California Hydrocoral

1. Ensure that dive businesses that use waters around SCI are aware that this species is protected and to instruct their clients not to touch it.
2. Consider mapping and monitoring this species especially after El Nino events.

B. Kelp harvesting

4.4.9 Marine Invertebrates

Specific Concerns—Marine Invertebrates

- White abalone, native to SCI, has declined dramatically and was recently federally listed as endangered. With the listing, there may be increased interest in the nearshore waters of SCI to support recovery efforts.
- Black abalone may be petitioned for listing under the Endangered Species Act in the near future, and other abalone species have also declined sharply.
- Urchin grazing has seriously affected kelp beds on northern Channel Islands, but this has not been a problem to date in SCI beds.
- Erosion on SCI could affect water quality around the Island
- The introduction of an invasive algae or new competitor/predator could devastate marine invertebrate populations around the Island.
- Little is known about most marine invertebrates around SCI.

Proposed Management Strategy—Marine Invertebrates

Objective: Participate in conservation of native marine invertebrates in and around San Clemente Island.

I. Community-level:

A. Continue to develop baseline information on the status of marine invertebrate populations around San Clemente Island and in relation to other Channel Islands.

1. Ensure cooperative funding of baseline and trend monitoring of in-water surveys by the National Park Service or MARINE.
2. Support the inclusion of San Clemente Island as part of the Channel Island rocky intertidal monitoring program.

B. Provide a representative to the Channel Islands Science Panel.

II. Management Focus Marine Invertebrates:

A. White abalone and other abalones

1. Evaluate threats to white abalone from short rounds off SHOBA.
2. Participate in recovery planning for the white abalone and be a full partner on the recovery team or other recovery planning.

B. Urchins

1. Monitor their populations (through the Intertidal Monitoring Program) and analyze their affect on kelp beds.

C. Invertebrates covered under Magnuson-Stevenson Fisheries Management Act EFH designations.

III. Protect invertebrate populations as a source of food for humans, shorebirds, fishes, and rays.

A. Continue to implement BMPs during construction and training evolutions to keep temporary turbidity increases to a minimum, for the protection of invertebrate populations.

B. Fully mitigate project impacts due to dredging or fill.

1. Since project impacts are relatively infrequent and small-scale in unvegetated shallows, implement mitigation requirements on a case-by-case basis using the following as a guide:
    a. Provide clear guidelines for minimizing impacts.
        1. Alternative, innovative designs should be encouraged and considered early in the project planning stages that minimize impacts. Adjustments in project siting should also be considered to avoid or minimize impacts.
    b. Mitigate unavoidable impacts, recognizing and providing a means to define at least some differences in site value and restoration potential.

4.4.10 Fishes

Specific Concerns—Fishes

- SCI's renowned, abundant marine life, including fishes , while generally only indirectly affected by military activity, requires consideration in daily management as well as for NEPA and Magnuson-Stevenson Act compliance.
- ASBS water quality designation is another level of water quality protection for which sedimentation into ocean waters should be considered. an important priority.

Proposed Management Strategy for Fish and Marine Invertebrates

- Federal agencies are required to ensure that their actions will not adversely impact EFH. If EFH is likely to be adversely impacted, the Navy shall enter into consultation with NMFS.

***Objective:* Conserve fish population abundance and diversity, with priority to those using SCI waters as a nursery or refuge, focusing on habitat conservation as a first priority.**

I. Comply with EFH guidance on defining effects on habitat of these species for any in-water projects.

A. Conduct an EFH analysis for use in future project planning, targeting the fishes listed in Chapter 3.

II. Habitat protection, water quality improvement, and monitoring are the primary means SCI will provide for marine fishes.

A. Conserve eelgrass and unvegetated, shallow habitat that provides reproductive, nursery, and foraging functions for fishes.

B. Comply with the Southern California Eelgrass Mitigation Policy.

C. Conserve surf grass as a nursery for lobster and for its other values.

III. Protect the health of the fish inhabiting SCI waters.

A. Implement Best Management Practices to protect and improve water quality and to prevent sedimentation from SCI land and roads into sensitive waters.

B. Continue to implement Best Management Practices (BMPs) during construction and training evolutions to keep temporary turbidity increases to a minimum, for the protection of foraging fishes.

IV. Cooperate in interagency monitoring that will help improve fish management decisions.

V. Contribute to enforcement of fishing regulations.

VI. Promote education and outreach.

A. 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.

4.4.11 Marine Mammals

Specific Concerns—Marine Mammals

- Observations of the federally threatened Guadulupe fur seal have been made at SCI (most recently in 1997).
- SCI is an important rookery site for seals and sea lions.
- Whale collisions with navy vessels near SCI are a possibility.
- Erosion and pollution on SCI could affect water quality around the Island.
- Populations can fluctuate widely depending on prey abundance.
- Military exercises, especially those involving live ordnance can disturb breeding pinnipeds.

- Underwater noise from military exercises and tests can travel long distances and may affect marine mammals.

Proposed Management Strategy—Marine Mammals

Objective: ***Maintain current levels of pinnipeds using the Island as a haulout site, and provide contingency plans for increased use of SCI by pinnipeds, especially the Guadalupe fur seal.***
Objective: ***Conserve whale migration pathways near SCI.***

I. Protect haulout sites for breeding pinnipeds on SCI.

A. Minimize access and disturbance to California sea lion haul outs and rookeries during April through May that may result in mortality of pups.

B. Restrict Island personnel from approaching or disturbing haulout sites.

C. Continue to enforce 300-yd operational restricted area around SCI which will have the added benefit of protecting marine mammal haulout sites.

D. Survey pinniped populations every three years.

II. Develop contingency plans for increased pinniped use of SCI using procedures consistent with those approved by NMFS.

A. Determine which areas could potentially be used by colonies of pinnipeds and the military value of those areas.

B. If Guadalupe fur seals begin to regularly use SCI, and conflict with military operations, consult with NMFS regarding the species.

III. Ensure military activities do not disturb whale migration pathways near SCI.

A. Control erosion which could impact nearshore feeding areas.

B. Determine the potential effects of increased in-water military exercises on marine mammals.

IV. Report dead or stranded marine mammals to the appropriate agency.

A. The NMFS Southwest Fisheries Science Center (858-546-7162) should be contacted when dead marine mammals (or turtles) are located.

B. Seaworld (619-226-3831) may be contacted for information if an injured marine mammal is located, however, they will not attend to the animal on offshore islands.

4.5 Invasive Species

For all sources and types of invasive exotics, a new Executive Order “Invasive Species” came out in February 1999 with the purpose of assigning responsibilities to federal agencies to prevent the introduction and spread of and to provide control of invasive species, plant or animal, aquatic or terrestrial (US President 1999). ANational Invasive Species Management Plan is required to be drafted by a new Invasive Species Council within 18 months, with performance-oriented goals and objectives and specific measures of success for federal agency efforts. In addition, the USDoD's Armed Forces Pest Management Board serves as a source of information on exotic species and noxious weeds for any requesting US Navy facility. In response to the new Executive Order, the Secretary of Defense has directed the military services to incorporate invasive species prevention measures into existing operational and transportation policies, as well as into INRMPs and pest management plans. Table 4-8 describes criteria used by California Exotic Plant Pest Council (Cal EPPC).

Table 4-8. Prioritization of pest plant problems, adapted from CalEPPC [awaiting new version].

Set priorities in order to tackle the fastest growing and most disruptive problems first; in this way hoping to minimize the total long-term workload. First act to prevent new pest species from becoming established, then attack incipient problems and outliers of larger infestations. Next prevent the expansion of larger infestations and then work to reduce their size or, if possible, eliminate them, and finally, learn to 'live with' pests/infestations that cannot reasonably be controlled but keep our eyes out for innovations that might allow us to control them.
■ Prioritize particular species or infestations as follows:
1 Pest species with the ability to alter ecosystem functions. 2 Pest species that move into and dominate undisturbed native communities. 3 Pest species that overtake and exclude natives following natural disturbances. 4 Pest species that prevent or depress regeneration by natives.This includes understory species that suppress seedling establishment and growth of overstory species thereby causing long-term changes in species composition. 5 Small or otherwise easily eliminated pest populations. Avoid major problems by nipping them in the bud. 6 Pest species that are increasing in number or extending their ranges, unless these changes are thought to be part of a well-known cycle or, temporary and due to unusual conditions. 7 Pest species for which long-term control or elimination can be accomplished at reasonable expense. 8 Pest species that are problems in nearby natural areas but are not thus far problematic [on the present site].
■ The following factors recommend <u>against</u> control:
1 Species whose numbers are stable or decreasing. 2 Non-natives that colonize only disturbed areas and do not move into undisturbed habitats. 3 Pest species that will be pushed out by natives with succession or with the re-establishment of natural processes, e.g. fires, flooding. 4 Pest species for which long-term control or elimination cannot be accomplished at reasonable expense.

Specific Concerns—Invasive Species

- Vigilance is needed to curtail and prevent new, long-term or permanent ecological damage to the ecosystem due to invasives.
- Non-native ants like the Argentine ant are increasingly prevalent on mainland California and are spreading to the Channel Islands. They could seriously threaten the persistence of native invertebrates on SCI without safeguards against their establishment and spread.
- Non-native species invasion poses one of the most serious threats to the integrity of SCI's ecosystem, and the rate of local introduction is probably increasing, as has been shown on the nearby mainland coast (Crooks 1998).
- Experience elsewhere shows that ignoring an alien species often leads to a crisis situation where the species can no longer be eradicated and actions to limit the population become very expensive, if not impossible (Cohen and Carlton 1998).

- Very little known about the vast majority of invading species and their effects on the ecosystem.
- Isolated but consistent sightings of brown-headed cowbirds on San Clemente for years.
- The alligator lizard and certain snake species have anecdotally arrived on Island before in packing crates. While these animals do not occur now, their establishment could be devastating, as has been demonstrated by the brown tree snake (*Boiga irregularis*) in Guam.
- Killer algae (*Caulerpa taxifolia*) is not known from San Clemente Island waters but, given its growth capability, it can have devastating ecological and economic consequences (California Water Quality Control Board Region 9 2001). It will kill all marine life in its path if it becomes established, as it did in Agua Hedionda Lagoon in Carlsbad in 1999. In the late 1970s, this species became popular among saltwater aquarium enthusiasts for its growth and brilliant green fern-like fronds. Around 1984 it was inadvertently introduced into the Mediterranean sea where it spread rapidly. As in the Mediterranean, the introductions into California waters were probably from aquarium water illegally emptied into or near a storm drain, creek, lagoon, bay, or the ocean. It spreads mainly by fragmentation and can be transported by boats and fishing gear. If this species were to become established off the California shore, it could seriously impact commercial fisheries by altering fish distribution and creating considerable impediment to net fisheries. Navigation could also be affected through quarantine restrictions intended to prevent the spread of the species.
- Recent observation of Japanese seaweed (*Undaria pinnatifida)* in waters of Santa Catalina Island and Port Hueneme, and attached to floats in Santa Barbara Harbor have alarmed marine biologists in Southern California. Japanese seaweed is regarded as a highly invasive pest to other marine communities because of it's rapid growth and ability to displace native species. A native seaweed of the Japan Sea and northwest Pacific coasts of Korea and Japan, this commercially valuable plant is often harvested and consumed as a food plant in many Asian countries and France. It is commonly believed that the Japanese seaweed was initially introduced to Europe in the early 1970s through the import of Pacific Oysters (*Crassostrea gigas*). The plant was later intentionally cultivated as a food source in the early 1980's. Scientists now believe Undaria is being introduced by attaching itself to ship hulls and aquaculture equipment (cages, ropes, floats, etc.), and on the anchors and nets of commercial fishermen.

Proposed Management Strategy–Invasive Species

***Objective:* Control exotic species invasions to minimize disruption of the Island's ecosystem and continue to improve through an adaptive management approach.**

I. Develop and instruction to prevent the introduction of exotic marine and coastal species to San Clemente Island, as a first priority for control.

A. Focus on methods to reduce or prevent the number of new invasive exotic species.

1. Periodically update and distribute the list of known exotic species found at San Clemente Island.

2. Promote education about appropriate preventative methods.

a. 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.

b. Develop a list of native species useful for landscaping and encourage use of these plants.

c. Use only native plants grown in the Island nursery from seeds collected on SCI.

d. Explain the issue of invasive species management to Island personnel during orientation training. Ask that they attempt to wash any items (e.g. boots, clothing, vehicles, etc.) that they bring to the Island and that they do not plant any invasives.

3. Support state policies that control invasive non-indigenous coastal and marine plants and animals through the Fish and Game Code and other appropriate regulations.

4. According to the INLMA BO (1997), the Navy shall 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 shall assure that the underside and wheel wells of all vehicles are sprayed under high pressure to remove weed seed.

5. The Navy shall 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 shall 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).

6. To prevent new snail introduction containerized plants should not be brought to the Island. All plants used on the Island for landscaping or restoration should be grown at the Island nursery.

B. Become a partner in the California Interagency Noxious Weed Coordinating Committee (CINWCC). This committee was formed in 1995 when 14 federal, state, and county agencies signed a Memorandum of Understanding to coordinate the management of noxious weeds. The US Air Force is signatory to this MOU. The committee’s mission is to facilitate, promote, and coordinate establishment of an Integrated Pest Management partnership between public and private land managers towards the eradication and control of noxious weeds on federal and state lands and on private lands adjacent to public lands.

II. Evaluate the status and biology of invaded ecosystems and non-indigenous marine and coastal species in the Channel Islands, focusing on those with the most potential for ecological disruptions.

A. Within a short timeframe and before they can become established, study the basic biology of existing and probable new arrivals that have the potential to become pests or alter habitats.

1. Determine habitat requirements, native predators and parasites, food requirements, and other life history requirements.

2. Identify use of exotics by native animals (e.g. insect use of plants).

3. Conduct research into the effects of exotic species on the abiotic environment.
4. Analyze native-exotic species interactions.

B. Evaluate the introduced species for their effect on the Island's ecosystem.

1. Continue research on known problem species.
2. 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.
3. Rank the relative impact of the known exotic species found in Island waters in order to determine control priorities. Use the following priorities:
   a. Priority 1: Colonizing Species that should be sought out and eradicated when detected. This includes new non-native species to the Island.
   b. Priority 2: Widespread species that should eradicated if resources are available.
   c. Priority 3: Species too widespread to be effectively eradicated, control measures may be needed in localized areas or during habitat restoration.
   d. Priority 4: Species perceived to be innocuous.
   e. Ornamentals not known to reproduce on SCI.
   f. Species not seen recently, no longer known from SCI.

C. Support the implementation of an exotic species portion of the Channel Island's ecological monitoring program with the addition of other marine plant and animal groups.

1. As species taxonomy can be quite difficult and is frequently changing, encourage careful taxonomic identifications to species level, particularly of marine invertebrates and marine algae.
2. Promote cooperative interagency efforts to collect and analyze comprehensive monitoring data, including shared funding and staffing.
3. Support easy access to the ecological monitoring program's results (e.g. agency website).
4. When feasible, minimize costs by using knowledgeable volunteers to assist with exotic species inventories.

D. Enjoin financial resources from public and private sources.

1. Pursue research grants from the National Sea Grant Program targeting National Invasive Species Act (NISA) implementation.
2. Seek appropriations for the National Aquatic Nuisance Species Task Force and its Western Regional Panel for the above studies and for an ecological survey of San Clemente Island, as provided in NISA 1996.
3. Approach private foundations as a sole or matching grant source.

III. Control existing exotic species problems and restrict their future expansion.

A. Provide for an early warning system for newly discovered species.

1. Conduct weed related inventories.
   a. Target locations with higher probability for newly arrived species (e.g. docks, poorly flushed (back harbor) settings, and disturbed sites).
2. Evaluate the results of all species monitoring on the Island for the presence of new exotics on an annual basis at least.
3. Determine the potential of the new species to become invasive, based on case histories in other areas and lag timing. Eradication is most effective during the lag phase of low numbers and isolated locales.
4. Develop a descriptive list of possible control measures, including mechanical, chemical, biological, and harvest management.

B. Conduct prescribed fires to reduce or eliminate non-native plant species.

C. Create a list of target species that may invade to be watchful for.

1. Evaluate the Island's exotics list for prioritization, starting with the following as a draft (Table 4-91):

Table4-9. Exotic plant species on San Clemente Island.

Priority 1: Colonizing species that should be sought out and eradicated when detected. This includes new non-native species found on the Island.		
Acacia sp. (near commander's office)	*Herniaria hirsuta* L. cinerea (DC.) Cout.	*Pennisetum setaceum* Forssk.
Asphodelus fistulosus L.	*Hypochaeris radicata* L.	*Piptatherum milaceum* (L.)Cosson
Carpobrotus chilensis (Molina) N.E.Br.	*Limonium perezii* (Stapf)F.T.Hubbard ex. Bailey	*Polycarpon depressum* Nutt.
Cenchrus echinatus (near airfield 2000)	*Limonium* sp. (collected near airfield 2000)	*Ricinus communis* L.
Chenopodium multifidum L.	*Malephora crocea* (Jacq.)Schwantes	*Schinus mollis* L.
Chrysanthemum coronarium L.	*Myoporum laetum* Forster	*Schinus terebinthifolius* Raddi
Eschscholzia californica Chamisso	*Nicotiana glauca* Graham	*Tamarix ramosissima* Leded.
Festuca arundinacea Schreb.	*Opuntia ficus-indica* (L.)Miller	*Ulmus parviflora* Jacq.
Foeniculum vulgare Miller	*Oxalis corniculata* L.	
Hedypnois cretica (l.) Dum. Cours.	*Oxalis pes-caprae* L.	
Priority 2: Widespread species that should eradicated if resources are available		
Anagallis arvensis L.	*Cynodon dactylon* (L.)Person	*Silybum marianum* L.Cotula *australis* (Sieber)Hook
Brassica nigra	*Ehrharta calycina* Smith	*Sisymbrium irio* L.
Bromus catharticus Vahl	*Eucalyptus globulus* Labill.	*Sisymbrium orientale* L.
Carpobrotus edulis (L.) N.E.Brown	*Hirschfeldia incana* (L.) Lagr.-Fossat	*Tragopogon porrifolius* L.
Centaurea melitensis L.		
Priority 3: Species too widespread to be effectively eradicated, control measures may be needed in localized areas or during habitat restoration		
Atriplex semibaccata R.Br.	*Gastridium ventricosum* (Gouan) Schinz & Thellung	*Polygonum arenastrum* Bor. (*Polygonum aviculare* L. missapplied)
Avena barbata Brotero	*Hypochaeris glabra* L.	*Polypogon monspeliensis* (L.)Desf.
Avena fatua L.	*Lactuca serriola* L.	*Salsola tragus* L.
Bassia hyssopifolia (Pallas) Kuntze	*Medicago polymorpha* L. *brevispina* (Bentham) Heyn.	*Silene gallica* L.
Bromus diandrus Roth	*Medicago polymorpha* L. *polymorpha*	*Sonchus asper* (L.)Hill
Bromus mollis L.	*Mesembryanthemum crystallinum* L.	*Sonchus oleraceus* L.
Bromus rubens L.	*Mesembryanthemum nodiflorum* L.	*Spergularia bocconii* (Scheele) Foucaud
Chenopodium murale L.	*Plantago lanceolata* L.	
Conyza bonariensis (L.)Cronquist		
Conyza canadensis (L.)Cronquist		
Priority 4: Species perceived to be innocuous, but that may be a problem locally		
Cakile maritima Scop. maritima	*Pelargonium X hortorum Bailey*	*Pinus halapensis* (near security, seedling)
Ficus carica L.	*Phylla nodiflora (L.)Greene var. rosea (Don)Munz.*	*Tropaeolum majus* L.
Ornamentals not known to reproduce on Island		
Agave americana	*Nerium oleander*	
Not seen recently, no longer known from Island		
Avena sativa L.	*Lobularia maritima* (L.) Desv.	*Sonchus tenerrimus* L.

D. To control new invaders with the potential to become problems, provide a rapid response, and respond at the appropriate spatial scale.

1. Identify and prioritize the best available techniques to eradicate or reduce the species of concern.
2. Work on developing biological controls that could be used for existing and potential arrivals, while ensuring safety of nontarget species.

E. Provide exotic species control measures to substantially reduce existing problem areas and to prevent new problem sites.

1. Map the existing problem areas and determine priority sites and control measures.
2. Monitor progress, evaluate the effectiveness of measures, and revise as needed.
3. Control the black mustard population along the China Road.
4. Control the invasion of *Ehrharta calycina* by the runway fuel depot.
5. Continue to spray priority noxious weeds.

F. Experiment with prescribed fire as an appropriate and effective tool for controlling exotic annual plants that are pervasive in the environment.

1. Populations of invasive annual plants have been reduced when fire is applied while seeds are suspended above ground in their inflorescences.
2. Beware of fire resulting in increased exotics.

IV. Coordinate invasive species control actions.

A. Coordinate with and consider using volunteers groups like the CNPS and California Exotic Pest Plant Council. These groups are actively working to develop local and statewide strategies for the management of invasive exotic plants and can offer technical advice and volunteer labor. The local CNPS chapter has assisted the Navy in the past by removing ice plant from sand dunes near San Diego Bay (C. Burrascano, *pers. comm*.). The Boy Scout groups which visit the Island could also be enlisted for this effort.

B. Hold an annual Channel Islands-wide workshop on the topic, including a brainstorming session on alternative measures.

C. Provide an electronic database and bibliography on exotic species and control measures accessible to CNRSW resource managers.

D. Initiate eradication programs for known invasive species (e.g. black mustard, veldt grass).

V. Management Focus Terrestrial Invasives: ants and brown-headed cowbirds.

A. Develop measures to prevent the establishment and spread of invasive ants.

1. Comprehensive baseline surveys of ants, focusing on the distribution and impact of the Argentine ant and methods to curtail its spread (Ted Case, UCSD is doing this with mainland invasive ants).

2. Once baseline ant fauna is known, develop identification aids to distinguish native versus potential invasives and establish simple monitoring program using bait stations at key Island entry points.
3. Develop inspection standards for equipment, building materials, and other items to minimize establishment and spread of invasive ants.

B. Determine the status of aggressive brood parasites like the brown-headed cowbird on SCI. Evaluate all known bird survey records to better understand seasonal patterns and location of brown-headed cowbird use of SCI and the potential breeding status. Determine if focused surveys are needed.

VI. Management Focus Marine Invasives

A. Prevent the introduction of killer algae.

1. Watch for killer algae (*Caulerpa*) in the water and on vessels and gear. Prevention of new introductions from aquaria and detection of existing infestations are critical. Divers, sailors, and fishermen should become familiar with its appearance.
2. If located on SCI, it should not be disturbed and SCCAT should be contacted immediately. If it becomes established near SCI, it could impact Naval training exercises. Contact the Caulerpa Action Team at caulerpa@rb9.swrcb.ca.gov or at (858) 467-2952 if this species is suspected.

4.6 Predator Management

Specific Concerns—Predators

- Introduced predators can have substantial negative and often irreversible effects on native Island populations that are lacking the necessary defense mechanisms against new predation and competition pressure.
- In the past, unclear policies and practices toward cat control at Wilson Cove have resulted in a permanent source population for the entire Island.
- Because of safety concerns regarding control methods used for the rest of the Island, no systematic cat control method has been employed at Wilson Cove.
- Conservation interest in the status of foxes on SCI will likely continue to grow as populations on the northern Channel Islands and Catalina Island have declined precipitously. This is particularly true in light of the continued management of the island fox as a shrike predator.
- Although it is known that mice are secondarily taken during the rat control program, there is no understanding of population effects for the native SCI deer mouse population.
- Fox recruitment and pair bonds may be affected by control efforts.
- There have recently been large declines of foxes reported from some established fox trapping grids.

Proposed Management Strategy—Predator Management

Objective:** **Deconflict management of the San Clemente loggerhead shrike with native predator populations.
Objective:** **Remove all non-native predators from SCI.

I. Management Focus – Raptors

- **A.** Continue non-lethal control of raptors from shrike territories. Use lethal control only when there is imminent threat to shrikes.
- **B.** Monitor raptors Island-wide to determine if predator control efforts are affecting populations of these species.

II. Management Focus – Island Fox

- **A.** Discontinue removing foxes from breeding shrike territories.
- **B.** Continue to monitor and study island fox demographics and ecology.
  1. Determine current levels of reproductive success, prey abundance, and disease, and causes of mortality.
  2. Develop and implement co-management strategies for foxes and shrikes.

III. Management Focus – Feral Rodents and Cats

- **A.** Develop an all-Island approach to rat and cat management rather than restricting management to only part of the Island.
  1. Remove restrictions on managing cats in the Wilson Cove area, and develop management strategies that may be more compatible with that urban-type setting.
- **B.** Eliminate feeding sources that support thriving populations.
  1. Continue ban on all feeding and care of feral cats by personnel on SCI.
  2. Convert all trash bins on the Island to rodent-proof and cat-proof containers.
- **C.** Develop guidance for protecting native rodents during baiting programs for black rats and evaluate the efficacy of alternative baits.
- **D.** 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.

4.7 Bird/Aircraft Strike Hazard and Wildlife Hazard Assessment

Specific Concerns—Bird/Aircraft Strike Hazard and Wildlife Hazard Assessment

- Military aircraft are especially vulnerable to collisions with birds because such aircraft operate at lower altitudes and higher speeds than commercial aircraft, and have frequent take-offs and landings. The problem has resulted in death to pilots and crew (and sensitive bird species), as well as many millions of dollars in military aircraft damage. Bird aircraft hazard avoidance strategies vary by season, altitude, temperature, rainfall patterns, and surrounding land use. Different tactics are needed for each kind of species, and generally for migrating birds versus local bird movements. Flocking species are the most problematic, due to there numbers.

- Two recent incidents (both in June of 2001) have been reported at the airfield on the Island. Both incidents involved a horned lark (*Eremophila alpestris*) which is a small land bird present on SCI year-round. This species is common around the runway as it forages in open habitats where most trees and shrubs are absent (CDFG 1999). In both instances it collided with a small passenger plane, and, because of the species' small size, did not cause any damage.
- On October 2, 2001 an eight-passenger prop plane collided with a northern pintail (a duck) causing minor damage to the aircraft. Another recent incident involved a sea gull.
- Certain birds may become pests around buildings and the airfield, such as starlings, sparrows, or horned larks. Removal and exclusion for some species of birds in buildings may only occur outside the breeding season to comply with the Migratory Bird Treaty Act. House sparrows and starlings are not included under the MBTA. Methods are needed that do not affect other animals.
- A Bird/Aircraft Strike Hazard (BASH) program has not been initiated at SCI. The following general recommendations are based on other BASH plans developed for NAS North Island, NOLF Imperial Beach (USDA 2000), and NAF El Centro.

Proposed Management Strategy—Bird/Aircraft Strike Hazard and Wildlife Hazard Assessment

Objective:* *Reduce the potential for bird and other animal collisions with aircraft at the SCI airfield.

I. Develop a BASH Instruction.

II. Involve appropriate SCI personnel in Naval Base Coronado BASH working group (BWG) and delineate responsibilities of all personnel involved. The group will:

A. Consist of personnel from Management, Maintenance, Fire, Operations, Air Traffic Control, and Natural Resources.

B. Meet at least four times a year and more often if necessary.

C. Use BASH Plans and instructions developed at other installations for guidelines until a plan is developed for SCI. Review and update guidance annually to include new deterrence methods and management guidelines.

D. Conduct a Wildlife Hazard Assessment (by an individual trained in wildlife identification) to monitor wildlife populations and use patterns at the airfield.

E. Develop a BASH Instruction that institutes an uncomplicated bird hazard reporting system that ensures that SCI is informed of incidents no matter where pilots are based.

1. Require that pilots, tower personnel, and mechanics report all incidents, damaging and non-damaging, so that corrective actions may be assessed.

2. Make available Strike Incident Report forms.
3. Make wildlife species identification guides available.
4. Place posters for bird species identification at air control tower and at pilot gathering areas.
5. Disseminate information to aircrews. Use a three-tiered rating system for hazard conditions, such as green-yellow-red, based on bird concentrations. For example, *red* condition is five or more targets within 20 degrees either side of extended runway center line to three nautical miles (nm) and yellow is three or more targets within one nautical mile.
6. Have the maintenance crews or pilots collect feathers or any body parts for determination of species. Identify dead birds to species, if possible, using assistance from local wildlife biologists.
7. Develop and maintain a database to organize wildlife strike information from pilot reports, mechanical inspections, and runway surveys.

F. Be responsible for obtaining and renewing appropriate permits for wildlife removal and environmental modifications.

1. A depredation permit should be procured from USFWS.

G. Ensure that all deterrent supplies are readily available.

1. 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.
2. All weapons will need to be registered with NBC (NAS North Island) and SCI Security.
3. At a minimum, the airport should have at disposal: two pyrotechnic pistol launchers with caps, ten boxes of bird bangers, ten boxes of screamers, one carton of Mylar tape, two propane cannons.

H. Adopt a zero-tolerance policy toward hazardous wildlife on the airfield. All birds should be consistently and immediately scared off of airfield.

I. Improve coordination of bird aircraft strike information regionally and nationally.

1. Participate in projects that could potentially increase wildlife hazards in order to reduce those hazards. These may include, but are not limited to: new building construction, wildlife habitat enhancement, landscaping, or refuse disposal projects.
2. Provide data to the Navy Safety Center.
3. Keep track of activities of the U.S. Air Force and Navy national BWG.

J. Support research that will enhance safety of pilots with respect to bird aircraft strikes.

1. Consider use of a radar system to study bird migration patterns with the purpose of developing and refining a pilot alert system for migrating song birds (high altitude), waterfowl (intermediate altitudes), and local bird movements (low altitude).

III. Adapt principles of reducing bird aircraft strike hazards to the local environment.

A. Bird-proof airfield buildings.

1. Exclude small birds such as house sparrows, finches, and starlings from cavities and openings using wire mesh.

2. Persistent birds, if they are not protected species, may be shot with a pellet gun or trapped using approved traps. House sparrows and starlings, and their nests, are not protected under the MBTA and can be removed at any time of year. Consult with NRO personnel before physically removing the nests of other species that may be protected.

B. Reduce attractiveness of the airfield vicinity to birds that may pose a hazard to low-flying aircraft by eliminating sources of food, water, and cover.

1. Leave no standing water in the airfield vicinity. Eliminate low spots.

2. Reduce the edge effect between habitats that attracts birds and other wildlife by maintaining a uniform appearance of the airfield.

3. Identify nearby potential roosts that can be removed or made less attractive to birds.

4. Prohibit the planting of berry-bearing shrubs and trees in the vicinity of the airfield.

5. Remove from the active airfield all posts, poles or solitary shrubs or trees that might serve as perches for birds of prey.

6. Ensure windbreaks or other landscaped plantings utilize species that do not attract flocks of birds.

7. Ensure all trash bins, waste receptacles, and landfills near the airfield are covered to reduce their attractiveness to birds.

8. Keep drainage ditches clear so they do not become a breeding ground for wildlife.

9. If other methods are unsuccessful, replace bare ground with hard surface in order to deter horned larks from using the airfield.

IV. Develop routine practices for removing hazards.

A. Increase frequency of Foreign Object Damage (FOD) surveys at airfield.

B. 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.

C. Be sure to advise the tower when hazards are observed or removal techniques are about to be employed.

D. Disperse birds in the vicinity of the airfield that pose an aviation hazard and serve as an attractant to other birds.

1. Dispersal should be performed early in the morning to discourage birds from feeding at the airfield.

2. Use dispersal only as a short-term solution.

3. The key to successful bird dispersal is perseverance. If done consistently birds will learn to avoid the airfield.

4. Methods used could be pyrotechnics, bioacoustics, live trapping and euthanasia. Additional personnel may be required to provide continual harassment.
5. 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.
6. Keep a record of the number of birds hazed and whether they are roosting, loafing, or in flight.
7. All hazing activities will avoid habitats or known populations of federally listed species or nesting birds without consulting with NRO.

E. Increase dispersal tactics during migrational periods.

1. Transient birds are unaware of the "off-limits" status of the airfield and should immediately be deterred. Propane exploders may be appropriate at this time.
2. Fox effigies, owl decoys, and raptor silhouettes are best used at this time also because their locations have not been "learned" yet.

F. If necessary, use lethal control for unusually persistent wildlife.

1. Shooting should not occur when aircraft are about to land to or take-off because remaining birds, especially in the case of gulls, may circle and investigate downed birds.
2. Ensure that take permits are up-to-date prior to shooting.
3. Ensure that the species has been properly identified and is not a sensitive species or federally listed species.
4. Eggs, chicks, and fledglings of nuisance species located at the airfield will be dispatched with using legal, humane methods of euthanasia after receiving permission from NRO. Records will be kept of the date, location, and number of young removed.

V. Adjust aviation activities during high risk periods.

A. Use the calendar provided in the BASH plan to predict critical periods and flying altitudes most at risk (e.g. low-level local flights, medium-level flights for waterfowl migrations, high-level flights for passerine migrations).

B. Fly with aircraft lights on at all hours during peak migration periods.

C. During migratory periods air crew 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 (500 ft and below), high speed flight through bird migratory routes should be considered.

D. Portions of the airfield may be closed for short periods of time for large-scale removal efforts.

4.8 Wildland Fire Management

Specific Concerns—Wildland Fire Management

- A typical fire response time to the high fire risk SHOBA Impact Area(s) or other remote training areas is thirty minutes or more due to inadequate telephone or radio communications and low standard (rough) road conditions.
- After this delay, expected fire sizes will be more than what current firefighting resources can be expected to contain.
- Follow-up resources from the mainland cooperators or other Federal Wildland Firefighting Units are, at a minimum, 4–6 hours away under the best of conditions.
- If fire weather conditions are very high or extreme, the fire spread rates, fire intensity, and fire size will be much greater.
- Under the current level of fire protection, the most appropriate method of initial attack would be to back-burn and hold the wildland fire along a road, fuelbreak, or other fuel treated area. This method of allowing a fire to continue to burn until it reaches a road or other fuel treated area may involve more burned acres than is desirable; however, it has the highest probability of fire containment and the least amount of overall burned acres.
- The current level of fire protection, as determined in conjunction with the SCI Fire Management Planning Process, does not meet the SCI INRMP and military training objectives.
- Fire suppression even by helicopter over SHOBA Impact Areas is not safe from any altitude effective for water drops due to the presence of unexploded ordnance. There is a risk of explosion due to fire or suppression activity during a wildfire incident.
- The use of salt water for suppression on sensitive areas, such as water sources, should be evaluated.
- The use of fire retardant for establishment of fuelbreaks should be evaluated for its potential effect on sensitive resources.
- There is a need for effective control of invasive species in order to protect habitat values for endemic species. Prescribed fire is widely recognized as a valuable tool to accomplish this task.
- Excessively hot, frequent, or large fires will damage the health of most ecological communities. However, some habitats degrade over time without fire or some other natural disturbance. The recent buildup of fuel loads in shrublands and woodlands has increased the risk of damaging or stand-replacing fires.
- Wildland fires may impact sensitive species due to fire size, frequency, or intensity.
- For sheer cost-effectiveness, fire prevention needs to be a high priority. A balance of prevention, pre-suppression activities such as fuelbreak construction, and suppression strategies are needed.
- Wildfires may affect shrike recovery in the long term by altering or slowing habitat restoration processes. To the contrary, wildfires in or around operational areas may be attractive nuisances, drawing shrikes towards training ranges to benefit from short term availability of prey in recently burned areas, potentially causing conflicts with military operations.
- In certain areas, suppression is not appropriate because vehicles and equipment will do more damage than letting the fire burn through. Appropriate fire control lines are needed to stop a fire at a logical location. Habitats sensi-

tive to off-road driving need to be called out to guide the Fire Department before and during an incident.

- The Fire Department is continually asked to do more without additional funds. They continue to be organized for airfield and structural fire protection; they have simply assumed wildland fire responsibilities over the years.
- The target area needs to be expanded during fire season for certain Marine exercises in which a wider shooting angle is required.
- There is a need to conduct certain activities using illumination at night that are currently restricted.
- Controlled burns need to be conducted for Explosive Ordnance Disposal (EOD) so they can “see the deck” during ordnance sweeps.
- There needs to be improved communication between NRO and Federal Fire Department. Firefighters need to know where the natural resource values are that need protection during an incident, and know the prescriptions for their protection. Everyone needs adequate maps, and the same map, to refer to before and during an incident.
- There are serious limitations in communication capabilities across the Island and an integrated communication system among all commands and civilian aircraft is necessary. Currently, helicopter operators have no communication with the Fire Chief during a fire. When fire bell goes off, the Battalion Chief requires 20 minutes to download weather information using his current computer system. Also the Battalion Chief must use a telephone, because radio communication is insufficient to communicate with aircraft. There are 11 different commands on the Island, each with their own communication system. Security can only get communication to about SHOBA Gate, and that is by telephone. With more people in the field these days, lack of communications has become a serious safety concern. Cell phones provide spotty service. LAN mobile phone systems have been tested on SCI. Usually fires are first spotted from an observation tower; there are two phone systems, but 10% of the time both of those are down. There is a need to communicate with Marine Band, VHF, UHF, and aircraft. Helicopter pilots need communication boxes so the pilot can hear military frequencies, air-to-air frequencies and the incident commander on the ground.
- Current fire planning is piecemeal in that SHOBA and other ranges have separate rules, and these are not integrated with human safety and structural protection program of the Fire Department. This Plan is a whole-Island plan where structures and wildland fire management are not separated and all areas of the Island are addressed no matter who uses them.
- To date, there seems to be little allowance made for improved management practices. Progress made on fire management on the part of operators should be rewarded with more flexibility in the conduct of operations, especially when endangered species management is also making progress. there has been no relaxation of restrictions on training, although $160,000 per year is spent on a helicopter.
- A favorable benefit-cost ratio is important, which suggests that prevention is more effective than suppression as a management technique. Another is ensuring a short response time so that fires are kept small.
- There is no formal transportation system plan for SCI that addresses the values and associated operation and maintenance costs for roads. An integrated approach to road planning is needed that identifies those needed and not, based on operations, fire management, recreation, natural resource

access, etc. At the same time, these roads should be designed and maintained so they do not erode, degrading Island habitats.

- Predictability of fire season restrictions is important. It is important to know in advance what will be allowed during an exercise instead of arriving on location for an exercise and then getting that information. Different operations need different lead times. This question pertains more to the beginning and end of fire season rather than the middle. The middle of fire season is the most predictable.
- Some areas will need to have a higher level of acceptable loss from fire impacts because of extreme military value and the need to conduct training with fire-related consequences. Compromise of an Impact Area’s utility to training and testing needs should be avoided. Fires that occur within Impact Area boundaries should be expected and natural resource protection needs should be planned for compatibility with both. Fires within the Impact Areas should be accepted as part of doing business and not counted “against” a success target or standard.
- There are new ignition sources on-Island, such as increased use of all-terrain vehicles (ATVs) for the shrike recovery program.
- Firebreaks and fuelbreaks have fire control benefits but can have environmental impacts in and of themselves. Alternatives are needed.
- There has been inconsistent documentation of fire patterns, including number of fires, location, and ignition sources, among other data needs.

Proposed Strategy -Wildland Fire Management

Objective: Protect life, property and natural ecosystem functions and diversity, while maximizing training opportunities and minimizing total cost.

I. Adopt the Guiding Principles of the 1995 Federal Wildland Fire Management Policy and DoD INST 6055.6:

A. Safety is top priority.

B. Plan for fire as an essential ecological process.

C. Support land and resource management plans.

D. Fire policy is established on a foundation of sound risk management.

E. Fire management must be economically viable.

F. Fire management is based on the best available science.

G. Public health and environmental quality are considered.

H. Coordination and cooperation are essential.

I. Fire management involves ongoing standardization of policy and procedures.

II. Integrate federal fire policy with the following Fire Management Guiding Principles for SCI (An appendix bound separately contains the complete Fire Management Plan for SCI):

A. There will be no net loss of training access and opportunities due to wildland fire management (SAIA).

B. There will be no net loss of habitat value across the Island.

C. Fire-safe planning and defensible space will be the principal protection strategy for inhabited structures and high-value facilities.

D. 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.

E. 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.

F. Wildland fire strategy and control will be based upon designated Fire Protection Units.

III. Firefighting resources will be allocated based on the following principles.

A. 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.

B. 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.

C. 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.

D. 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.

E. 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.)

F. 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.

IV. 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--NAS North Island
- Navy Landing Craft Air Cushion (LCAC) group

A. 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.

B. 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. A Strike Team would consist of:

Two Type 3 engines from MCBCP Fire Department

One Type 3 engine from MCAS Miramar

Two Type 3 engines from San Diego County Federal Fire Department

One Strike Team Leader with a command car equipped with joint radio communications among all Strike Team units.

C. Work with Marine Corps Base Camp Pendleton LCAC Facility to develop coordination, operational and dispatch procedures to send the Type 3 Strike Team to San Clement Island via hovercraft during a wildland fire emergency on SCI.

D. 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.

E. Use the established Incident Command System (ICS) terminology, procedures, and certification standards required in all federal wildland fire policy, which the DoN is a signatory partner, in all wildland and prescribed fire activities.

V. 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).

A. Explore the option of requiring the contractor to supply a small (75 to100-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.

B. The contract helicopter should be stationed at the SCI Naval Auxiliary Landing Field near the fire station during fire season.

C. 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:

1. 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,

2. enhances the protection of sensitive areas and/or single nesting areas,

3. 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.

D. 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.

E. 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.

F. 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.

VI. Staff a full-time Wildland Fire Manager position on SCI.

A. This position, at a minimum, should be at the Captain level in the Federal Fire Department Organization.

B. 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.

C. 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.

D. 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.

E. Funding for this position is required over and above existing Federal Fire Department budget allocation.

VII. Acquire one additional Type 3 wildland fire engine to reside on the Island. Staff this engine with one year-long Engine Captain and three additional seasonal firefighters during the expected SCI fire season period by backfilling as necessary from staff resdiing on the mainland or paying overtime for existing staff.

A. This additional Type 3 engine and four wildland firefighters, plus the four firefighters on the staff of the current Type 3 wildland fire engine, would be the principal resources for conducting initial prescribed fires and implementing the other recommended fuel treatment programs.

B. The new additional wildland fire engine should be staffed Monday through Friday and any time when a military training operation takes place on a weekend day with a projected MODERATE or higher fire weather condition.

VIII. Consider the following options for staffing a wildland fire crew:

A. *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.

B. *Option No. 2*. Hire on additional full-time federal fire captain as a Wildland Fire Coordinator. Hire six additional seasonal wildland fire technicians, either federal firefighters or through NRO.

C. *Option No. 3*. Hire on additional full-time federal fire captain as a Wildland Fire Coordinator. Hire one full-time NRO crewleader.Hire six seasonal wildland fire/natural resource office wildland project technicians to implement the fuels/prescribed fire program.

IX. Once the full implementation of the SCI Fire Plan is funded, five or six 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.

- ***A.*** The actual need for staffing of these five or six seasonal firefighters will be determined at a later date after a three-year annual review of the effectiveness of recommendations 1 through 5.

X. Ensure Remote Automated Weather Stations (RAWS) are providing consistent and accessible fire weather information on a daily basis.

- ***A.*** Upgrade computer system in Federal Fire Department to provide fire weather processing capability and video views of fire.

XI. 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.

XII. 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.

XIII. Adopt the following preliminary Fire Danger Rating System (FDRS) for SCI (Table 4-10). 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 SCI Fire Management Plan (Appendix bound separately).

- ***A.*** Evaluate and revise the FDRS on an annual basis based on new resource information, improved weather data, and fire history.
- ***B.*** The Fire Danger Rating should be announced daily on a website accessible to all operators.
- ***C.*** When the FDRS is HIGH and training using incendiary ordnance or devices is taking place, either a contracted helicopter or military HC-85 unit (if involved in the training activity) shall be on ready stand-by alert for response to wildland fire as its only responsibility from SCI Auxiliary Landing Field.
- ***D.*** When the FDRS is EXTREME, both helicopters shall be on ready standby alert from SCI Auxiliary Landing Field with no other assigned responsibilities regardless of whether training is occurring.
- ***E.*** If a helicopter is not available, then training will be restricted to non-incendiary ordnance use.

Table4-10. Fire Danger Rating System for San Clemente Island.

SAN CLEMENTE ISLAND DAILY FIRE DANGER RATINGS and RESTRICTIONS

Fire Danger Rating	Caution to Be Exercised	Necessary Precautions
LOW 0-3 mph 20-ft. wind speed 13+ % 1-hr FFM	**Use normal caution during military training exercises. Fires may start easily, but will have low rate of spread and fire intensity. i.e. less than 30 acres of spread per hour.**	**Care should be taken; however, any type of ammunition can be used during this condition. Outside of Wilson Cove, smoking is only permitted in developed areas or roadways.** **SHOBA Impact Area #1 & #2 retardant fuelbreak and strip burning completed by June 15 annually.**
MODERATE 4-5 mph 20-ft. wind speed 11-12 % 1-hr FFM	Use extra caution. Fires may start very easily. Fires are expected to have moderate rate of spread and fire intensity. i.e. less than 100 acres of spread per hour.	**All Low Fire Danger Precautions and SHOBA Impact Area fuelbreaks are in place.** This condition is the beginning of a fire ignition concern. Any type of ammunition may be used on designated ranges and within a SHOBA Impact Area. The use of pyrotechnics, demolitions, white phosphorous and illumination ammunition and other heat/flame producing devices within designated training areas will be limited as much as possible to night time activity, a cleared area or areas previously burned over. Except for SHOBA, normally training area exercises will be conducted in the early morning (before 1000 hours) or late evening (after 1900 hours) when relative humidities will be at their maximum. Restrictions do not apply to SHOBA Impact Areas in this Fire Danger Rating.
HIGH 6-8-mph 20-ft. wind speed 9-10% 1-hr FFM	Use extra caution Fires are expected to have high rate-of-spread and fire intensity. More than 100 acres of spread per hour	**All Moderate Fire Danger Precautions and SHOBA Impact Area fuelbreaks are in place. A helicopter will be placed on ready alert during 0900 to 1900 hours whenever key training activities are scheduled, Other SCI military missions can take place during this fire alert; however, a fire dispatch should be a high priority mission.**
VERY HIGH 9-10 mph 20-ft. wind speed 6-8 % 1-hr FFM	Extra protection caution. Fires will start easily and spread rapidly. Fires are expected to exceed 100 acres in one hour and burn very hot. Fires will be hard to contain at designated roads and fuel treatment areas without private and military helicopters and 2 wildland fire engine companies.	**All High Fire Danger Precautions and SHOBA Impact Area fuelbreaks are in place.** Firing of all types of ammunition will be permitted at all times within the SHOBA IA 1 & 2 unless restricted by the Range Manager. Minimal use of pyrotechnics, demolitions, illumination ammunition and heat/flame producing, including blanks, and white phosphorous are allowed within other designated training areas. However, their use should be restricted to night time (1900 to 0800 hours) activity, cleared or previously burned areas. A helicopter with crew and water bucket is to be placed on fire alert during the hours of 1000 to 1900 hours. **This helicopter will stand by at the SCI Auxiliary Landing Fields, with pilot, crew and bucket ready for immediate fire dispatch. No other missions should be assigned while on fire alert.** A wildland fire engine, with a 4-person crew is to be located in the vicinity where the highest fire hazard military training outside of SHOBA is taking place. ***The decision to put the standby fire fighting resources in place with be a joint decisionbetween the Wildland Fire Coordinator and the Military Training Unit Leader(s).***
EXTREME **>10 mph 20-ft. wind speed** **<6% 1-hr FFM**	**Use extreme caution and allow only essential and high cost military training operations to continue under these conditions. Fires will spread at extreme rate of spread and will burn at unacceptable fire intensities. Fires will create long distance spotting situations.**	**All Very High Fire Danger Precautions and SHOBA Impact Area fuelbreaks are in place.** **The firing of high explosives, pyrotechnics, incendiaries, or other ammunition likely to cause fires are prohibited during the hours of 0900 and 1900 hours, except in SHOBA two designated Impact Areas which should consider restricting any firing or bombing activities during the hours 1100 to 1500 or whenever the Extreme fire danger rating subsides.**

[a] Mid-flame wind speeds (MFWS) are determined by the fuel model and friction loss of a 20-feet wind speed due to vegetative cover. They are expressed by an adjustment factor of 0.4 for all SCI NFFL unsheltered fuel models except Fuel Model 4 (tall dense brush), which has an adjustment factor of 0.6. For example, a ten mile per hour recorded 20-foot wind speed would be multiplied by the factor and recorded as a 4-mph MFWS in all fuels, except Fuel Model 4. Fuel Model 4 would be a 6 mph MFWS.

[b] Fine Fuel moistures (FFM) is the reading of the 1-hour (fuels less than 1/4-inch in diameter) dead fuels (grass, twigs and leaves).

XIV. 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.

XV. 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.

A. 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 Wildland Fire Management Plan and as identified in this INRMP, this policy will be immediately re-evaluated for adjustment for the remainder of the fire season upon evaluation of cause.

XVI. 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.

A. Develop application protocols that minimize the effects of fire retardant application on plant and wildlife communities. Consider the following:

1. Prescribed fire is likely to be the most environmentally compatible alternative to establishing fuelbreaks, compared to retardant use, disking and herbicide use.

2. The temporary fertilizing effect of retardants from residual NH_3, NH_4, and total phosphorus, which occur in the natural environment, might promote annual grasses.

a. This effect has been shown to disappear after the year of application in two separate studies.

b. Retardant can be applied after grasses have seeded out to avoid this effect.

c. Retardant use can be rotated within the fuel management zone to avoid repeated application.

3. Apply retardant after grasses have seeded out to avoid a fertilizing effect or rotate use within the fuel management zone to avoid repeated application.

4. Application by aerial spraying or from roads will prevent damage to habitats caused by vehicle or foot traffic.

a. Develop a system whereby EOD may ensure ranges are safe for aerial application of fire retardant or prescribed fire in a non-wildfire situation.

   b. Aerial spraying from a boom on a small helicopter (similar to crop-dusting) is expected to be safe enough to use above Impact Areas.

5. 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.

   a. Some years may not require any application depending on weather, fuel loads, and training schedules.

   b. 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.

6. A controlled burn within the area of concern soon after retardant application will ensure the effectiveness of the retardant line.

7. Application of retardant after the winter rains will reduce the risks of chemicals washing into water sources.

8. Avoid establishment of chemical mixing areas near water, and avoiding aerial flight patterns that may result in accidental application to fresh or sea water resources.

9. Application of retardants should be performed in conjunction with long-term monitoring of soil and vegetation responses to this activity. Long-term impacts to plant and wildlife communities are thought to be insignificant at this time.

10. Survey for rare plants in advance of application so that populations may be avoided.

11. Avoid, if possible, use of fire retardant, especially repeated applications, on soils that are naturally low in nutrients and upon which the native plant community may depend on this impoverished nutrient status. An example may be the first-terrace boxthorn community.

12. Avoid spraying of occupied shrike nesting areas by avoiding shrike breeding season in those locations.

B. Fire retardants should only be used when deemed necessary to maintain the military mission and protect sensitive resources.

XVII. 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.

A. Identify fire intervals, patch sizes, and fire intensities which are expected to protect long-term community values and achieve this Plan's goal.

B. 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 fuel-breaks in seven key fire control areas.

C. 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).

D. 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.

E. No fire risk is anticipated, so no management direction is provided for: Active Dune, Stabilized Sand Dune, Coastal Strand, and Coastal Salt Marsh.

XVIII. If prescribed burns are deemed necessary, the following guidelines should be adopted to reduce smoke emissions:

Table 4-11. Smoke management guidelines. (National Wildfire Coordinating Group 1985; Haddow 1995; Mahaffey and Miller 1994; all in DeBano et al. *1998).*

■ The following guidelines are recommended as prefire management provisions to reduce smoke emissions:

1 Clearly state fire management objectives.
2 Use weather forecasts to predict future fire conditions.
3 Do not burn when air stagnation advisories are in effect, during urban pollution episodes, or when relative humidity or visibility risk indices indicate that smoke problems might occur.
4 Comply with smoke management regulations and air pollution control.
5 Notify local fire-control organizations, air monitoring units, local law enforcement agencies, and nearby residents of proposed burning plans.
6 Develop emergency plans.
7 Consider the volume of smoke already present in a geographic area when making decisions about prescribed fire and prescribed natural fire.
8 Avoid heavy burning on days when smoke might affect smoke-sensitive areas, heavily used recreation areas, and public holidays.

■ These provisions reduce the amount of smoke generated during actual burning operations:

1 Burn when conditions are good for rapid air dispersal to reduce the effects of emissions.
2 Burn under favorable moisture conditions.
3 Use backing fire when appropriate to increase combustion efficiencies.
4 Burn small parcels of land.
5 Burn when fine fuels have low moisture contents, large fuels have high moisture contents, and the forest floor has a high moisture content.
6 Be cautious when burning at night.
7 Mop-up as soon as possible after burning.
8 Increase the utilization of harvested wood material to lessen the accumulation of slash.
9 Expand the burning season, if possible, to include early spring or late fall to obtain favorable fuel moisture contents.
10 Use mass ignition techniques that allow burning at higher fuel moisture.

XIX. Monitor all fires regardless of size and location.

- ***A.*** Map fire boundaries.
- ***B.*** 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:

Table 4-12. Fire intensity classes and definitions, adapted from National Park Service (1992).

FIRE INTENSITY CLASS	Effects on Litter/Duff	Effects on Herbs/Grasses	Effects on Shrubs	Effects on Trees
1 Completely Burned	Burned to ash	Burned to ash	Burned to ash, few resprouts	Burned to ash or killed by fire
2 Heavily Burned	Burned to ash	Burned to ash	Burned to ash, some resprouts	Killed by fire or severely stressed
3 Moderately Burned	Burned to ash	Burned to ash	Burned to singed, some resprouts	Crown damage only to smaller trees
4 Lightly Burned	Blackened, but not evenly converted to ash	Burned to ash, some resprouting	Singed/stressed, many resprout/recover	No effect on mature trees, may kill seedlings/saplings
5 Scorched	Blackened	Singed/stressed, many resprout/recover	Not affected, slight stress	No effect on trees
6 Unburned	Unburned inclusions within a fire should be marked as 6			

XX. Report of wildland fire information should include information on fire SEVERITY (damage to resources). Wildland fires can result in a net benefit natural resources, and an evaluation of actual damage (based on success targets) should be a routine part of the reporting process both internally and to regulatory agencies. (See XVII above, and the success targets described under each habitat category in 4.1 "Habitat Protection and Management" for success targets.)

XXI. Reinitiate consultation on fire's effects on listed species with USFWS.

XXII. 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.

XXIII. 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.

XXIV. 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.

XXV. Use defensible space principles to defend NRO facilities including shrike cage complex, the field station, and fox holding cages.

4.9 Watershed Management

4.9.1 Soil Erosion

Specific Concerns—Soil Erosion

- Past or current erosion caused by water is a concern on the high plateau loamy soils, along the drainage margins where established tree roots have been undercut, and on upper canyon soils supporting oak groves. Areas denuded by historic grazing on steep slopes have quickly become landslides. Even fairly level areas on the west side have been eroded by wind. Large storms can produce flooding and destructive wave action along the shoreline.
- Preventing erosion is much more cost-effective than controlling erosion after the problem has begun. Erosion prevention and control becomes a "Class 1" funding action (Table 7-1) when it affects habitat of federally listed species or jurisdictional waters. The best way to avoid erosion is not to disturb existing plants or soil crust, to ensure culverts are adequately sized, and to ensure the ground is sufficiently protected at the outfalls of channelizing structures. Once the surface is broken by grading or traffic, wind may pick up particles of soil, increasing the rate of erosion as well as leaving the soil surface vulnerable to water, which may cause mudslides and flooding.
- Limited annual budgets allow only for road maintenance, not correcting problems, for overall greater long-term cost.

Proposed Management Strategy—Soil Erosion

***Objective:* Protect and restore soil productivity, nutrient functioning, water quality, air quality, and wildlife habitat through effective implementation of Best Management Practices to prevent and control soil erosion.**

I. Soil conservation shall be considered in all site feasibility studies and project planning, design and construction. Appropriate conservation work and associated funding shall be included in project proposals and construction contracts and specifications.

A. Generate and ensure incorporation of innovative BMPs in the preliminary design of construction and maintenance activities involving ground disturbance. Keep a record of the most effective BMPs for use in NEPA planning and mitigations.

1. Use the specific guidance for selecting BMPs as presented in the *California Storm Water Best Management Practices Handbooks*, and other proven techniques, with the following strategy:

a. Minimize site disturbance;

b. Stabilize site disturbance;

c. Protect slopes and channels;

d. Control site perimeter; and

e. Control internal erosion.

f. After construction, add source-control BMPs and treatment-control BMPs.

2. Ensure incorporation of BMPs in the preliminary engineering, design, and construction of facilities involving ground disturbance (OPNAVINST 5090.1B, Ch. 22-6.7[h]).

a. The selected construction contractor shall prepare and submit an erosion control plan that shall be reviewed and approved by the Navy. This erosion control plan shall identify the types of BMPs used to control sediment.

b. Minimize disturbance by locating staging areas in disturbed areas only. Staging areas shall be prohibited within sensitive habitat areas. Staging areas shall be delineated on the grading plans and reviewed by the resource agencies and project biological monitors prior to start of construction.

B. Ensure NEPA review includes the mandate for erosion control.

C. Incorporate responsibilities for BMPs and sensitive resource protection in all Real Estate agreements (leases and easements) when they come up for renewal.

D. Coordinate with other organizations when erosion concerns cross jurisdictional boundaries.

II. To reduce impacts to natural resources and maintain the desired level of training, soil erosion control activities should be prioritized according to the seriousness of the degradation and its potential impacts using the following parameters:

A. Potential impact on high-value facilities, including frequently-used roads that, if impassable, could hamper training access.

B. Damage to Navy lands.

C. Likelihood of sediment entering a Jurisdictional Wetland or Waters of the U.S., impacting a listed species, or affecting significant cultural resources.

D. Volume of potential soil loss.

E. Cost-effectiveness of the control measure.

III. Regularly monitor storm runoff and its effect on particularly vulnerable areas such as steep slopes.

IV. Stabilize disturbed sites with protective materials or erosion control plants native to SCI, and grown in the SCI nursery.

A. Plant disturbed sites with appropriate erosion control or landscape plants that are native to SCI and grown in the Island nursery. Adopt locally-proven revegetation practices with standards for:

1. ground preparation,

2. types of plants (native species when possible),

3. seed mixtures (of native species),

4. fertilization,

5. mulching,

6. irrigation,

7. timing,
8. maintenance,
9. landscaping,
10. cut/fill slope maximums, and
11. standards for compliance.

B. Install water bars, retaining walls, or diversion culverts in areas of high runoff.

1. Water bars or dips should be constructed on dirt roads located on slopes.
2. Retaining walls should be erected along the uphill edges of roads where the road has created a significant cut bank.
3. A system of cement diversion culverts or rock lined channels are appropriate for vegetated slopes.

C. Protect natural watersheds by minimizing the runoff of pollutants.

V. 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.

A. No off-road activity should be allowed except in designated areas.

B. Control erosion from ATV trails.

4.9.2 Road Design, Maintenance and Erosion Control

Specific Concerns

- The main SCI Ridge Road is not in condition to support the kind of use it is receiving, resulting in or exacerbating erosion of areas on the high plateau. Major gullies continue to erode the area especially from just north of Stone Station and then south.
- Many in the operations community see fixing the road system as the highest priority for the future of the Island. It is reported that the poor road system has been affecting the ability to train and that some operations have been cancelled due to poor road conditions (R. Tahimic, *pers. comm.* 2000).
- This road is the only access to primary ranges, yet its reconstruction has not yet been addressed in a BA, or BO by the USFWS, as required by Section 7 of the ESA.
- Unpaved secondary roads are not maintained, and in some cases have expanded their footprint due to erosion even when no longer in use. They also channelize water and cause erosion and sedimentation.
- Necessary access for SCLS management activity has resulted in establishment of ATV trails that have become an erosion concern.
- Unmaintained roads encourage off-road use.
- Standards or BMPs for road construction and repair are lacking or not implemented.
- Annual budgets and staffing are insufficient for anything but normal maintenance, resulting in an inability to correct known problems that become more expensive to fix later.

- An integrated road system is a priority need. Operations, natural resources, fire protection, Public Works, and others all need to be consulted and arrive at consensus about what roads they do and do not need.
- Routine maintenance of roads, utility lines, fuelbreaks and other infrastructure is important for safeguarding access to facilities that are central to the mission of SCI, as well as the safety of those involved in implementing the mission. Proper maintenance also prevents erosion and associated non-point source pollution.
- Guidelines for maintenance are needed that allow for protection of sensitive environmental resources and the timely, cost-effective completion of environmental documentation requirements, while ensuring full accomplishment of the military mission.
- Damage to cultural resources is possible in any ground-breaking activity such as building new culverts or roads.
- Emergency protocols are needed for repair of infrastructure that ensure human life, health and safety are given precedence, but sensitive resources are also protected. Emergency repairs such as on roadways should be anticipated so that environmental damage, which is typically worse in an emergency than during a planned repair, can be reduced. In addition, a clear understanding with USFWS about the extent of environmental damage that may be expected from disturbances such as plane crashes, emergency repairs, spills, and fire control is needed. Habitat may be temporarily impacted but not lost.

Proposed Strategy for Road Repair and Maintenance

***Objective:* Safeguard Fleet readiness by maintaining access and operation of roads, utilities, and fuelbreaks to their original design standard or better, while protecting wildlife habitat, sensitive species, soil productivity, watershed functioning, and water quality.**

I. Infrastructure shall be aligned to contribute to Fleet readiness.

II. Minimize the proliferation of roads and ATV trails, keeping only those that are essential for safety and access.

A. Use the Fleet Project Team as a conduit for arriving at a consensus of priority need of for a minimum network of roads to meet requirements for Fleet readiness, safety and security, fire control, and environmental protection.

B. Public Works should develop a 5–10 year Long-term Road Maintenance Plan.

III. Achieve compliance with all safety, quality, fire, and environmental and cultural resource laws, regulations and requirements while reducing compliance costs.

A. In order to comply with environmental and cultural requirements in a cost-effective manner, realign record-keeping on infrastructure to facilitate effective documentation, permitting and mitigation planning.

1. Keep specifications for each culvert, road structure, road, utility line, communication line, and other infrastructure in an electronic format so they can be reproduced at any scale, updated as needed, and in sufficient detail to assist in environmental and cultural resource compliance and monitoring.

B. Minimize project delays, environmental permitting complexity, and environmental documentation time requirements.

1. Keep up-to-date a five-year schedule of maintenance plans available to environmental and cultural resource planners, biologists, and regulators.

IV. Provide overall management guidelines for maintenance activities while preventing erosion and protecting sensitive natural and cultural resources.

A. The first priority shall be to prevent, through proper planning, losses of environmental values due to impacts to soils, watersheds, habitats or species.

1. Adjust the timing or locations of maintenance practices to avoid impacts to breeding animals. Use breeding season dates as guidelines.
2. Mitigate for unavoidable impacts.

B. When repair work becomes necessary, it will be prioritized according to its seriousness and potential impact based on the following criteria:

1. Safety or security, as for emergency or military vehicle access on secondary roads.
2. Potential for affecting high-value facilities or areas crucial to the Island's mission.
3. Likelihood of affecting a listed species (beneficially or otherwise), a jurisdictional wetland, or significant cultural resource.
4. Volume of potential soil or habitat loss.
5. Cost-effectiveness of the repair or control measure.

C. When repair work becomes necessary, NEPA and NRO staff will be notified early enough so the needed review, surveys, and documentation may be prepared without project delay.

1. Road repair, other than routine maintenance, should be coordinated with NRO.

V. Continue to prohibit off road use except in designated off-road areas or on established trails approved by NRO (NAS North Island Instruction).

VI. To facilitate compliance, develop and maintain long-term agreements and permits with State and Federal agencies for protection of sensitive resources.

A. Assess and monitor the biological impacts of maintenance activities on sensitive species, water quality, and erosion. Highlight potential conflicts and difficult trade-offs.

B. Comply with water quality permit requirements if a project may affect wetlands or watercourses.

1. Seek and obtain regional 404 permits (four months in advance) from USACOE, if needed.
2. Obtain a five-year regional permit for all routine maintenance practices.
3. Obtain the following concurrently with regional 404 permit if appropriate: 401 permit from California RWQCB, CDFG Streambed Alteration Agreement, documentation of contact with State Historic Preservation Officer, and documentation of contact with USFWS.

VII. Promote the innovative and effective use of BMPs to prevent and control erosion and protect sensitive resources.

A. Erosion from the following sources shall be addressed through plans and BMPs, based on the priorities cited above.

1. Paved and secondary (unpaved) roads and culverts.
2. Active gullies, prioritized based on the current soil erosion evaluation (Zink 2001) and potential benefit or detriment to sensitive resources.
3. Utilities, pipelines and underground cables.
4. New construction.

VIII. Monitor resource condition and effectiveness of BMPs as mitigation.

A. 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.

B. Monitor Best Management Practices in terms of:

1. Implementation to specifications,
2. Having the desired management effect (Strategies for monitoring BMP performance are described in the *California Storm Water Best Management Practices Handbook*, [Camp Dresser and McKee *et al.* 1993]); and
3. Soundness in context of the overall management strategy.

C. Keep a record of the most effective BMPs for use in NEPA and mitigation planning.

D. Periodically map existing and new areas of moderate to severe erosion and digitize into an Island GIS system. Establish and actively update this GIS system.

IX. Anticipate and prevent emergency infrastructure problems to ensure human health and safety while minimizing damage to sensitive resources.

A. As a first priority, prevent emergencies.

1. Implement a mishap root cause analysis program to identify problems and correct them.
2. Implement a mishap critique system to assess performance of the response team and feed results into making continuous improvements.

B. Develop and seek funding for an infrastructure replacement schedule.

1. Establish and maintain an equipment management program to ensure that necessary items are procured and properly maintained.
    a. Establish a complete inventory readiness list of all emergency response equipment including their location.
    b. Develop a preventative maintenance schedule to ensure equipment readiness is maintained.

4.9.3 Water Resources

Specific Concerns—Water Resources

- Little is understood about how the quantity or quality of water resources available to plants and wildlife may have changed since overgrazing by feral goats radically changed the Island ecosystem.
- It is possible that moisture from fog is less available to the system due to the loss of "fog-catching" shrubs.
- Ironwoods and oaks that tend to occur high up on canyon slopes may depend on moisture from fog or from stored moisture in the ground water table.
- Water pollution from storm runoff, fuel spills, and erosion could all potentially impact the sparse water resources on SCI.

Proposed Management Strategy—Water Resources

***Objective:* Protect water resources for the benefit and natural integrity of the Island ecosystem.**

I. Develop a water resources management plan that addresses the following:

A. Maintain natural fresh water sources for wildlife to access.

1. Allow no shrinkage of fresh water resources.
2. Do not dump sea water on fresh water sources or on endangered or threatened species (especially sage sparrow) habitat during fire suppression practice or incidents.
3. Determine SCI groundwater consumptive use by native versus non-native plants.

B. Develop a monitoring protocol for water and soil resources.

C. Continue to comply with all water permits and regulations.

D. Continue dry and wet season monitoring of storm drains.

E. Continue implementation of storm water BMP for pollution prevention.

F. Continue annual storm water report to the Los Angeles Water Quality Control Board.

G. Explore and establish mechanisms to improve hydrologic regimes.

1. Reduce increased runoff caused by erosion and artificial surfaces.
2. Investigate opportunities for reclaiming moisture from fog for Island Nursery, landscape irrigation, and watering of outplantings.

4.10 Wetland Protection

Specific Concerns—Wetland Protection

- Wetland delineations need to be completed and certified by the USACOE.
- Sedimentation from increased erosion can shrink wetlands.
- Invasive plant species can outcompete native species and change the hydrology of wetlands.
- See Section 4.1.12 for discussion of coastal salt marsh management.

Proposed Management Strategy—Wetland Protection

Objective: ***Protect native wetland vegetation from invasives, and maintain freshwater vernal pools that support their natural species diversity, with special emphasis on species such as the fairy shrimp which are dependent on this habitat.***

I. Complete current wetland delineation and seek certification from USACOE regarding results.

II. Control erosion of upland watersheds with priority on areas with concentrations of vernal pools.

III. Groundwater levels should be maintained within the rooting zone of wetland native species throughout the growing season.

IV. Control invasive plants from encroaching on wetland habitat.

V. Continue to comply with water regulations to ensure wetlands are not at risk of pollution from military activities.

4.11 In-water Activities Management

4.11.1 Boat Maintenance Operations

Water quality issues are the main concern with boat and ship maintenance practices. The federal CZARA of 1990 required EPA to develop the reference “Guidance Specifying Management Measures for Sources of Nonpoint Source Pollution in Coastal Waters,” which includes measures for marinas and recreational boating and their “economic achievability” (US Environmental Protection Agency 1996). States were to incorporate these measures in their own Nonpoint Source Pollution plan (California Coastal Commission 1996). California’s answer was a two part program. If a problem is detected, then Phase 1 would recommend that industry regulate itself.

UNDS are currently being developed for Armed Forces vessels. Phase I (of three phases), published in 1999, determined which discharges will be required to control by using a marine pollution control device (MPCD), and which discharges will not require controls (Table 4-13; 40 CFR Chapter VII).

Table4-13. Discharges requiring marine pollution control devices and those exempted from control according to Phase I of the Uniform National Discharge Standards (UNDS) for Vessels of the Armed Forces (40 CFR Chapter VII).

Discharges Requiring Marine Pollution Control Devices	Discharges Exempted from Controls
Aqueous film-forming foam	Boiler blowdown
Catapult water brake tank and post-launch retraction exhaust	Catapult wet accumulator discharge
Chain locker effluent	Cathodic protection
Clean ballast	Freshwater lay-up
Compensated fuel ballast	Mine countermeasures equipment lubrication
Controllable pitch propeller hydraulic fluid	Portable damage control drain pump discharge
Deck runoff	Portable damage control drain pump wet exhaust
Dirty ballast	Refrigeration/Air conditioning condensate
Distillation and reverse osmosis brine	Rudder bearing lubrication
Elevator pit effluent	Steam condensate
Firemain systems	Stern tube seals and underwater bearing lubrication
Gas turbine water wash	Submarine acoustic countermeasures launcher discharge
Graywater	
Hull coating leachate	
Motor gasoline compensating discharge	
Non-oily machinery wastewater	
Photographic laboratory drains	
Seawater cooling overboard discharge	
Seawater piping biofouling prevention	
Small boat engine wet exhaust	
Sonar dome discharge	
Submarine bilgewater	
Surface vessel bilgewater/Oil-water separator discharge	
Underwater ship husbandry	
Welldeck discharges	

Specific Concerns—Boat Maintenance Operations

- Antifouling coatings, or biocidal paint, on boats and ships are significant contributors of copper and other metal contaminants can be due to leaching and cleaning of hulls.
- Pollution is a problem at marinas due to improper practices related to boat cleaning, fueling operations, and marine head discharge.
- Pollutants accumulate in areas of high vessel density and low hydrologic flushing.
- Navy installations are not presently regulated under waste discharge permits.
- Potential remains high for continued exotic species introduction from ballast water purged during ship maintenance and moorage.

Proposed Management Strategy—Boat Maintenance Operations

***Objective:* Ensure boat maintenance operations do not affect the Island ecosystem.**

I. Emphasize cost savings of preventative actions in comparison to remedial, cleanup actions (following spills and discharges).

A. Ensure that BMPs are effective and diligently implemented.

1. Incorporate internal pollution prevention plan requirements by the Navy for this installation through specific instructions to include specific components:

a. An audit of all pollutants generated by the facility and their sources within the operation.

b. An analysis of appropriate pollution prevention methods to address each pollutant.

c. A strategy to prevent pollution, including specific objectives to be accomplished.

d. Anticipated short- and long-term costs and savings.

e. A detailed description of tasks and time schedules for the above.

II. Continue to comply with regulations regarding ballast water and boat cleaning activities.

III. Educate Port Operations about the potential effects exotic marine organisms can have on the Island and provide identification materials for particularly noxious species.

4.11.2 Shoreline Construction

Specific Concerns—Shoreline Construction

- Shoreline construction can increase erosion, affect water quality, and disturb sensitive species which inhabit these areas.
- Sensitive species which rely on shoreline habitats include: western snowy plover, Xantus' murrelet, and pinnipeds.
- Numerous cultural resource sites are located along the shorelines.
- Wood previously used for piers was commonly treated with chemicals that contained polynuclear aromatic hydrocarbons (PAHs), a potential carcinogen.

Proposed Management Strategy—Shoreline Construction

***Objective:* Ensure that shoreline construction activities do not increase erosion or adversely impact sensitive natural or cultural resources.**

I. Comply with Coastal Commission requirements for shoreline construction.

II. Complete all NEPA requirements (i.e. EIR, EIS, FONSI).

III. Submit Notice of Intent to Water Board for construction with storm water pollution prevention plan as applicable.

IV. Ensure BMPs are implemented for any shoreline construction project.

V. Consider constructing new piers using concrete or plastic to reduce the use of PAHs.

4.11.3 Oil Spill Prevention and Cleanup

Specific Concerns—Oil Spill Prevention and Cleanup

- Oil spills can kill plant and animal species in the marine and shore environments.
- Effects of oils spills can continue to be present for many years after the spill and affect the entire food chain.
- Oil spills will also have an economic effect on commercial enterprises which rely on the waters around SCI for their business.
- Particularly sensitive locations include coves, sandy beaches, and pinniped haulout sites.

Proposed Management Strategy—Oil Spill Prevention and Cleanup

***Objective:* Prevent spills of oil and other hazardous substances, and ensure the effectiveness of prevention and response planning.**

I. Continually enhance oil and hazardous substances spill response capabilities through equipment procurement, training, and participation in drills and area exercises.

A. Continue to test the local Spill Response Plan with exercises and drills.

B. Continue spill response, regardless of its source, in partnership with the USCG in accordance with the existing MOU between the USCG and the Navy.

II. Integrate the protection priorities of this Plan into spill response planning. Use GIS (Geographic Information System) layers of natural resources to support preparedness planning.

4.12 Restoration and Enhancement Planning

Restoring disturbed habitats is still a difficult and relatively unproven management tool. However, severe degradation of the natural habitats of the Channel Islands by non-native herbivores and other human practices makes restoration worth attempting, if not essential. Conservation efforts in an altered environment must act in the manner of a medical triage unit: 1) stop the hurt, 2) repair what is broken, and 3) maintain functions. The first step was taken when the Island's degradation and decline was recognized and non-native grazers were removed from the Island. Restoration efforts are part of the second step in the equation and are achieved through such efforts as exotic weed and erosion control, sensitive species propagation, and habitat rehabilitation.

Numerous locations on SCI may be appropriate for restoration efforts. In particular, areas severely eroded by over-grazing or disturbed by military activity may be restored to their previous state. Federally listed species, and their habitats, and species essential to an ecosystem's proper functioning should be given first priority. Due to over-grazing, many shrub and tree species have declined dramatically in some areas, removing an important structural component of the habitat. Non-native species have also been introduced and flourished on the Island, at the expense of native species. A new native plant nursery has recently been developed on the Island with the intention of propagating native plant species that have dramatically declined and for enhancing degraded habitats.

Thorough planning and research is essential to restoration success. The effects, and history, of the disturbance on the proposed location should be understood as completely as possible. Enhancement projects should not be attempted without first removing the original causes of disturbance. In addition, insufficient knowledge of the habitat's ecology prior to disturbance can be an impediment to restoration planning (Halvorson 1993). The physical processes and biotic interactions are poorly understood for most ecosystems. Consequently, research of historical records and conducting field analyses may be required prior to implementing a restoration project.

Proposed Management Strategy—Restoration and Enhancement Planning

Objective: ***Restore degraded habitats and declining native species on SCI to their pre-disturbance state.***

Conceptual framework for developing restoration projects:

I. Prioritize potential sites for restoration and create a map depicting areas targeted for restoration. Consider all of the following:

- ***A.*** Is the severity of the degradation such that active restoration is needed or could natural processes restore the habitat within a reasonable amount of time?
- ***B.*** Can the site be effectively restored given the current knowledge of the habitat and current technology?
- ***C.*** Are the organisms to be restored to the environment available for relocation or planting (seeding)?
- ***D.*** Is the site essential to a listed species or is it lacking an essential structural component?
- ***E.*** Will sufficient funding and resources be available to perform a complete restoration project including any follow-up work that may be required?
- ***F.*** Are training facilities or operations requirements going to prevent, preclude or interfere greatly with restoration?

II. If active restoration is appropriate, secure adequate funding and resources needed for the restoration project.

III. Gather and analyze historical information about the area requiring restoration.

IV. Perform new research to clearly establish what is currently inhabiting a site and the state of the physical characteristics of a site.

V. Properly plan the restoration effort. Determine the following:

- ***A.*** who will do the work and under what time frame,
- ***B.*** the exact boundaries and size of the area to be restored,
- ***C.*** what ecological processes need to be restored, including but not limited to geological, hydrological, and biological processes,
- ***D.*** which native species will be restored, in what order, and where they will come from,
- ***E.*** whether non-native species will need to be removed,
- ***F.*** the potential effects on adjacent habitats,
- ***G.*** the most appropriate time of year for the restoration effort considering precipitation, access to the training area, and the use of the area by sensitive species,
- ***H.*** how the effort can be performed to maximize habitat for wildlife, and
- ***I.*** establish criteria for determining success.

VI. Perform the restoration.

- ***A.*** Ensure BMPs for reducing erosion and pollution are followed.
- ***B.*** Maintain quality control measures and ensure that goals are met at each step of the project.

VII. Monitor and evaluate the effectiveness of restoration efforts and adjust management accordingly.

- ***A.*** Annually monitor the location to determine if restoration is successful.
- ***B.*** Maintain careful records of the habitat's restoration, including photographs, for future reference in other projects and to receive mitigation credit.

Specific Projects:

VIII. Continue San Clemente loggerhead shrike habitat restoration efforts.

IX. Coordinate restoration projects with exotic species control efforts.

X. Continue to develop restoration projects currently in the planning stages, including:

A. Island oak reforestation,

B. maritime desert scrub (sage sparrow habitat) restoration,

C. native grassland restoration,

D. studies on the reproductive biology of Island ironwood,

E. sensitive species preservation and propagation, and

F. interpretive garden.

XI. Monitor the effectiveness of all projects and ensure that thorough records are kept on all aspects of restoration efforts.

XII. Seek funding from sources outside of the DoD budget for restoration projects. See Section 6.4.3 for a list of possible sources.

4.13 Outplanting of Artificially Propagated Species

Artificial propagation is often used as a conservation tool for populations that have declined to a point where natural reproduction can no longer sustain the population. Artificial propagation should only be used as part of a larger recovery strategy and, even then, only as a last resort. The original condition that led to the decline of the species should be addressed prior to instituting an artificial propagation program. Techniques for increasing reproductive success in the natural habitat and decreasing mortality should also precede artificial propagation.

Specific Concerns—Outplanting Artificially Propagated Species

- Resource managers should be prepared to evaluate proposed propagation projects for plant and wildlife species inhabiting both terrestrial and marine habitats at SCI. However, the waters around SCI are less polluted and less over-fished than areas near the mainland and, consequently, the most likely candidates for artificial propagation may be marine species.
- While there are no firmly established guidelines, several practical criteria are normally employed in evaluating the merits and possible shortcomings of a proposed propagation project and its installation into the environment of SCI:
  - The first concern of any proposed project not required by a federal law is that the project not alter the military mission of SCI.
  - A second, but vitally important concern, is the biological or commercial need for culturing a particular species. Species such as the white abalone, for which the population size, harvest yield, and market supply have declined markedly, would have the highest priority for propagation. This would be true both for culture leading directly to

commercial sale or the production of juveniles released for population enhancement.

- A third important criterion is the degree to which existing technology for a species is well established and will likely lead to successful propagation. In the case of the white abalone program, for example, successful laboratory production techniques are already established, which would lead to a high ranking.
- Careful consideration of the genetic consequences of a proposed project should also be evaluated. In general three criteria should be considered:
  1. What is the amount of genetic variation in the taxon on or around SCI?
  2. What is the amount of variation among populations on or around SCI? Do some populations contain much more variation than others?
  3. What kind of variation is their among populations at SCI? Are the differences among populations based on the same genes or completely different ones?
- Important management implications resulting from these questions may include:
  a. More variable populations are more valuable and may deserve additional protection.
  b. If the variation is high between populations then multiple populations should be conserved.
  c. Populations with low genetic variability may be the best candidates for reintroductions from other populations.
- Any proposed project should include a detailed plan of action that stipulates specific goals and timelines necessary for successful completion of the project. Programs at SCI should not become permanent farming projects and should only be used to re-establish declining populations to self-sustaining levels. Even proposed “mariculture” projects should only be considered for the short-term and not as a remedy for continued over-harvesting.
- Finally, the location where the rearing stock originated from is also important. The rearing stock should have originated on SCI. Only under extreme circumstances should stock from other locations be considered for placement at SCI.

■ In contrast to the approach normally employed for species in terrestrial habitats, high ranking of candidate species for mariculture does not require that they be threatened or endangered species, only that the fishery stocks and yields are substantially depressed and, usually, that commercial or recreational demand for the species exceeds its natural supply. These effects on the population are caused by fishery and environmental problems normally involving overfishing, associated ineffective fishery management practices, changes in habitat conditions, or a combination of these factors.

■ For successful mariculture, another set of criteria involves questions about water quality. Two primary, general questions are normally considered. First, are water quality conditions (e.g. good water circulation, low concentrations of toxic chemicals) at the proposed mariculture site adequate to help ensure successful production of the species? Second, is the proposed mariculture installation likely to cause any degradation of water quality conditions (e.g. from animal wastes or uneaten food) at the site?

- There is currently a program in place for propagating shrikes (Section 3.5.2.3).
- There is also a recently developed plant nursery for propagation of some plant species (Section 3.4.3).
- There is interest to develop an artificial propagation and outplanting program for green and pink abalone at SCI in conjunction with SSC SD's Point Loma propagation program.

Proposed Management Strategy—Outplanting of Artificially Propagated Species

Objective: Thoroughly evaluate any artificial propagation projects that may be proposed at SCI for their compatibility with the goal and objectives of this INRMP.

Conceptual Framework

I. Proposed projects should be evaluated by a team of qualified biologists, land managers, and military operations personnel to determine the project merits and potential effects on SCI's military mission. The analysis should determine answers to the following questions:

A. Will the project require a change in current training activities on SCI?

B. Is the proposed species in need of artificial propagation to sustain the species in the wild?

1. Is the species currently listed by a federal or state agency?

2. Could the species be listed in the near future if artificial propagation is not undertaken?

3. Will the project significantly improve the species' chances of survival?

C. Have appropriate propagation techniques been developed and tested, and are they feasible at SCI?

D. Have the genetics of the population been fully evaluated and considered in the project (see above considerations)?

E. Where on SCI would such a program be located?

F. What will the effects of the project be on other species on the Island, particularly sensitive species?

G. Will there be effects on habitat or water quality?

H. What are the public concerns and impressions about the project or the species? Does the decline of the species have commercial ramifications?

II. Ensure that SCI receives appropriate mitigation and public credit for any approved project.

Specific Projects:

III. Continue the artificial propagation of San Clemente loggerhead shrikes until no longer required to sustain the population.

IV. Continue artificial propagation of native plant species for use in habitat restoration efforts (Section 4.12).

V. Continue to cooperate with the Point Loma abalone artificial propagation program.

VI. If appropriate, funded by others, and compatible with the military mission, develop an artificial propagation and outplanting program for green and pink abalone at SCI in conjunction with SSC SD's Point Loma propagation program.

A. Ensure that appropriate precautions are made to protect water quality.

B. To reduce the possibility that exotic species or diseases are not introduced into SCI waters, all aspects of the program should occur at SCI, including: collection of brood stock, raising of brood stock, and outplanting of appropriate individuals.

4.14 Landscaping and Grounds Maintenance

Specific Concerns—Landscaping and Grounds Maintenance

- Landscaping benefits the human working environment by conserving energy, providing wildlife habitat, protecting water quality, preventing soil erosion, reducing glare, buffering noise, improving visual aesthetics, creating wind buffers and providing for heat control in recreation areas and around buildings. The importance of appropriate landscaping, both for visual and climate control reasons, cannot be underestimated.
- U.S. Navy policy requires minimizing disturbance to native habitats and using integrated pest management practices, xeriscape landscaping, and recycled water in arid environments. SCI must use native plants for landscaping and other beneficial water conservation techniques. Federal agencies are restricted in the use of exotic (non-native) plant species in any landscape and erosion control measures, as indicated by Executive Order 11987. The use of non-natives of any kind is of grave concern on SCI due to the potential for escape and inter-breeding with native flora.
- The CNRSW Natural Resource Department limits landscaping plants to SCI native species. Species used should be grown at the SCI nursery from Island seed stock.
- With the above guidelines in mind, a well designed landscaping plan has several advantages. Utilizing native and other drought tolerant plants, coupled with improved irrigation design, will result in significant water cost savings. Landscaping can also reduce glare, buffer noise, improve visual aesthetics, create wind buffers, and provide for heat control in recreation areas and around buildings, reducing energy costs.
- Comprehensive landscape planning for SCI must consider both landscape design quality and appropriateness for the local site. Design quality includes both aesthetic and functional aspects of the landscape. Functional purposes include screening, directing views and/or traffic, highlighting areas of

importance, controlling erosion, and creating a sense of scale for buildings and open spaces. Design appropriateness is based on two factors: ease of maintenance and water consumption.

Proposed Management Strategy—Landscaping and Grounds Maintenance

***Objective:* Improve the visual and aesthetic environment for both civilian and military personnel living, working, or visiting SCI, while avoiding the introduction of invasive exotic species, decreasing water use, and using drought tolerant plants.**

I. Develop an Instruction for landscaping and maintenance.

II. Develop an Instruction for use of herbicides/pesticides.

III. Prioritize landscape improvement projects.

- ***A.*** Give high priority to areas that serve as important gathering places or highly used areas.
- ***B.*** Implement projects that will reduce water usage and help meet water conservation goals.
- ***C.*** Develop a priority planting scheme to determine which areas should receive higher levels of watering during emergency drought conditions. Consider the following:
  1. Trees are normally the most valuable and most easily sustained.
  2. Shrubs, vines and groundcovers are of moderate value and can be replaced with like-size materials if lost during a drought.

IV. SCI landscaping should allow for: no bird attractants such as berries, near the airfield; plants native to SCI and grown in the Island nursery, special function selections for windbreaks, shade in parking and recreation areas, visual screens, critical area planting, and phased implementation.

V. Landscaping should consist of species native to SCI and grown in the SCI Nursery, combined with rock mulches and boulders. Any new landscaping and/or outdoor amenities must be designed within conservation and budgetary guidelines and should require little maintenance.

VI. Prohibit lawns. Lawns require frequent watering and contain exotic species.

VII. No foreign topsoil should be brought to SCI because of concerns regarding exotic species. There is an existing borrow pit approved for use at SCI.

VIII. 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.

- ***A.*** Plan new facilities in coordination with existing and new landscaping.
  1. Take advantage of building orientation, overhangs, trellises, etc.

2. Use landscaping, where necessary, to define edges and buffer areas that are incompatible with the surrounding use.
3. Plant locations and spacing should permit normal plant development without undue crowding or pruning.
4. Re-assess the landscape planting list in follow-up INRMPs.

B. Provide weed control.

1. Use mulches to reduce evapotranspiration and erosion, and to control weeds.
2. Apply herbicides on an as-needed basis only.

C. Minimize water use, maintenance, and fertilizers wherever possible through efficient irrigation systems, drought-tolerant plants, appropriate plant use and effective plant establishment techniques.

1. Because water is an expensive commodity on SCI (consumptive water is barged to the Island), landscaping activities must be analyzed based on their water consumption. The only ground covers that can survive from one rainy season to another without water are those that contain established drought-tolerant plants. All others need water in the dry season.
2. Plant native species only.
3. Require all new irrigation to use automatic systems with water-conserving design.
   a. Equip systems with soil moisture sensors, weather station monitors, flow and pressure sensors.
   b. Consider all of the following devices as appropriate for the new system: wet taps, backflow preventers, main and lateral line piping, isolation water meters, wiring, moisture sensors, clocks, rain shut-off devices, irrigation sprinkler heads and/or drip irrigation equipment.
4. 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.
5. Water between midnight and 7 a.m.
6. Set runtimes during periods of less wind velocity, usually dusk until dawn.
7. Lengthen the irrigation interval between irrigations and increase the amount of water at each irrigation to promote deep rooted turf. Deep watering once a week is preferable to more frequent, shallow watering which promotes surface rooting.
8. Use fog collecting devices for irrigation as much as possible.
9. Monitor plant health and appearance and adjust controllers to minimum water levels.

D. Substitute plant material with non-vegetative groundcover where suitable.

1. Encourage use of mulches, decomposed granites, and other high quality paving materials for areas of high use or prominence.

2. Prohibit the substitution of existing plant materials with asphalt, plain concrete, or barren soil.

E. Encourage recycling or burning of trash.

F. Create an outdoor demonstration garden in conjunction with the SCI native plant nursery incorporating native plants, as well as pollution prevention and water conservation techniques, to promote awareness of the environmental and economic benefits of these practices.

4.15 Outdoor Recreation for On-Island Personnel

Specific Concerns—Outdoor Recreation for On-Island Personnel

- Recreational opportunities are particularly important at SCI because personnel are often sequestered on the Island for long periods of time.
- SCI currently has a golf driving range, bowling alley, gymnasium, and certain hiking and jogging trails.
- The Moral and Welfare Recreation (MWR) Office also organizes recreational events including volleyball and basketball tournaments and a 5K run around the airfield.
- Personnel also have the opportunity to fish, swim, or snorkel from certain areas of the shore. SCUBA diving is not allowed from shore.

Proposed Management Strategy—Outdoor Recreation for On-Island Personnel

***Objective:* Promote compatible, sustainable outdoor recreation opportunities which enhance quality of life for military personnel, while conserving natural resources, and without compromising Fleet readiness.**

I. Develop an Outdoor Recreation Plan in cooperation with the National Park Service.

A. Identify and evaluate suitable outdoor recreation opportunities for installation personnel in undeveloped areas.

1. Areas of SCI where outdoor recreation is restricted should be clearly delineated.

2. Maps should be created for personnel showing appropriate places for outdoor recreation opportunities.

3. Provide interpretive material about native habitats, sensitive species, and areas to avoid because of the presence of sensitive resources.

4. Develop natural and cultural resource brochures, on-site interpretive signs, and a field guide for wildlife viewing.

II. Seek strategies for compatible use, sustained yield, and overall protection of natural, cultural and outdoor recreation resources.

4.16 Environmental Awareness and Education On-Island

Specific Concerns—Environmental Awareness and Education

- The nature of military service entails a degree of transience in the resident population. Communicating the ways in which natural resources improve quality of life to residents can enhance pride and a feeling of ownership even for those residing at SCI temporarily. Appreciating the links between human land use and the native environment leads to a caring and responsible attitude toward the ecosystem. The Navy has interesting and sensitive resources under its stewardship on the Island, including certain imperiled wildlife and plant species. These may be highlighted for new and long-term personnel.
- Some resource conservation measures have been incorporated into SCI regulations. However, regulations alone fall short of establishing an adequate degree of protection from impacts of military use. Accordingly, regulations should be supplemented with a formal program of conservation education, designed to instruct and motivate all military personnel in the elements of resource protection. Currently, a short brief on natural resources is given during Indoctrination Training.

Proposed Management Strategy—Environmental Awareness and Education

Objective: ***Build a strong conservation ethic and personal commitment to environmental stewardship by all personnel.***

I. Identify the types of information and conservation practices that need to be communicated to military personnel in order to protect resources and build a conservation ethic.

A. Provide a clear and concise set of environmental precautions and restrictions to be used by personnel. It could be produced in the form of an Instruction or a brochure and should be reviewed annually.

1. Integrate instruction on environmental precautions and restrictions into existing training opportunities (i.e., safety stand downs, environmental awareness training, security briefings).

B. Commands should encourage appropriate staff personnel to participate in natural resources management job training activities and professional meetings (OPNAVINST 5090.1B).

II. Develop a multimedia educational program in support of the program objective.

A. Expand the current natural resources brief given at Indoctrination Training or support the development of a separate natural resource orientation program for new personnel.

1. 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 (a video has been produced on the shrike), why the Navy is required to manage for them, and how to avoid disturbing the habitats they reside in.

2. Develop a brochure or series of brochures about natural resources on SCI (some are currently under development). Highlight key issues such as sensitive species management, non-native species control, and fire management.

B. Educate personnel about land management goals by way of classes, workshops, displays in communal areas, literature and signs.

C. Educate personnel about the need for enforcement of environmental restrictions to ensure the military mission is not affected.

III. Encourage the informal participation of all Island personnel in natural resource management activities.

A. Develop checklists and observation forms for Island personnel to record their observations.

B. Encourage all Island personnel to report unique plant and wildlife observations.

IV. Evaluate the effectiveness of strategies adopted and adapt them as necessary.

4.17 Coordination and Communication of Rules, Regulations and Safety Requirements

Currently, orientation of military personnel new to SCI is conducted by SCORE. Operational manuals provide rules for use of ranges and what type and where specific ordnance may be used. The natural resource liaison handles orientation of newcomers to the Island sponsored by NRO, all of whom are required to take an explosive ordnance safety class once a year if they intend to access SHOBA. A “rules of engagement”-style brochure oriented to operators and explaining natural and cultural resource restrictions is under development.

Specific Concerns—Coordination and Communication of Rules, Regulations and Safety Requirements

- Better coordination between NRO and military operations will improve the efficiency and productivity of all programs.
- The information regarding natural resources provided during Indoctrination Training and prior to exercises is crucial to obtaining the involvement of all Island personnel in conserving resources on SCI.

Proposed Management Strategy—Coordination and Communication of Rules, Regulations and Safety Requirements

Objective: ***Establish and express a clear and concise set of guidelines for military personnel and private contractors to follow to ensure all rules and regulations regarding natural and cultural resources are understood.***

Objective: ***Establish a way in which natural resource personnel are made aware of all rules and regulations regarding military operations and scheduling.***

I. Ensure that natural resource personnel, including contractors, understand the military mission, and observe the schedules and regulations of military personnel on SCI.

- ***A.*** Guidance should be provided all new and returning contractors and visitors regarding safety, security, travel, berthing, and other logistical protocols and information for their comfort and efficient completion of their assigned task. This guidance should include instruction on the use and return of SHOBA keys.
- ***B.*** Create a video or digitized compact disc for natural resource employees explaining the military importance of SCI and the military training performed on the Island. Require new personnel to view the video.
- ***C.*** Develop efficient and standardized protocols for scheduling natural resource activities in conjunction with military operations.

II. Establish uniform channels for communication between natural resources and military personnel.

- ***A.*** Delineate personnel to act as liaisons between appropriate departments and require monthly updates.
- ***B.*** Maximize the use of websites for dissemination of information.

III. NRO and commands should work together to develop a clear, concise manual of environmental precautions and restrictions to be used by commands when training personnel. The manual should be reviewed annually.

- ***A.*** The natural resource liaison should integrate instruction on environmental precautions and restrictions into existing training opportunities (i.e. safety stand downs, environmental awareness training, security briefings).

IV. Develop a multimedia educational program in support of the program objective.

- ***A.*** Support a natural resource orientation program for new personnel. Create a video for distribution to new personnel and for use at meetings about resources to avoid, and signage to watch for warning of sensitive resources. The video should feature interesting interpretive features and instructions on proper ways to enjoy and protect them.

V. Outline themes to increase awareness of natural and cultural resource activities.

A. Describe how military readiness and public land stewardship come together in the idea of sustainability.

B. Develop military membership and stakeholder involvement in natural resource decision-making groups and updates of this INRMP. Keep military stakeholders informed by way of:

1. Fact sheets
2. Policies, procedures and regulations
3. News articles and newsletters
4. Brochures
5. Inputs for current training courses
6. Informational videos
7. Web-based material
8. Commanding Officer's Guides

VI. Establish clear, coherent policies and procedures for allowing temporary access to SCI.

A. Planning for personnel access shall consider, but not be limited to, the following topics:

1. Eligible users of installation resources and facilities, including the installation's method of determining user eligibility and priorities.
2. Procedures required for the public to gain access.
3. Accessible and off-limits resources, areas and facilities.
4. Areas designated for special use.
5. Points of access and egress.
6. Periods of access.
7. List of permitted and prohibited activities.
8. Access agreements with agencies and organizations.
9. Installation-established access quotas to reflect installation operational, outdoor recreation, and wildlife carrying capacity.

VII. Evaluate the effectiveness of the strategies adopted and adapt them as necessary.

4.18 Cumulative Effects

Cumulative impacts may be defined as the sum of all individual impacts to a system. Individual projects may have little measurable ecological effect beyond the project footprint. However, dozens of similar projects could very measurably change sediment erosion and deposition patterns, organic matter production and movement, as well as affect types and areas of habitat on SCI. Modeling of cumulative impacts requires quantification of links between habitat "quality" and biological resource use, and these are generally poorly understood. For example, the cumulative effects of armoring on habitat functions other than resource use are not predictable at present, such as changing longshore drift velocities and lowering of the beach profile such that organic deposition on beaches is altered, as well as nutrient flux from sediments (Thom *et al.* 1994).

Specific Concerns

- Cumulative effects of small, medium, and large oil spills from boats, personal watercraft, and ships can contaminate SCI waters and affect biological resources.
- Coordinated planning for oil spill cleanup activities should be integrated with protection priorities of this Plan.
- Increased risk of oil spills and exotic species invasions with increased maritime traffic.
- Increased risk to water quality and air quality.

The definition of cumulative effects is different under NEPA than under the ESA. Under NEPA, cumulative effects are those that result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or nonfederal) or person undertakes those actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

The definition under the ESA is narrower. Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in a biological assessment or opinion. Future federal actions that are unrelated to the proposed action are not considered because they require separate consultation pursuant to Section 7 of the ESA (US Fish and Wildlife Service and National Marine Fisheries Service 1998). Usually, the NEPA/CEQA cumulative effects analysis is taken and applied to the narrower ESA definition. Potential cumulative effects from SCI projects include:

- Habitat conversion, loss, and fragmentation.
- Changes in sediment or salinity dynamics due to dredging.
- Increased disturbance of birds using shoreline areas.

Proposed Management Strategy—Strategy for Cumulative Effects

Objective: ***Minimize adverse cumulative effects on habitats and species of the SCI ecosystem.***

I. Standardize the format by which cumulative effects are discussed in environmental documentation (Parry 1990) as shown below and in this outline (sections *II* and *III*):

A. Documentation should be presented at different hierarchical scales that are standardized to the extent possible from lowest to highest scales, such as by habitat, the Island as a whole, Southern California Bight, state of California, or the Pacific Flyway.

B. Ensure the habitat classification system used in all documentation is the recognized classification used by NRO to make management decisions and that it is based upon the most recent information.

C. The assessment should provide a check on the fragmentation and loss of connectivity of remaining habitats.

D. The assessment should provide a check on the minimum size of viable habitat parcels, using target management species to define "viable" parcels.

E. The format should support an information base on local extirpations or declines of species at risk, both listed and others of concern, so that additional effects to these species from a project can be more easily reported upon.

II. Properly bound the spatial and temporal extent of projects, such that all other projects that overlap in time and space are considered.

A. Geographic boundaries of a proposed action should be defined by actual effects, not administrative or ownership boundaries.

B. The immediate geographic boundary of an analysis should be expanded until trends show that project effects diminish sharply.

C. Identify crucial agents of connection or interaction between habitats that may be affected by projects, such as water/watershed, sediment movement, animal movement, and wind transport.

D. If information is not available, such as a project site is known but no other supporting engineering or natural resource data, use data from this Plan to support the analysis.

III. Use focus management species identified in this Plan (Appendix D) that represent values at risk for a particular project, both directly and due to connections up the food chain or among habitats, to help focus the analysis of potential impacts.

IV. Once a standardized format is established, make the information accessible to project proponents and agencies to update and include in cumulative effects documentation.

V. Support research to improve the adequacy of cumulative effects analysis at predicting when habitat or species effects become significant.

A. Promote research on connections among habitats and species, and the relationship between habitat "quality" and resource use.

B. Support research on the effects of habitat fragmentation, using focus management species.

VI. Develop means to mitigate for cumulative effects.

4.19 Tracking Progress Over Time: Inventory, Monitoring and Research

Baseline inventories are essentially an audit of the status of natural resources at a fixed point in time, while monitoring tracks changes in these resources over time. Research is sometimes needed to cost-effectively determine the cause and effect of various management-related questions.

Long-term monitoring that builds upon a baseline resource inventory is the core of the monitoring and research program proposed in this Plan. A long-term monitoring program which tracks ecological integrity, soil and water status, and military use sustainability (Section 6.2.1 “Military Mission and Sustainable Land Use”) will allow the Navy to be responsive and adaptive in management approach and to respond to management and regulatory challenges in a timely and science-based manner.Time series data will support and serve as a powerful backdrop to all other aspects of monitoring, research, and conceptual modeling about ecosystem structure, function, and interdependencies that take place.

The aim is to strike the best balance between measuring a broad suite of environmental properties and species of interest, comparing new observations to the very limited data set from the past (to detect long-term trends), comparing trends in SCI waters and on land to trends in other regions (to separate local from large-scale influences), and keeping the costs down to an absolute minimum (to ensure that the time-series data collection can be maintained). Priorities will be kept to the minimum program needed to detect long-term trends. Once such trends are detected, additional research may be needed to understand the causes and consequences of the trends.

4.19.1 Inventory

Objective: ***Conduct baseline inventories to recognize the natural resources to be managed for at SCI.***

Proposed Management Strategy—Baseline Inventory

- DoD INSTR 4715.3 (3 May 1996) Section 6.1.8.1 states "Biological inventory should include, at a minimum, soils, vegetative communities, critical species (e.g. threatened and endangered, locally rare, keystone) and delineation of wetlands and water sources."

I. Compile, review, and integrate into the management program existing data collected but left unanalyzed by previous researchers, including:

A. Insect surveys — Extensive databases that need updating by Scott Miller (Smithsonian Institution) and Jerry Butler (University of California Berkeley)

B. Intertidal surveys, 1980s – 2000 — Jack Engle, Marine Science Institute, UC Santa Barbara

C. Trawling surveys — Dan Pondella, Occidental College

D. Miscellaneous SCI bird surveys over the years

E. Pelagic bird surveys — USGS or NOAA

F. Bureau of Land Management biological surveys, 1970s — Steve Murray

G. Organized diver transect surveys.

II. Conduct baseline ecological mapping of bottom substrate in nearshore and intertidal waters. Better substrate maps may help reduce the size of critical habitat designated for the white abalone.

A. Update the vegetation map and improve characterization of the plant communities due to dramatic changes over the last 20 years.

B. Collect historic aerial and satellite photos and maintain in a central location. Purchase new aerial photos at least every five years to monitor change.

C. Continue efforts to develop baseline information regarding small mammals, including abundance, distribution, and habitat relationships in order to evaluate the prey base for the shrike and fox.

D. Conduct vegetation trend monitoring surveys every other year.

E. Conduct baseline insect surveys.

F. Conduct baseline bat surveys, already funded for 2002.

G. Conduct baseline intertidal surveys.

H. Conduct targeted exotic species surveys to detect recent introduction and prioritize eradication effort.

I. Conduct a baseline kelp inventory at 26 sites.

4.19.2 Long-term Monitoring for Status and Trends

Specific Concerns–Long-term Monitoring for Status and Trends

- Management questions also need to consider whether an anthropogenic cause is due to local, regional, or larger-scale processes. This means monitoring protocols should be consistent with those on a regional or larger scale to be most telling. Populations of some species should be tracked regionally to provide understanding of their local dynamics.
- Better definition of policy/management issues will allow more focused objectives for assessment and monitoring and more cost-effective strategies to reach the objective. In some cases, we do not yet have the baseline information or perhaps the insightful understanding necessary to define these issues and state specific objectives.
- Low-frequency variability (long-term change such as that associated with El Niño) often tends to be greater in magnitude than changes on seasonal and shorter time scales. A key and very difficult question for management and policy making is whether an observed change is due to natural or anthropogenic causes. These and many other management questions cannot be answered without long-term data sets that track conditions on the Island and their cause. In general these long-term data sets are not available.
- Without current inventories and monitoring, natural resources personnel could be constrained by a lack of knowledge that could lead to regulatory penalties.
- The Navy needs to demonstrate its good stewardship with science-based data in order to communicate better about its mission and earn public confidence in its responsible use of public lands.

***Objective:** Detect the extent and spatial scale of trends in critical ecosystem structural and functional attributes that contribute to the Island's important role as a nursery for juvenile fish and invertebrates; as a migratory stopover; as a breeding/nesting ground for wildlife, and for supporting endemic and rare species.*
***Objective:** Determine the cause of detected trends, separating management effects from natural variability.*
***Objective:** Use the trends to assess the relationship between physical and chemical factors and biological responses.*

Long-term Monitoring for Ecological Condition and Trend and Military Sustainability

I. Establish a long-term monitoring program that tracks both ecological trends and military sustainability.

A. Make this monitoring program the centerpiece of accountability in a programmatic approach to environmental compliance based on the following principles:

1. Flexibility in controls on military use with accountability for performance.
2. Establishment of performance measures based on mutually agreed-upon, shared indicators of success.
3. Adaptive management
4. Identification of both ecological and military success criteria.

II. Select focus management species for long-term monitoring that together meet the above objective.

A. The set of species should meet most of these criteria:

1. It should be a marker of long-term trends in ecosystem structure or process.
2. The sampling and analysis expected can be sustained in the long-term due to its cost-effectiveness.
3. The indicators can serve as an early warning for ecosystem threats, such as exotics.
4. The work has broad support and involvement by planners, managers, scientists, and the public.
5. Information supports an annual report produced in a manner useful to managers and the public, with synopses.

B. Periodically and iteratively refine objectives of long-term monitoring so that indicators can progressively define degradation of the Island in a more quantitative sense (National Research Council 1990).

C. Phase the implementation of long-term monitoring based on a set of priority measures that are essential and should be accomplished at a minimum.

D. Define the types of analysis that will be conducted with these data.

III. Select target species.

A. The following are criteria for selecting and using suitable target management species for the Island using recommendations from the literature (Patton 1987; Landres *et al.* 1988; Morrison *et al.* 1992; Marcot *et al.* 1994; Niemi *et al.* 1997) as guidance and drawing on the experience of the San Francisco Bay monitoring program, among others. The target management species selected should meet most of these criteria and should be highlighted in project evaluations, long-term monitoring focus, and modeling and research priorities in implementing this Plan.

1. The species relies on SCI to complete its life cycle.
2. The species is sufficiently sensitive to SCI disturbances that it provides a marker of environmental degradation.
3. The species is a keystone upon which the diversity of a large part of a community depends.
4. The species is a habitat specialist that consistently uses one habitat type or condition, or a certain combination of habitats to complete its life cycle.

5. Populations are of sufficient size or density to be reasonably detected and monitored.
6. The species is a year-round resident or, if migratory, is known or strongly suspected of being primarily affected by local disturbances.
7. Populations are not normally sensitive to other environmental factors that would confound determination of cause-and-effect relationships (e.g. weather, predation, disease, competition).
8. The species is in decline even if the cause is known to be non-SCI-specific.

IV. At a minimum, the following species or groups of species should be monitored:

A. All federally and state listed plant species should be monitored every five years.

B. All arborescent plant species should be monitored as indicators of community integrity and health every three years.

C. Marine mammals surveys should be conducted every three years.

V. Coordinate sampling to maximize the ability to establish correlations among the monitoring elements.

A. 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.

B. Develop and adopt a means to obtain and use this information in an integrated and coordinated manner that would avoid conflict and dilution of effort, as well as maximize the ability to conduct correlations among the monitoring elements.

1. 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. The sampling could also be stratified by season, or an indicator season might be selected.
2. Conduct certain standardized analyses. For instance, an environmental indicator variable such as salinity or temperature should be directly related back to effects on species, habitats, and communities.

VI. Apply adaptive management principles to modify the content of a comprehensive monitoring program to be more supportive of the needs of managers.

VII. Establish a committee to make decisions on long-term monitoring. The purpose of the committee is to decide about long-term monitoring priorities, phasing or stepwise implementation of monitoring elements, quality assurance and quality control, and effective dissemination of monitoring results to a broad audience. This committee will not make management recommendations.

VIII. Monitor fire weather in at least four locations and improve access to these data.

IX. Conduct long-term monitoring of sea temperature and water clarity, at a minimum, in conjunction with Channel Island-wide programs, in order to separate natural from artificial changes in habitats and communities.

X. Continue to monitor Island trend using LCTA plots.

XI. Monitor fire intensity using a nationally developed method.

XII. Conduct kelp monitoring at 12 survey sites.

XIII. Repeat Littler transects from the 1970s.

XIV. Partner with other agencies to conduct intertidal monitoring.

XV. Participate in Channel Islands intertidal surveys.

4.19.3 Research

For the purposes of this INRMP, we propose to monitor a set of management focus species to monitor trends and provide management cues. Any environmental variable selected for monitoring and evaluation should be directly related back to effects on species, habitats, and communities. Indices that combine sets of data based upon species abundance or relative abundance as indicators of ecological health are not necessarily preferred over simple, long-term data on specific physical, chemical, or biological trends. While there are some species abundance and proportions strongly correlated with environmental perturbations, a very large data set is needed to calibrate such an index. It may be much more work to develop the index of some aspect of structure that would be accepted in the scientific community (if it were even possible) than it would be to take the samples needed to detect long-term change in the first place.

Many regional monitoring programs depend heavily on the use of focus management species to assess ecological condition and trend, including that of Chesapeake Bay, San Francisco Bay, and many others both terrestrial and aquatic. Use of focus species as a management tool supports these advantages:

- Fosters continual reevaluation of efforts, refinement of objectives.
- Helps communicate a consistent public message.
- Supports program planning, strategic direction-setting.
- Supports targeting of resources.

Target or focus management species have provided and likely will continue to represent one of the most tangible, measurable approaches to environmental inventory, monitoring, and assessment (Noss 1990). The criteria and assumptions used to select these species should be clearly defined prior to the selection process to ensure the best possible candidates are selected and to avoid over-interpreting results of monitoring and project evaluations (Landres *et al.* 1988).

Focus management species can add an important level of detail to a time-series program that can allow the relating of physical and chemical data to a species' specific dispersal or other life history needs tied to its use of resources. The role of particular habitats or environmental factors may go undetected if at least some species are not examined at a fine, life-history scale. They are also meant to provide management a practical focus, under the assumption that managing for certain, carefully selected species of concern will take care of many others with overlapping habitat, food chain, or other ecological needs. However, focus management species are only one type of ecological indicator, and should not be used in isolation from other tactics that are equally important, such as those that are more directly habitat-based.

Proposed Management Strategy—Data Integration, Access, and Reporting

***Objective:* Ensure the most effective integration, analysis, and dissemination of monitoring and research on San Clemente Island and communication of this information to all concerned, so resources are targeted effectively.**

I. 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.

- ***A.*** The criteria for selection of an institution for managing a data clearinghouse should include longevity, objectivity, ability to work with the public, and cost benefit.
- ***B.*** Develop and adopt a means to catalog and access this information that would avoid conflict and dilution of effort.
  - *1.* 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.
  - *2.* Establish a standardized format for submitting data or reports to the clearinghouse.

II. Organize events to promote data sharing, technology transfer, and communication for a broad range of involved parties.

- ***A.*** Produce a biannual report on the results of long-term monitoring and other research in a format accessible to the involved public.
- ***B.*** Participate in biennial workshops or conferences on ongoing research and monitoring, and management planning for the Channel Islands.
- ***C.*** Develop shared field programs that will promote cross-disciplinary working relationships.
- ***D.*** Target reporting and communication in conjunction with neighboring "estuarine" systems: Tijuana Estuary, Mission Bay, Los Penasquitos, etc.
- ***E.*** Integrate data with that of other Channel Islands.

III. Seek standardization of the approach to communicate research and monitoring results so that the format is accessible to a broad audience, through the two separate committees established to manage the research and the long-term monitoring programs.

A. "Bundle" sets of results for reporting to management and the public so that the monitoring results are more comprehensible.

IV. Enhance data compatibility and standardization of study methods so that data may be more effectively integrated.

A. 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.

Policy Strategy - Research to Support Management Needs

Objective: Support management decisions by conducting research on the mechanisms and processes that provide value to the Island as an ecosystem.

I. 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. The work supports technically sound decisions about the relative quantities (habitat balance) desirable for SCI.
- 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. If there is disagreement, then managers carry the day. The list is reconsidered every year, based on adaptive management principles. The criteria for making the list are (1) prevention of new problems or threats to the Island's ecosystem; (2) helps resolve conflict with Island uses; (3) reduces an ecosystem-wide impact or provides an ecosystem-wide benefit; (4)improves conditions of the most impaired habitats or species on the Island; or (5) relatively cost-effective for achieving the goal and objectives.

II. Coordinate with USFSW and NPS on updating the Channel Island Recovery Plan.

III. Establish a committee of scientists, managers, users, and the involved public to prioritize research needs. The purpose of the Research Committee will be to set research priorities in relation to management concerns, decide what management concerns make the Priority Problem List and rank issues on the list, ensure the quality of research conducted and tie-in to management, and communicate research results effectively to a broad audience.

A. The committee should develop, maintain and update conceptual models of how species groups use the Island in order to: improve communication about how the ecosystem works, help identify research and monitoring priorities, and provide a framework within which to identify and test key processes.

IV. The broad purpose of a research program will be to:

- Increase understanding of physical/chemical processes on the Island that support plant and wildlife use and that relate to management actions.
- Help relate information from long-term and project monitoring into conceptual models about Island functions on multiple scales from individual species life history to the Island as a whole.
- Test cause-and-effect relationships identified in conceptual models.
- Reduce scientific uncertainty with respect to management decisions.

A. Conduct baseline, whole-Island characterization studies. Fill critical information gaps needed to understand the functional relationships among habitats and communities well enough to provide guidance for impact assessment and enhancement priorities.

1. Give priority to baseline studies that will be taken up in the long-term monitoring program, except when the results of the study are expected to suffice for an extended time (such as sediment characterization).

2. Establish baseline data sets for community abundance and distribution, emphasizing lower trophic levels or physical factors that have predictive value for organisms.

a. Substrate characterization

b. Temperature and salinity

c. Phytoplankton

d. Zooplankton

e. Algae

f. Benthic invertebrates

g. Larval fishes

3. Use correlation among the relevant variables as a guide for more focused studies.

B. Conduct focused studies on the effects of natural and anthropogenic disturbance that test conceptual models.

C. 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 biological resources.

1. As a first priority, evaluate the effects of fires (wildfire and prescribed fire) on key biological resources, and abiotic features such as erosion rates, where relevant,

   a. Examine the effects of fire on the boxthorn community.

2. Conduct studies on the feeding dependencies of declining birds.

3. Continue to refine concepts of reference condition for SCI habitats.

D. Conduct pilot projects that expand restoration science or technical understanding. Examples are:

1. Optimal design, configuration, and management outplanting experiments.

2. Effective and affordable methods for controlling non-native invasive plants.

V. Facilitate cooperation among involved organizations, including integrated and collaborative actions, and collaboration of relevant scientific and engineering disciplines.

4.19.4 Monitoring for Project Success: Evaluating Effectiveness

Proposed Management Strategy—Monitoring Related to Projects

***Objective:* Improve the ability to build on existing and new project monitoring experience.** The outline below draws heavily on the San Francisco Baylands Goals Project (Goals Project 1999).

I. Obtain useful information from each restoration and enhancement project and use projects to test new ideas.

A. Integrate the use of pilot projects for innovation in mitigation and restoration design and construction.

B. Standardize methods and protocols to enable comparison among projects, as well as between short-term and long-term monitoring programs at a reasonable cost.

II. Provide quality control and assurance for monitoring data and their interpretation.

A. Assess existing monitoring efforts on the Island.

III. Encourage public-private partnerships to research the design, implementation, and monitoring of mitigation projects.

A. Assess success of mitigation projects and use results to improve implementation.

IV. Supplement project-related monitoring with focused research on such topics as:

- the relative importance of habitat at a certain location compared to a neighboring area, to support evaluation of project placement/alternative sites.
- the strength of dependencies among habitats and organisms (productivity, physical material transport, tidal circulation, and biological linkages such as migration and feeding dependencies, etc.), in order to better define the area of influence of a project and cumulative effects.
- quantified area of influence, and
- quantified response time scale, and
- quantify changes in organism abundance and community structure.

V. Evaluate project success based on priority goals and objectives of this Plan.

A. Consider success ranking based on the SCCWRP 1999:

- To what extent will the project restore functioning of natural processes (e.g. hydrology)?
- Will the project result in an increase in habitat acreage?
- Will the improvements be self-sustaining? What level of on-site management or maintenance will be required?
- To what extent is the site physically and ecologically connected to other natural upland transition habitats?
- To what extent is the site hydrologically and ecologically connected to marine habitats?
- To what extent will the project benefit marine and intertidal resources?
- What is the site's function and value from a regional perspective, including sensitive species habitat, use by migratory birds, fisheries support, and biodiversity?

B. Identify a predisturbance reference condition to help evaluate success.

C. Where possible, restore processes instead of structural habitat features, in order that the work be self-sustaining. Emphasis should be on process-based ecosystem restoration.

VI. A systematic program is needed, designed to fill gaps in data and technology as these are prioritized by managers, rather than the past project-by-project, opportunistic approach.

VII. Disseminate inventory, monitoring, and research results to facilitate integration into management decisions.

VIII. Partner with other agencies to conduct long-term monitoring, since no single agency can afford the whole cost, and data sets provide more information for management when they are collected elsewhere as well.

IX. Seek multiple-agency concurrence with long-term monitoring decisions and methods.

X. Facilitate mutually beneficial research on SCI ecological concerns by correcting access problems for researchers.

4.20 Cultural Resources Management

Federal laws and regulations protect cultural resources and require Federal agencies to identify, protect, and manage them. Within Navy Region Southwest and San Clemente Island, 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. 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.

Proposed Management Strategy for Cultural Resources Management

Objective: Ensure that natural resources management strategies proposed in this INRMP do not have an adverse effect on cultural resources.

I. Ensure consistency between this INRMP and existing cultural resource plans and any Integrated Cultural Resource Management Plan.

II. Resolve uncertainty for sponsors of mission-related activities regarding which cultural resources are significant and what measures should be taken for their protection.

- ***A.*** Continue to use the site approval process to accomplish this strategy.

III. Clarify when mission activities and preservation of an eligible or National Register-listed site may be in conflict, requiring an assessment of effects and mitigation measures.

- ***A.*** Consult with the SHPO on archeological and architectural inventories.
- ***B.*** Consult with SHPO regarding the management of historic properties, including the appropriateness of a Programmatic Agreement to expedite routine or repetitive actions.

IV. Safeguard resources and information to preserve the cultural heritage of the NBC properties.

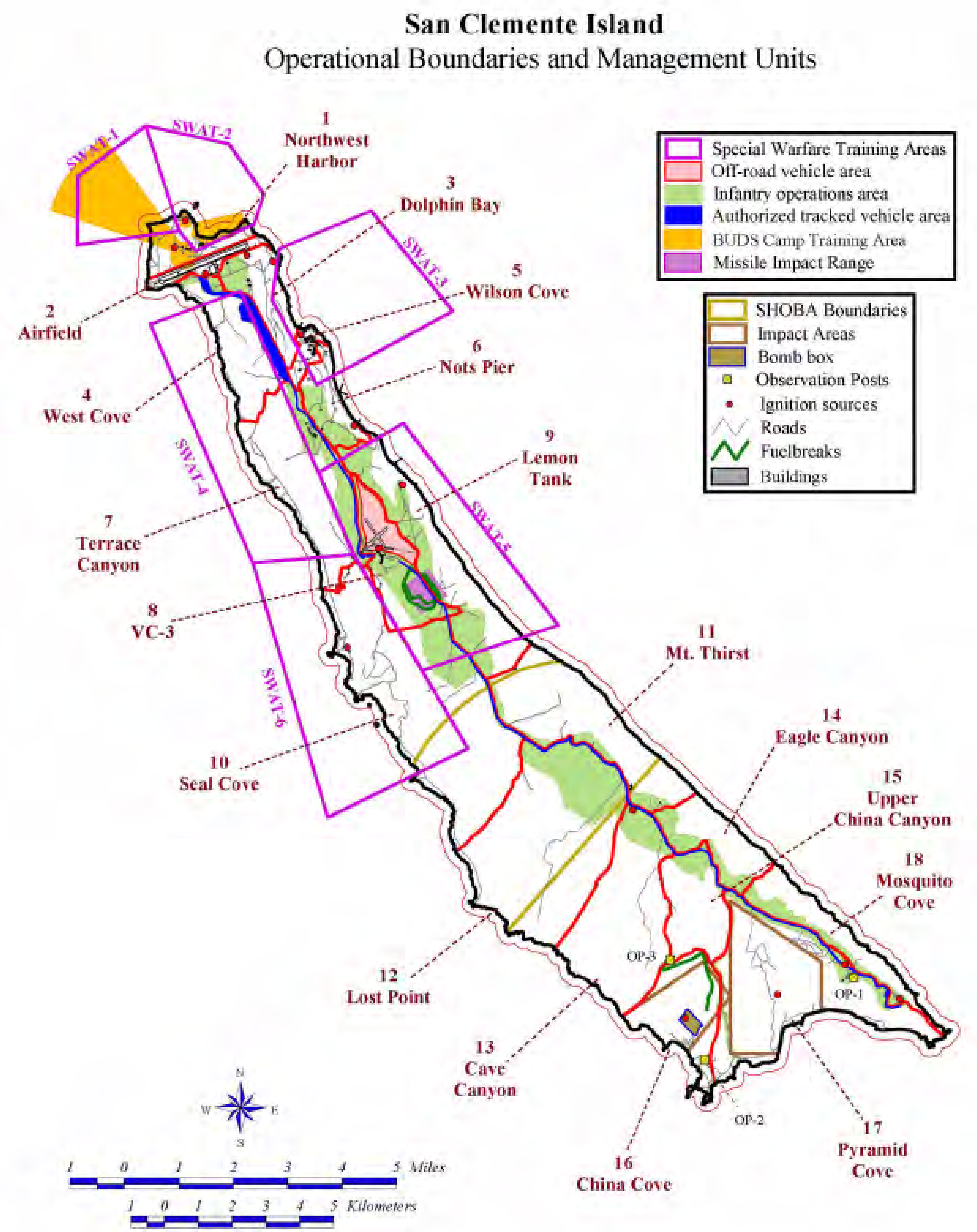
- ***A.*** Develop and adopt policies, standards, and BMPs for protecting resources.
- ***B.*** Support research on archaeological resources that is compatible with the military mission.

V. Determine stewardship responsibilities with respect to Native American values.

VI. Establish access criteria and communication protocols for Native Americans with interests in SCI resources.

5.0 Strategies by Management Unit

In this chapter, individual land management units are looked at in detail as a practical way to organize the objectives and strategies already presented in Chapter 4 to assure compatibility and deconflict incompatibilities on the ground. Management priorities shift from unit to unit as both resource values and military values and use change. This focus on smaller land areas land management units provides another means to achieving "integrated" natural resource management and the INRMP goal.



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Definitions of Types of Operations Conducted on San Clemente Island

Refer to management unit descriptions for listing of operations applicable to each management unit.

Air Special Operations: Naval Special Warfare members may be extricated or infiltrated by helicopter as part of different training scenarios.

Combat Search & Rescue (CSAR): CSAR Operations train participants to search for, locate, protect & rescue pilots and air-crew who have landed or been downed in hostile territory. The operation can include reconnaissance aircraft to find the downed aircrew, helicopters to conduct the rescue & fighter aircraft to perform close air support to protect both the downed aircrews and the rescue helicopter.

Command & Control: Command & control training is part of all operations to teach organization of personnel assets to achieve target goal. Allows training in communication coordination both among ground troops and other exercise participants.

Electronic Warfare: All electronic warfare (EW) exercises train participants to detect, identify, characterize & counter an electronic threat. The REWS facility can send electronic threat signatures to fixed wing air, rotary wing air, surface ships or ground forces to train personnel in the above. The number of participants and scenarios run can enhance the complexity.

Engineering Operations: Training Objective is to orchestrate ship to shore movement and beach landings. Approximately 30 Marines come shore from a Landing craft Unit (LCU) in the Northwest Harbor area. They are accompanied by 3 HMMWVs and one 5-ton truck. They conduct demolition in the NW Harbor Demolition Training areas. Marines leave by LCU from Northwest Harbor.

Fire Support Coordination: Marine Corps personnel train to direct air assets to provide cover for ground troops during ground operations. Personnel train on how to accurately place location of ground troops to direct air support away from personnel location but sufficiently target "enemy" forces.

Firex: Naval gun crews on surface ships within the SHOBA boundaries, train on how to coordinate with spotters and accurately place naval gunfire on target.

Fleet Carrier Landing Practice (FCLPs): Before landing planes on an at sea aircraft carrier either for the first time or when reestablishing qualifications, all pilots practice on a simulated carrier deck painted on the surface of the existing airfield runway.

Ground Operations: Can include shore assault, boat raids, airfield seizure and reconnaissance missions, which include insertion to the island by UH-1 helicopters landing in an authorized landing zone & small marine units traveling on foot to the intended target. The Battalion Landing can include up to 1500 Marines coming ashore by sea and air, and may include landings within this zone. The Infantry Operations area will be utilized during any amphibious landings in this zone.

Ground Reconnaissance & Surveillance: Small groups of marines travel on foot to the objective area. Covert reconnaissance is conducted in preparation for a follow-on assault.

HC-85 Operations: HC-85 personnel can launch and recover helicopters taking part in the recovery of training mines or mine shapes as part of ASW exercises or RDT&E. Additionally, HC-85 supports fire fighting through its capacity to carry water buckets.

Information Special Operations: Can be a part of all other operations. Training in the gathering, use and manipulation of simulated intelligence information about simulated opposing forces.

Land Special Operations: includes Naval Special Warfare land navigation training and reconnaissance training.

Live and Inert Ordnance: Can be dropped from fixed wing or rotary wing aircraft to gain training in accuracy of weapon delivery. Pilots train to identify and locate targets

Maritime Special Operations: includes small group, covert amphibious landings where Special Forces plan and execute a successful beach approach and landing. Units then form on the beach and move towards a designated area for further training, such as a simulated air field seizure, humanitarian assistance and reconnaissance training.

Night Air Operations: Any and all aircraft training taking place at the SCIRC Ranges both onshore and offshore can take place at night departing or landing at the airfield. The use of special night vision goggles to increase visibility can be practiced at the airfield.

RDT&E Missile Tests: During the test flights of missiles to be used in the missile impacts range, there will be support aircraft that could launch from the airfield.

RDT&E Ocean Engineering: Aircraft supporting ocean engineering exercises can launch from the airfield.

RDT&E Radio Frequency (RF) Tests: electronic tests to determine field intensities and their effects on certain targets.

RDT&E Unmanned aerial vehicles (UAV) tests: Training in the operation of UAVs provides reconnaissance of opposition forces without the risk of loosing American lives. Exercises can be conducted from the main air terminal & runway, allowing for close observation of the UAV and target.

Support Surface to Air Missiles: Aircraft used for target launch & recoveries depart from the airfield.

Third Fleet Multi-warfare operations: This area can be used by forces participating in a coordinated large-scale multi-warfare mission being planned in the water ranges off of SCI, such as a Joint Task Force or Battalion Size Amphibious Landing Exercise. The specific training in this area would include Land Special Operations, Reconnaissance Operations, Marine Fleet Operations, and Intelligence Operations, as part of an inter-discipline training exercise.

Third Fleet Support Battle Exercises: As the main transportation area for water traffic, Wilson Cove would become a part of many fleet Battle Experiments.Fleet sometimes tests new weapons within SHOBA.

Third Fleet Theater-level Operations: All large scale operations that utilize multi-SCIRC ranges such as JTFEX or Battalion Landings will include some of the activities previously discussed under *Third Fleet Multi-warfare Operations*. Can also include some ordnance training within SHOBA.

Troop Lifts: Part of USMC training exercises on SCI. Marines are transported on and off the island via: air assets. Helicopter assaults and infantry Operations are conducted at the old airfield. Marine personnel, vehicles and equipment participate in exercises at the Marine Training Area and Infantry area.

Tables of Potential Conflict Between Human Activities and Focus Management Species

The tables included within each management unit summarize the ***potential*** for impacts to focus management species based upon overlap of species locations and human activities. The ratings are subjective and should be viewed cautiously on a unit by unit basis. The tables are intended to highlight those areas where avoidance or minimization measures may be necessary.

The level of potential impact on some species was assumed to increase as the number of individuals on foot increased. Ratings may be lowered (e.g., Medium to Low) if the activity is likely to have little impact on the species (i.e. Individuals on Foot). Land demolitions are confined within TARS and SWATS, however the noise from this activity may still impact some species.

Species notes:

Because the San Clemente Island Fox is found throughout the Island, it was only evaluated for the effects of increased road traffic which will impact foxes.

Although rodents are a focus management species, they were removed from the analysis because there is no current information as to their distribution on SCI.

Dune Specialists are *Camassonia guadalupensis clementina* and *Cryptantha traskiae*.

Terrestrial Mollusks are *Micrarionta gabbi, M. intercisa, M. redimita, Vertigo californica spp. longa, V. c.* ssp. *catalinaria*, *Sterkia clementina, Quickella rehderi,* and *Catinella oregenensis.*

Abalone includes white (*Haliotis sorenseni*), pink (*H. corrugata*), black (*H. cracherodii*), green (*H. fulgens*), red (*H. rufescens*), threaded (*H. assimilis*), and flat abalone (*H. walallensis*).

Pinnipeds include the California Sea Lion (*Zalophus californianus*), the Northern Elephant Seal (*Mirounga angustirostris*), and the Pacific Harbor Seal (*Phoca vitulina*).

Orange-crowned warblers were included in those units which contained their preferred habitat on SCI, Maritime Sage Scrub.

Presence of Terrestrial Mollusks and Island Night Lizards are based upon correlations with vegetation communities.

For locations of non-listed, but sensitive plant species see Appendix C.

Definitions:

TARS = Training Area and Ranges
SWATS = Special Warfare Training areas
MTR = Mine Training Range
FSA1 and 2 = Fire Support Area (Impact Areas)
General Increase in Tempo = These are expected increases due to both an increase in military operations and the increased presence of natural resource managers.
High = There is a strong possibility that activities within that operational footprint have the potential to impact the focus management species, and avoidance or minimization measures may be necessary.
Medium = There is a possibility that activities within that operational footprint may impact the focus management species, and a voidance or minimization measures may be necessary.
Low = Although some conflict is possible, the activity should have little potential for impacting the species.
? = Some conflict is possible, but cannot be rated given current information.
blank = There should be no potential for conflict.
^{s} = The potential for impacts are seasonal based upon the species' life history.
* = Federally listed species - Endangered, Threatened, Proposed

Location: Unit 1 (Northwest Harbor)

Military Value: Highest

Naval Special Warfare
- Land Special Operations
- Maritime Special Operations
- Air Special Operations
- Information Special Ops

THIRD Fleet
- Multiwarfare Operations

Prohibited Uses:
Recreational camping, off-road vehicles, heavy wheeled vehicles, tracked vehicles, missile impacts, fixed wing landings, bombing, laser designator.

Other Uses:
- Recreational diving and fishing areas offshore
- Boxthorn monitoring
- Sage sparrow monitoring
- Quarrying (borrow pits)

Facilities:
- TAR 1-4, 18
- BUD/S Camp
- Maritime Operations Facility
- Small Arms Range
- Demolition Ranges (3)
- Hand Grenade Range

Roads: Primary- 2.3 mi (3.7 km)
Secondary- 4.8 mi (7.7 km)

Natural Resource Value: Medium

Ecological Units:
- MDS Boxthorn (333.8 ac)
- Active sand dunes (10.7 ac)
- Stabilized sand dunes (70.9 ac)
- Coastal strand (33.1 ac)
- Sea stacks

Wildlife:
- Sage sparrow*
- Snowy plover*
- Brown pelican*
- Island night lizard*
- Island fox
- marine mammal haul-out site
- endemic dune beetles possible

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
- *Aphanisma blitoides*
- *Astragalus nevinii*
- *Camissonia guadalupensis*
- *Cryptantha traskiae*
- *Eriophyllum nevinnii*
- *Eschscholzia ramosa*
- *Lavatera assurgentiflora glabra*
- *Lycium brevipes hassei*
- *Phacelia floribunda*

**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- Highest military value, so management emphasis is aimed at maximizing those military values with consideration of the resource values.
- Active dunes, because Northwest Harbor may be the only location where the processes that sustain these dunes are still ongoing on the Island.
- Island tree mallow, because this is the only Island location where it remains in its natural (unplanted) state and 85% of *the* existing known SCI population lives in Northwest Harbor.
- High value for *Cryptantha traskiae* (50% of population occurs in this unit).

Concerns:
- Live-fire training in this area will be conducted adjacent to extant sage sparrow habitat. The challenge of focusing training into a well-defined footprint without compromising the integrity of the surrounding habitat will be tested.
- Brown pelicans roost off-shore from this management unit on Castle Rock and Bird Rock. Disturbance of these important offshore roosts should be minimized.

Management:

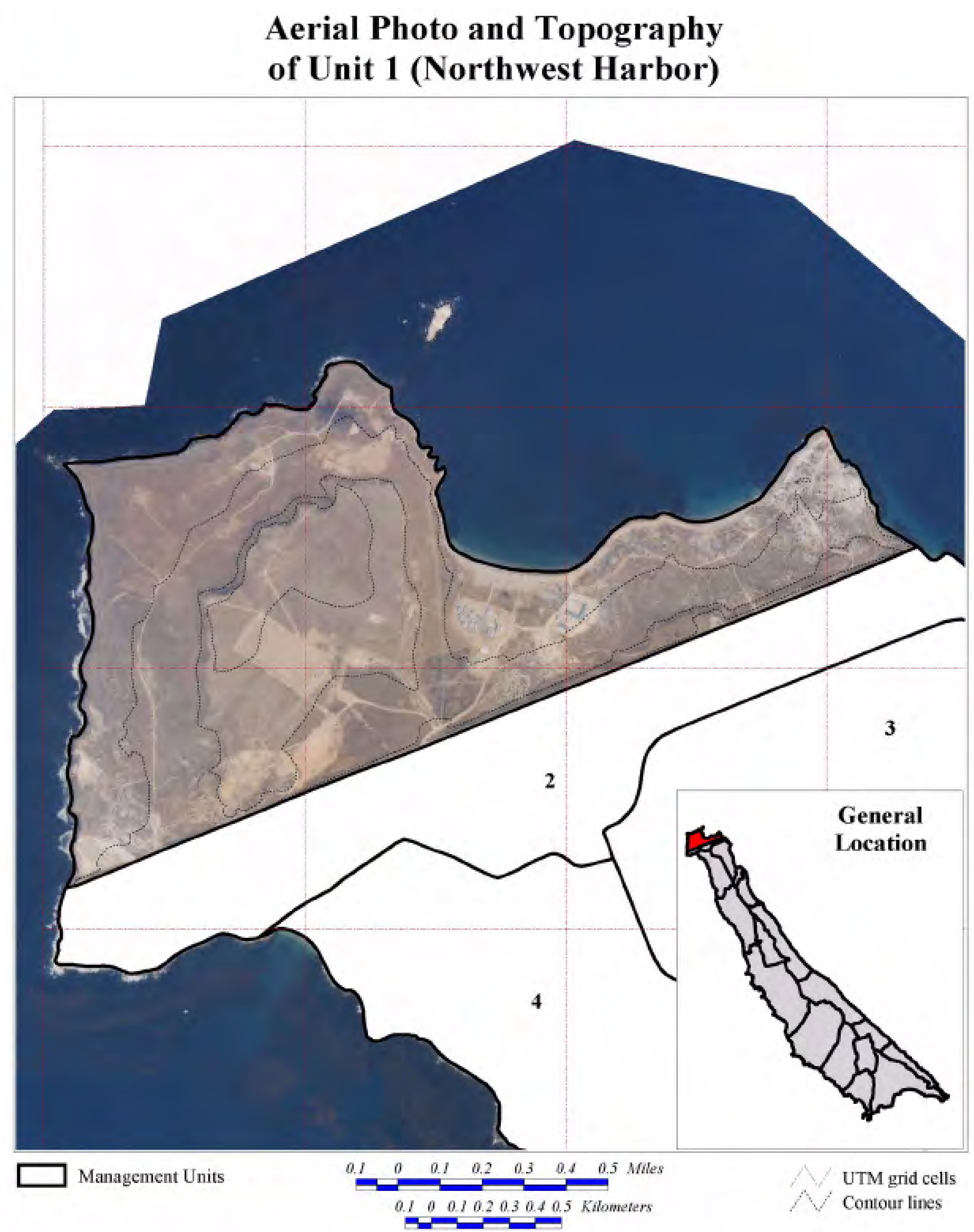
- Minimize conflicts between training and snowy plover that might result in restrictions on training. If deemed necessary by NRO, conduct pre-activity reconnaissance for western snowy plover during its overwintering period and adjusting timing or location of activity as needed. Wintering period is from the end of August through February.
- Protect the existing island tree mallow and reintroduce new plants, when necessary, in areas not in conflict with military use to ensure the species' persistence from extinction.
- Evaluate fire vulnerability of Island tree mallow and protect from hot fires if necessary with brush clearing or retardant.
- Maintain the processes that sustain dunes in their active state by evaluating shoreline or other structures for whether they obstruct the movement of wind and water currents and disrupt the natural dynamics and sand supply needed to sustain active dunes on SCI.
- Control exotics to conserve the dune community and endemic plants and animals native to the active dune complex on SCI.
- Monitor boxthorn to maintain this community's northernmost distribution in a condition suitable for occupation by the San Clemente sage sparrow at existing (2001) territory levels.
- Monitor *Cryptantha* population.
- This area has very high military value, so the usual boxthorn objectives will not apply. Fire management consultation under the Endangered Species Act will evaluate a focus on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn within five years. For a fire to be counted as a burn it must be at least a moderate burn (Score 3 on NPS scale 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.
- This is a high priority fire management area due to incendiary activities.
- Primary fire suppression asset during fire season will be a helicopter based at nearby airfield. Outside of fire season, suppression assets will be ground based.
- This area is a good location for further investigation of fire's effects on boxthorn to improve management objectives, since there is a history of past fires there.
- Avoid shoreline construction (other than planned MOUT facility) that results in a loss of coastal strand habitat.
- Clean up trash and debris especially in shoreline areas.
- Survey sea stacks for use by plants and animals, with emphasis on endemics.
- Limit disturbance on or near sea stacks, including use as military targets. Protect purple hydrocoral on Bird Rock. Protect seabird values of sea stacks.
- For eelgrass, continue to abide by no net loss provisions of the Clean Water Act and mitigation standards under the Southern California Eelgrass Mitigation Policy if disturbed.
- Avoid disturbance of and limit access to pinniped haul outs and rookeries during the breeding season May through August, which may result in stampeding and trampling of pups.
- Resolve plant community designation for unmapped area on vegetation map.
- Retain MDS Lycium community outside of TAR 4 boundaries sufficient to continue to support breeding sage sparrows.
- Conduct all necessary training activities within defined training area footprint and do not degrade surrounding habitat. Document capability of focused training.
- Implement, with the review and concurrence of the USFWS, TAR 4 Habitat Monitoring and Restoration Guidelines. As habitat damage is identified, restoration shall begin and be maintained until success is achieved.
- 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. 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.
- Place water buffaloes, swatters and other appropriate fire fighting equipment at each TAR, and train all personnel to use this fire fighting equipment, prior to commencement of training.
- Monitor each new TAR for new exotic plant introductions on a semi-annual basis, and control new species if located.
- Provide ongoing natural resources training for the MAROPS Officers in Charge (OICs) of the new TARS so they can convey necessary environmental information to user groups. All Range Safety Officers (RSOs) and Range OICs leading training exercises on SPECWAR ranges shall receive a brief from the range manager on rules and regulations for each TAR.
- Report any fires to the USFWS, and include them as a part of annual fire reporting.
- 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.
- Remove metallic debris, including shell casings and bullets (where accessible without damaging vegetation), from TAR 4.
- To the maximum extent possible, conduct any range surface clearance necessary in MDSLY on foot to reduce habitat damage.
- Continue ongoing population monitoring of the sage sparrow.
- 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. 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.

Table5-1. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

1. Northwest Harbor

		Species Present in Unit	Activities																				
			Infantry Ops (Battalion Landings) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
			Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****																						
	Delphinium variegatum kinkiense*																						
	Lithophragma maximum*																						
	Lotus dendroideus traskiae*																						
	Malacothamnus clementinus*																						
	Sibara filifolia*																						
	Brodiaea kinkiensis		Not Applicable															Not Applicable	Not Applicable				
	Lavatera assurgentiflora glabra	X																		Low	Med		
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists	X										Low			High					High	Med		
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	**Terrestrial Mollusks**	X							Low			Low								Low			
	Island night lizard*	X							Low			Low	Med		Low					Low			
	San Clemente sage sparrow*	X							Low			Low	Med		Low					Med			
	San Clemente Island fox	X																		Low	Low	Med	
	San Clemente loggerhead shrike*		Not Applicable															Not Applicable	Not Applicable				
	Western snowy plover*	X							High[S]		High[S]	High[S]											
	Xantus' murrelet																						
	Abalone*	X									?			Med		Low	Med						
	Pinniped Haulout	X											?	Med	Med		Low			Med			

*** Effects related to fire are treated in a separate matrix.**



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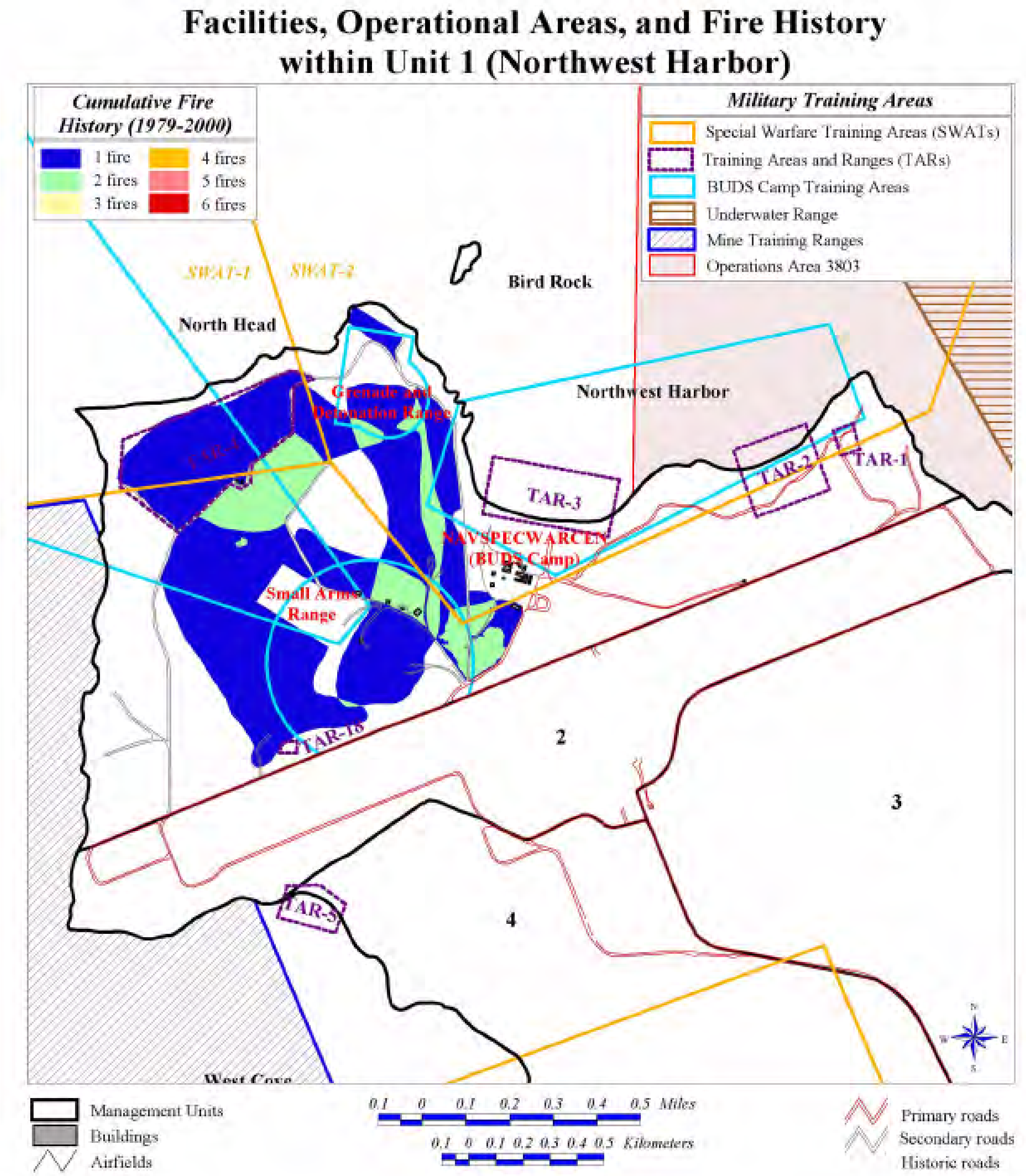

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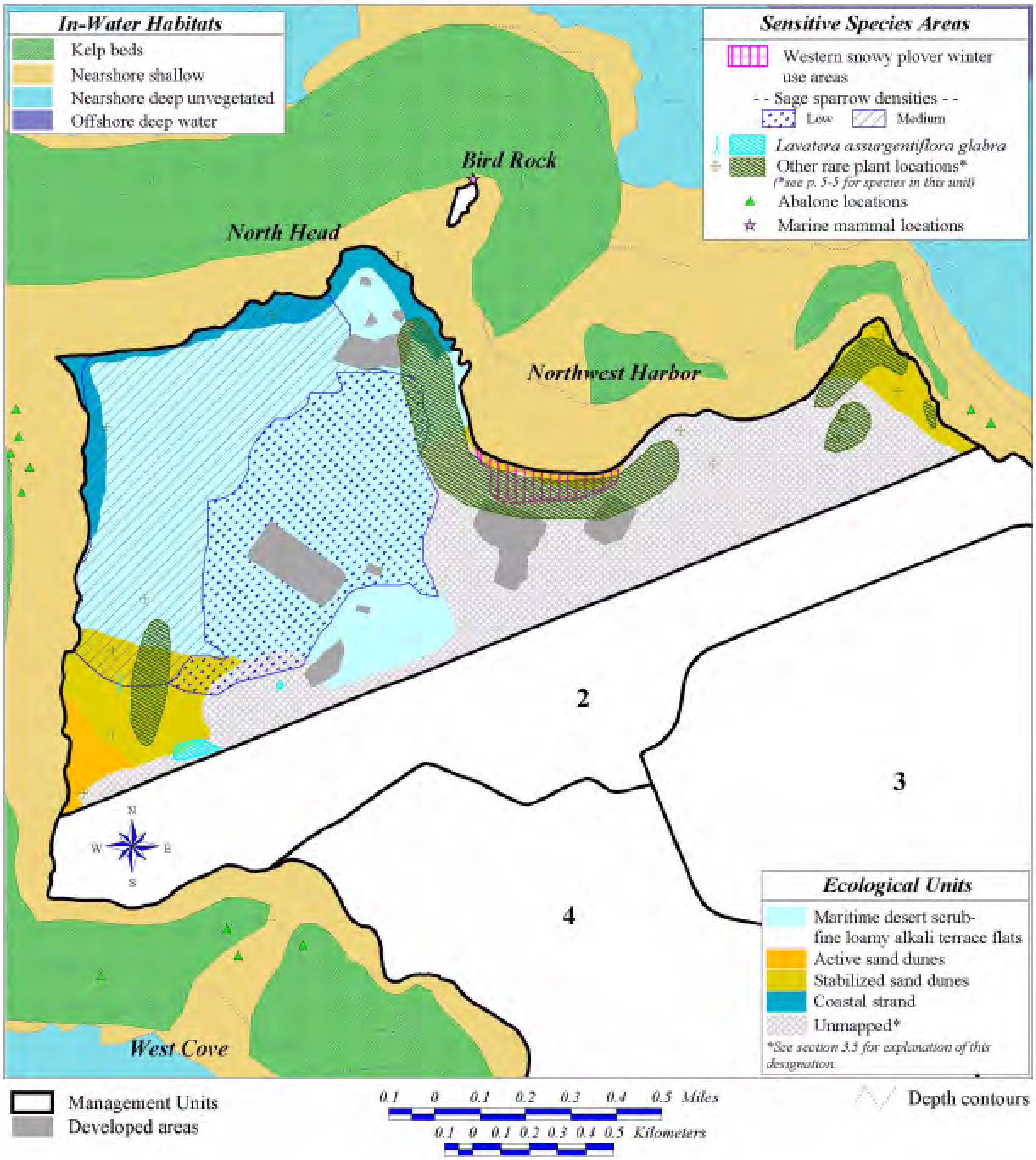
Natural Resources Locations within Unit 1 (Northwest Harbor)



Location: Unit 2 (Airfield)

Military Value: Highest

Air
- Fleet Carrier Landing Practice
- Night Operations
- HC-85 Operations

Surface
- Support Surface to Air MISSILEX
- Combat Search & Rescue

Fleet Marine Air
- Air Command & Control
- Night Operations

RDT&E
- Ocean Engineering
- Missile Tests
- Unmanned Aerial Vehicle Tests
- Radio Frequency Tests

THIRD Fleet
- Multiwarfare Operations

Prohibited Uses:

Recreational camping, missile impacts, bombing, small arms/live fire, detonations (small detonations at airfield proper only), laser designator.

Other Uses:
- Essential for all aspects of Island support
- Recreational fishing areas offshore
- Snowy plover monitoring
- Quarrying (borrow pits)

Facilities:
- Tactical Air Navigation Facilities

Roads: Primary- 5.0 mi (8.1 km)
Secondary- 1.4 mi (2.2 km)

Natural Resource Value: Lowest

Ecological Units:
- MDS Boxthorn/grassland (1.2 ac)
- Active sand dunes (10.7 ac)
- Stabilized sand dunes (70.9)
- Coastal strand (33.1 ac)

Wildlife:
- Snowy plover*
- Island fox

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
- *Astragalus nevinii*
- *Camissonia guadalupensis*
- *Cryptantha traskiae*
- *Eriophyllum nevinii*
- *Lavatera assurgentiflora glabra*

Special Management Emphases:
- Highest military value, so management emphasis is aimed at maximizing those military values with consideration of the resource values.
- Unencumbered Crash response and HAZMAT programs.
- BASH plan, to reduce the potential for bird and other animal collisions with aircraft.

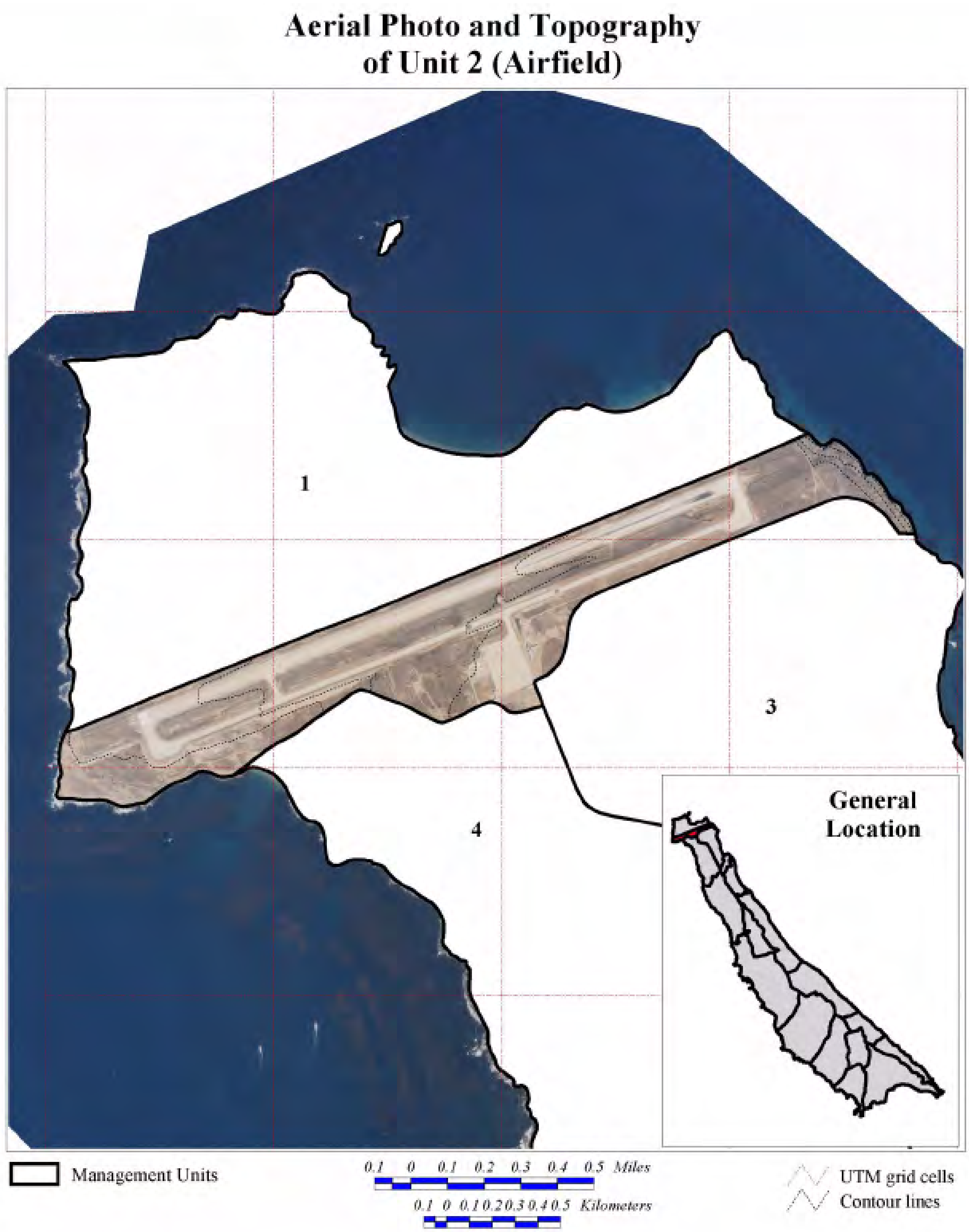
Management:
- Develop Wildlife Hazard Assessment and BASH plan for the airfield (*in progress*).
- Make airfield and associated buildings and structures less attractive to birds, for example by eliminating low spots where water might accumulate, removing potential roosts, bird-proofing buildings around the airfield to exclude small birds, such as house sparrows and starlings.
- Avoid recovery activities or promoting reestablishment of sensitive animals on the northern portion of the island where recovery and human safety may be compromised.
- Invasive species control, many species new to the island have been detected in this unit.
- Fire management targets 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.

Table5-2. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

2. Airfield

			Activities: Infantry Ops (Battalion Landings) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****																						
	Delphinium variegatum kinkiense*																						
	Lithophragma maximum*																						
	Lotus dendroideus traskiae*																						
	Malacothamnus clementinus*																						
	Sibara filifolia*																						
	Brodiaea kinkiensis																	Not Applicable	Not Applicable				
	Lavatera assurgentiflora glabra	X																					
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists	X																		Low			
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	**Terrestrial Mollusks**																						
	Island night lizard*																						
	San Clemente sage sparrow*																						
	San Clemente Island fox	X																				Low	
	San Clemente loggerhead shrike*																	Not Applicable	Not Applicable				
	Western snowy plover*	X																					
	Xantus' murrelet																						
	Abalone*	X															Med						
	Pinniped Haulout																Low						

*** Effects related to fire are treated in a separate matrix.**



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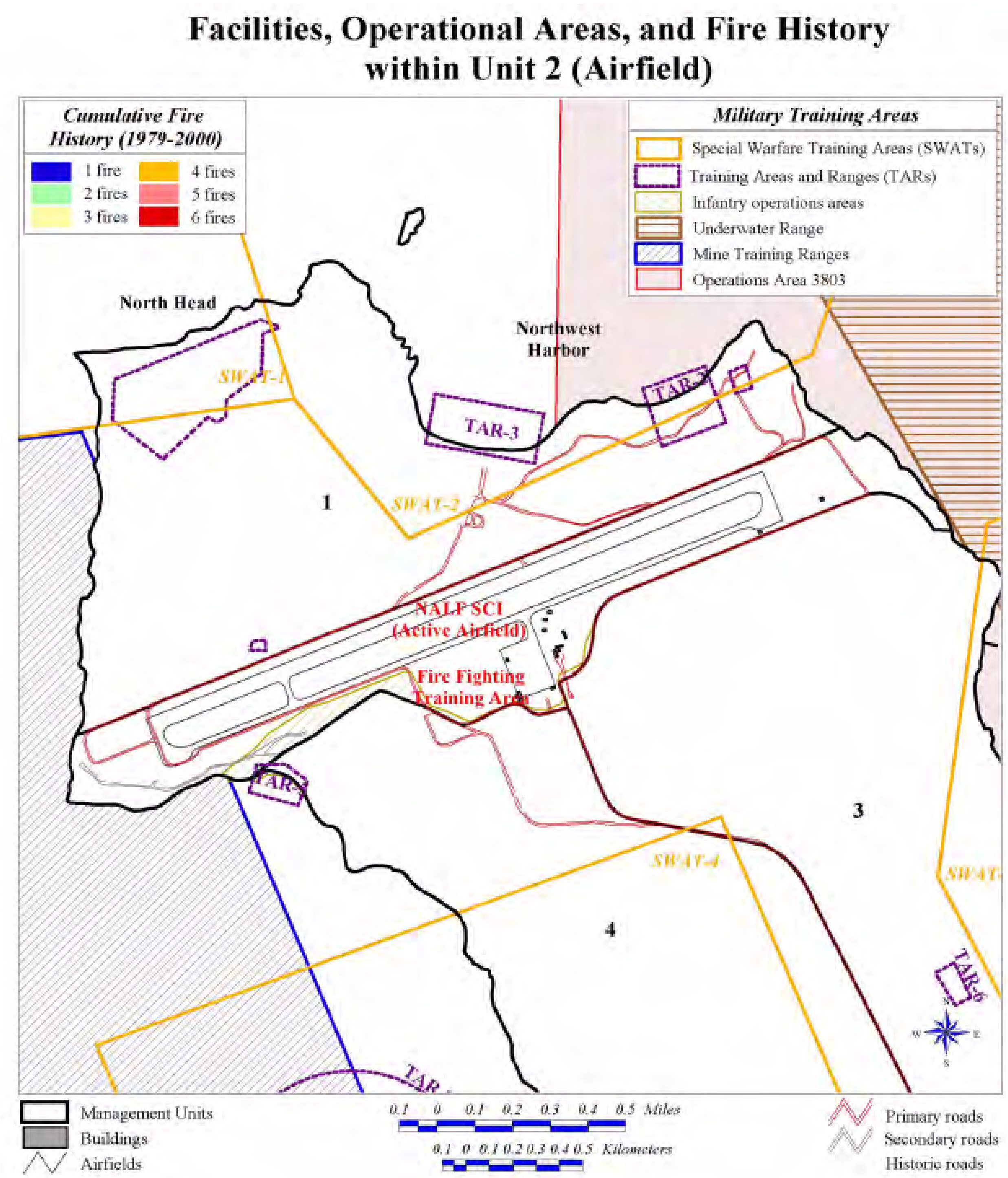

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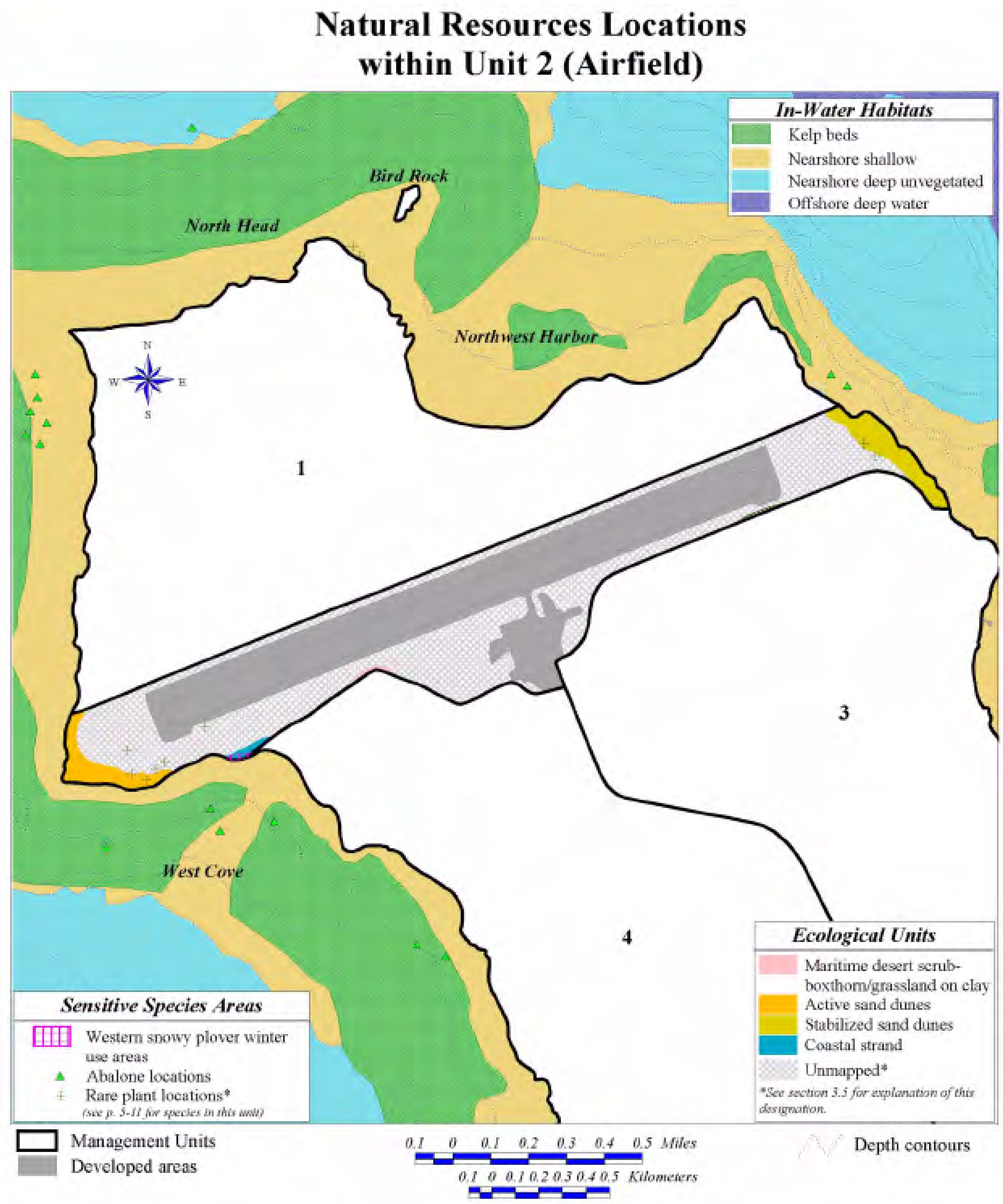

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Location: Unit 3 (Dolphin Bay)

Military Value: Low

Fleet Marine Ground
Ground Operations
Naval Special Warfare
Land Special Operations
THIRD Fleet
Multiwarfare Operations

Prohibited Uses:
Off-road vehicles, heavy wheeled vehicles, tracked vehicles, missile impacts, fixed wing landings, parachute drops, bombing, small arms/live fire, detonations (all sizes), laser designator.

Other Uses:
Recreational fishing areas offshore

Facilities:
ASR Radar
TAR 6
Fuel Farm
Water Tank
North Light Pier
RDT&E Lab

Roads: Primary- 3.9 mi (6.2 km)
Secondary- 6.5 mi (10.4 km)

Natural Resource Value: Lowest

Ecological Units:
MDS/Grassland Complex (14.0 ac)
MDS Boxthorn/grassland (458.6)
Maritime Sage Scrub northeast escarpment (103.2 ac)
Grasslands, clay soils (54.2 ac)
Stabilized sand dunes (9.4 ac)

Wildlife:
Island night lizard*
Island fox
Orange-crowned warbler
**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
Astragalus nevinii
Camissonia guadalupensis
Eriophyllum nevinii
Lavatera assurgentiflora glabra
Lotus dendroideus var. *traskiae**
Lupinus guadalupensis
Phacelia floribunda
**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- Low military values, so management emphasis is aimed at maintaining those military values to the extent possible and with greatest flexibility for maintaining natural resource values as an integral part of day-to-day operations.

Management:
- The risk to natural resources from short fire return intervals in clay grasslands appears to be low. Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species and native forbs. Fire is expected to be a useful tool in control of exotic plants.
- Invasive weed control of grasses and fennel.
- 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 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.
- 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. A more precise fire return interval will be established after consultation on the Fire Management Plan.

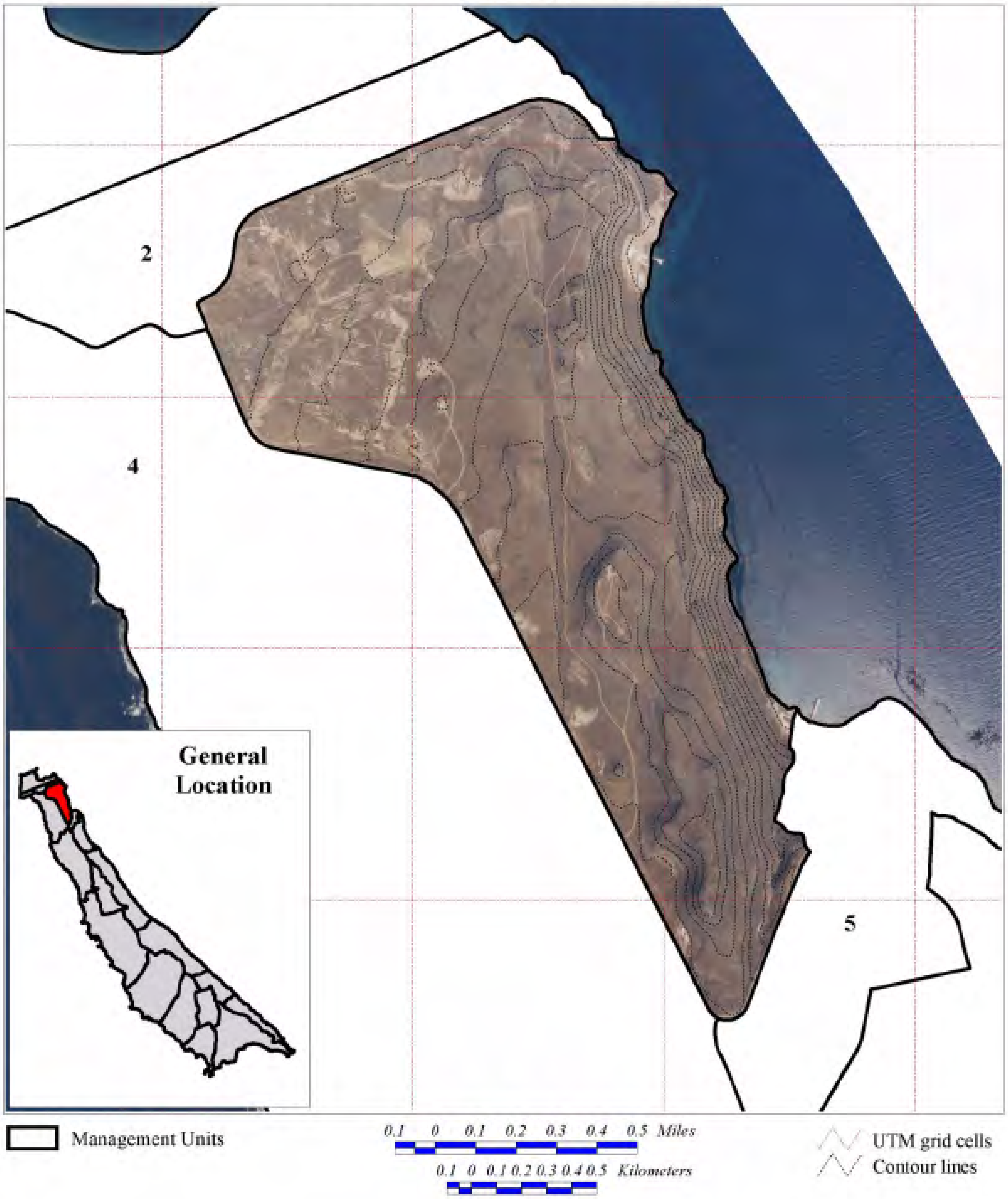
Table5-3. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

3. Dolphin Bay

			Activities																				
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****																	Not Applicable	Not Applicable				
	Delphinium variegatum kinkiense*																						
	Lithophragma maximum*																						
	Lotus dendroideus traskiae*	X																					
	Malacothamnus clementinus*																						
	Sibara filifolia*																						
	Brodiaea kinkiensis																						
	Lavatera assurgentiflora glabra	X	Low	Med	High		High																
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists	X																					
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	**Terrestrial Mollusks**	X											Med		Low			Not Applicable	Not Applicable	Low			
	Island night lizard*	X											Med		Low					Low			
	San Clemente sage sparrow*																						
	San Clemente Island fox	X																				High	
	San Clemente loggerhead shrike*																						
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*	X												Med		Low							
	Pinniped Haulout																						

*** Effects related to fire are treated in a separate matrix.**

Aerial Photo and Topography of Unit 3 (Dolphin Bay)



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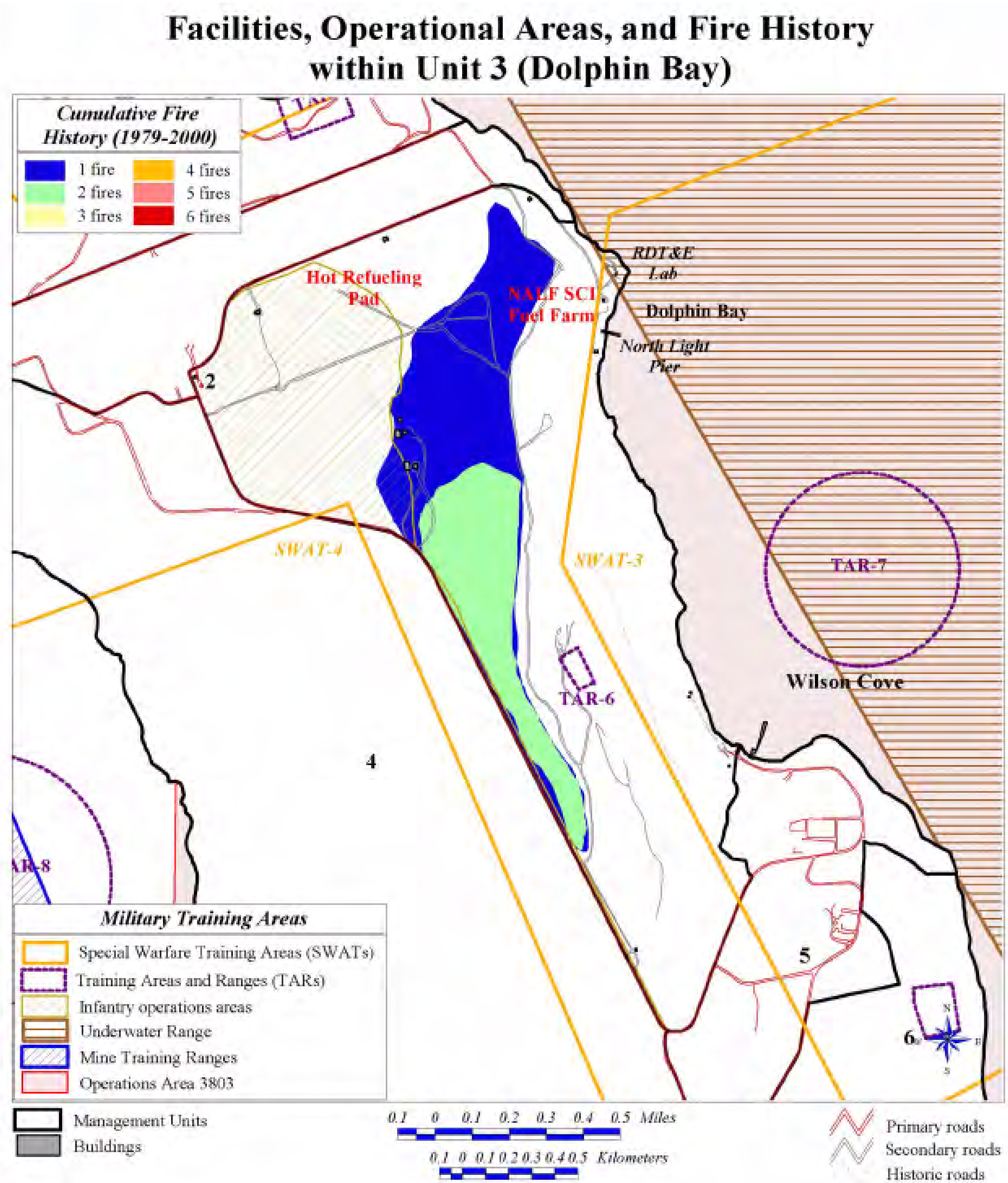

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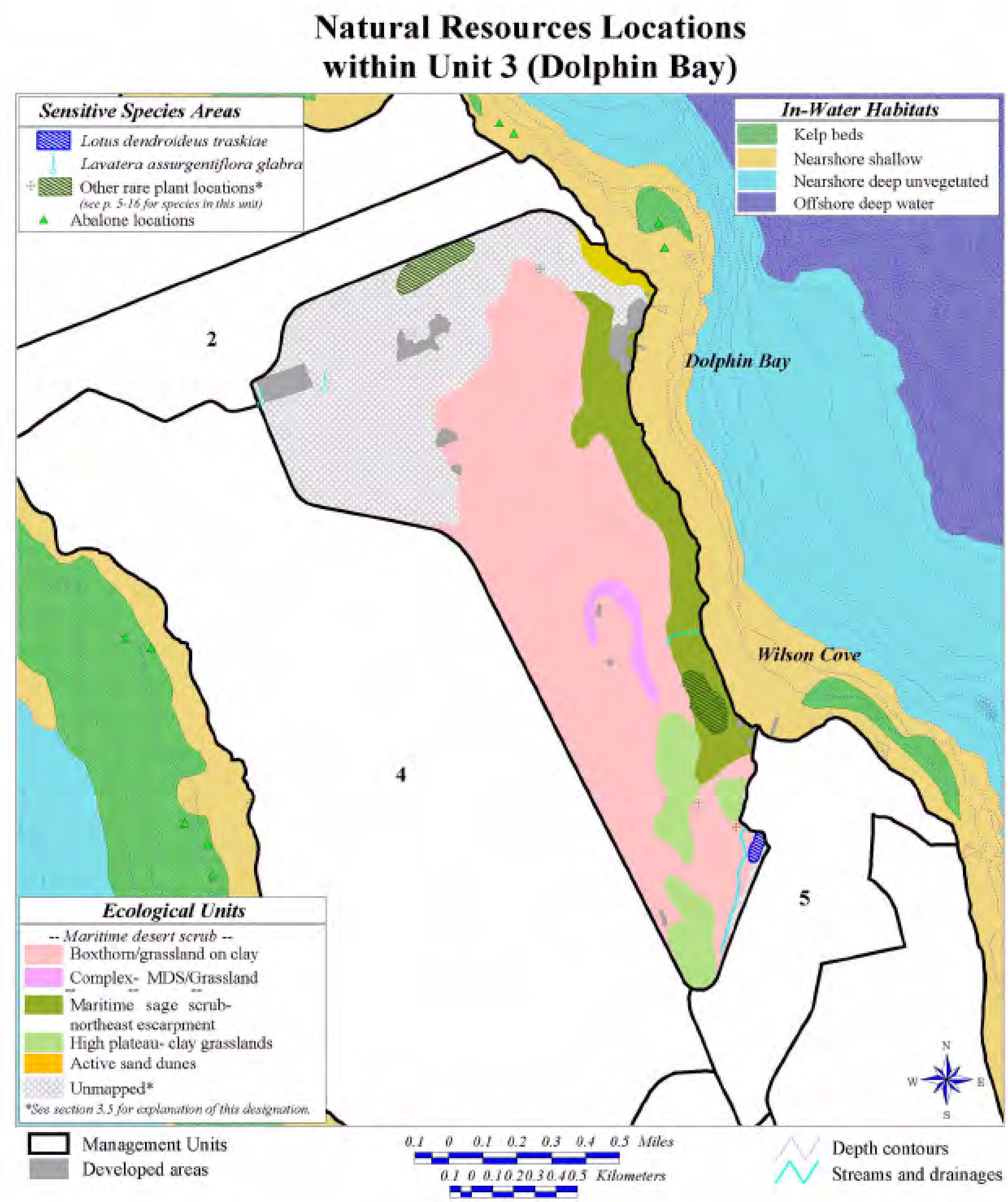

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Location: Unit 4 (West Cove)

Military Value: Medium

Fleet Marine Ground

Ground Operations
Fire Support Coordination
Ground Reconnaissance and Surveillance

Naval Special Warfare

Land Special Operations
Maritime Special Operations

THIRD Fleet

Multi-warfare Operations

Prohibited Uses:

Missile impacts, fixed wing landings, parachute drops, bombing, small arms/live fire, detonations (small detonations in northeast portion only), laser designator.

Other Uses:

Location of SCORE's Cable Termination van and future site of Shallow Water Range instrumentation cables
Recreational fishing areas offshore
Wildlife surveys
Habitat restoration (*Lycium*, dunes)
Weed eradication

Facilities:

TAR 5

Roads: Primary- 3.7 mi (6.0 km)
Secondary- 5.6 mi (9.1 km)

Natural Resource Value: High

Ecological Units:

MDS/Grassland complex (0.2 ac)
MDS Boxthorn/grassland (458.6 ac)
MDS Boxthorn (428.7 ac)
Maritime Sage Scrub northeast escarpment (6.1 ac)
Grasslands, clay soils (1.2 ac)
Active sand dunes (201.8 ac)
Stabilized sand dunes (241.8 ac)
Coastal strand (36.4 ac)

Wildlife:

Sage sparrow*
Snowy plover*
Island night lizard*
Island fox
Orange-crowned warbler
endemic dune beetles possible
**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:

Aphanisma blitoides
Astragalus nevinii
Camissonia guadalupensis
Crossosoma californicum
Cryptantha traskiae
Dudleya virens virens
Eschscholzia ramosa
Lavatera assurgentiflora glabra
Lupinus guadalupensis

Special Management Emphases:

- Medium military value, so management emphasis is aimed at maintaining those military values with high flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- Erosion of dune roads
- Sage sparrow high density area east of dunes.
- High value for *Lavatera assurgentiflora glabra* (12% of extant population occurs in this unit). Also historic records from this general area.
- High value for *Cryptantha traskiae* (42% of population occurs in this unit).
- High value for *Camissonia guadalupensis clementina* (70% of population occurs in this unit).
- Invasive species management.

Management:

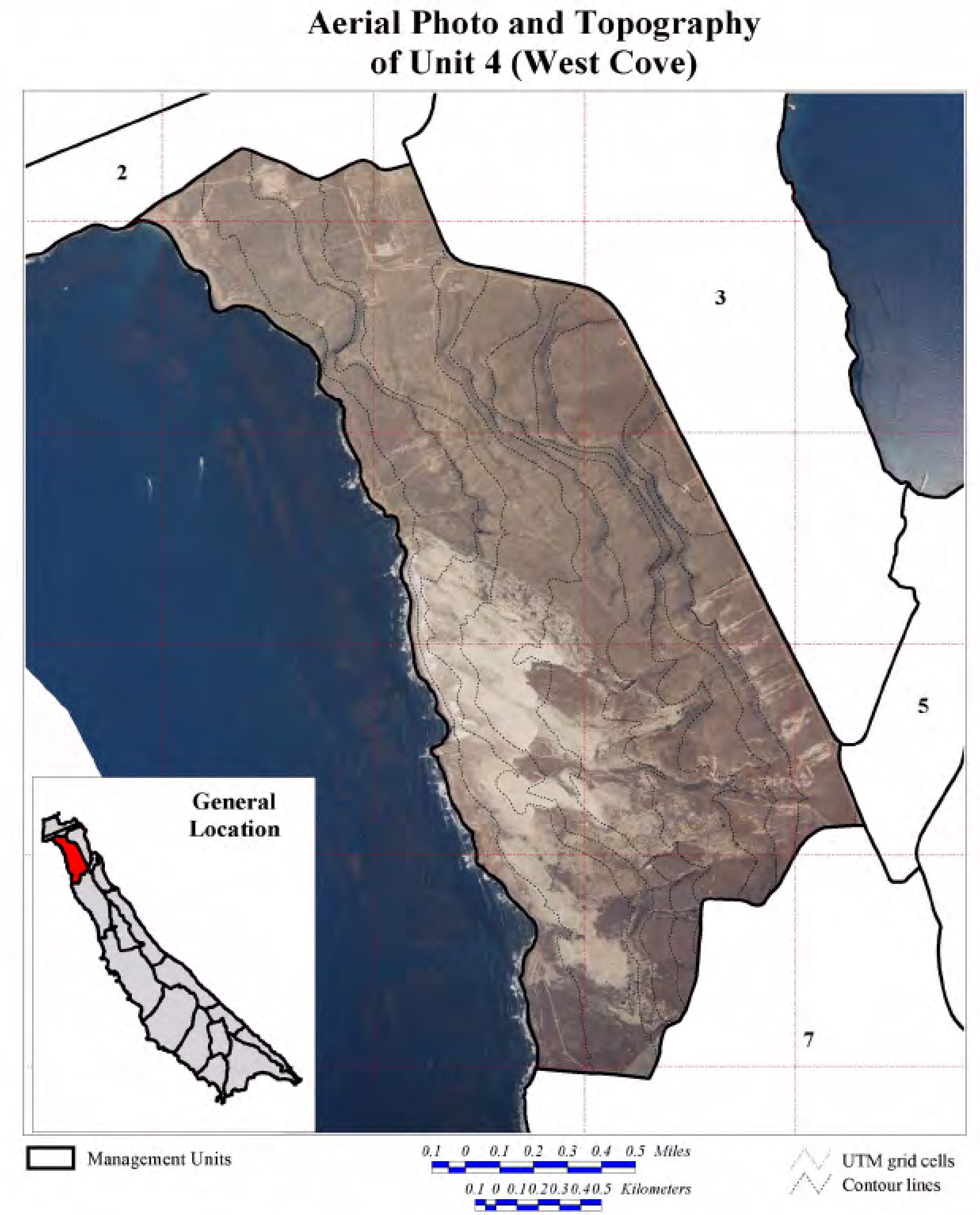
- Minimize conflicts between training and snowy plover that might result in restrictions on training. If deemed necessary by NRO,conduct pre-training reconnaissance for western snowy plover during overwintering period and adjusting timing or location of training if possible. Wintering period is from the end of August through February.
- Maintain the processes that sustain dunes in their active state by evaluating shoreline or other structures for whether they obstruct the movement of wind and water currents that supply sand to these sites.
- Control exotics to conserve the dune community including the beetles, plants, and other endemics that may occur there.
- 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.
- Active dunes: Reduce the cover of exotic species by 50% in the next ten years from the 1992-93 baseline of 20% of total plant cover, based on long-term vegetation condition and trend monitoring.
- Stable dunes: Reduce the cover of exotic species by 50% in the next ten years from the 1992-93 baseline of 35% of total plant cover, based on long-term vegetation condition and trend monitoring.
- Island tree mallow was known historically from this general location, and therefore this area should be a priority reintroduction area.
- Avoid shoreline construction that results in a loss of coastal strand habitat.
- Key weed monitoring and control area as a entry point for weeds near the airfield terminal.
- Clean up trash and debris.
- Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species and native forbs.
- Invasive weed control of grasses and fennel.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- Fire management targets in boxthorn/grassland complex 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.
- 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 for openness of grasslands and for native perennial herbs and grasses, to enhance transit and prey availability forIsland fox, and prey availability for the shrike.
- 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. Seek a fire return interval of at least 20 years, and patch sizes that do not exceed 200 acres.

Table5-4. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

4. West Cove

			Activities																				
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	*Castilleja grisea**																	Not Applicable	Not Applicable				
	*Delphinium variegatum kinkiense**																						
	*Lithophragma maximum**																						
	*Lotus dendroideus traskiae**																						
	*Malacothamnus clementinus**																						
	*Sibara filifolia**																						
	Brodiaea kinkiensis																						
	Lavatera assurgentiflora glabra	X											High		Low					Low			
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists	X	Low	Med	High		High						High		Low					Med	?		
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	Terrestrial Mollusks	X	Low	Low	Med		Med	Med										Not Applicable	Not Applicable				
	Island night lizard*	X		Low	Med		Low	Low					Med		Low					Low			
	San Clemente sage sparrow*	X	Low^{S}	Med^{S}	High^{S}		Low	Low					High		Low					Low	Low		
	San Clemente Island fox	X																				High	
	San Clemente loggerhead shrike*																						
	Western snowy plover*	X				High^{S}			High^{S}		High^{S}	Med^{S}								High^{S}			
	Xantus' murrelet																						
	Abalone*	X												High		Med	Med						
	Pinniped Haulout																						

* Effects related to fire are treated in a separate matrix.



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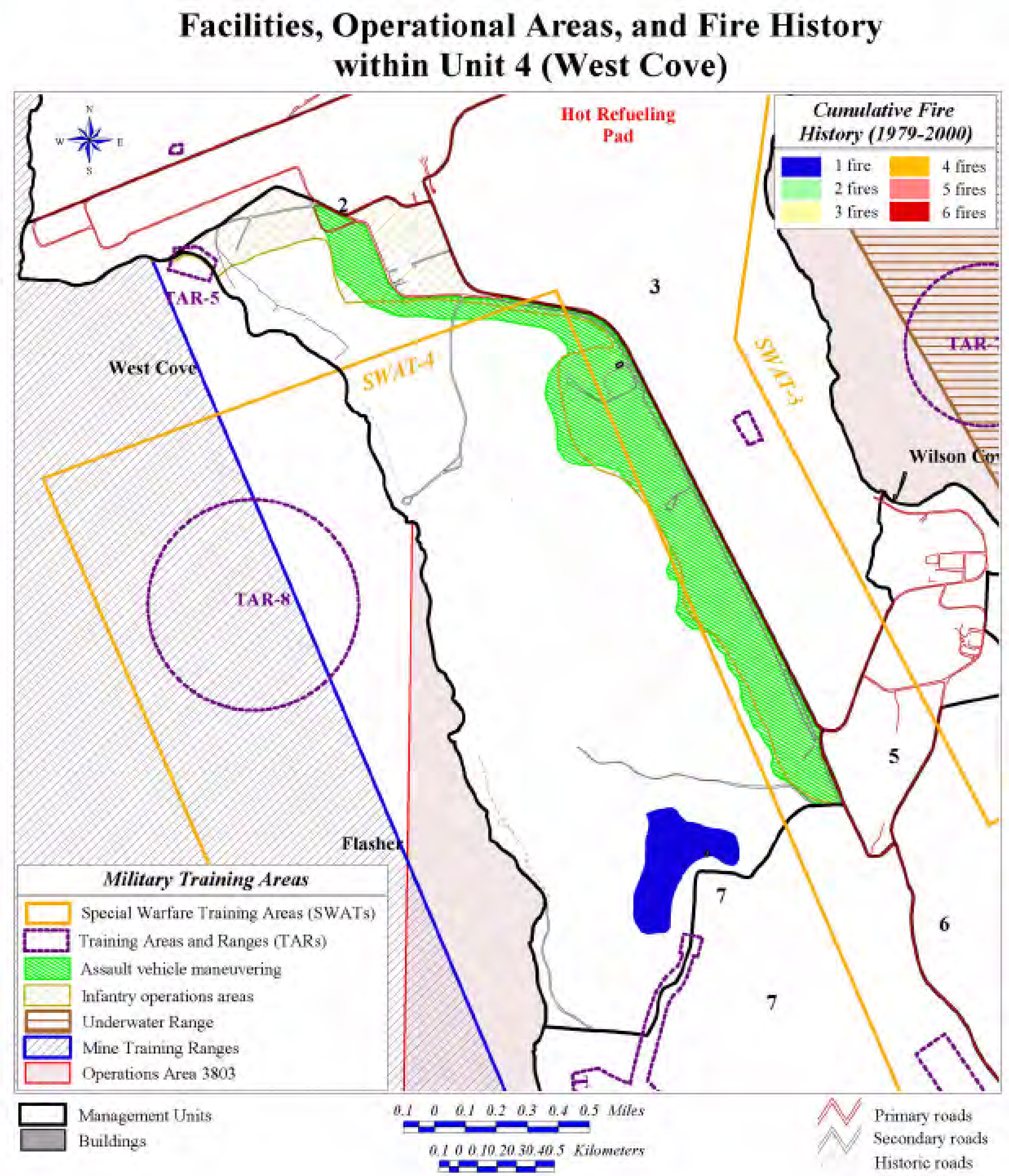

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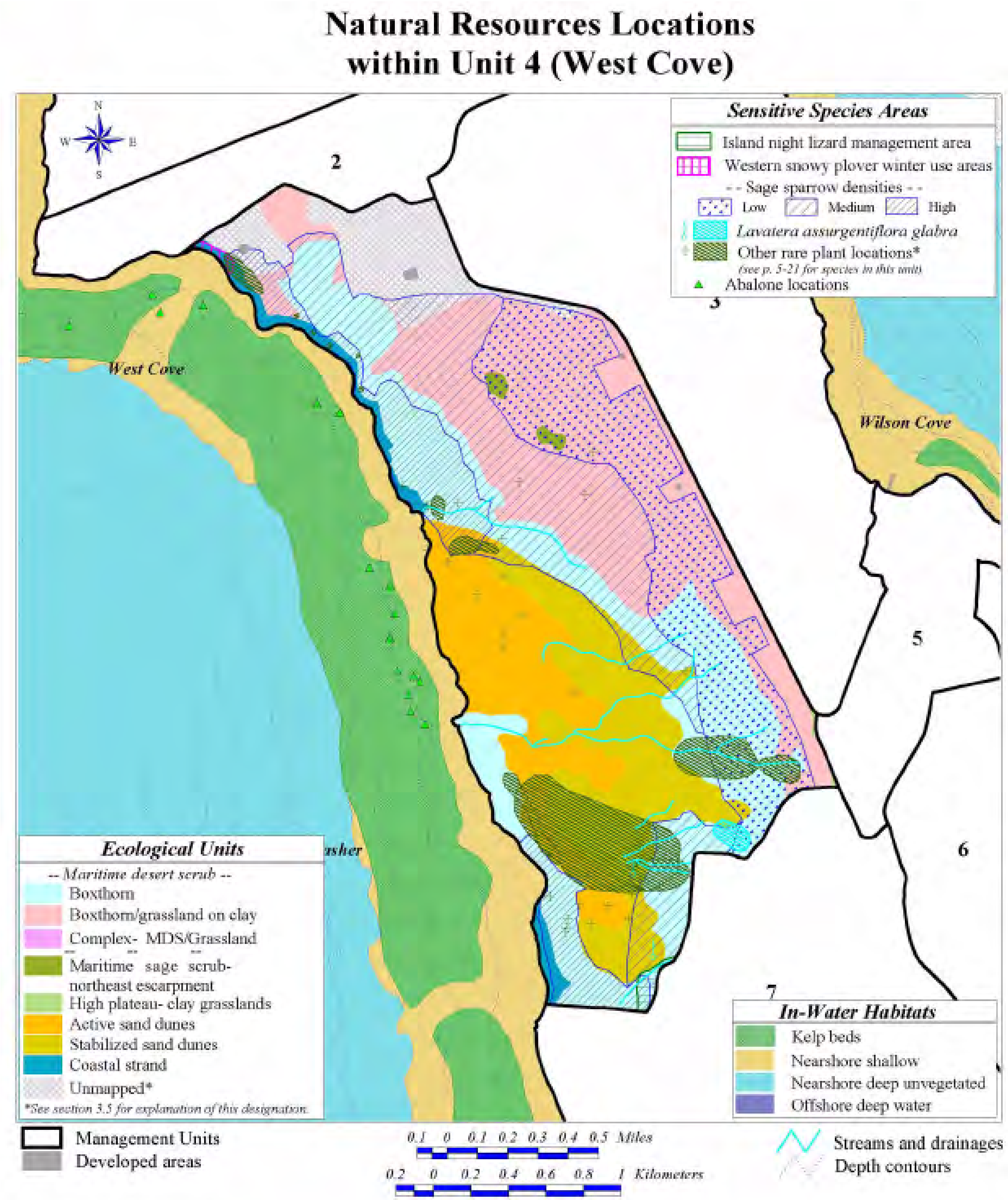

Natural Resources Locations
within Unit 4 (West Cove)
Sensitive Species Areas
Island night lizard management area
Western snowy plover winter use areas
- - Sage sparrow densities - -
Low
Medium
High
Lavatera assurgentiflora glabra
Other rare plant locations*
(see p. 5-21 for species in this unit)
Abalone locations
2
3
5
6
7
West Cove
Wilson Cove
Ecological Units
-- Maritime desert scrub --
Boxthorn
Boxthorn/grassland on clay
Complex- MDS/Grassland
Maritime sage scrub- northeast escarpment
High plateau- clay grasslands
Active sand dunes
Stabilized sand dunes
Coastal strand
Unmapped*
*See section 3.5 for explanation of this designation.
In-Water Habitats
Kelp beds
Nearshore shallow
Nearshore deep unvegetated
Offshore deep water
Management Units
Developed areas
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
Streams and drainages
Depth contours

Location: Unit 5 (Wilson Cove)

Military Value: High

Fleet Marine Ground
Fire Support Coordination
Engineering Operations
Naval Special Warfare
Land Special Operations
Maritime Special Operations
THIRD Fleet
Theater-level Operations
Multiwarfare Operations
Support Fleet Battle Exercises
RDT&E
Ocean Engineering

Prohibited Uses:
Off-road vehicles, heavy wheeled vehicles, tracked vehicles, missile impacts, fixed wing landings, parachute drops, bombing, small arms/live fire, detonations (all sizes), laser designator.

Other Uses:
Recreational fishing areas offshore

Facilities:
Wilson Cove contains virtually all of the permanent billeting, feeding, transportation, recreation, and port facilities for Island personnel.

Roads: Primary- 3.7 mi (5.9 km)
Secondary- 1.2 mi (2.0 km)

Natural Resource Value: Lowest
Ecological Units:
MDS/Grassland complex (6.8 ac)
MDS Boxthorn/grassland (40.3 ac)
Maritime Sage Scrub northeast escarpment (31.4 ac)
Grasslands, clay soils (25.0 ac)

Wildlife:
Island night lizard*
Island fox
Orange-crowned warbler
**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
Artemisia nesiotica
Lavatera assurgentiflora glabra (historic location)
Lotus dendroideus var. *traskiae**
**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- High military value, so management emphasis is aimed at protecting those military values with increasing flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- Historic location for island tree mallow.
- Trask's island lotus (17% of population occurs in this unit).
- Invasive species management.

Management:

- Island tree mallow was known historically from this location and therefore this area should be a priority reintroduction area.
- For eelgrass, continue to abide by no net loss provisions of the Clean Water Act and mitigation standards under the Southern California Eelgrass Mitigation Policy.
- Maintain or enhance existing *Lotus* populations.
- Key weed monitoring and control area to help prevent weed establishment elsewhere on Island. Also to control competition of invasive species with *Lotus* and *Lavatera* populations.
- Fire management targets in boxthorn/grassland complex 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.
- 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 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.
- 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. A target fire return interval will be established after consultation on the Fire Management Plan.

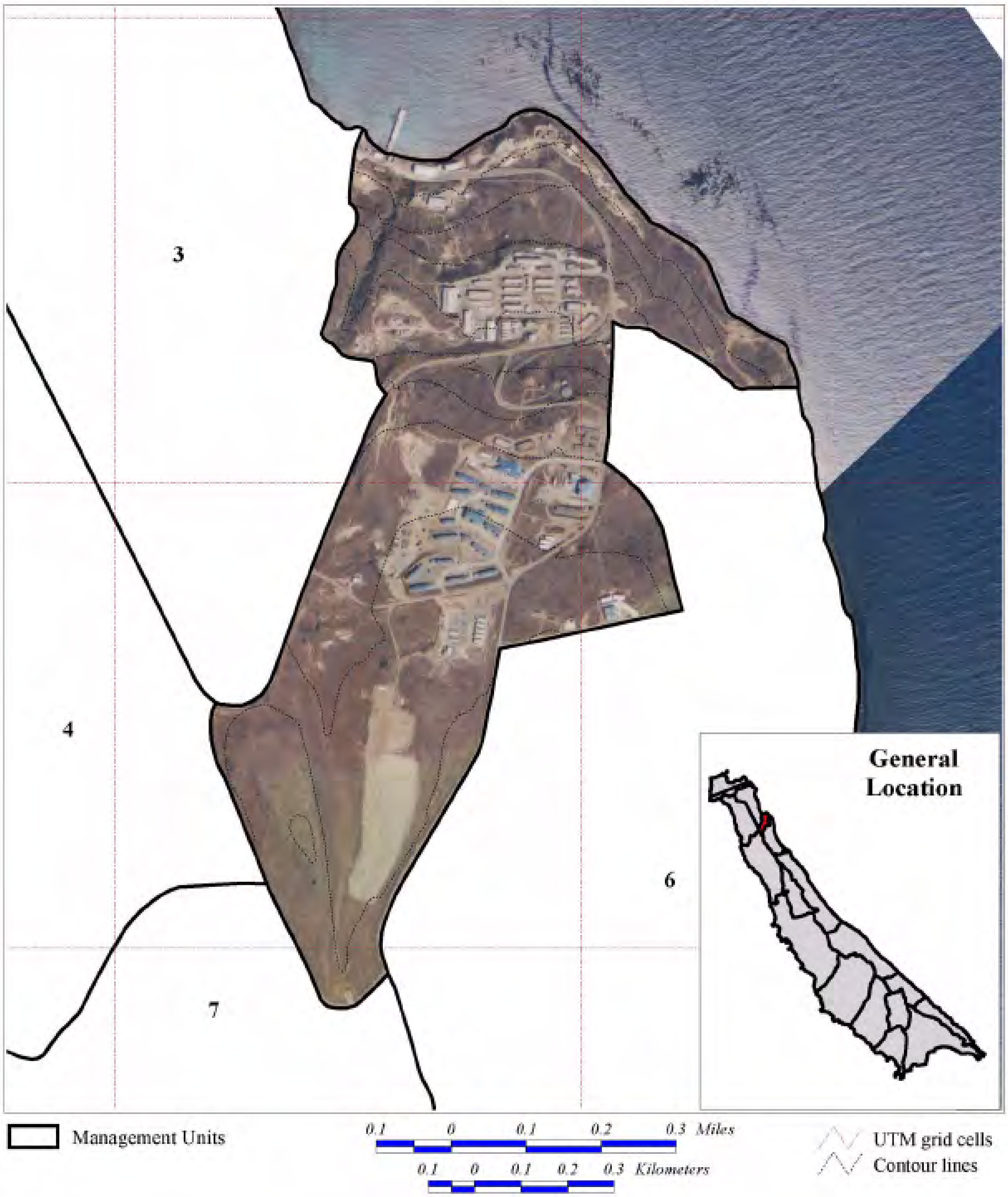
Table5-5. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

5. Wilson Cove

			Activities																				
			Infantry Ops (Battalion Landings) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****																						
	Delphinium variegatum kinkiense*																						
	Lithophragma maximum*																						
	Lotus dendroideus traskiae*	X											Med		Low					Low			
	Malacothamnus clementinus*																						
	Sibara filifolia*																						
	Brodiaea kinkiensis		Not Applicable														Not Applicable	Not Applicable	Not Applicable				
	Lavatera assurgentiflora glabra																						
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists																						
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	**Terrestrial Mollusks**	X											Low										
	Island night lizard*																						
	San Clemente sage sparrow*																						
	San Clemente Island fox	X																				Med	
	San Clemente loggerhead shrike*		Not Applicable														Not Applicable	Not Applicable	Not Applicable				
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*																						
	Pinniped Haulout																						

*** Effects related to fire are treated in a separate matrix.**

Aerial Photo and Topography of Unit 5 (Wilson Cove)



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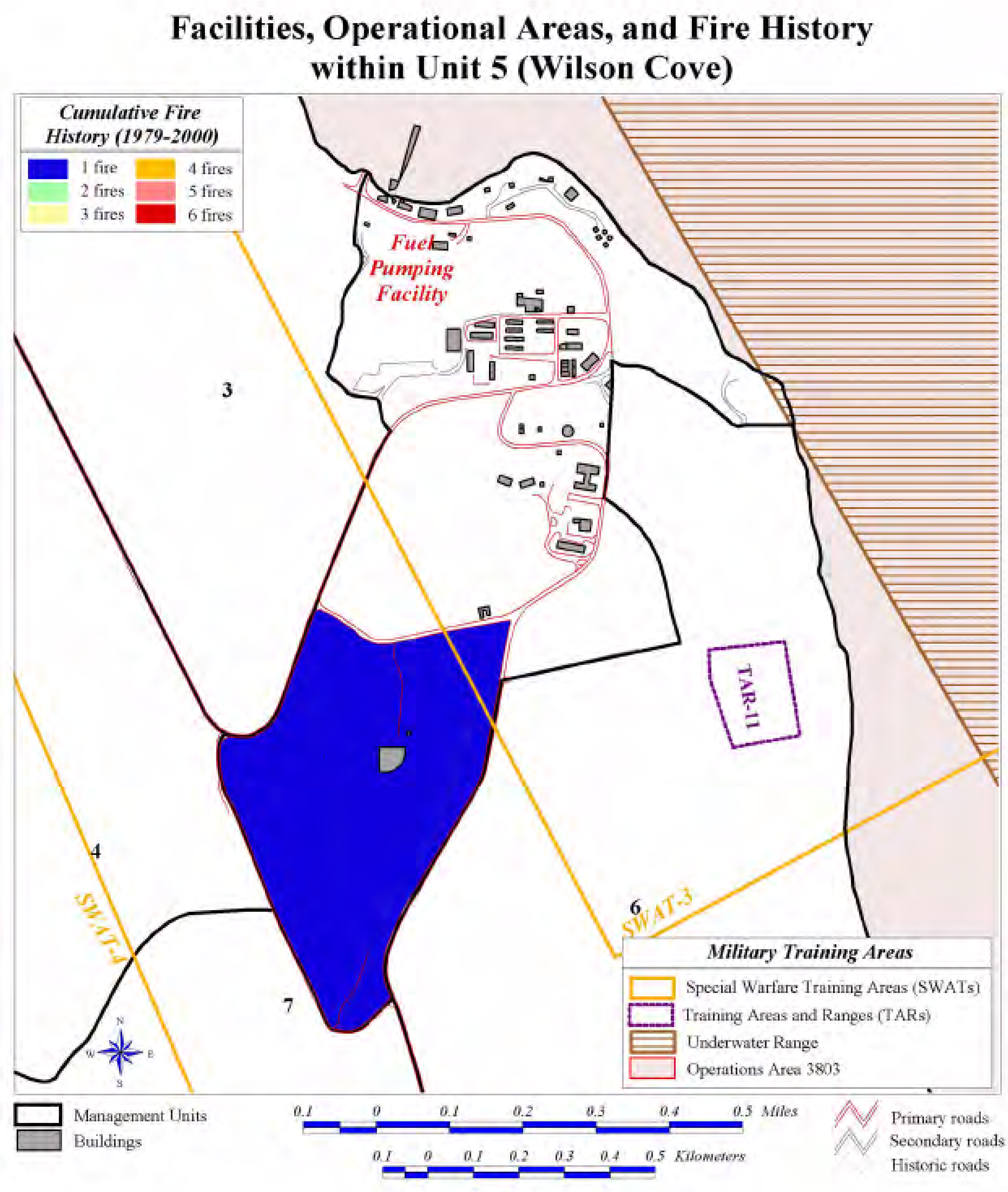
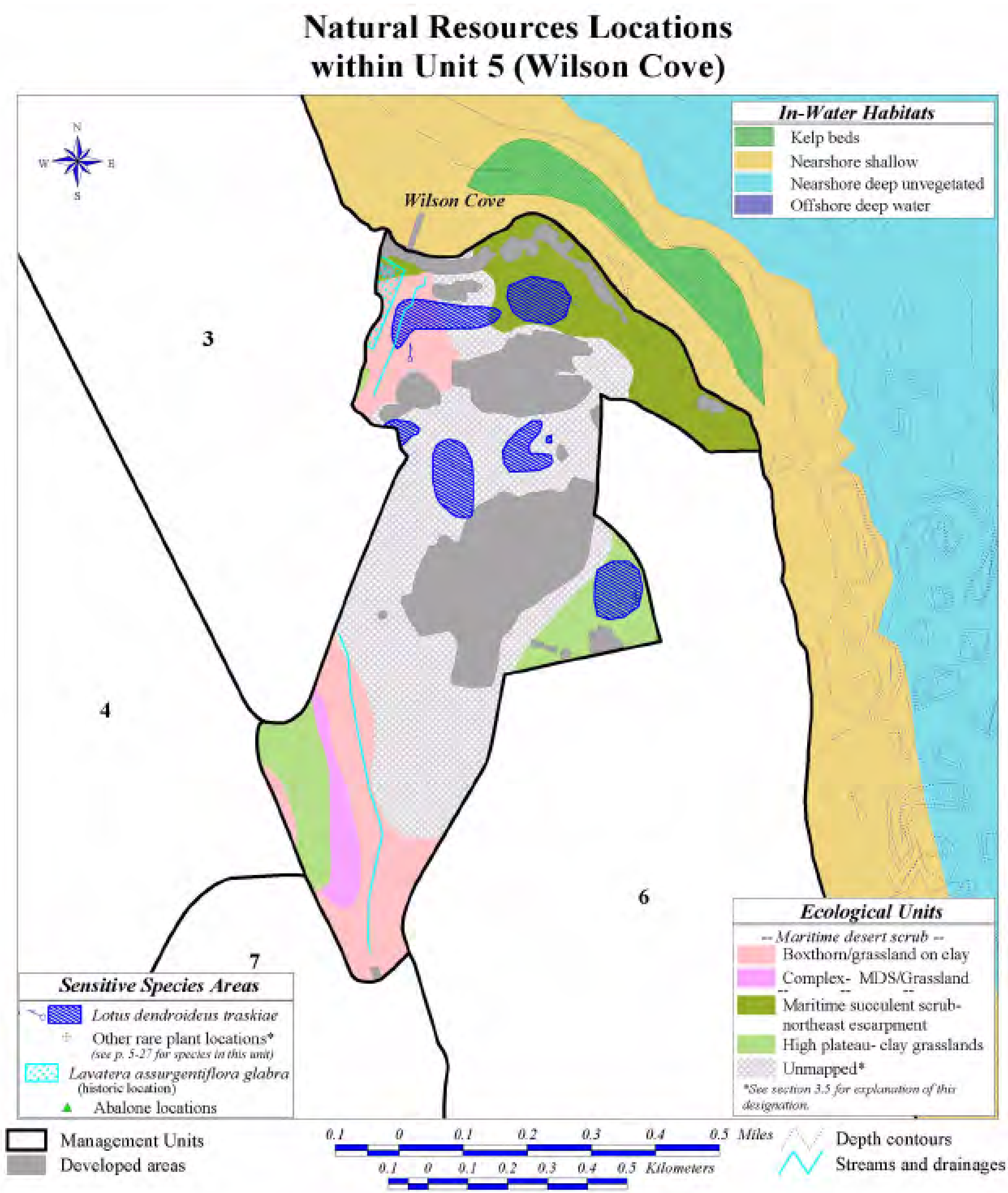


Facilities, Operational Areas, and Fire History within Unit 5 (Wilson Cove)
Cumulative Fire History (1979-2000)
1 fire
2 fires
3 fires
4 fires
5 fires
6 fires
Fuel Pumping Facility
3
4
6
7
SWAT-4
SWAT-3
TAR-11
Military Training Areas
Special Warfare Training Areas (SWATs)
Training Areas and Ranges (TARs)
Underwater Range
Operations Area 3803
Management Units
Buildings
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.1 0 0.1 0.2 0.3 0.4 0.5 Kilometers
Primary roads
Secondary roads
Historic roads
N
W
E
S



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Location: Unit 6 (NOTS Pier)

Military Value: High

Naval Special Warfare
Land Special Operations
Maritime Special Operations
RDT&E
Ocean Engineering
THIRD Fleet
Multiwarfare Operations

Prohibited Uses:
Off-road vehicles, heavy wheeled vehicles, tracked vehicles, missile impacts, fixed wing landings, bombing, detonations (all sizes), laser designator.

Other Uses:
Center of SPAWARSYSCEN RDT&E activities on SCI
Recreational fishing areas offshore

Facilities:
TARs 11 and 12
Wind Farm
Water Tank

Roads: Primary- 1.9 mi (3.1 km)
Secondary- 7.3 mi (11.7 km)

Natural Resource Value: Low
Ecological Units:
Canyon woodland (1.1 ac)
MDS/Grassland complex (9.9 ac)
MDS Boxthorn/grassland (1.4 ac)
Maritime Sage Scrub northeast escarpment (192.3 ac)
Maritime Sage Scrub (11.2 ac)
Grasslands, clay soils (497.9 ac)
Sea bluff succulent (5.2 ac)

Wildlife:
Sage sparrow*
Island night lizard*
Island fox
Orange-crowned warbler
**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
Artemisia nesiotica
Astragalus nevinii
*Delphinium variegatum kinkiense**
Delphinium variegatum thornei
Dudleya virens virens
Eriogonum giganteum formosum
Lavatera assurgentiflora glabra
Lotus dendroideus var. *traskiae**
Lupinus guadalupensis
Lycium brevipes brevipes
**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- High military value, so management emphasis is aimed at protecting those military values with increasing flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- High value for Trask's island lotus (32% of population occurs in this unit).
- Historic location for island tree mallow.
- Improve understanding of where needlegrass currently resides to help focus restoration objectives.

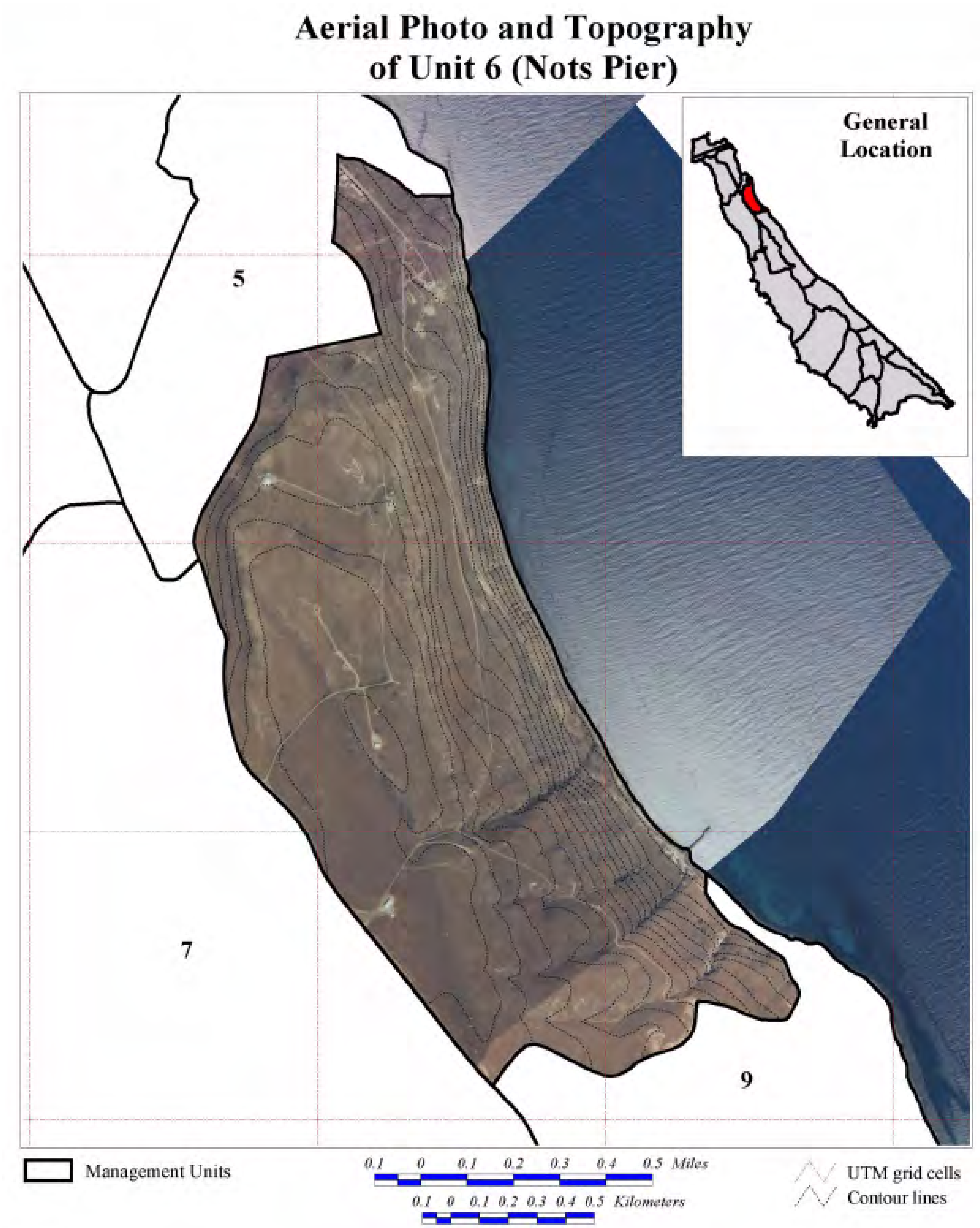
Management:
- Island tree mallow was known historically from this location and therefore this area should be a priority reintroduction area.
- Manage fire for openness of grasslands and native endemic forbs, to enhance transit and prey availability for Island fox, and prey availability for the shrike. Manage fire to enhance status of Trask's island lotus.
- Use prescribed fire to manage fuel loads and achieve the above objectives.
- Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species and native forbs.
- Fire management targets in boxthorn/grassland complex 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.
- 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 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.
- 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. A target fire return interval will be established after consultation on the Fire Management Plan.

Table5-6. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

6. NOTS Pier

			Activities																				
			Infantry Ops (Battalion Landings) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****																Not Applicable	Not Applicable	Not Applicable				
	Delphinium variegatum kinkiense*	X	Low	Med	High		High																
	Lithophragma maximum*																						
	Lotus dendroideus traskiae*	X	Low	Med	High		High		High			Low	High		Low					Med			
	Malacothamnus clementinus*																						
	Sibara filifolia*																						
	Brodiaea kinkiensis																						
	Lavatera assurgentiflora glabra	X											Low		Low								
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists																						
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	**Terrestrial Mollusks**																Not Applicable	Not Applicable	Not Applicable				
	Island night lizard*	X		Low	Med		Low		Low				Low		Low								
	San Clemente sage sparrow*																						
	San Clemente Island fox	X																				High	
	San Clemente loggerhead shrike*																						
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*																						
	Pinniped Haulout																						

*** Effects related to fire are treated in a separate matrix.**



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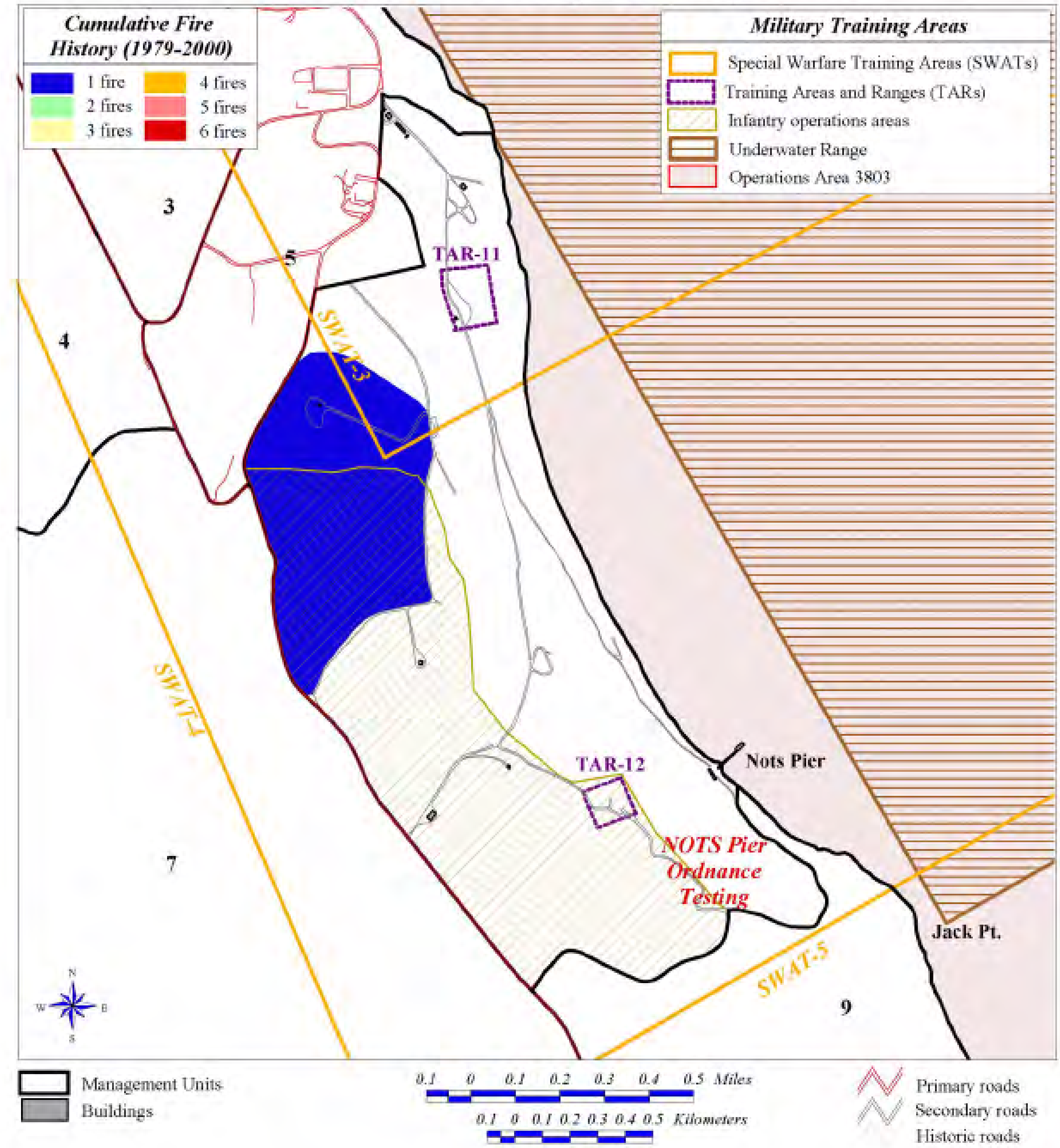
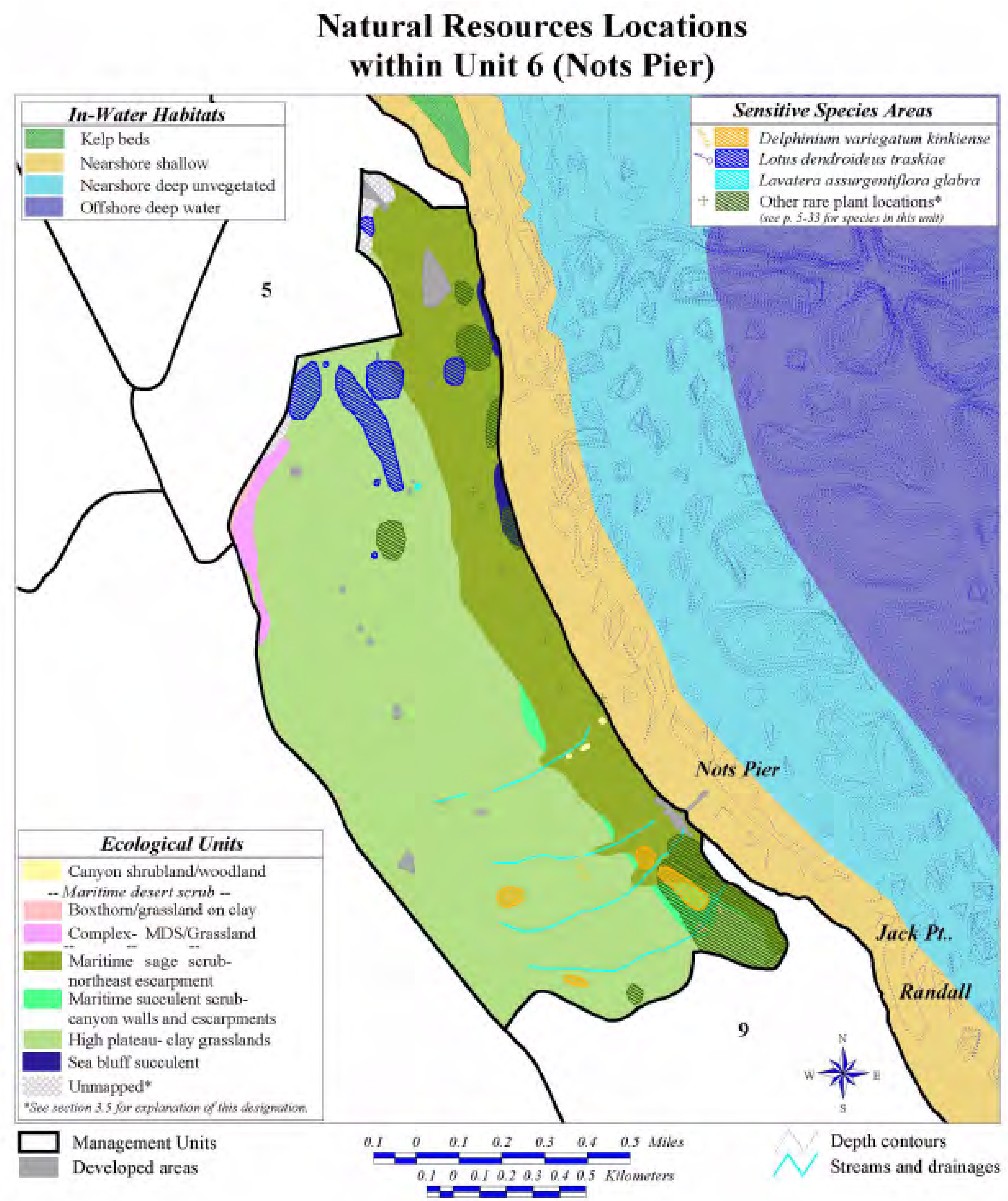
Facilities, Operational Areas, and Fire History within Unit 6 (Nots Pier)




Natural Resources Locations within Unit 6 (Nots Pier)
In-Water Habitats
Kelp beds
Nearshore shallow
Nearshore deep unvegetated
Offshore deep water
Sensitive Species Areas
Delphinium variegatum kinkiense
Lotus dendroideus traskiae
Lavatera assurgentiflora glabra
Other rare plant locations*
(see p. 5-33 for species in this unit)
5
Nots Pier
Jack Pt.
Randall
9
Ecological Units
Canyon shrubland/woodland
-- Maritime desert scrub --
Boxthorn/grassland on clay
Complex- MDS/Grassland
Maritime sage scrub- northeast escarpment
Maritime succulent scrub- canyon walls and escarpments
High plateau- clay grasslands
Sea bluff succulent
Unmapped*
*See section 3.5 for explanation of this designation.
Management Units
Developed areas
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.1 0 0.1 0.2 0.3 0.4 0.5 Kilometers
Depth contours
Streams and drainages
N
W
E
S

Location: Unit 7 (Terrace Canyon)

Military Value: Medium

Fleet Marine Air
Night Operations

Fleet Marine Ground
Ground Operations
Command & Control
Ground Reconnaissance & Surveillance

Naval Special Warfare
Land Special Operations
Maritime Special Operations
Air Special Operations
Information Special Operations

RDT&E
Radio Frequency Tests

THIRD Fleet
Multiwarfare Operations

Prohibited Uses:
Landing craft, missile impacts, fixed wing landings, bombing, laser designator.

Other Uses:
Contains the Photo Lab complex of buildings which, though unoccupied, are used for many RDT&E and training events
Recreational fishing areas offshore

Facilities:
TAR 9

Roads: Primary- 3.9 mi (6.3 km)
Secondary- 13.8 mi (22.2 km)

Natural Resource Values: High

Ecological Units:
MDS/Grassland complex (765.8 ac)
MDS Boxthorn/grassland (415.4 ac)
MDS Boxthorn (647.5 ac)
Grasslands, clay soils (824.3 ac)
Coastal strand (2.5 ac)

Wildlife:
Sage sparrow*
Island night lizard*
Island fox
**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
Aphanisma blitoides
Astragalus nevinii
Brodiaea kinkiensis
Camissonia guadalupensis
*Castilleja grisea**
Crossosoma californicum
*Delphinium variegatum kinkiense**
Dudleya virens virens
Eschscholzia ramosa
Lotus dendroideus var. *traskiae**
Lupinus guadalupensis
**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:

- Medium military value, so management emphasis is aimed at maintaining those military values with high flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- Sage sparrow high density area.
- Island night lizard management area
- San Clemente Island larkspur

Management:

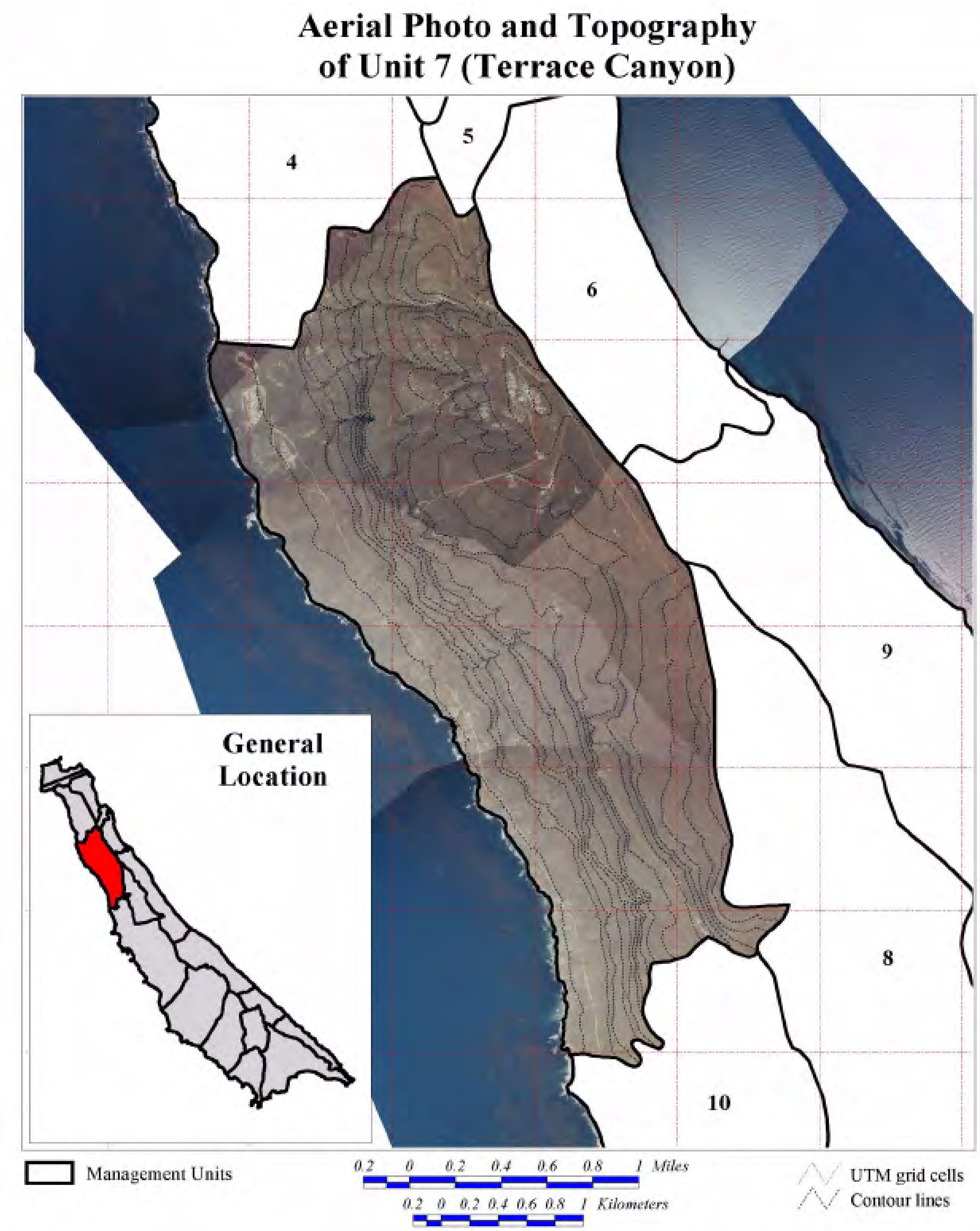
- Monitor and evaluate the military use and effectiveness of the INLMA to the Island night lizard and associated species.
- Comply with guidance for Island Night Lizard Management Area.
- Improve understanding of where needlegrass currently resides to help focus restoration objectives.
- Reduce the percent cover of invasive plants from the 1992-93 baseline of 41% on the faces, 53% on the flats, as evaluated over at least one 7-year El Niño cycle.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- Fire management targets in boxthorn/grassland complex 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.
- 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 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.
- In the terrace face-terrace flat complex, manage for periodic, cool fires of NPS intensity 5 (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.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.

Table5-7. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

7. Terrace Canyon

		Species Present in Unit	Activities: Infantry Ops (Battalion Landing) (New): Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	TARS (New and Existing): Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	SWATS (Existing): Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	MTR: Underwater demolition	FSA 1: Species Present in boundary	FSA 2: Species Present in boundary	General Increase in Tempo: Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****	X											Low		Low			Not Applicable	Not Applicable				
	Delphinium variegatum kinkiense*	X											Low		Low								
	Lithophragma maximum*																						
	Lotus dendroideus traskiae*	X											Low		Low								
	Malacothamnus clementinus*																						
	Sibara filifolia*																						
	Brodiaea kinkiensis	X																					
	Lavatera assurgentiflora glabra																						
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists	X																					
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	**Terrestrial Mollusks**	X											High		Low			Not Applicable	Not Applicable				
	Island night lizard*	X		Low	Med			Low	Med			?	High		Low								
	San Clemente sage sparrow*	X	Low^{S}	Med^{S}	High^{S}				High			Low	High		Low								
	San Clemente Island fox	X																			Low	High	
	San Clemente loggerhead shrike*																						
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*	X												Low		Low	Low						
	Pinniped Haulout																						

*** Effects related to fire are treated in a separate matrix.**



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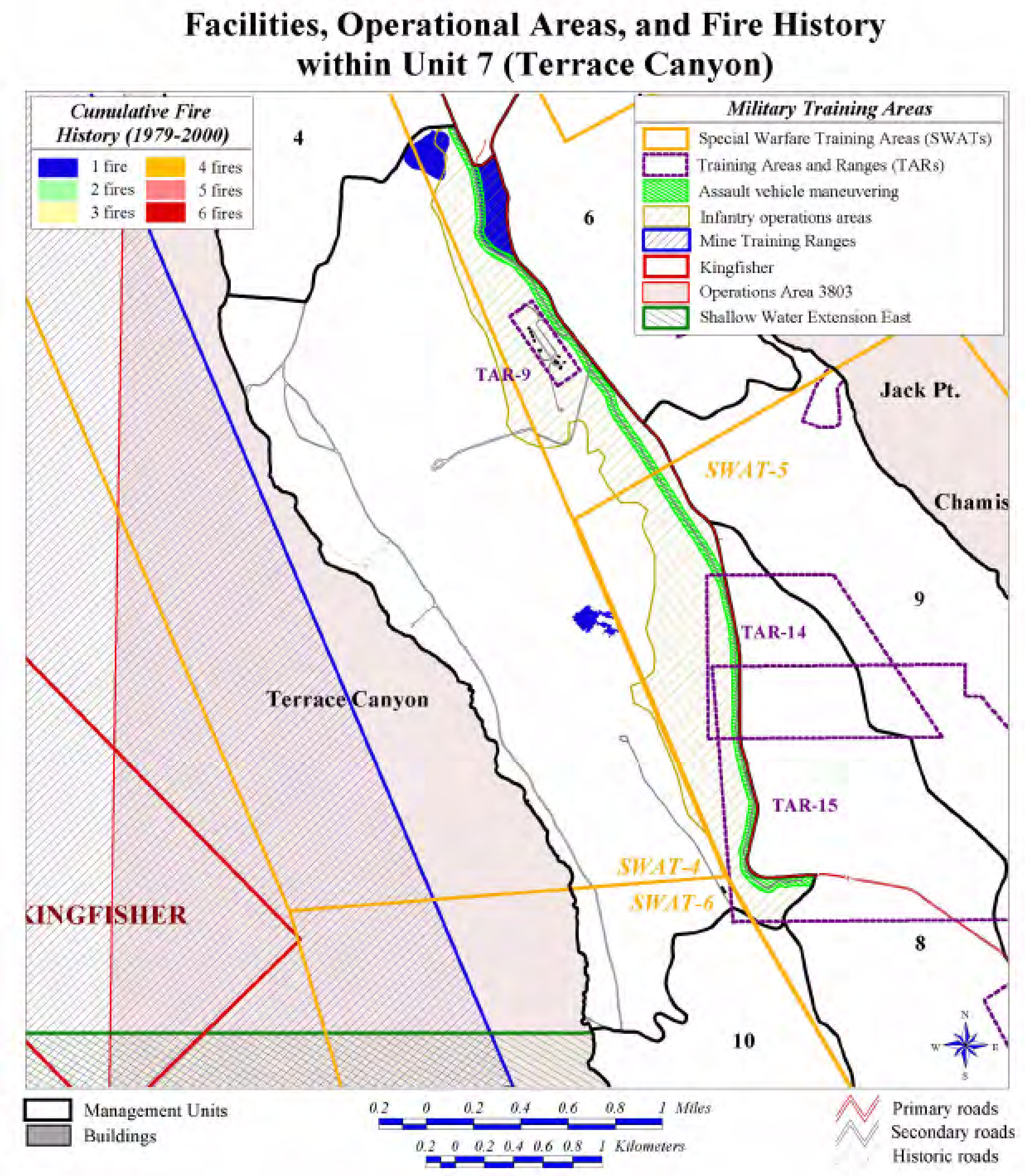

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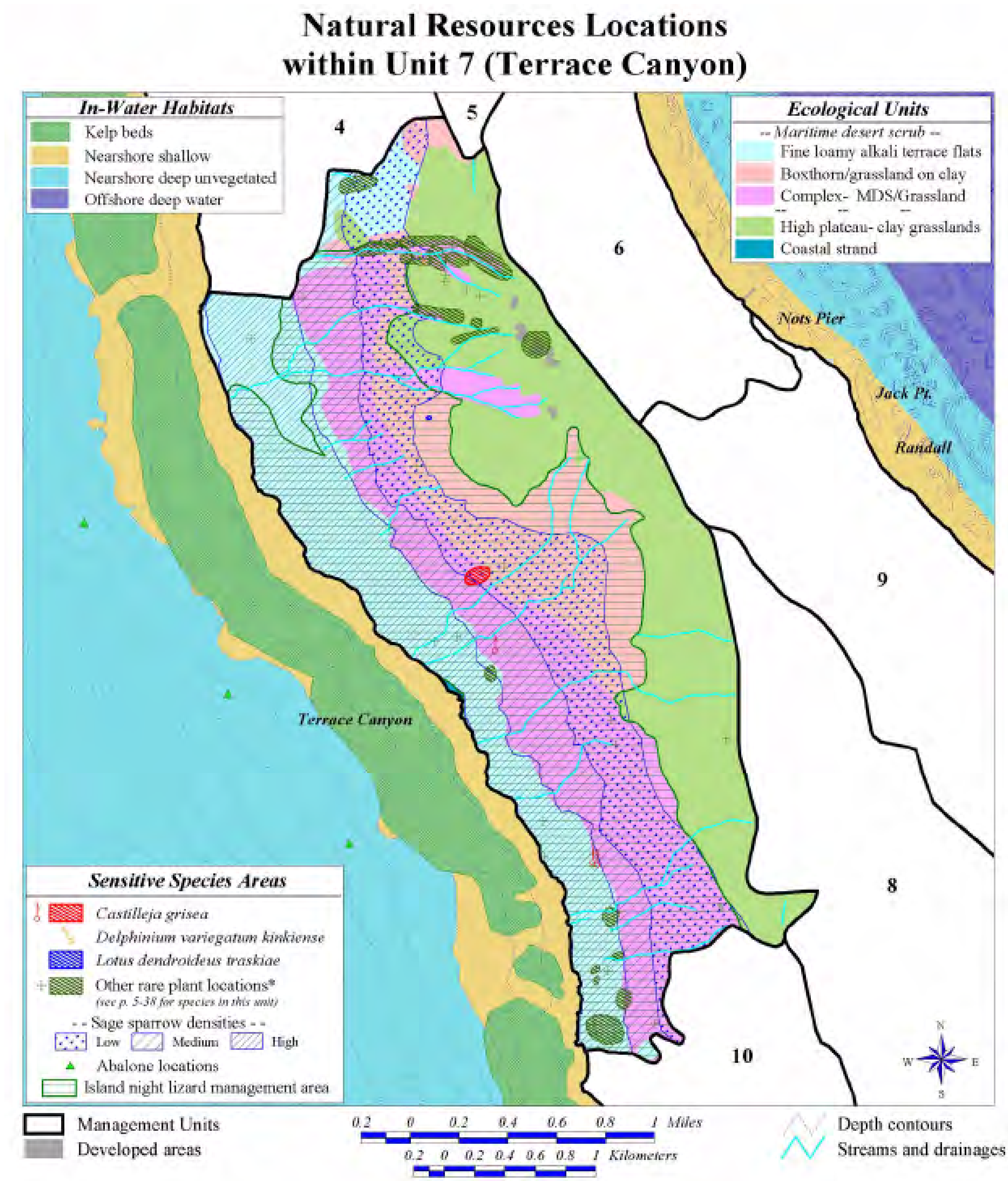

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Location: Unit 8 (VC-3)

Military Value: Highest

Fleet Marine Air
- Combat Search & Rescue
- Troop Lifts
- Air Command & Control
- Night Operations

Fleet Marine Ground
- Ground Operations
- Engineering Operations
- Command & Control
- Ground Reconnaissance & Surveillance

Naval Special Operations
- Land Special Operations
- Air Special Operations
- Information Special Operations

THIRD Fleet
- Theater-level Operations
- Multi-warfare Operations
- Realistic Threat, Complex EW
- Support Fleet Battle Exercises

RDT&E
- Missile Tests
- Unmanned Aerial Vehicle Tests

Prohibited Uses:

Landing craft, fixed wing landings, bombing, small arms/live fire, small detonations (<30 lbs), laser designator.

Other Uses:

Facilities:

TARs 14 and 15, munitions storage

Roads: Primary- 3.7 mi (6.0 km)
Secondary- 8.4 mi (13.5 km)

Natural Resource Values: Lowest

Ecological Units:
- MDS/Grassland complex (88.9 ac)
- Grasslands, clay soils (1250.0 ac)

Wildlife:
- Island night lizard*
- Island fox

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
- *Brodiaea kinkiensis*
- *Lotus dendroideus* var. *traskiae**
- *Lupinus guadalupensis*

**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- Highest military value, so management emphasis is aimed at maximizing those military values with consideration of the resource values.
- High fire risk area.
- Invasive species control.

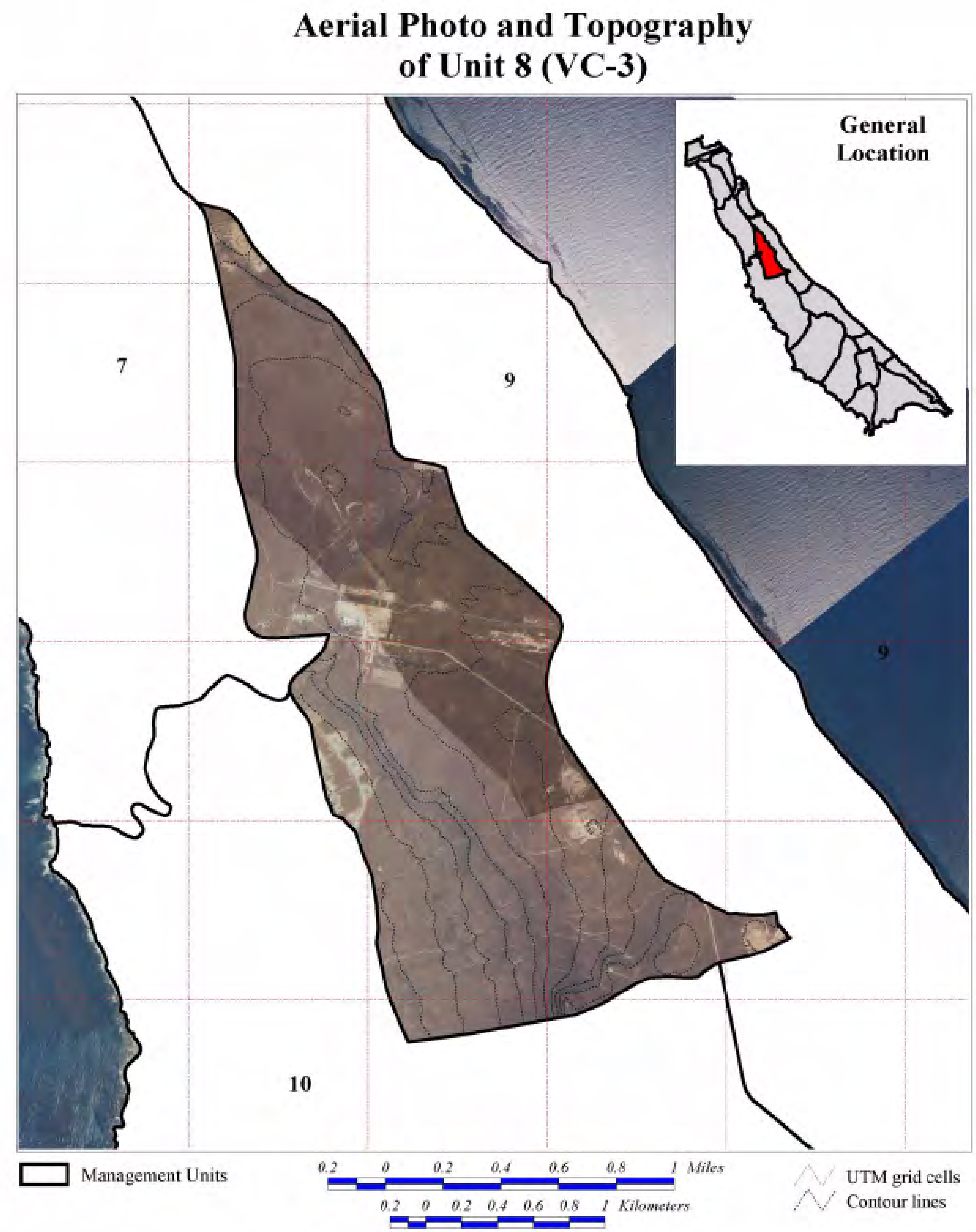
Management:
- Ensure fire does not cross boundaries of management unit
- Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the shrike.
- Use prescribed fire to foster a mosaic of native grassland and shrub, while considering the impacts of fire on rare shrub species and native forbs.
- Invasive species likely to occur in area will need frequent monitoring and treatment.
- 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.

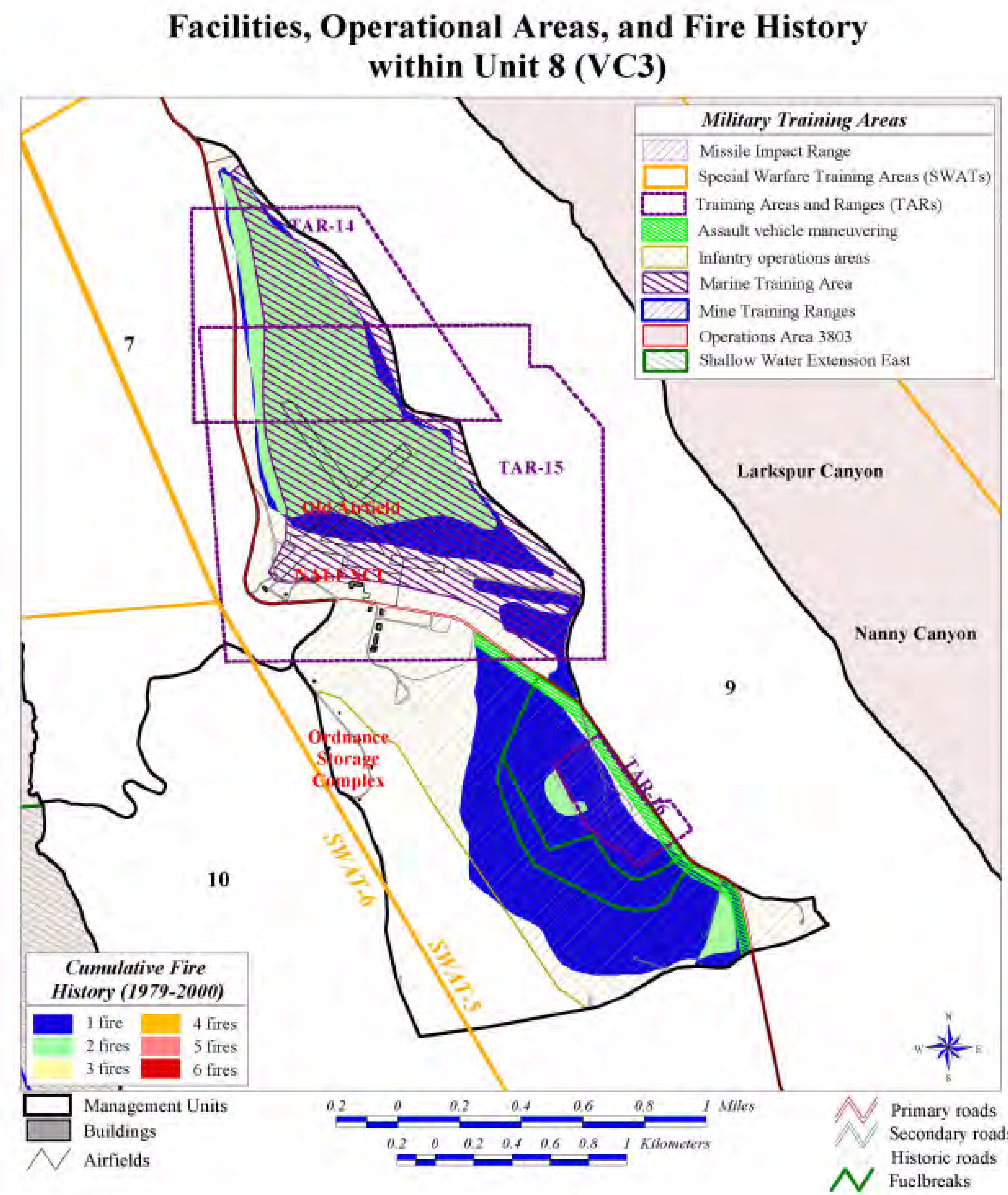
Table5-8. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

8. VC3

			Activities																				
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	*Castilleja grisea**																	Not Applicable	Not Applicable				
	*Delphinium variegatum kinkiense**																						
	*Lithophragma maximum**																						
	*Lotus dendroideus traskiae**	X	Low	Low	Med		Med						Low		Low								
	*Malacothamnus clementinus**																						
	*Sibara filifolia**																						
	Brodiaea kinkiensis	X																					
	Lavatera assurgentiflora glabra																						
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists																						
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	Terrestrial Mollusks	X																Not Applicable	Not Applicable				
	Island night lizard*	X		Low	Low			Low	Low			Low	Low		Low								
	San Clemente sage sparrow*	X											Low		Low								
	San Clemente Island fox	X																				High	
	San Clemente loggerhead shrike*																						
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*																						
	Pinniped Haulout																						

*** Effects related to fire are treated in a separate matrix.**


Aerial Photo and Topography
of Unit 8 (VC-3)
General
Location
7
9
9
10
Management Units
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
UTM grid cells
Contour lines



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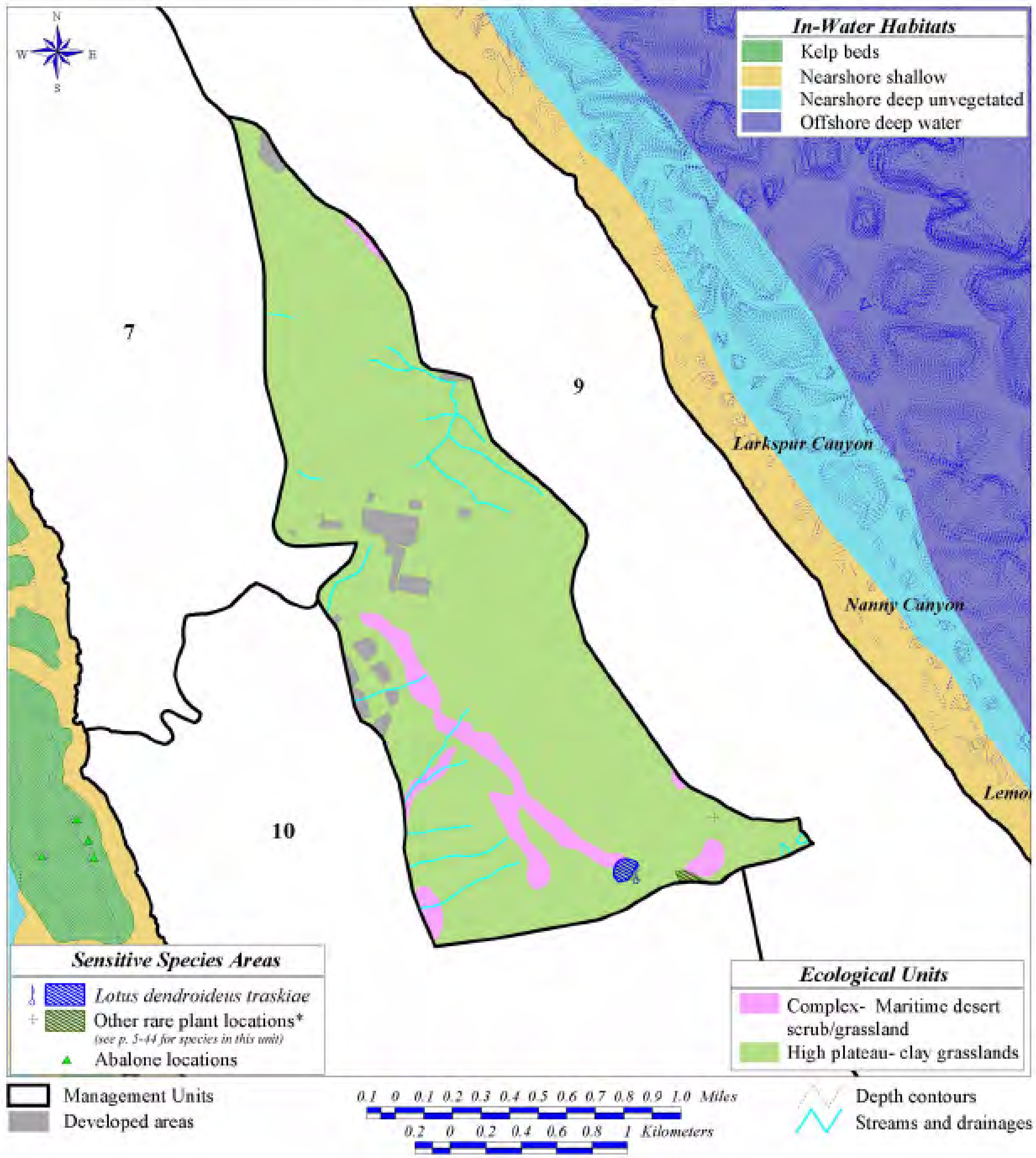
Natural Resources Locations within Unit 8 (VC3)



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Location: Unit 9 (Lemon Tank)

Military Value: Low

Fleet Marine Ground
- Ground Operations
- Engineering Operations
- Command & Control
- Ground Reconnaissance & Surveillance

Naval Special Warfare
- Land Special Operations
- Maritime Special Operations
- Air Special Operations
- Information Special Operations

RDT&E
- Radio Frequency Tests

THIRD Fleet
- Multiwarfare Operations

Prohibited Uses:

Off-road vehicles, heavy wheeled vehicles, tracked vehicles, landing craft, missile impacts, fixed wing landings, bombing, laser designator.

Other Uses:

Facilities:

TAR 13

Roads: Primary- 2.9 mi (4.7 km)
Secondary- 11.3 mi (18.2 km)

Natural Resource Value: High

Ecological Units:
- Canyon woodland (25.3 ac)
- MDS/Grassland complex (28.6 ac)
- Maritime Sage Scrub northeast escarpment (20.1 ac)
- Maritime Sage Scrub (665.6 ac)
- Grasslands, clay soils (1488.2 ac)
- Grasslands, loamy soils (216.7 ac)
- Sea bluff succulent (16.0 ac)

Wildlife:
- Loggerhead shrike*
- Island night lizard*
- Island fox
- Orange-crowned warbler

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:

Aphanisma blitoides, Artemisia nesiotica, Astragalus nevinii, Brodiaea kinkiensis, Castilleja grisea, Coreopsis giganteum, Delphinium variegatum kinkiense*, Dudleya virens virens, Eriogonum giganteum formosum, Eriophyllum nevinnii, Eschscholzia ramosa, Galium catalinense acrispum, Galvezia speciosa, Jepsonia malviflora, Lavatera assurgentiflora glabra, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis, Malacothamnus clementinus*, Phacelia floribunda, Phacelia lyonii, Quercus tomentella, Scrophularia villosa, Stephanomeria blairii, Triteleia clementina*

**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- Low military values, so management emphasis is aimed at maintaining those military values to the extent possible and with greatest flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- Historic location for island tree mallow.
- High value for San Clemente Island larkspur (72% of population occurs in this unit).
- High fire encroachment risk from the west.
- High value for *Lavatera assurgentiflora glabra* (4% of population occurs in this unit).
- High value for Island oak (13% of the population occurs in this unit).
- High value for *Coreopsis giganteum*- only known island location.

Management:

- This is a high priority grassland restoration area because of high percentage of endemic forms including the endangered San Clemente Island larkspur. Improve understanding of where needlegrass patches currently reside to help focus restoration objectives. Also manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the shrike
- Island tree mallow was known historically from this location and therefore this area should be a priority reintroduction area.
- Protect Trask's island lotus from competition using managed fire. Protect from vehicle impacts if necessary.
- Protect Island oaks from fires that will damage trees or seedlings or saplings.
- 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 that oaks and other woodlands on eroding or erodible surfaces 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 maturations, reproduction and recruitment are the biggest risks of fire.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- 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.
- 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, but as of now which herbs cannot be identified due to lack of knowledge.
- 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 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 SCLS. So, until further understanding changes this approach, no situation is identified (except nesting by SCLS) in which enhanced fire suppression would be justified due to exceeding target values.
- Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage the risk of catastrophic fire.
- Encourage continued *Coreopsis* recolonization.

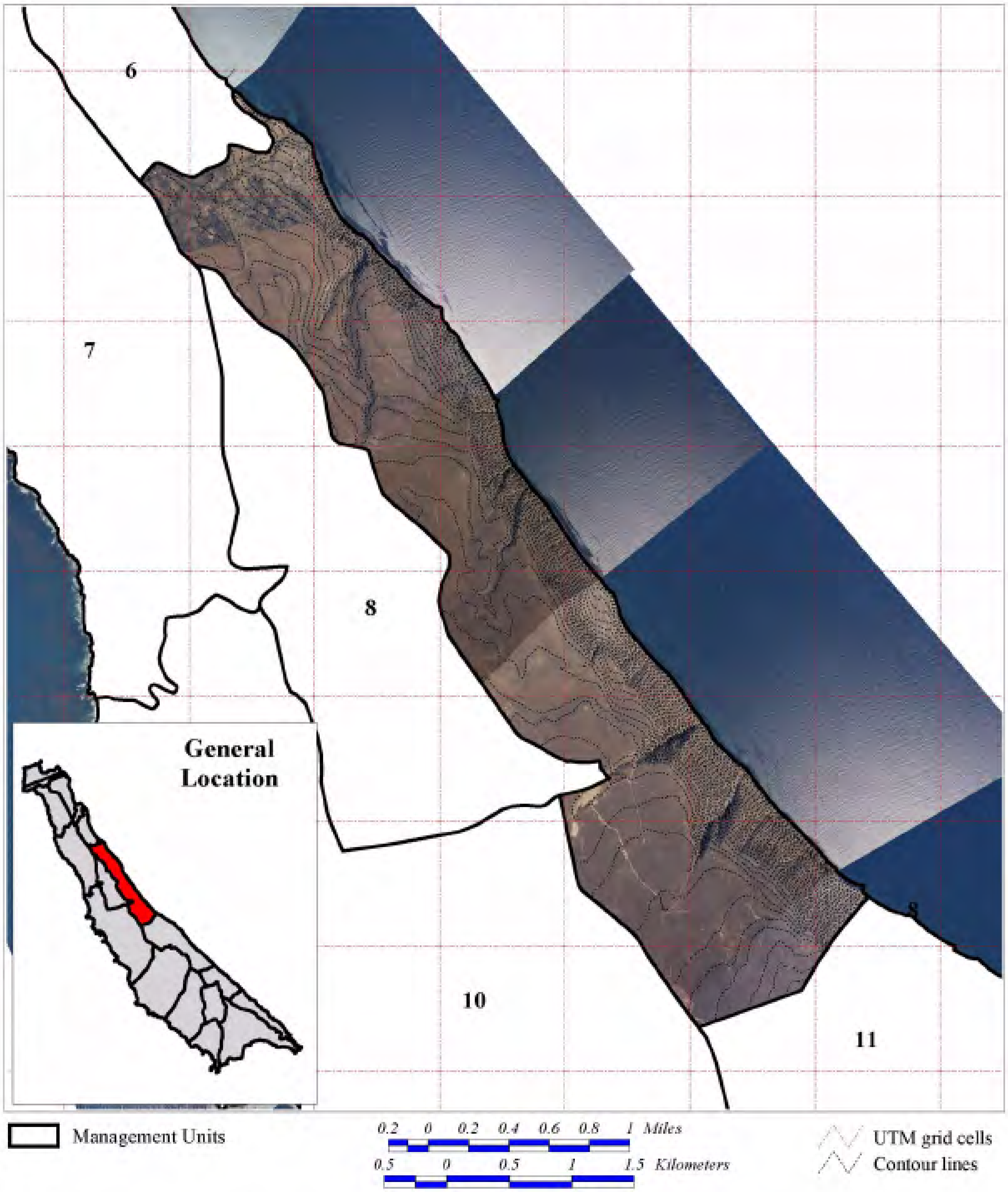
Table5-9. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

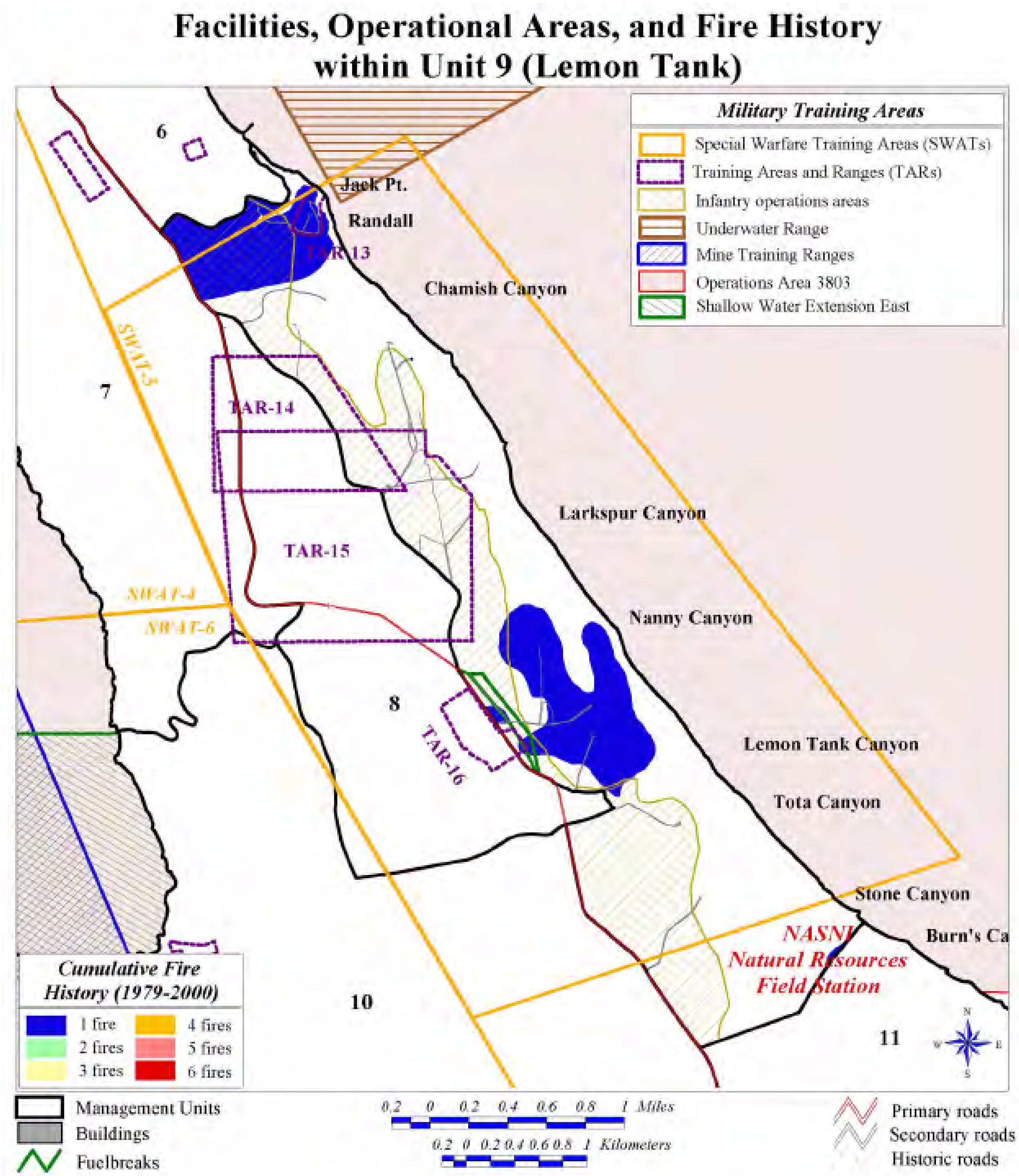
9. Lemon Tank

			Activities																				
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (>100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	*Castilleja grisea**	X											High		Low			Not Applicable	Not Applicable				
	*Delphinium variegatum kinkiense**	X	Low	Med	High		High		Low			Low	High		Low								
	*Lithophragma maximum**																						
	*Lotus dendroideus traskiae**	X											High		Low								
	*Malacothamnus clementinus**	X											High		Low								
	*Sibara filifolia**																						
	Brodiaea kinkiensis	X																					
	Lavatera assurgentiflora glabra	X											High		Low								
	Quercus tomentella	X	Low	Med	High		High						High		Low								
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists																						
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	Terrestrial Mollusks	X																Not Applicable	Not Applicable				
	Island night lizard*	X		Low	Low			Low	Low			Low	Med		Low								
	San Clemente sage sparrow*																						
	San Clemente Island fox	X																			Low	High	
	San Clemente loggerhead shrike*	X											Low		Low[S]							Low	
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*																						
	Pinniped Haulout																						

* Effects related to fire are treated in a separate matrix.

Aerial Photo and Topography of Unit 9 (Lemon Tank)





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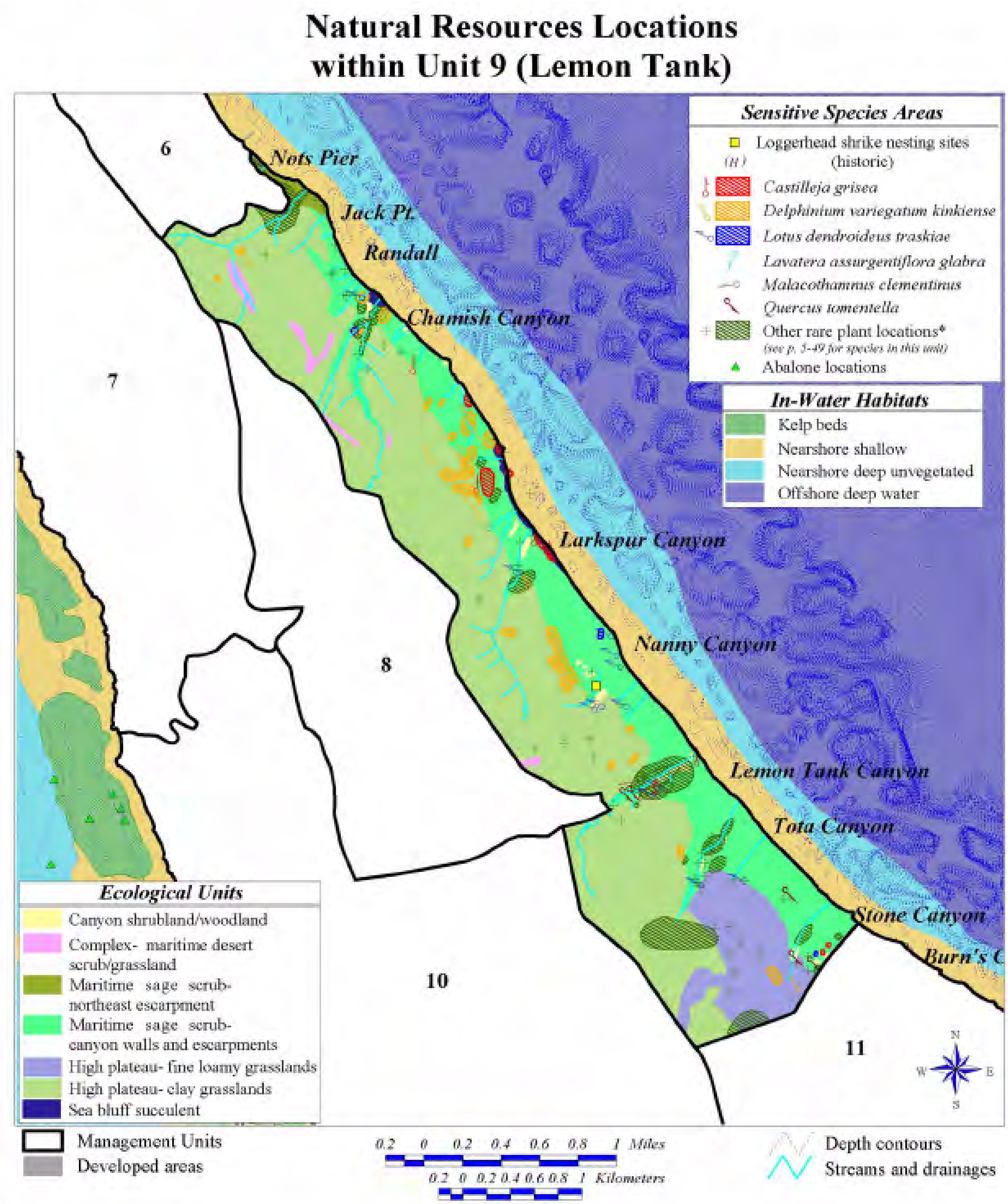

Natural Resources Locations within Unit 9 (Lemon Tank)
Sensitive Species Areas
Loggerhead shrike nesting sites (historic)
Castilleja grisea
Delphinium variegatum kinkiense
Lotus dendroideus traskiae
Lavatera assurgentiflora glabra
Malacothamnus clementinus
Quercus tomentella
Other rare plant locations*
(see p. 5-49 for species in this unit)
Abalone locations
In-Water Habitats
Kelp beds
Nearshore shallow
Nearshore deep unvegetated
Offshore deep water
Ecological Units
Canyon shrubland/woodland
Complex- maritime desert scrub/grassland
Maritime sage scrub- northeast escarpment
Maritime sage scrub- canyon walls and escarpments
High plateau- fine loamy grasslands
High plateau- clay grasslands
Sea bluff succulent
Management Units
Developed areas
Depth contours
Streams and drainages
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
Nots Pier
Jack Pt.
Randall
Chamish Canyon
Larkspur Canyon
Nanny Canyon
Lemon Tank Canyon
Tota Canyon
Stone Canyon
Burn's C
6
7
8
10
11
N
S
E
W

Location: Unit 10 (Seal Cove)

Military Value: High

Fleet Marine Air
- Combat Search & Rescue
- Troop Lifts
  - Night Operations

Fleet Marine Ground
- Ground Operations
- Engineering Operations
- Ground Reconnaissance & Surveillance

Naval Special Warfare
- Land Special Operations
- Maritime Special Operations
- Air Special Operations
- Information Special Operations

THIRD Fleet
- Multiwarfare Operations

Prohibited Uses:

Landing craft, missile impacts, fixed wing landings, bombing, laser designator.

Other Uses:
- SCORE's Tombstone Radar
- Recreational diving and fishing areas offshore

Facilities:
- Little Rock IR SAM
- Sites with Mobile EW

Roads: Primary- 2.7 mi (4.4 km)
Secondary- 14.5 mi (23.3 km)

Natural Resource Value: Highest

Ecological Units:
- Canyon woodland (11.2 ac)
- MDS/Grassland complex (1826.9 ac)
- MDS Boxthorn/grassland (209.1 ac)
- MDS Pyramid Cove/South-facing slopes (38.7 ac)
- MDS Boxthorn (761.2 ac)
- Maritime Sage Scrub (644.9 ac)
- Grasslands, clay soils (1126.0 ac)
- Grasslands, loamy soils (678.3 ac)
- Stabilized sand dunes (9.9 ac)
- Coastal strand (13.5 ac)
- Sea bluff succulent (1.8 ac)
- Sea stacks

Wildlife:
- Loggerhead shrike*
- Sage sparrow*
- Island night lizard*
- Xantus's murrelet
- Island fox
- Orange-crowned warbler

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:

Aphanisma blitoides, Artemisia nesiotica, Astragalus nevinii, Atriplex pacifica, Brodiaea kinkiensis, Camissonia guadalupensis, Castilleja grisea, Crossosoma californicum, Cryptantha traskiae, Delphinium variegatum kinkiense*, Dudleya virens virens, Eriogonum giganteum formosum, Eriophyllum nevinnii, Eschscholzia ramosa, Galium catalinense acrispum, Galvezia speciosa, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis, Phacelia floribunda, Phacelia lyonii, Stephanomeria blairii, Triteleia clementina*

**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- High military value, so management emphasis is aimed at protecting those military values with increasing flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- High fire incidence from Eel Point area.
- Sage sparrow high density area.
- Historic location for island tree mallow.
- Erosion from plateau roads.
- Invasive species control

Management:

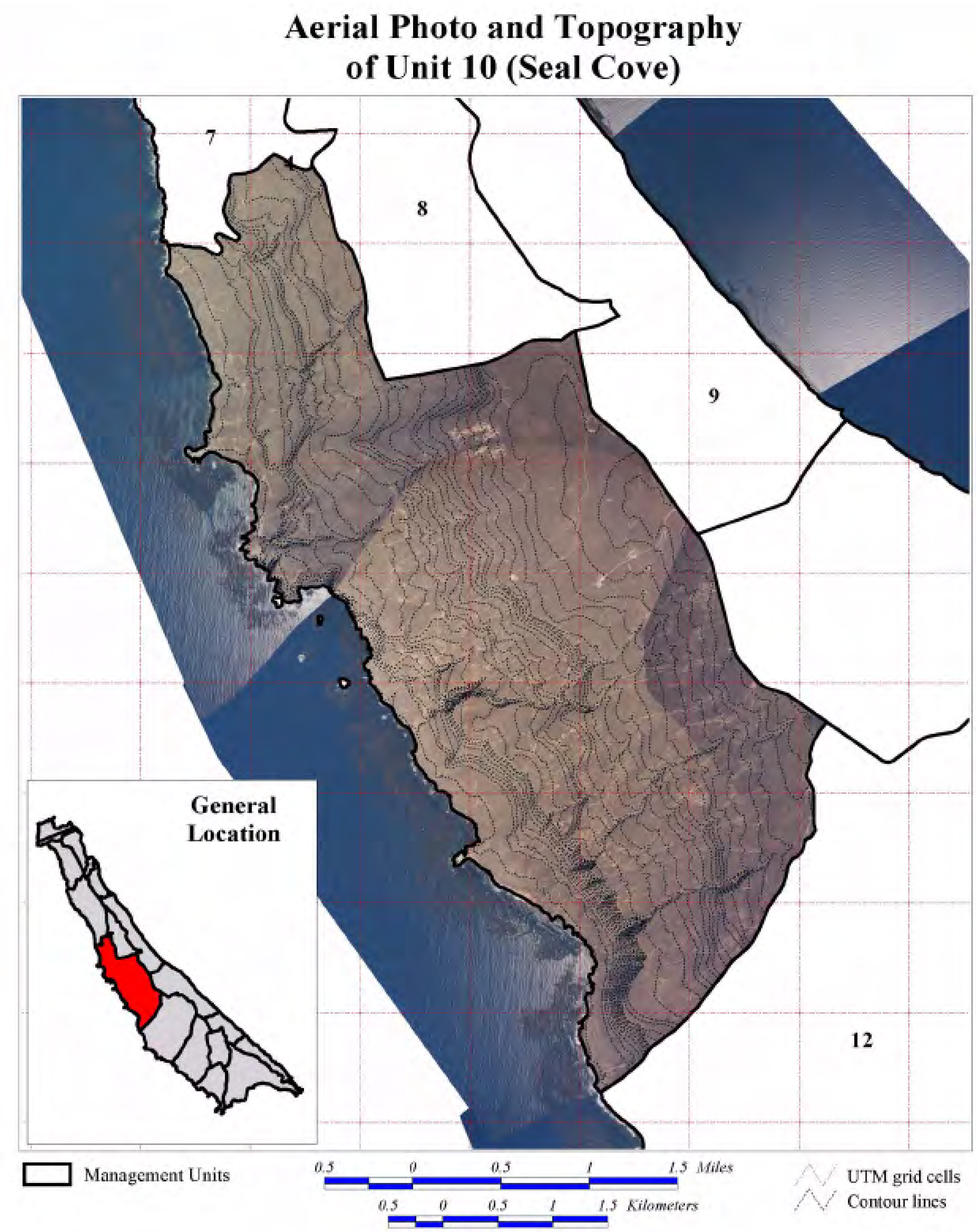
- This is a high priority fire management area to keep fires out of high density sage sparrow habitat and from crossing south of Eel Cove Canyon. Use retardant or prescribed fire fuels management as necessary to achieve objectives.
- This area has very high military value, so the usual boxthorn objectives will not apply except in high-density habitat. Consultation under the Endangered Species Act on the Fire Management Plan will focus on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn within five years. For a fire to be counted as a burn it must be at least a moderate bum (Score 3 on NPS scale 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.
- Comply with guidance for Island Night Lizard Management Area.
- Monitor and evaluate the military use and effectiveness of the INLMA to the Island night lizard and associated species.
- Island tree mallow was known historically from this location and therefore this area should be a priority reintroduction area.
- Protect San Clemente Island larkspur.
- Protect Trask's island lotus.
- Cliff spurge *(Euphorbia misera)* community on slope above Eel Point should be managed to protect from exotic competition and fire that kills the shrub.
- Avoid impacts to white abalone for siting of current and future uses.
- Avoid disturbance of and limit access to pinniped haul outs and rookeries during the breeding season May through August, which may result in stampeding and trampling of pups.
- Reduce the percent cover of invasive plants from the 1992-93 baseline of 41% on the faces, 53% on the flats, as evaluated over at least one 7-year El Niño cycle. Control spread of fennel.
- Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the shrike.
- Allow fire to play its natural role, as far as possible considering the pervasiveness of exotic species that are unnatural to the system, in dictating the boundaries of shrublands and grasslands.
- 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 that oaks and other woodlands on eroding or erodible surfaces 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 maturations, reproduction and recruitment are the biggest risks of fire.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- 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.
- 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, but as of now which herbs cannot be identified due to lack of knowledge.
- Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the shrike.
- 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 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 SCLS. So, until further understanding changes this approach, no situation is identified (except nesting by SCLS) in which enhanced fire suppression would be justified due to exceeding target values.
- Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage the risk of catastrophic fire.
- Avoid impacts to white abalone for siting of current and future uses.

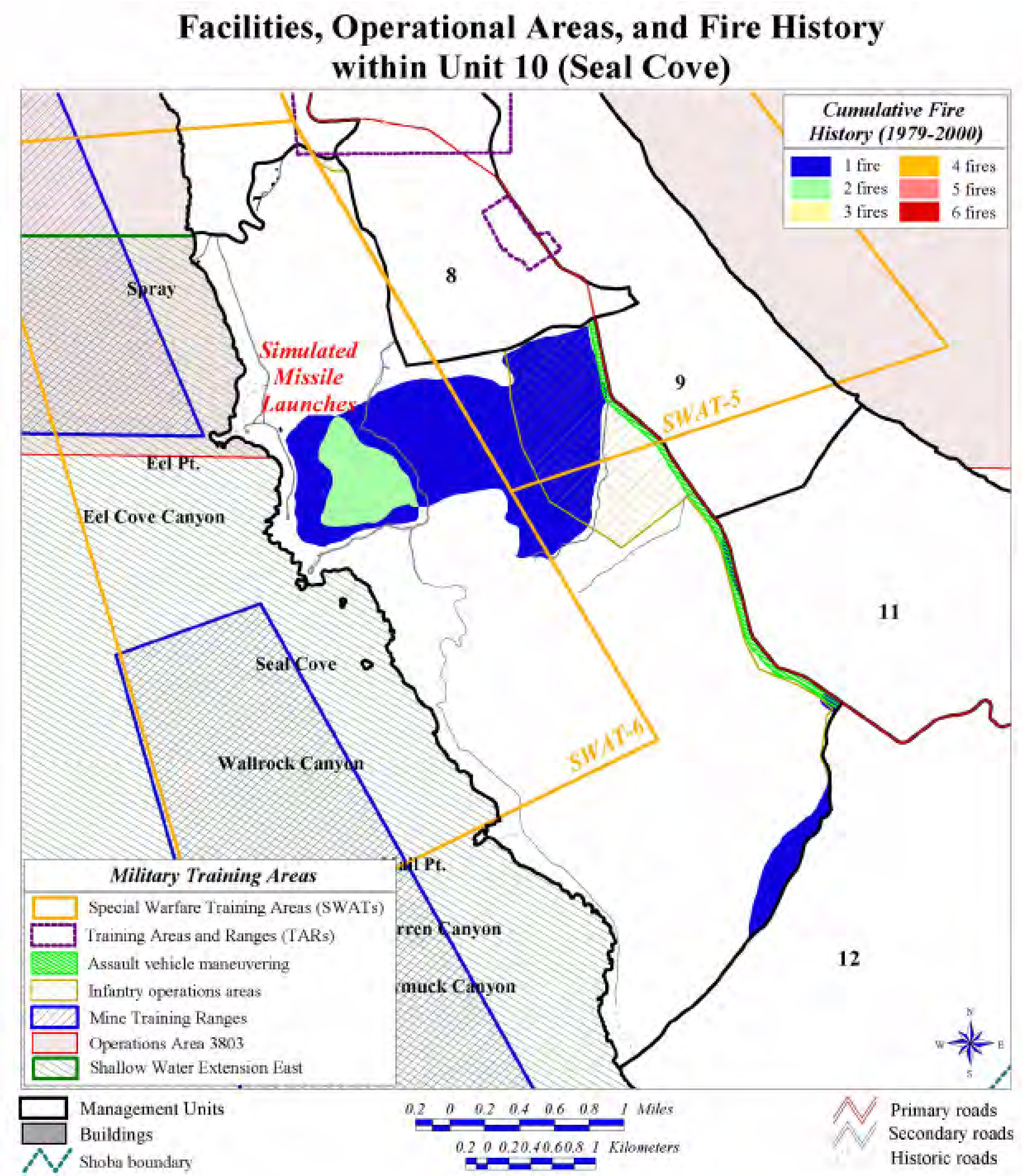
Table5-10. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

10. Seal Cove

			Activities																			
			Battalion Landing (Infantry) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	*Castilleja grisea**	X											High		Low			Not Applicable	Not Applicable				
	*Delphinium variegatum kinkiense**	X	Low	Low	Low		Low	High															
	*Lithophragma maximum**																						
	*Lotus dendroideus traskiae**	X											High		Low								
	*Malacothamnus clementinus**																						
	*Sibara filifolia**																						
	Brodiaea kinkiensis	X																					
	Lavatera assurgentiflora glabra																						
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists	X																					
	Lotus argophyllus adsurgens																						
	Euphorbia misera	X							Low				Low		Low					Med			
Management Focus Animal Species	Terrestrial Mollusks	X											High		Low			Not Applicable	Not Applicable				
	Island night lizard*	X		Low	Med		Low	Low	Med		Med	Low	High		Low								
	San Clemente sage sparrow*	X							High			Med^{S}	High		High^{S}								
	San Clemente Island fox	X																			Low	Med	
	San Clemente loggerhead shrike*	X		Low	Med								Low		Low^{S}								
	Western snowy plover*																						
	Xantus' murrelet	X											Low^{S}		Low^{S}								
	Abalone*	X									?			High		Med	Low						
	Pinniped Haulout	X												High		High	?						

*** Effects related to fire are treated in a separate matrix.**


Aerial Photo and Topography
of Unit 10 (Seal Cove)
7
8
9
12
General
Location
Management Units
0.5 0 0.5 1 1.5 Miles
0.5 0 0.5 1 1.5 Kilometers
UTM grid cells
Contour lines



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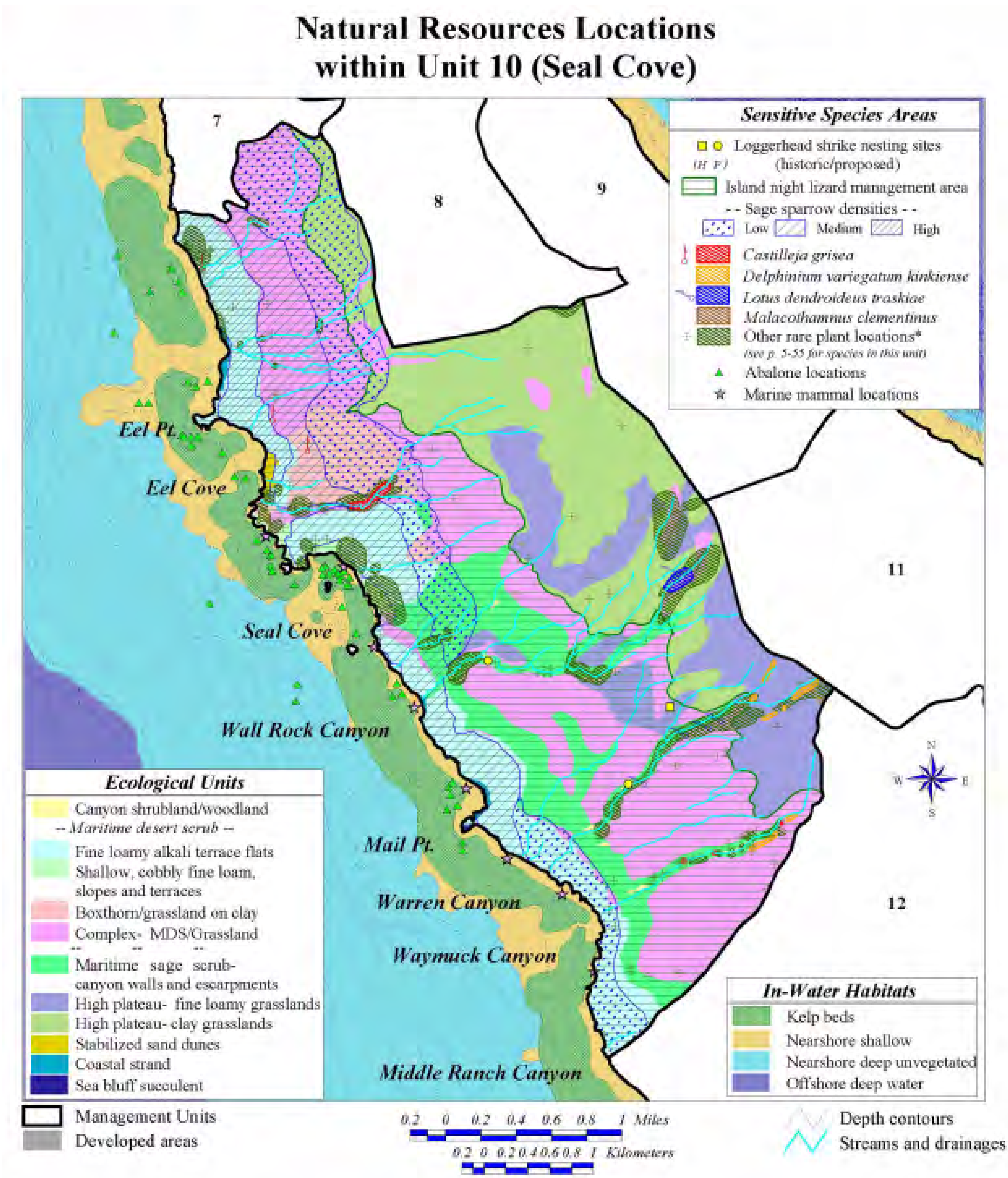

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Location: Unit 11 (Mt. Thirst)

Military Value: Medium

Fleet Marine Air
- Command & Control
- Night Operations

Fleet Marine Ground
- Ground Operations

Naval Special Warfare
- Land Special Operations

THIRD Fleet
- Multiwarfare Operations

Prohibited Uses:
Off-road vehicles, heavy wheeled vehicles, tracked vehicles, landing craft, missile impacts, fixed wing landings, bombing, laser designator.

Other Uses:
Recreational fishing areas offshore

Facilities:
- Mt. Thirst Radar
- Mt. Vista Communications TACAN
- Stations Peak Communications
- Natural Resource Station Stone

Roads: Primary- 4.7 mi (7.6 km)
Secondary- 2.9 mi (4.7 km)

Natural Resource Value: High

Ecological Units:
- Canyon woodland (158.1 ac)
- MDS/Grassland complex (<1 ac)
- Maritime Sage Scrub (1474.3 ac)
- Grasslands, clay soils (9.1 ac)
- Grasslands, loamy soils (1078.0 ac)
- Coastal strand (<1 ac)
- Sea bluff succulent (7.4 ac)

Wildlife:
- Loggerhead shrike*
- Sage sparrow*
- Island night lizard*
- Island fox
- Orange-crowned warbler

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
Brodiaea kinkiensis, Castilleja grisea, Delphinium variegatum kinkiense*, Delphinium variegatum thornei, Dudleya virens virens, Eriogonum giganteum formosum, Eschscholzia ramosa, Galium catalinense acrispum, Galvezia speciosa, Hazardia cana, Jepsonia malviflora, Lithophragma maximum, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis, Lyonothamnus floribundus asplenifolius, Phacelia lyonii, Quercus tomentella, Scrophularia villosa, Stephanomeria blairii, Triteleia clementina*

**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- Medium military value, so management emphasis is aimed at maintaining those military values with high flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- High fire encroachment risk in the southwest corner.
- Erosion from plateau roads
- San Clemente Island larkspur
- High value for Island oak (62% of the population occurs in this unit).
- High value for Santa Cruz ironwood (5% of population occurs in this unit).
- High value for *Castilleja grisea* (35% of population occurs in this unit).

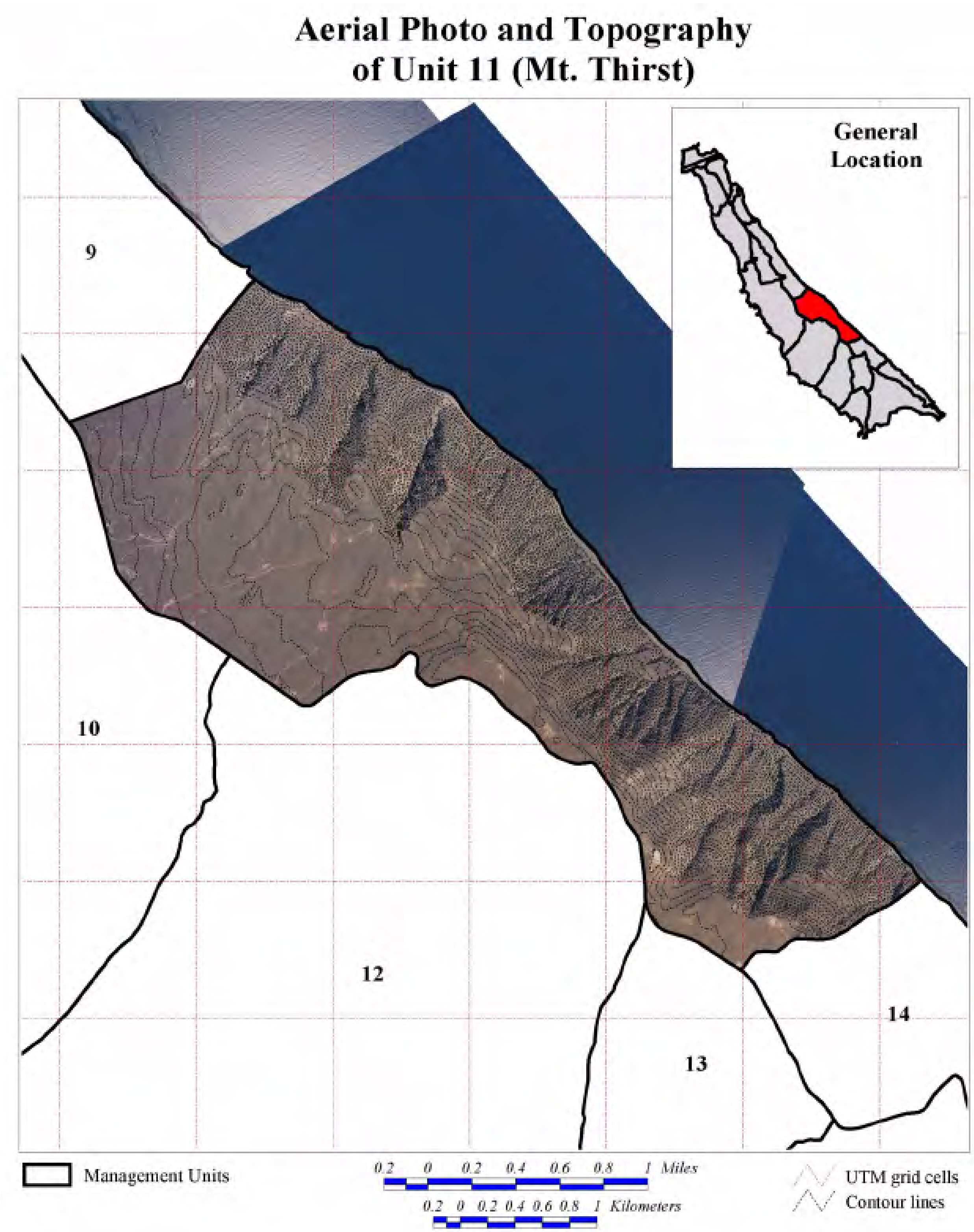
Management:
- For eelgrass, continue to abide by no net loss provisions of the Clean Water Act and mitigation standards under the Southern California Eelgrass Mitigation Policy.
- Ensure fires do not cross SHOBA Ridge Road.
- Manage fire for openness of grasslands and native forbs, to enhance transit and prey availability for fox, and prey availability for the shrike.
- Allow fire to play its natural role, 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 with shrub encroachment to devise fuel management measures and manage the risk of catastrophic fire.
- Allow no mortality of any individual ironwood tree to excessively hot or frequent fire. Consider the use of prescribed fire to protect entire groves from catastrophic loss, to improve seedbed conditions, and reduce exotics.
- 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.
- 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, but as of now which herbs cannot be identified due to lack of knowledge.
- Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the shrike.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.

Table5-11. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

11. Mt. Thirst

			Activities																				
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (>100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****	X																					
	Delphinium variegatum kinkiense*	X																					
	Lithophragma maximum*	X																					
	Lotus dendroideus traskiae*	X																					
	Malacothamnus clementinus*																						
	Sibara filifolia*																						
	Brodiaea kinkiensis	X							Not Applicable								Not Applicable	Not Applicable	Not Applicable				
	Lavatera assurgentiflora glabra																						
	Quercus tomentella	X	Low	Med	High		High																
	Lyonothamnus floribundus aspleniifolius	X	Low	Med	High		High																
	Active Dune Specialists																						
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	**Terrestrial Mollusks**	X																					
	Island night lizard*	X			Low		Low																
	San Clemente sage sparrow*	X																					
	San Clemente Island fox	X																				Med	
	San Clemente loggerhead shrike*	X					Low		Not Applicable								Not Applicable	Not Applicable	Not Applicable			Low	
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*																						
	Pinniped Haulout																						

*** Effects related to fire are treated in a separate matrix.**



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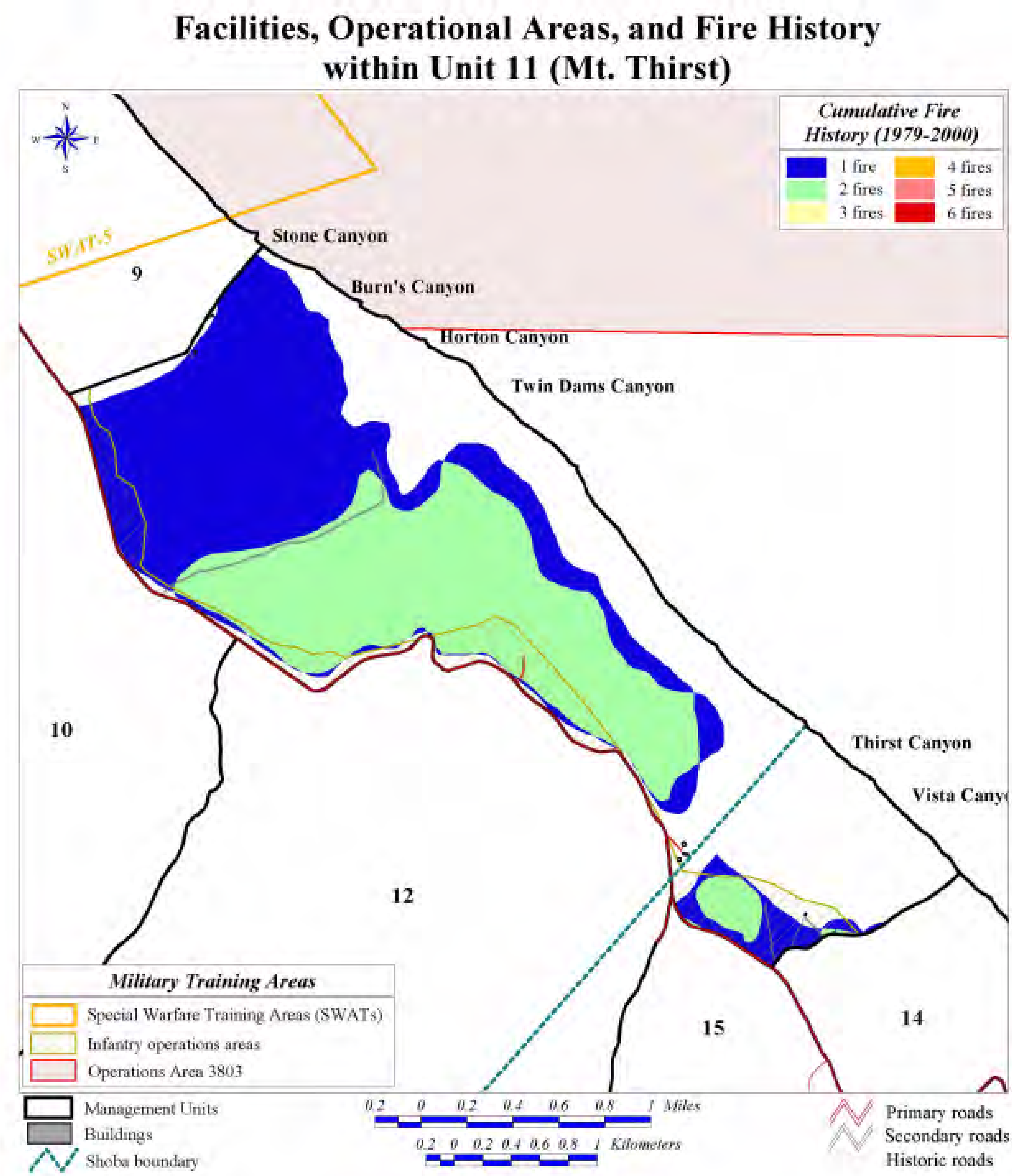

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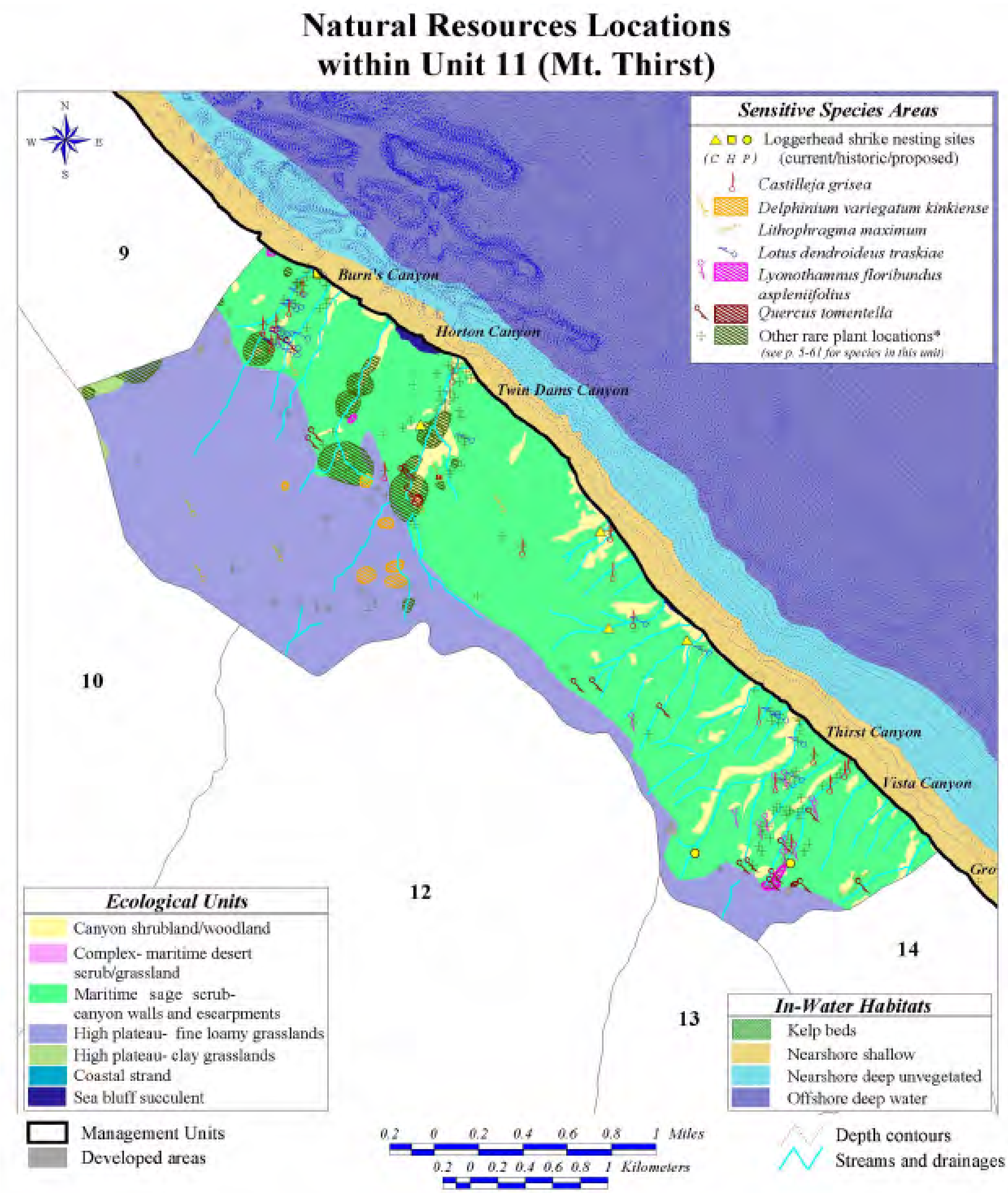

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Location: Unit 12 (Lost Point)

Military Value: Lowest

Fleet Marine Air
- Combat Search & Rescue
- Troop Lifts
- Night Operations

Naval Special Warfare
- Land Special Operations

Fleet Marine Ground
- Ground Operations
- Ground Reconnaissance & Surveillance

THIRD Fleet
- Multiwarfare Operations

Prohibited Uses:

Landing craft, missile impacts, fixed wing landings, bombing, laser designator.

Other Uses:

Recreational diving and fishing areas offshore

Facilities:

Roads: Primary- 2.8 mi (4.5 km)
Secondary- 4.7 mi (7.6 km)

Natural Resource Value: Highest

Ecological Units:
- Canyon woodland (44.2 ac)
- MDS/Grassland complex (1845.0 ac)
- MDS Boxthorn/grassland (27.4 ac)
- MDS Boxthorn (289.7 ac)
- Maritime Sage Scrub (792.4 ac)
- Grasslands, loamy soils (1756.1 ac)
- Coastal strand (17.6 ac)
- Sea stacks

Wildlife:
- Loggerhead shrike*
- Island night lizard*
- Island fox
- Sage sparrow*
- Orange-crowned warbler

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:

Artemisia nesiotica, Atriplex pacifica, Brodiaea kinkiensis, Castilleja grisea, Crossosoma californicum, Delphinium variegatum kinkiense*, Dudleya virens virens, Eriogonum giganteum formosum, Eschscholzia ramosa, Galium catalinense acrispum, Galvezia speciosa, Hazardia cana, Jepsonia malviflora, Lotus argophyllus adsurgens, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis, Lyonothamnus floribundus asplenifolius, Malacothamnus clementinus*, Phacelia floribunda, Phacelia lyonii, Rhamnus pirifolia, Stephanomeria blairii, Triteleia clementina*

**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- Lowest military values, so management emphasis is aimed at maintaining those military values to the extent possible and with greatest flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- Erosion from plateau
- High value for *Malacothamnus clementinus* (30% of population occurs in this unit).
- Protection for the Santa Cruz ironwood stand because it is one of only two locations in westshore canyons.

- Comply with guidance for Island Night Lizard Management Area.
- Monitor and evaluate the military use and effectiveness of the INLMA to the Island night lizard and associated species.
- Protect San Clemente Island larkspur
- Protect Trask's island lotus
- Protect San Clemente Island bush mallow
- Protect Santa Cruz ironwood
- Manage fire for openness of grasslands and native plants, to enhance transit/prey availability for fox, and prey availability for the shrike.
- Allow fire to play its natural role, 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.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- For areas with very high military value, the usual boxthorn objectives will not apply except in high density areas. Consultation on the Fire Management Plan under the Endangered Species Act will focus on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn within five years. For a fire to be counted as a burn it must be at least a moderate burn (Score 3 on NPS scale 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.

Management:

- 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 that oaks and other woodlands on eroding or erodible surfaces 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 maturations, reproduction and recruitment are the biggest risks of fire.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- Fire management targets in boxthorn/grassland complex 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.
- The risks to natural resource values in the terrace complex community are that excessively hot, frequent, or large fires may delay or prevent woody plant recovery. For example, lemonadeberry *(Rhus integrifolia)* appears to be prominent among the shrubs that have been lost from this complex. While considered a fire resistant species, it is not a vigorous sprouter and probably declined with heavy grazing along with over-frequent or over-hot fires. 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 (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. Consultation on the Fire Management Plan will focus on managing for fire return intervals five years or longer in grasslands, 10 years or longer in shrublands. No controls on patch size except to prevent fires from entering or crossing canyons and high fire management area on south side of Chukit Canyon boundary and along SHOBA Ridge Road.
- 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.
- 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, but as of now which herbs cannot be identified due to lack of knowledge.
- Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the shrike.
- Reduce the percent cover of invasive plants from the 1992-93 baseline of 41% on the faces, 53% on the flats, as evaluated over at least one 7-year El Niño cycle.
- Promote a fire regime which allows native shrubs and herbaceous species to out-compete prickly pear and cholla.

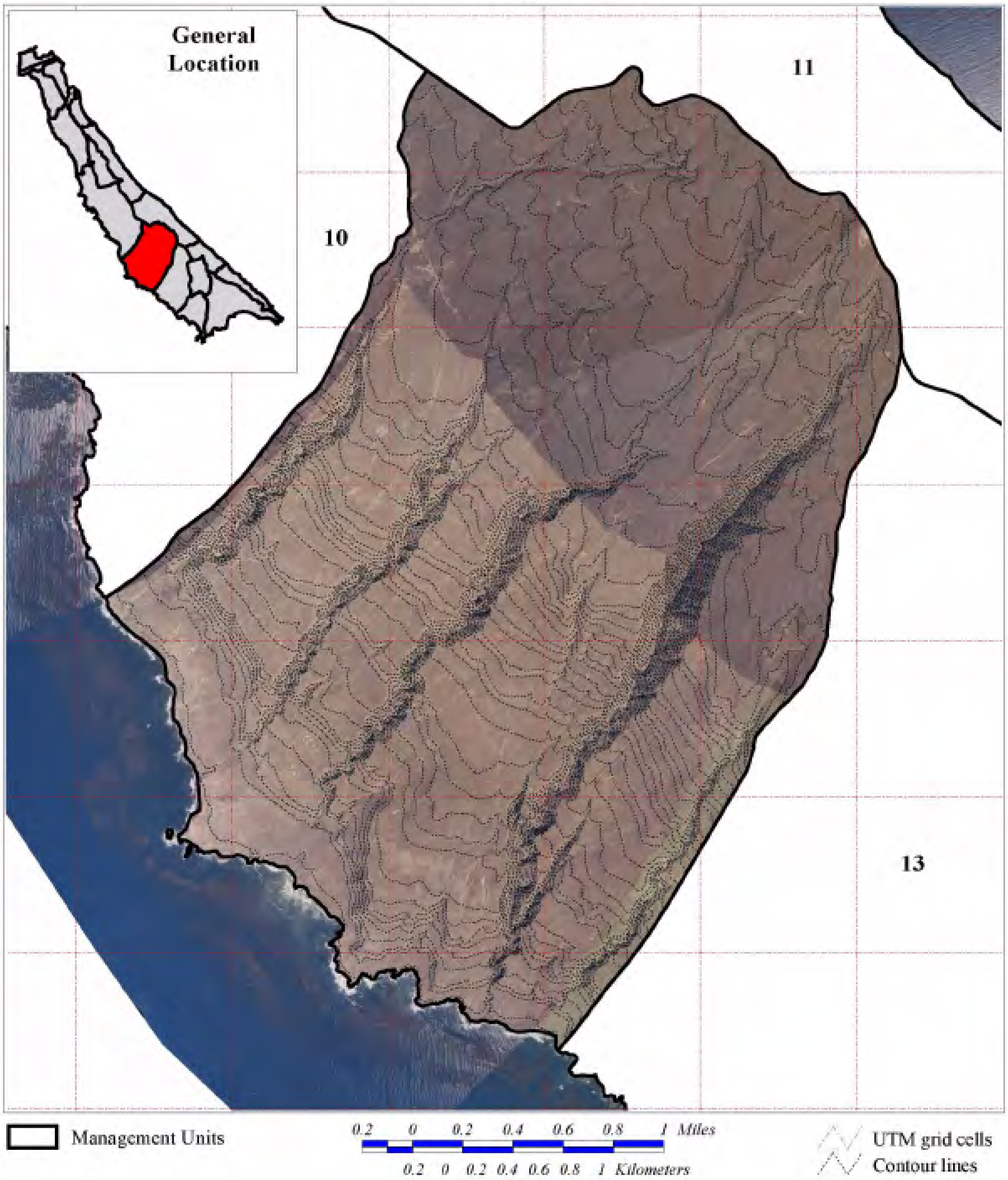
Table5-12. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

12. Lost Point

			Activities																					
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo				
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	*Castilleja grisea**	X	Low	Med	High		High																
	*Delphinium variegatum kinkiense**	X	Low	Med	High		High																
	*Lithophragma maximum**																						
	*Lotus dendroideus traskiae**	X																					
	*Malacothamnus clementinus**	X																					
	*Sibara filifolia**																						
	Brodiaea kinkiensis	X							Not Applicable									Not Applicable	Not Applicable				
	Lavatera assurgentiflora glabra																						
	Quercus tomentella	X	Low	Med	High		High																
	Lyonothamnus floribundus aspleniifolius	X	Low	Med	High		High																
	Active Dune Specialists																						
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	Terrestrial Mollusks	X																					
	Island night lizard*	X	Low	Low	Med		Low	Low												Low			
	San Clemente sage sparrow*	X			Low[S]															Low			
	San Clemente Island fox	X																				Med	
	San Clemente loggerhead shrike*	X			Low		Med	Med[S]	Not Applicable				High		Med			Not Applicable	Not Applicable	Med[S]	Low	Low	
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*																						
	Pinniped Haulout																						

* Effects related to fire are treated in a separate matrix.

Aerial Photo and Topography of Unit 12 (Lost Point)



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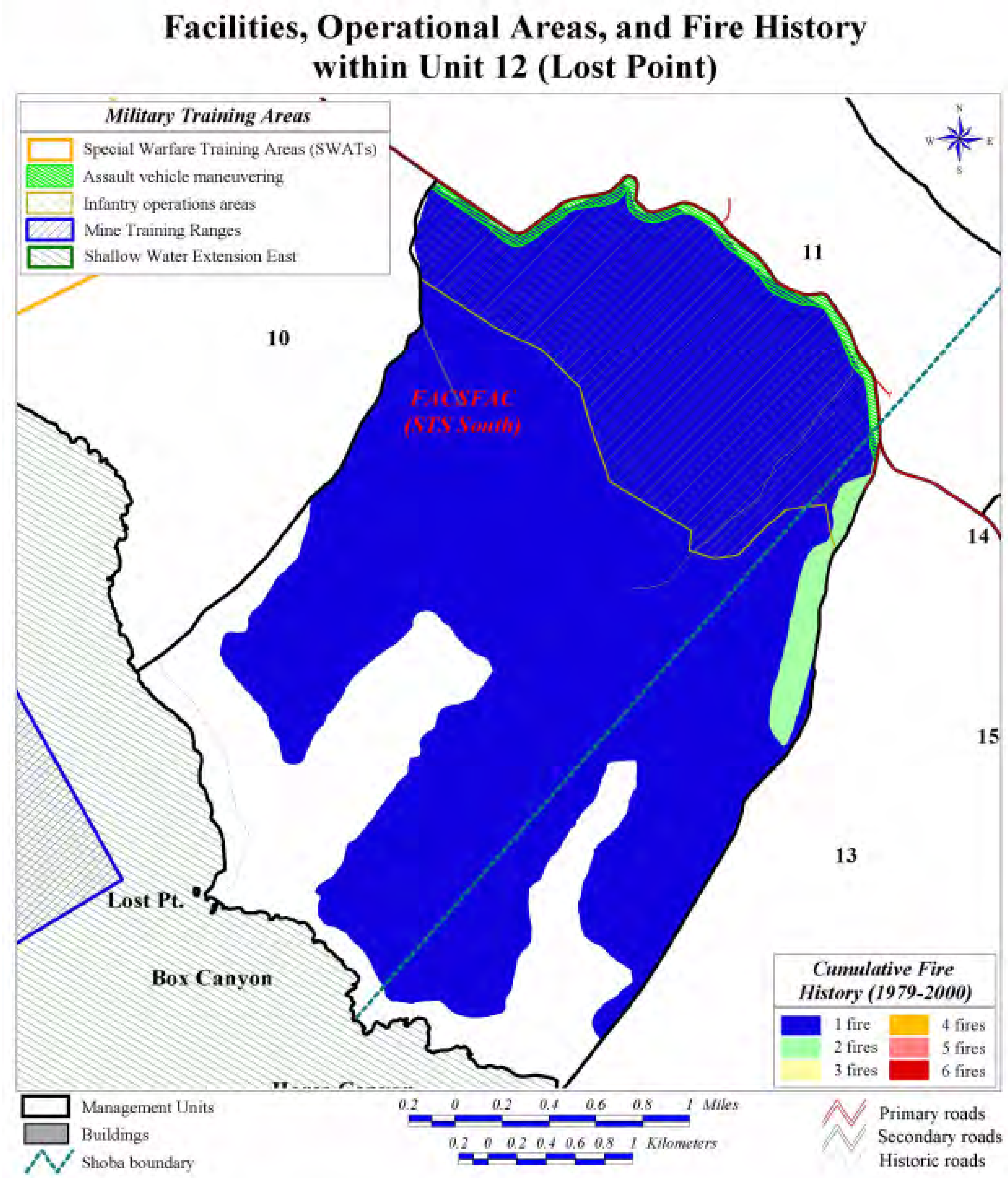

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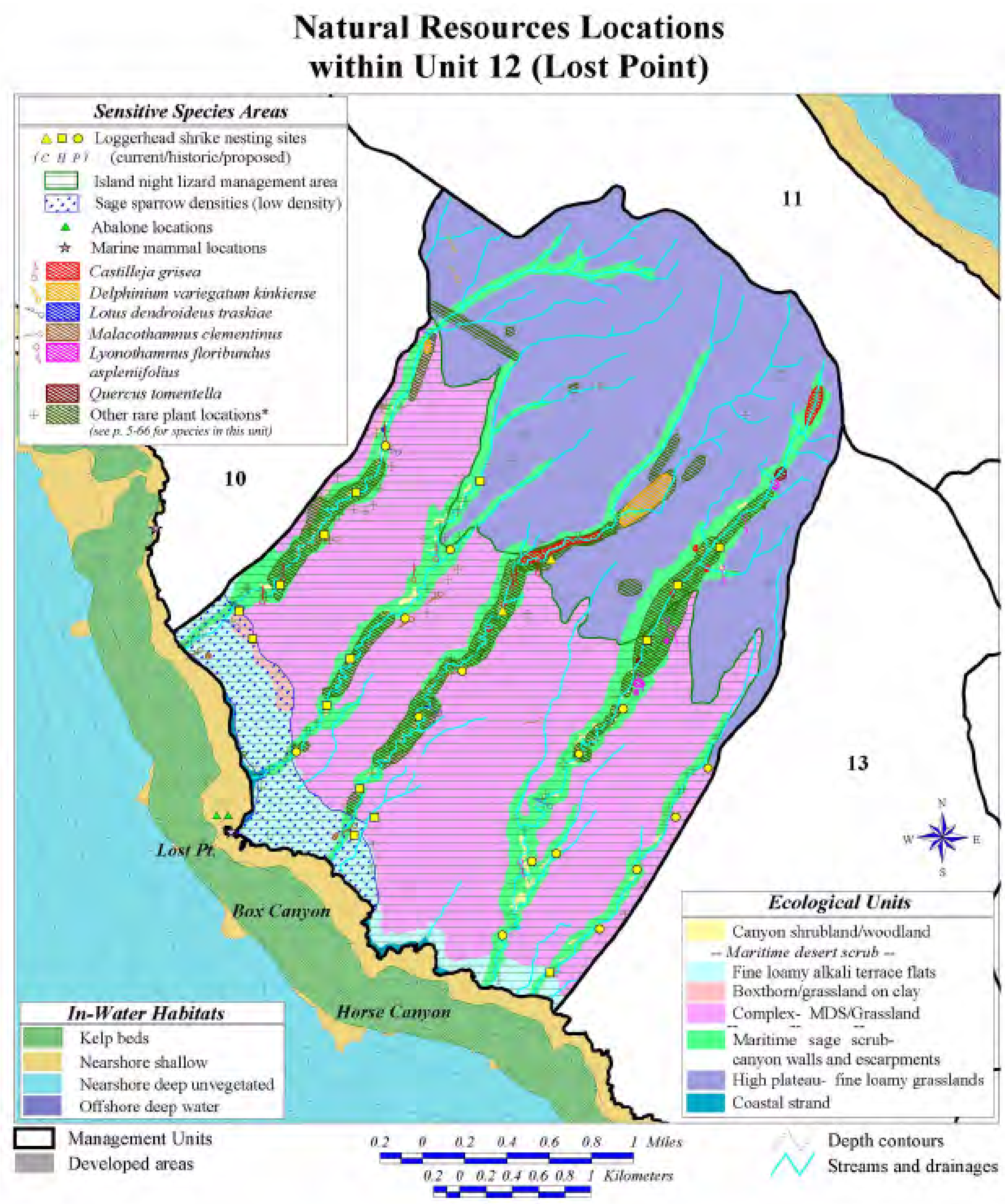

Natural Resources Locations
within Unit 12 (Lost Point)
Sensitive Species Areas
Loggerhead shrike nesting sites
(C H P)
(current/historic/proposed)
Island night lizard management area
Sage sparrow densities (low density)
Abalone locations
Marine mammal locations
Castilleja grisea
Delphinium variegatum kinkiense
Lotus dendroideus traskiae
Malacothamnus clementinus
Lyonothamnus floribundus aspleniifolius
Quercus tomentella
Other rare plant locations*
(see p. 5-66 for species in this unit)
10
11
13
Lost Pt.
Box Canyon
Horse Canyon
N
W
E
S
Ecological Units
Canyon shrubland/woodland
-- Maritime desert scrub --
Fine loamy alkali terrace flats
Boxthorn/grassland on clay
Complex- MDS/Grassland
Maritime sage scrub- canyon walls and escarpments
High plateau- fine loamy grasslands
Coastal strand
In-Water Habitats
Kelp beds
Nearshore shallow
Nearshore deep unvegetated
Offshore deep water
Management Units
Developed areas
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
Depth contours
Streams and drainages

Location: Unit 13 (Cave Canyon)

Military Value: Medium

Air
- Electronic Warfare
- Night Operations

Surface
- Electronic Warfare
- Mortar/artillery emplacements (EWTGPAC)

Fleet Marine Air
- Electronic Warfare
- Night Operations

Third Fleet
- Electronic Warfare
- Multiwarfare Operations

Prohibited Uses:
Recreational camping, fixed wing landings, parachute drops.

Other Uses:
Range Electronic Warfare Simulator

Facilities:
OP-3

Roads: Primary- 3.1 mi (5.0 km)
Secondary- 1.7 mi (2.8 km)

Natural Resource Value: Medium

Ecological Units:
- Canyon Woodland (43.6 ac)
- MDS/Grassland complex (1602.8 ac)
- MDS Boxthorn/grassland (<1 ac)
- MDS Boxthorn (151.3 ac)
- Maritime Sage Scrub (461.6 ac)
- Grasslands, loamy soils (732.7 ac)
- Coastal strand (3.0 ac)
- Sea stacks

Wildlife:
- Loggerhead shrike*
- Island night lizard*
- Island fox
- Sage sparrow*
- Orange-crowned warbler

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
Castilleja grisea, Crossosoma californicum, Dudleya virens virens, Eriogonum giganteum formosum, Eriophyllum nevinnii, Galium catalinense acrispum, Galvezia speciosa, Hazardia cana, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis, Malacothamnus clementinus*, Phacelia floribunda, Phacelia lyonii, Rhamnus pirifolia, Stephanomeria blairii*
**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- Medium military value, so management emphasis is aimed at maintaining those military values with high flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- Erosion from plateau.
- Protection for the Santa Cruz ironwood stand because it is one of only two locations in westshore canyons.

Management:

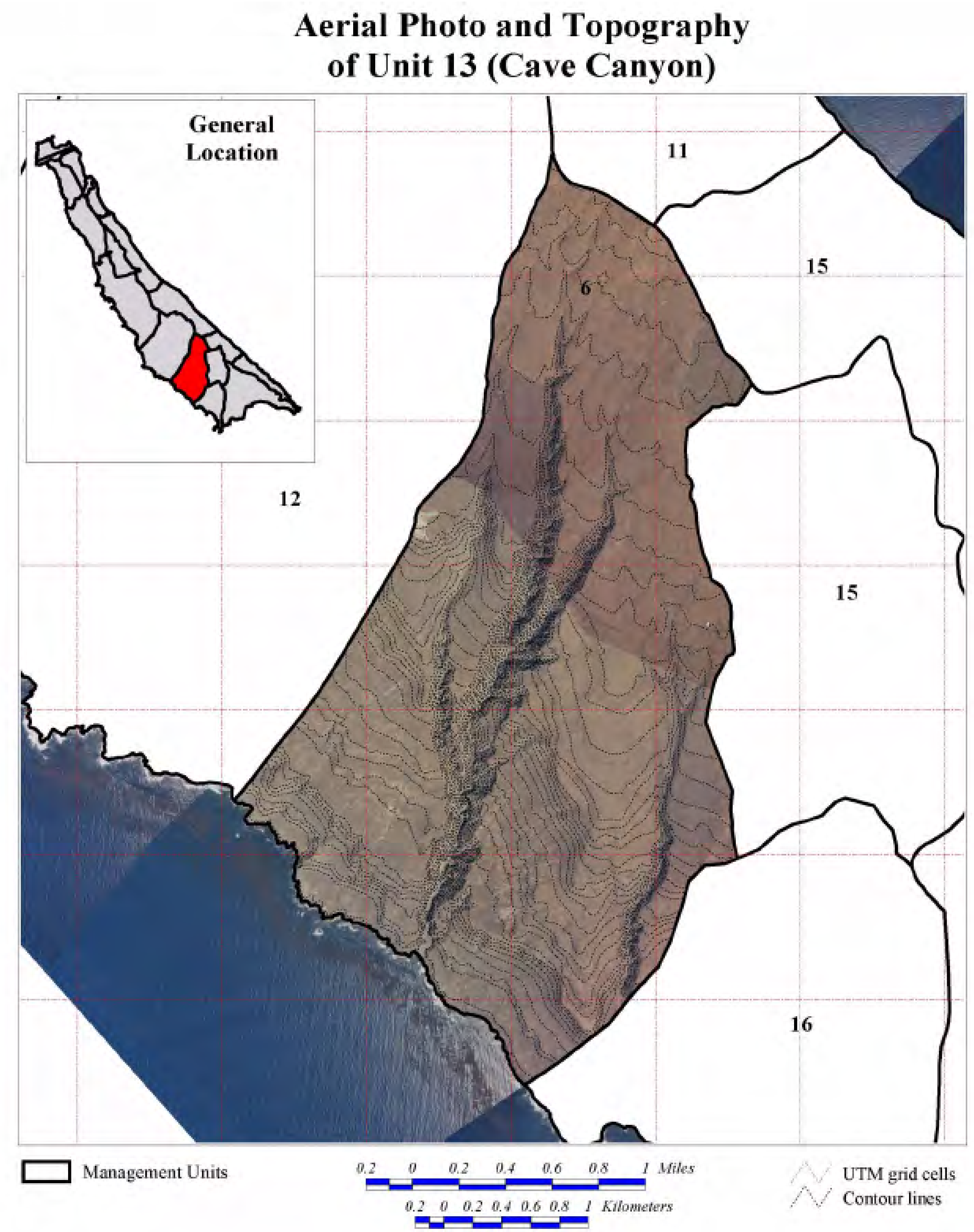
- This is a high priority fire management area to prevent fires from entering or crossing Chukit Canyon from the south.
- Comply with guidance for Island Night Lizard Management Area.
- Monitor and evaluate the military use and effectiveness of the INLMA to the Island night lizard and associated species.
- Reduce the percent cover of invasive plants from the 1992-93 baseline of 41% on the faces, 53% on the flats, as evaluated over at least one 7-year El Niño cycle. Invasive species management, especially for black mustard along Ridge Road and China Point Road.
- Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage the risk of catastrophic fire.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- 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 that oaks and other woodlands on eroding or erodible surfaces 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 maturations, reproduction and recruitment are the biggest risks of fire.
- Fire management targets in boxthorn/grassland complex 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.
- The risks to natural resource values in the terrace complex community are that excessively hot, frequent, or large fires may delay or prevent woody plant recovery. For example, lemonadeberry *(Rhus integrifolia)* appears to be prominent among the shrubs that have been lost from this complex. While considered a fire resistant species, it is not a vigorous sprouter and probably declined with heavy grazing along with over-frequent or over-hot fires. 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.
- 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.
- 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, but as of now which herbs cannot be identified due to lack of knowledge.
- Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the shrike.

Table5-13. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

13. Cave Canyon

			Activities																				
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****	X																					
	Delphinium variegatum kinkiense*																						
	Lithophragma maximum*																						
	Lotus dendroideus traskiae*	X																					
	Malacothamnus clementinus*	X																					
	Sibara filifolia*																						
	Brodiaea kinkiensis												Not Applicable				Not Applicable	Not Applicable	Not Applicable				
	Lavatera assurgentiflora glabra																						
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists																						
	Lotus argophyllus adsurgens																						
	Euphorbia misera																						
Management Focus Animal Species	**Terrestrial Mollusks**	X																		Low			
	Island night lizard*	X	Low	Low	Med		Low	Low	Low			Low								Low			
	San Clemente sage sparrow*	X																		Low			
	San Clemente Island fox	X																				Low	
	San Clemente loggerhead shrike*	X		Low	Low[S]		Med[S]	Low	High			Low	Not Applicable				Not Applicable	Not Applicable	Not Applicable	Low	Low		
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*	X																		Low			
	Pinniped Haulout																						

*** Effects related to fire are treated in a separate matrix.**



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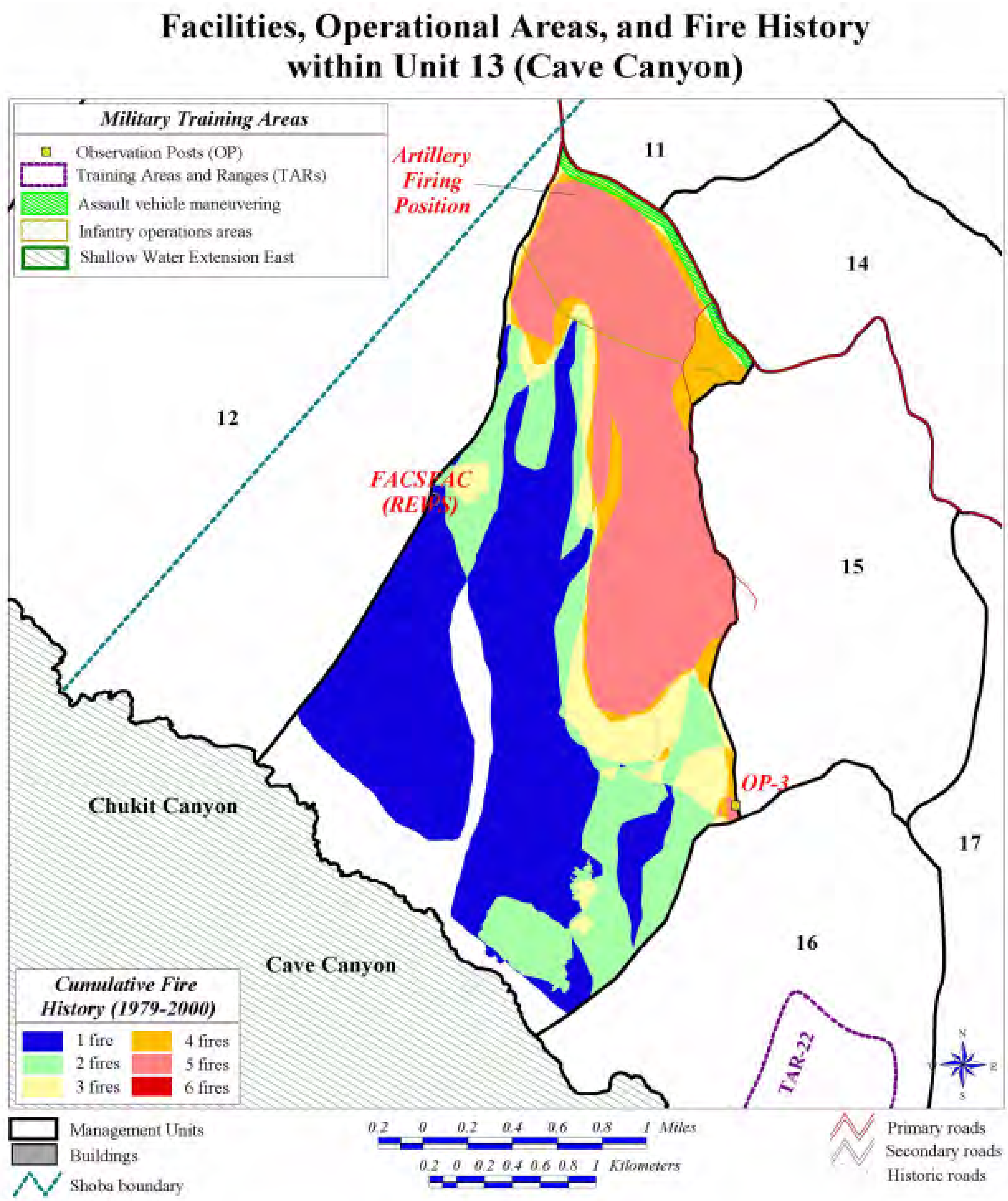
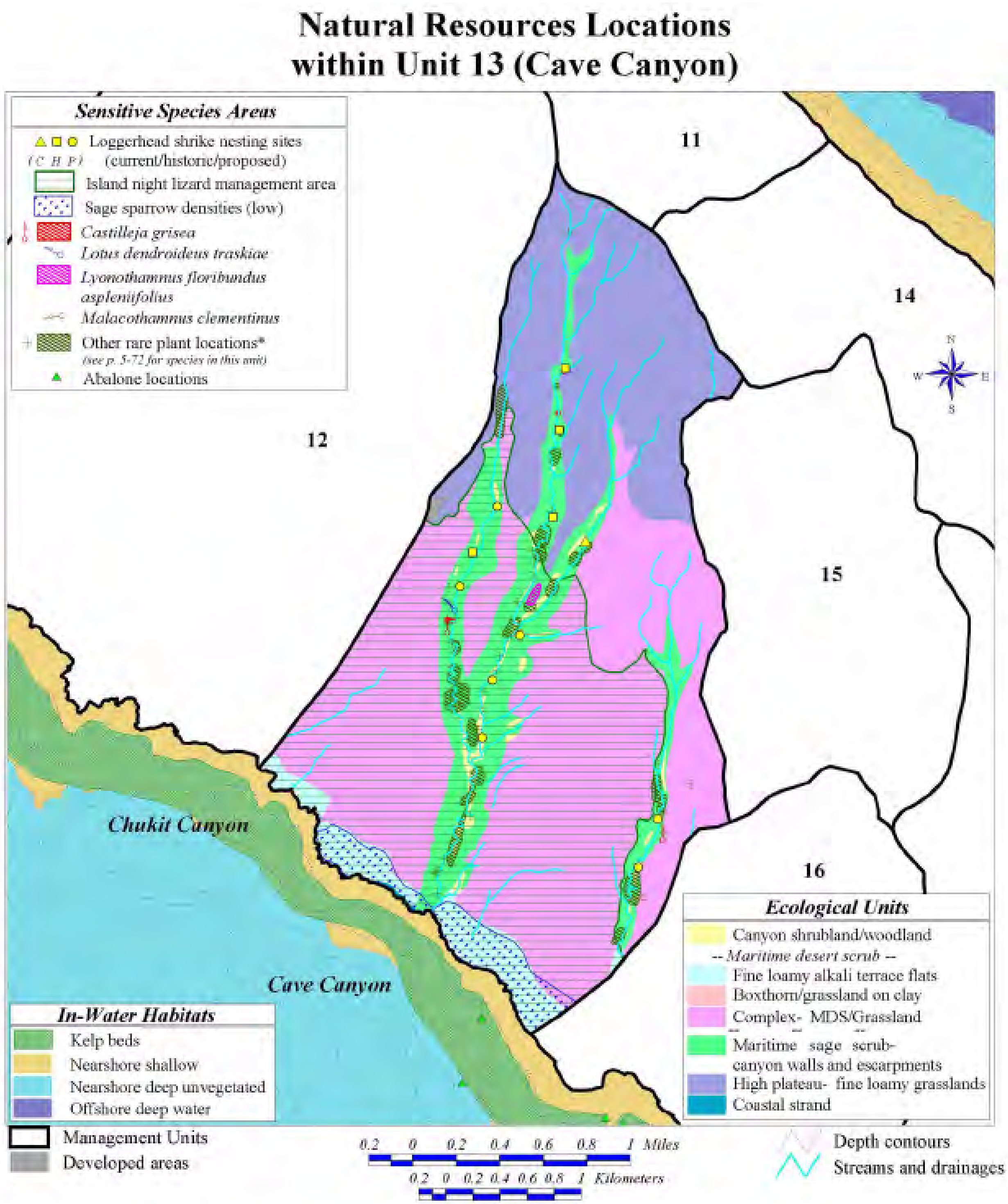

Facilities, Operational Areas, and Fire History
within Unit 13 (Cave Canyon)
Military Training Areas
Observation Posts (OP)
Training Areas and Ranges (TARs)
Assault vehicle maneuvering
Infantry operations areas
Shallow Water Extension East
Artillery Firing Position
FACSFAC (REWS)
OP-3
TAR-22
11
12
14
15
16
17
Chukit Canyon
Cave Canyon
Cumulative Fire History (1979-2000)
1 fire
2 fires
3 fires
4 fires
5 fires
6 fires
Management Units
Buildings
Shoba boundary
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
Primary roads
Secondary roads
Historic roads



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Location: Unit 14 (Eagle Canyon)

Military Value: Lowest

Fleet Marine Ground

Ground Operations

Fire Support Coordination

THIRD Fleet

Multiwarfare Operations

Prohibited Uses:

Recreational camping, fixed wing landings, parachute drops.

Other Uses:

Recreational fishing areas offshore

Facilities:

Roads: Primary- 2.9 mi (4.6 km)

Secondary- 0.7 mi (1.2 km)

Natural Resource Value: Medium

Ecological Units:

Canyon woodland (143.3 ac)

MDS/Grassland complex (61.1 ac)

MDS Boxthorn/grassland (21.2 ac)

Maritime Sage Scrub (648.1 ac)

Grasslands, loamy soils (287.0 ac)

Wildlife:

Loggerhead shrike*

Island night lizard*

Island fox

Orange-crowned warbler

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:

Castilleja grisea, Ceanothus megacarpus insularis, Delphinium variegatum kinkiense*, Dudleya virens virens, Eriogonum giganteum formosum, Galium catalinense acrispum, Galvezia speciosa, Hazardia cana, Jepsonia malviflora, Lithophragma maximum, Lotus argophyllus adsurgens, Lotus dendroideus* var. *traskiae*, Lyonothamnus floribundus asplenifolius, Phacelia floribunda, Phacelia lyonii, Quercus tomentella, Rhamnus pirifolia, Stephanomeria blairii, Triteleia clementina*

**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:

- Lowest military values, so management emphasis is aimed at maintaining those military values to the extent possible and with greatest flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- High fire encroachment risk from the west.
- Eagle Canyon is the benchmark canyon for cherry woodlands
- San Clemente Island woodland star
- High value for Island oak (25% of the population occurs in this unit).
- High value for Santa Cruz ironwood (21% of population occurs in this unit).

Management:

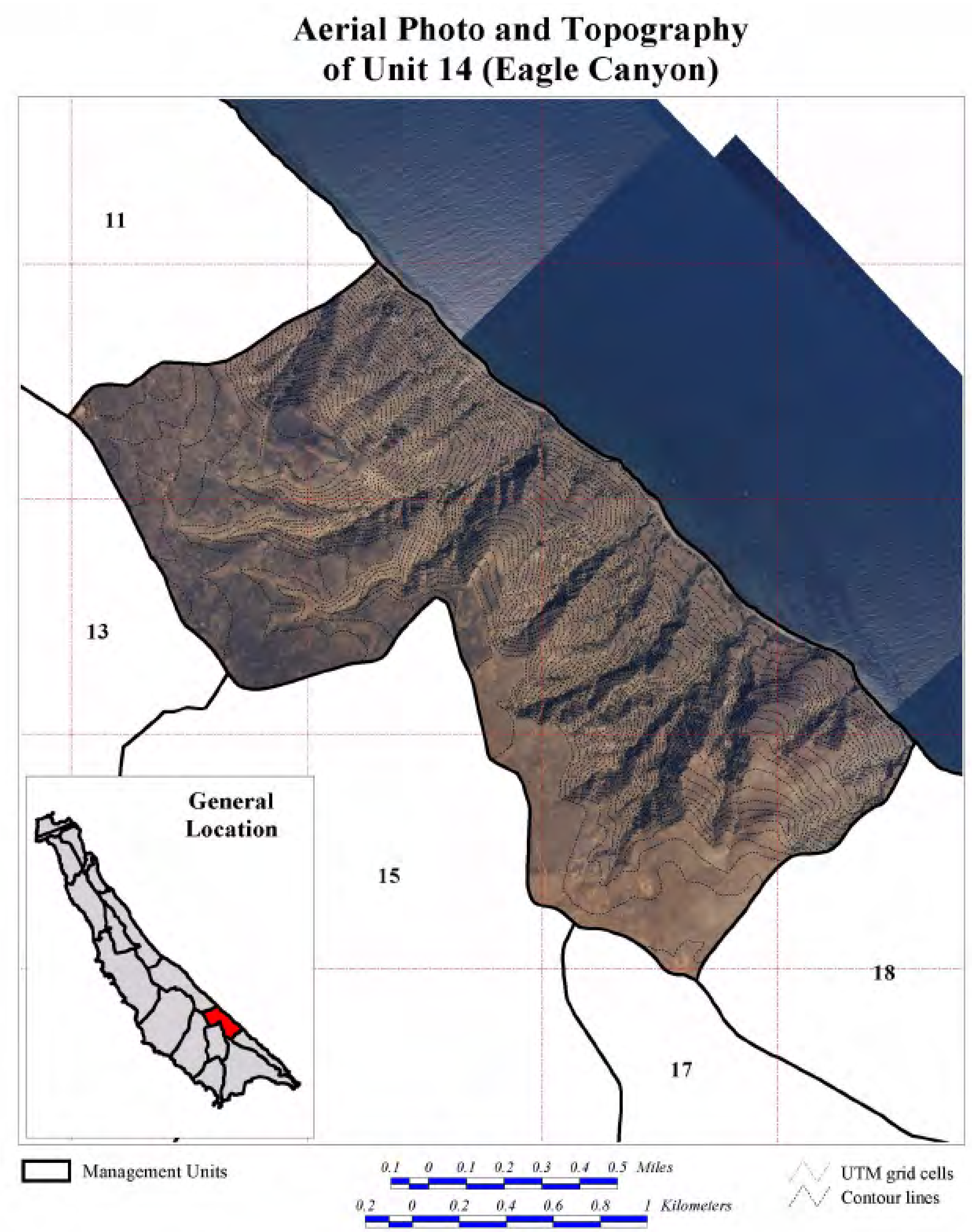
- For eelgrass, continue to abide by no net loss provisions of the Clean Water Act and mitigation standards under the Southern California Eelgrass Mitigation Policy, if eelgrass is damaged by operations.
- Invasive species management, especially for black mustard along Ridge Road.
- Ensure fires do not cross SHOBA Ridge Road.
- Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage the risk of catastrophic fire.
- Allow no mortality of any individual ironwood tree to excessively hot or frequent fire. Consider the use of prescribed fire to protect entire groves from catastrophic loss, to improve seedbed conditions, and reduce exotics.
- 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 that oaks and other woodlands on eroding or erodible surfaces 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 maturations, reproduction and recruitment are the biggest risks of fire.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- 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.
- 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, but as of now which herbs cannot be identified due to lack of knowledge. Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the shrike.

Table5-14. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

14. Eagle Canyon

			Activities																				
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****	X	Low	Med	High		High		Not Applicable				Not Applicable				Not Applicable	Not Applicable	Not Applicable				
	Delphinium variegatum kinkiense*	X																					
	Lithophragma maximum*	X	Low	Med	high		High																
	Lotus dendroideus traskiae*	X																					
	Malacothamnus clementinus*																						
	Sibara filifolia*																						
	Brodiaea kinkiensis																						
	Lavatera assurgentiflora glabra																						
	Quercus tomentella	X	Low	med	High		High																
	Lyonothamnus floribundus aspleniifolius	X	Low	Med	High		High																
	Active Dune Specialists																						
	Lotus argophyllus adsurgens	X	Low	Low	Low		Low																
	Euphorbia misera																						
Management Focus Animal Species	**Terrestrial Mollusks**								Not Applicable				Not Applicable				Not Applicable	Not Applicable	Not Applicable	Low			
	Island night lizard*	X			Low		Low																
	San Clemente sage sparrow*																						
	San Clemente Island fox	X																				Low	
	San Clemente loggerhead shrike*	X	Low	Med[S]	High[S]		High[S]																
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*																						
	Pinniped Haulout																						

*** Effects related to fire are treated in a separate matrix.**



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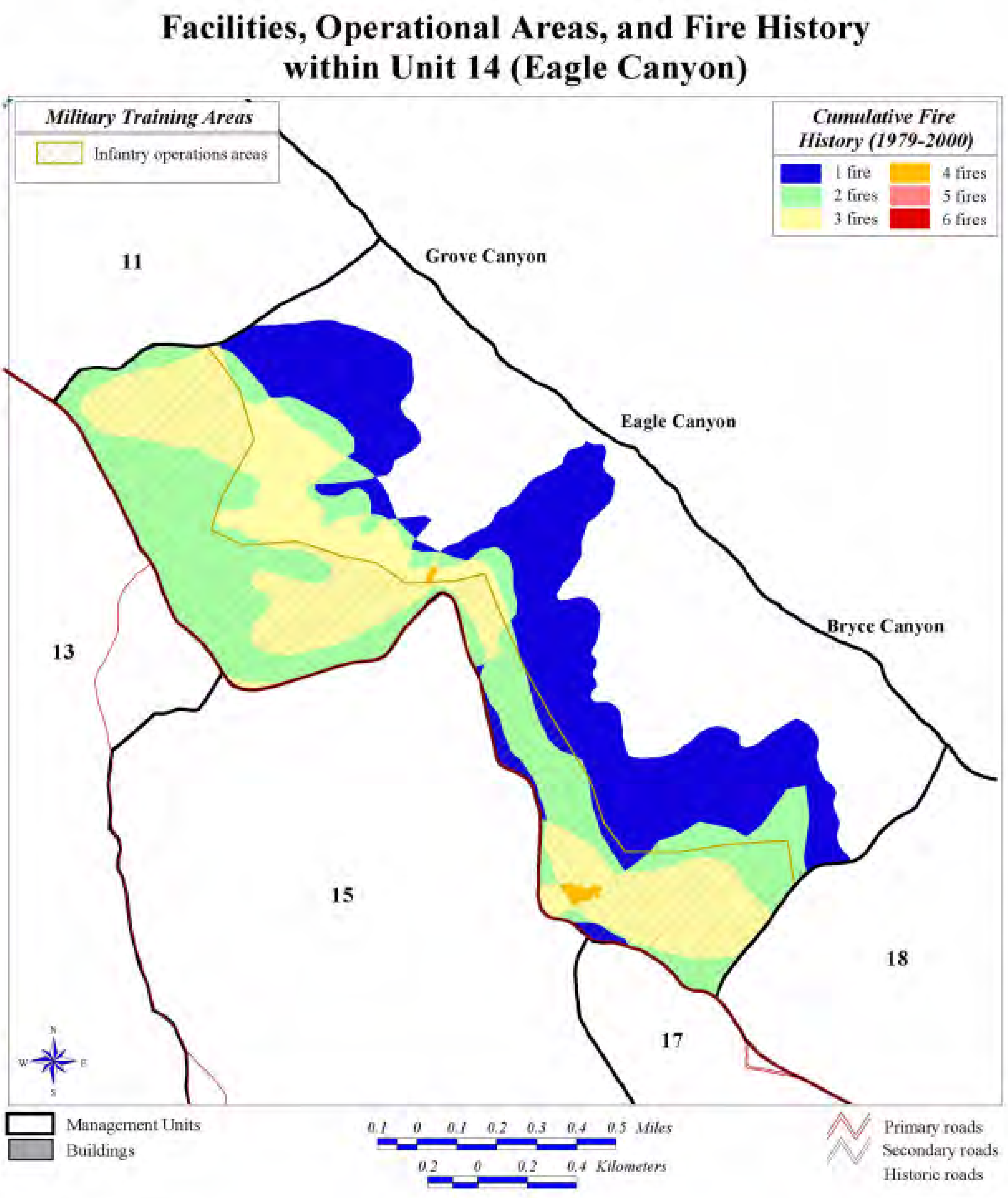
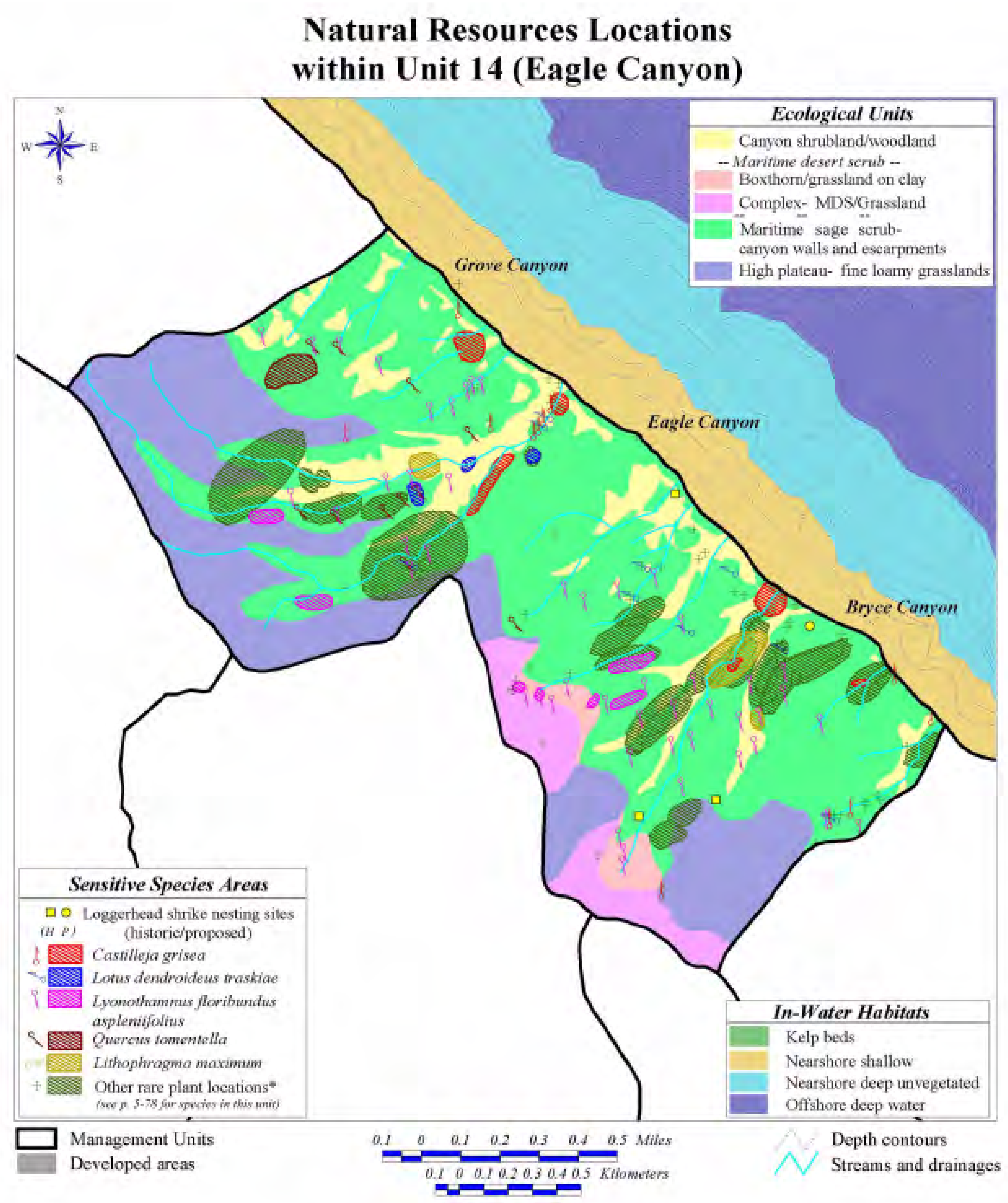

Facilities, Operational Areas, and Fire History within Unit 14 (Eagle Canyon)
Military Training Areas
Infantry operations areas
Cumulative Fire History (1979-2000)
1 fire
2 fires
3 fires
4 fires
5 fires
6 fires
Grove Canyon
Eagle Canyon
Bryce Canyon
11
13
15
17
18
N
W
E
S
Management Units
Buildings
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.2 0 0.2 0.4 Kilometers
Primary roads
Secondary roads
Historic roads



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Location: Unit 15 (Upper China Canyon)

Military Value: Lowest

Fleet Marine Ground
Ground Operations
THIRD Fleet
Multiwarfare Operations

Prohibited Uses:
Swimming, recreational camping, landing craft, fixed wing landings, parachute drops.

Other Uses:

Facilities: No infrastructure

Roads: Primary- 2.8 mi (4.6 km)
Secondary- 1.8 mi (2.9 km)

Natural Resource Value: Low

Ecological Units:
Canyon Woodland (22.3 ac)
MDS/Grassland complex (412.1 ac)
MDS Boxthorn/grassland (188.9 ac)
Maritime Sage Scrub (300.1 ac)
Grasslands, loamy soils (391.1 ac)

Wildlife:
Loggerhead shrike*
Island night lizard*
Island fox
Orange-crowned warbler
**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
*Castilleja grisea**
Ceanothus megacarpus insularis
Crossosoma californicum
Dudleya virens virens
Eriogonum giganteum formosum
Galium catalinense acrispum
Galvezia speciosa
Hazardia cana
Lotus argophyllus adsurgens
Lyonothamnus floribundus asplenifolius
*Malacothamnus clementinus**
Quercus tomentella
Stephanomeria blairii
**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- Lowest military values, so management emphasis is aimed at maintaining those military values to the extent possible and with greatest flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- Maintain roads necessary for accessing areas of high military value in neighboring units.

Management:

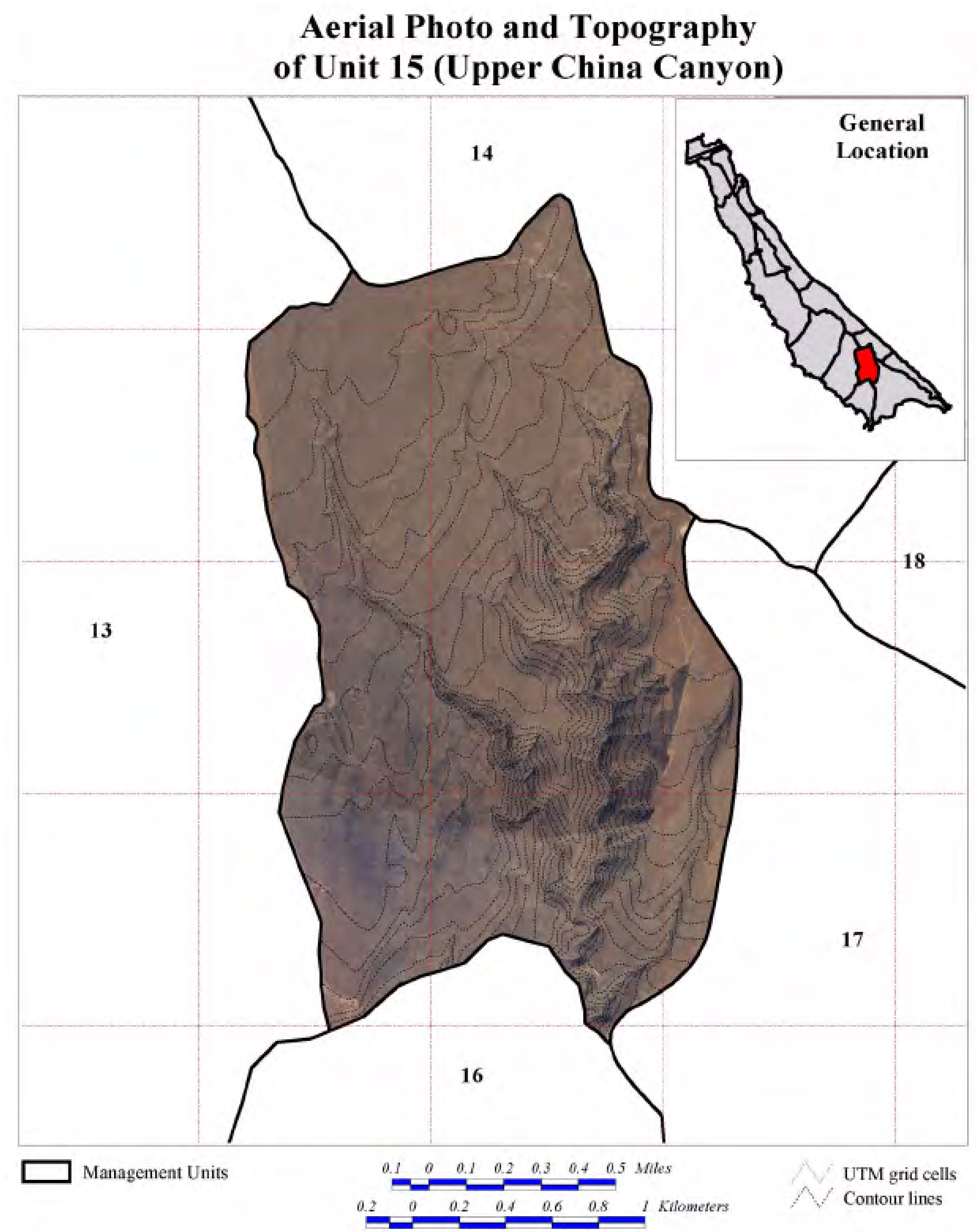
- Protect San Clemente Island bush mallow
- Protect Santa Cruz ironwood
- Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage the risk of catastrophic fire.
- The objective of fire management in shrublands and in woodlands is that recruitment 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 that oaks and other woodlands on eroding or erodible surfaces 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 maturations, reproduction and recruitment are the biggest risks of fire.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- The risks to natural resource values in the terrace complex community 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.
- 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.
- 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, but as of now which herbs cannot be identified due to lack of knowledge.
- Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the shrike.

Table5-15. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

15. Upper China Canyon

			Activities																				
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****	X											Not Applicable				Not Applicable	Not Applicable	Not Applicable				
	Delphinium variegatum kinkiense*																						
	Lithophragma maximum*																						
	Lotus dendroideus traskiae*																						
	Malacothamnus clementinus*	X																					
	Sibara filifolia*																						
	Brodiaea kinkiensis																						
	Lavatera assurgentiflora glabra																						
	Quercus tomentella	X																					
	Lyonothamnus floribundus aspleniifolius	X																					
	Active Dune Specialists																						
	Lotus argophyllus adsurgens	X																					
	Euphorbia misera																						
Management Focus Animal Species	**Terrestrial Mollusks**												Not Applicable				Not Applicable	Not Applicable	Not Applicable				
	Island night lizard*	X			Low		Low																
	San Clemente sage sparrow*																						
	San Clemente Island fox	X																		Low		Med	
	San Clemente loggerhead shrike*	X	Low[S]	Med[S]	High[S]		Med[S]													High[S]			
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*																						
	Pinniped Haulout																						

*** Effects related to fire are treated in a separate matrix.**



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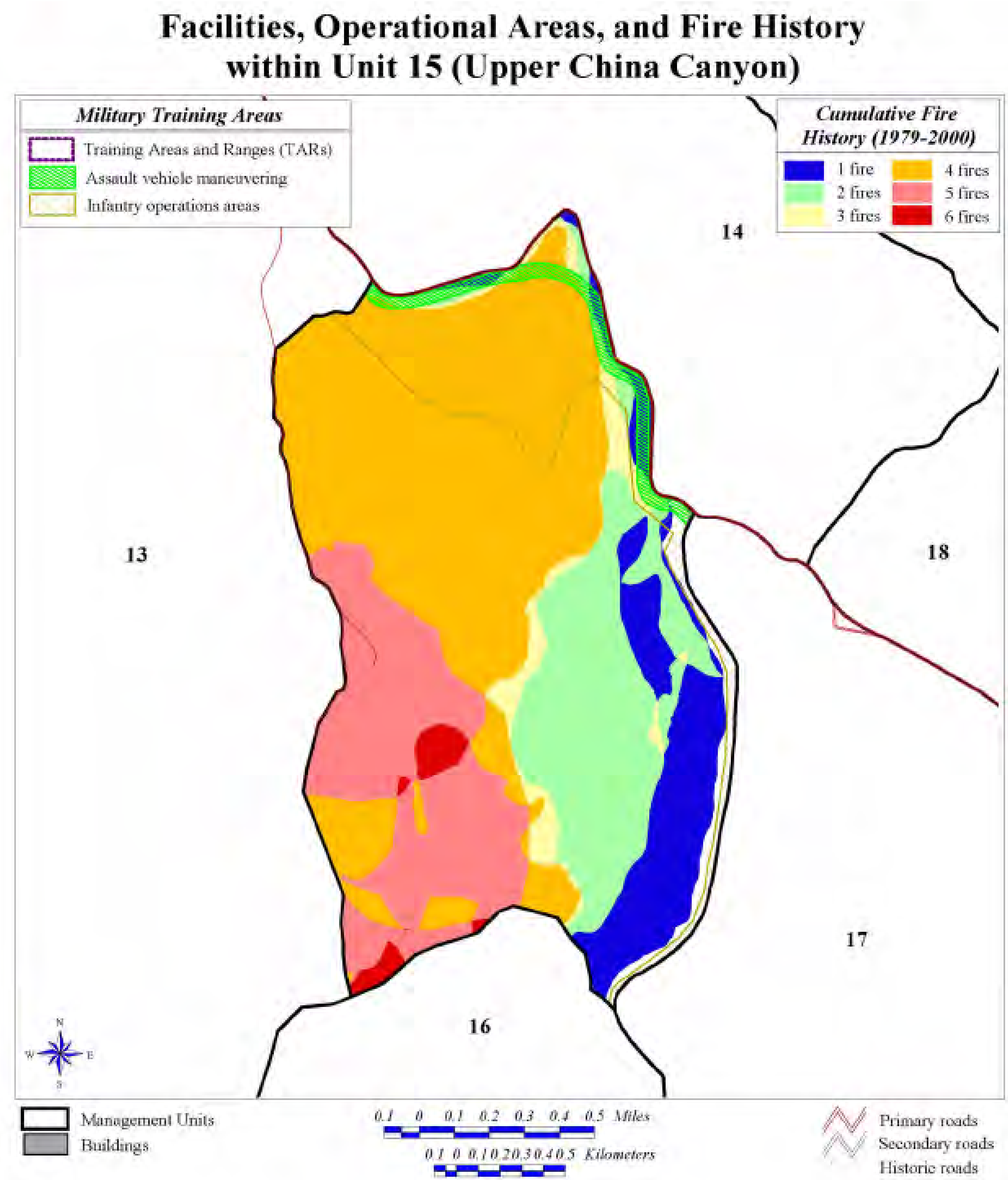

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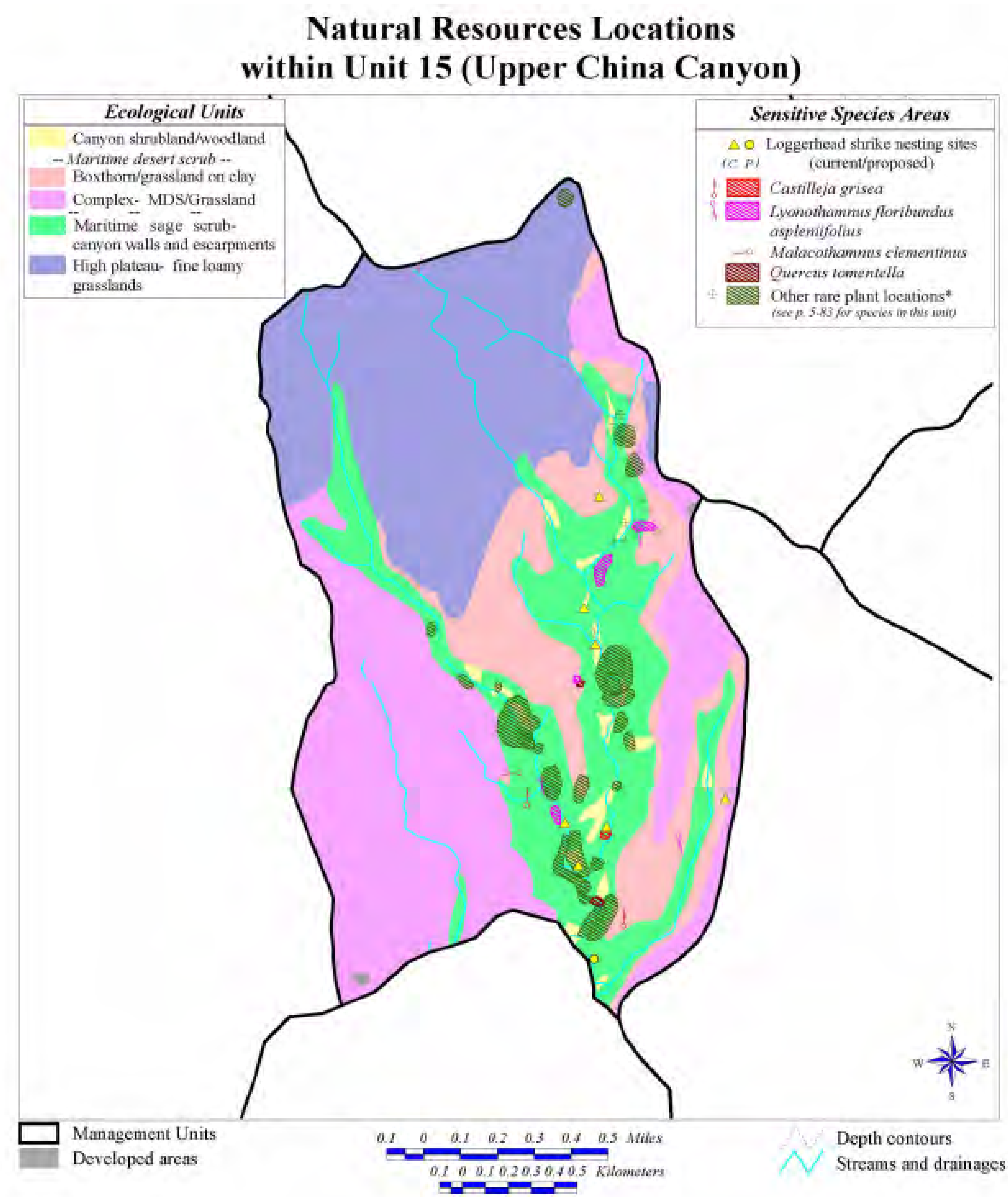

Natural Resources Locations
within Unit 15 (Upper China Canyon)
Ecological Units
Canyon shrubland/woodland
-- Maritime desert scrub --
Boxthorn/grassland on clay
Complex- MDS/Grassland
Maritime sage scrub-canyon walls and escarpments
High plateau- fine loamy grasslands
Sensitive Species Areas
Loggerhead shrike nesting sites (current/proposed)
(C P)
Castilleja grisea
Lyonothamnus floribundus asplenifolius
Malacothamnus clementinus
Quercus tomentella
Other rare plant locations*
(see p. 5-83 for species in this unit)
Management Units
Developed areas
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.1 0 0.1 0.2 0.3 0.4 0.5 Kilometers
Depth contours
Streams and drainages
N
W
E
S

Location: Unit 16 (China Cove)

Military Value: Highest

Air
- Live and Inert Ordnance
- Night Operations

Surface
- FIREX
- Live ordnance
- Mortar/artillery emplacements (EWTGPAC)

Fleet Marine Air
- Live and Inert Ordnance
- Night Operations

Fleet Marine Ground
- Ground Operations
- Fire Support Coordination
- Engineering Operations
- Live ordnance

Naval Special Warfare
- Land Special Operations
- Maritime Special Operations

Third Fleet
- Theater-level Operations
- Multi-warfare Operations
- Support Fleet Battle Exercises

RDT&E
- Missile Tests

Prohibited Uses:

Recreational camping, fixed wing landings, parachute drops.

Other Uses:

Recreational diving and fishing areas offshore (access may be restricted at certain time in some areas due to military operations)

Facilities:
- OP-2, TAR 22, Impact Areas II and IIA
- China Cove beach

Roads: Secondary- 2.7 mi (4.4 km)

Natural Resource Value: Medium

Ecological Units:
- Canyon woodland (10.2 ac)
- MDS/Grassland complex (551.6 ac)
- MDS Boxthorn/grassland (111.4 ac)
- MDS Boxthorn (596.1 ac)
- Maritime Sage Scrub (163.4 ac)
- Stabilized sand dunes (66.9 ac)
- Coastal strand (7.2 ac)
- Sea stacks

Wildlife:
- Loggerhead shrike*
- Sage sparrow*
- Snowy plover*
- Island night lizard*
- Island fox
- Xantus's murrelet
- Orange-crowned warbler

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
- *Aphanisma blitoides*
- *Artemisia nesiotica*
- *Camissonia guadalupensis*
- *Castilleja grisea**
- *Cryptantha traskiae*
- *Dudleya virens virens*
- *Eriogonum giganteum formosum*
- *Eschscholzia ramosa*
- *Galium catalinense acrispum*
- *Galvezia speciosa*
- *Hazardia cana*
- *Lotus argophyllus adsurgens*
- *Malacothamnus clementinus**
- *Phacelia lyonii*
- *Triteleia clementina*

**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:
- Highest military value, so management emphasis is on maximizing those military values with consideration of the resource values.
- High value for *Malacothamnus clementinus* (27% of population occurs in this unit).

Management:

- Avoid impacts to white abalone for siting of current and future uses.
- Avoid disturbance and limit access to pinniped haul outs and rookeries during the breeding season May through August, which may result in stampeding and trampling of pups.
- Minimize conflicts between training and snowy plover that might result in restrictions on training. If deemed necessary by NRO, conduct pre-training reconnaissance for western snowy plover during overwintering period and adjusting timing or location of training if possible. Wintering period is from the end of August through February.
- For areas with very high military value, the usual boxthorn objectives will not apply. Consultation on the Fire Management Plan under the ESA will focus on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn within five years. For a fire to be counted as a burn it must be at least a moderate burn (Score 3 on NPS scale 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.
- 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 Wildland Fire Management Plan.
- Ensure recruitment of rare species exceeds mortality.
- Limit disturbance to sea stacks and do not use as military targets. Expand cat and rat management at sea stacks.
- Protect San Clemente Island bush mallow.
- Reduce the percent cover of invasive plants from the 1992-93 baseline of 41% on the faces, 53% on the flats, as evaluated over at least one 7-year El Niño cycle. Invasive species management, especially for black mustard along Ridge Road and China Road.
- 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 that oaks and other woodlands on eroding or erodible surfaces 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 maturations, reproduction and recruitment are the biggest risks of fire.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- 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.
- 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.

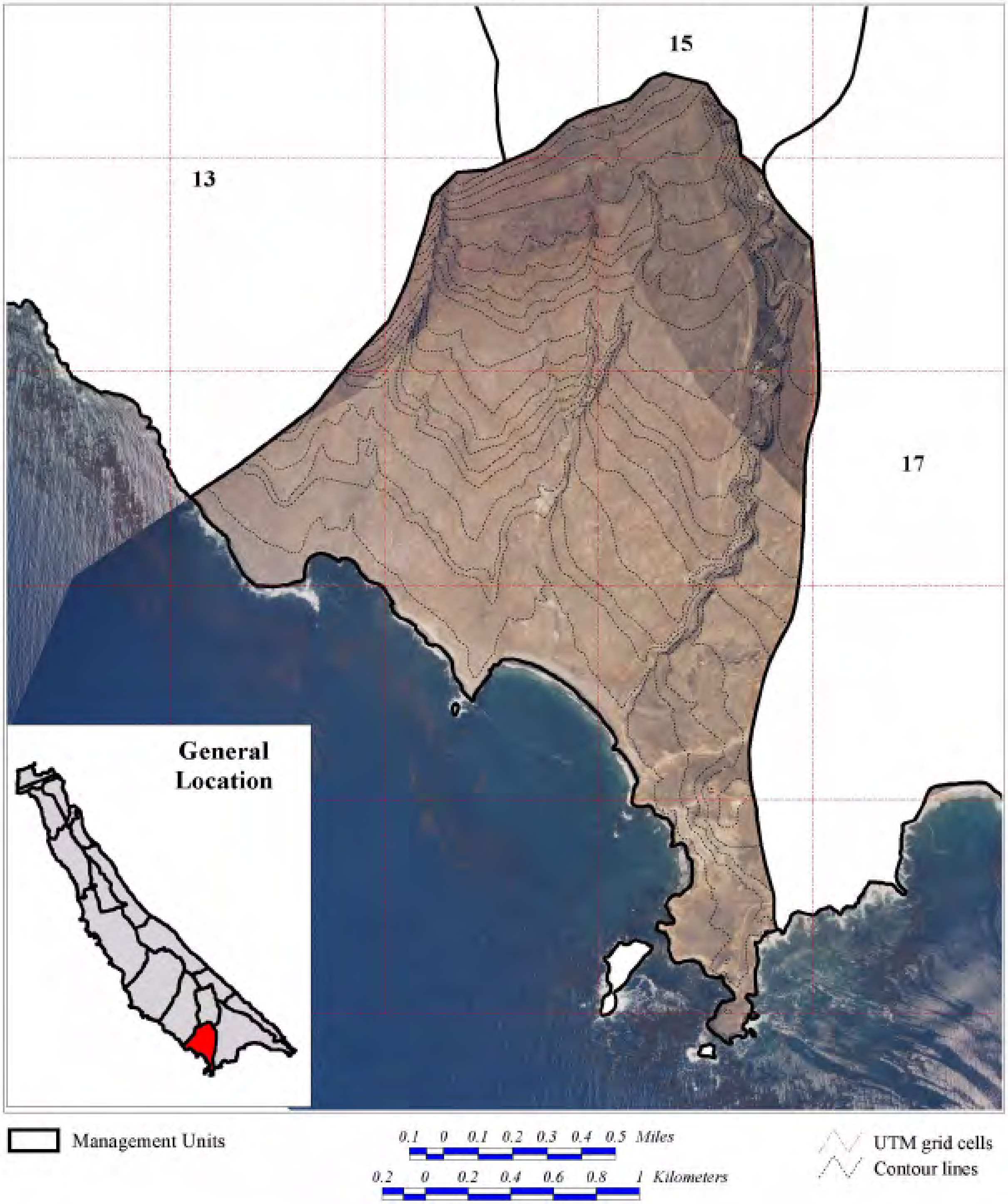
Table5-16. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

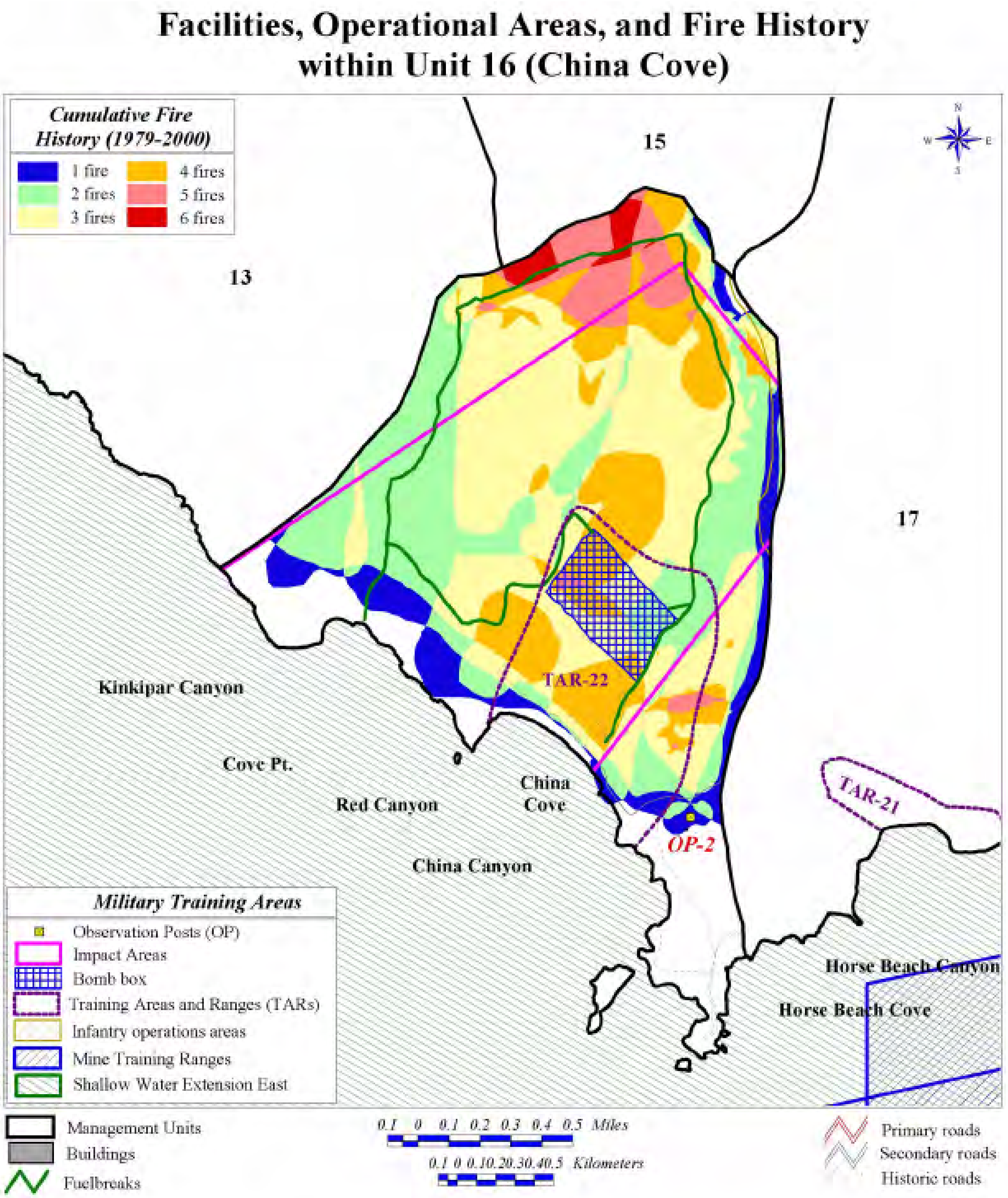
16. China Cove

			Activities																				
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (>100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	*Castilleja grisea**	X	Low	Low	Med		Med		High			Low							X				
	*Delphinium variegatum kinkiense**																						
	*Lithophragma maximum**																						
	*Lotus dendroideus traskiae**																						
	*Malacothamnus clementinus**	X							High			Low							X				
	*Sibara filifolia**																						
	Brodiaea kinkiensis												Not Applicable										
	Lavatera assurgentiflora glabra																						
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists	X																					
	Lotus argophyllus adsurgens	X																	X				
	Euphorbia misera																						
Management Focus Animal Species	Terrestrial Mollusks	X							Med			Low							X				
	Island night lizard*	X			Low				Med			Low							X				
	San Clemente sage sparrow*	X							Low			Low							X				
	San Clemente Island fox	X							Low										X				
	San Clemente loggerhead shrike*	X	Low	Med	Med		Med		Low^{S}			Low	Not Applicable						X				
	Western snowy plover*	X							High^{S}		High^{S}	High^{S}											
	Xantus' murrelet	X																					
	Abalone*	X																					
	Pinniped Haulout	X																					

*** Effects related to fire are treated in a separate matrix.**

Aerial Photo and Topography of Unit 16 (China Cove)





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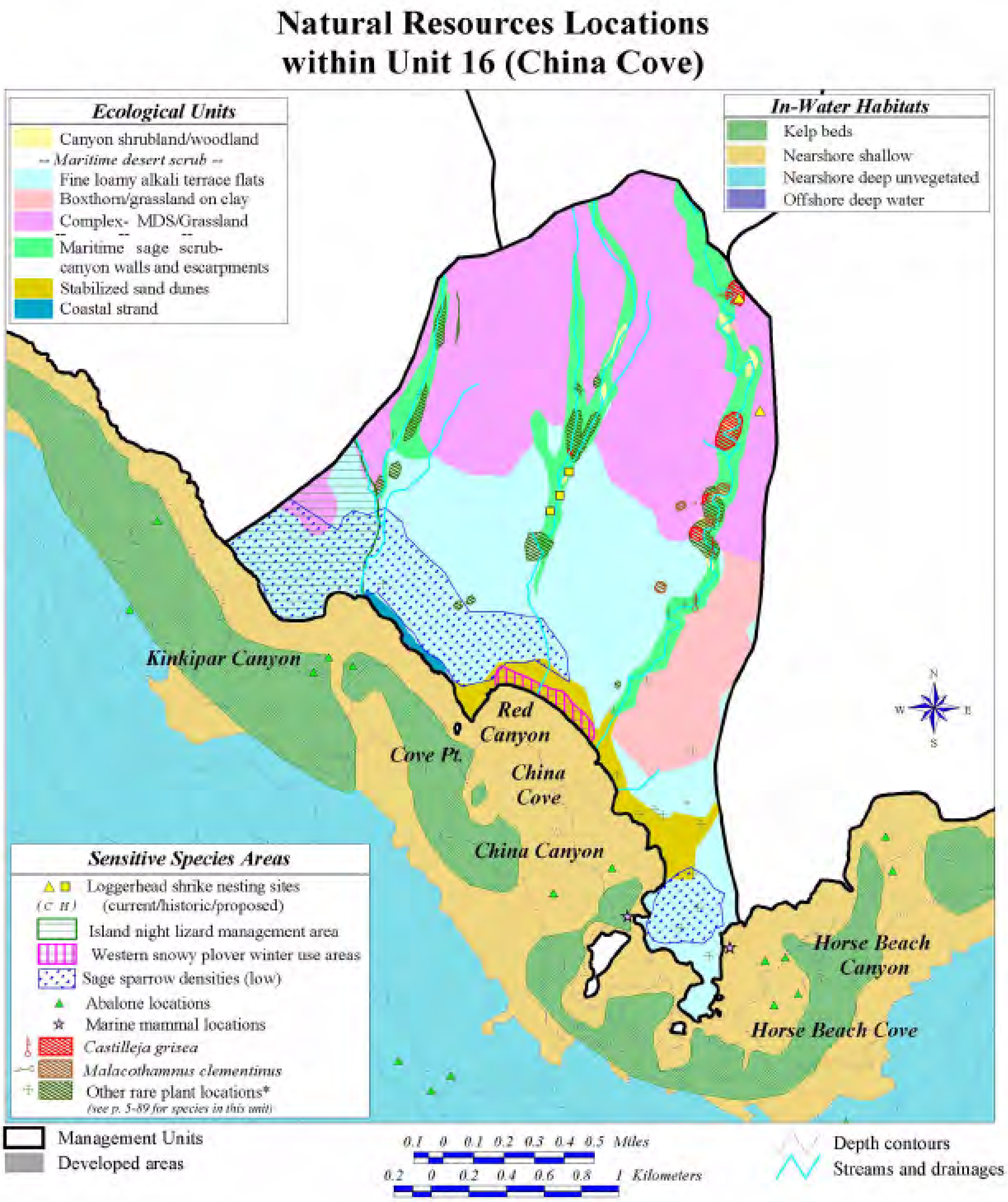

Natural Resources Locations within Unit 16 (China Cove)
Ecological Units
Canyon shrubland/woodland
-- Maritime desert scrub --
Fine loamy alkali terrace flats
Boxthorn/grassland on clay
Complex- MDS/Grassland
Maritime sage scrub- canyon walls and escarpments
Stabilized sand dunes
Coastal strand
In-Water Habitats
Kelp beds
Nearshore shallow
Nearshore deep unvegetated
Offshore deep water
Kinkipar Canyon
Red Canyon
Cove Pt.
China Cove
China Canyon
Horse Beach Canyon
Horse Beach Cove
Sensitive Species Areas
Loggerhead shrike nesting sites (current/historic/proposed)
Island night lizard management area
Western snowy plover winter use areas
Sage sparrow densities (low)
Abalone locations
Marine mammal locations
Castilleja grisea
Malacothamnus clementinus
Other rare plant locations*
(see p. 5-89 for species in this unit)
Management Units
Developed areas
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
Depth contours
Streams and drainages

Location: Unit 17 (Pyramid Cove)

Military Value: Highest

Air
- Live and Inert Ordnance
- Night Operations

Surface
- FIREX
- Live ordnance
- Mortar/artillery emplacements (EWTGPAC)

Fleet Marine Air
- Live and Inert Ordnance
- Air Command & Control
- Night Operations

Fleet Marine Ground
- Ground Operations
- Fire Support Coordination
- Engineering Operations
- Command & Control
- Live ordnance
- Ground Reconnaissance & Surveillance

Naval Special Warfare
- Land Special Operations
- Maritime Special Operations
- Information Special Operations

THIRD Fleet
- Theater-level Operations
- Multi-warfare Operations
- Support Fleet Battle Exercises

RDT&E
- Missile Tests

Prohibited Uses:
Recreational camping, fixed wing landings, parachute drops.

Other Uses:
Recreational diving and fishing areas offshore (access may be restricted at certain time in some areas due to military operations)

Facilities:
- OP1
- Impact Area I
- TARs 20 & 21
- Horse beach
- Pyramid Cove beach

Roads: Primary- 4.9 mi (7.9 km)
Secondary- 4.0 mi (6.5 km)

Natural Resource Value: Highest

Ecological Units:
- Canyon woodland (53.5 ac)
- MDS/Grassland complex (1455.8 ac)
- MDS Boxthorn/grassland (218.6 ac)
- MDS Pyramid Cove/South-facing slopes (1531.0 ac)
- MDS Boxthorn (412.8 ac)
- Maritime Sage Scrub northeast escarpment (17.0 ac)
- Maritime Sage Scrub (123.5 ac)
- Grasslands, clay soils (<1 ac)
- Grasslands, loamy soils (42.1 ac)
- Coastal strand (51.0 ac)
- Coastal salt marsh (19.3 ac)
- Sea bluff succulent (3.9 ac)
- Sea stacks

Wildlife:
- Loggerhead shrike*
- Snowy plover*
- Island night lizard*
- Island fox
- Orange-crowned warbler

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:
- *Artemisia nesiotica*
- *Astragalus nevinii*
- *Atriplex pacifica*
- *Castilleja grisea**
- *Crossosoma californicum*
- *Delphinium variegatum*
- *Dudleya virens virens*
- *Eriogonum giganteum formosum*
- *Eriophyllum nevinnii*
- *Eschscholzia ramosa*
- *Galium catalinense acrispum*
- *Galvezia speciosa*
- *Hazardia cana*
- *Lepidium virginicum robinsonii*
- *Lotus argophyllus adsurgens*
- *Lotus dendroideus* var. *traskiae**
- *Lupinus guadalupensis*
- *Malacothamnus clementinus**
- *Phacelia floribunda*
- *Rhamnus pirifolia*
- *Sibara filifolia**

**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:

- Very high military value, so management emphasis is aimed at maximizing those military values with consideration of the resource values.
- Horse Beach Canyon is the benchmark site for toyon groves.
- Maintain the existing salt marsh boundaries, allowing no shrinkage.
- This unit supports all or most of the Island populations of *Sibara filifolia, Lotus argophyllus* var. *adsurgens*, and *Euphorbia misera.* It may contain the grass thought to be extinct, *Dissanthelium californicum.*
- High value for *Castilleja grisea* (34% of population occurs in this unit).
- High value for *Malacothamnus clementinus* (42% of population occurs in this unit).

Management:

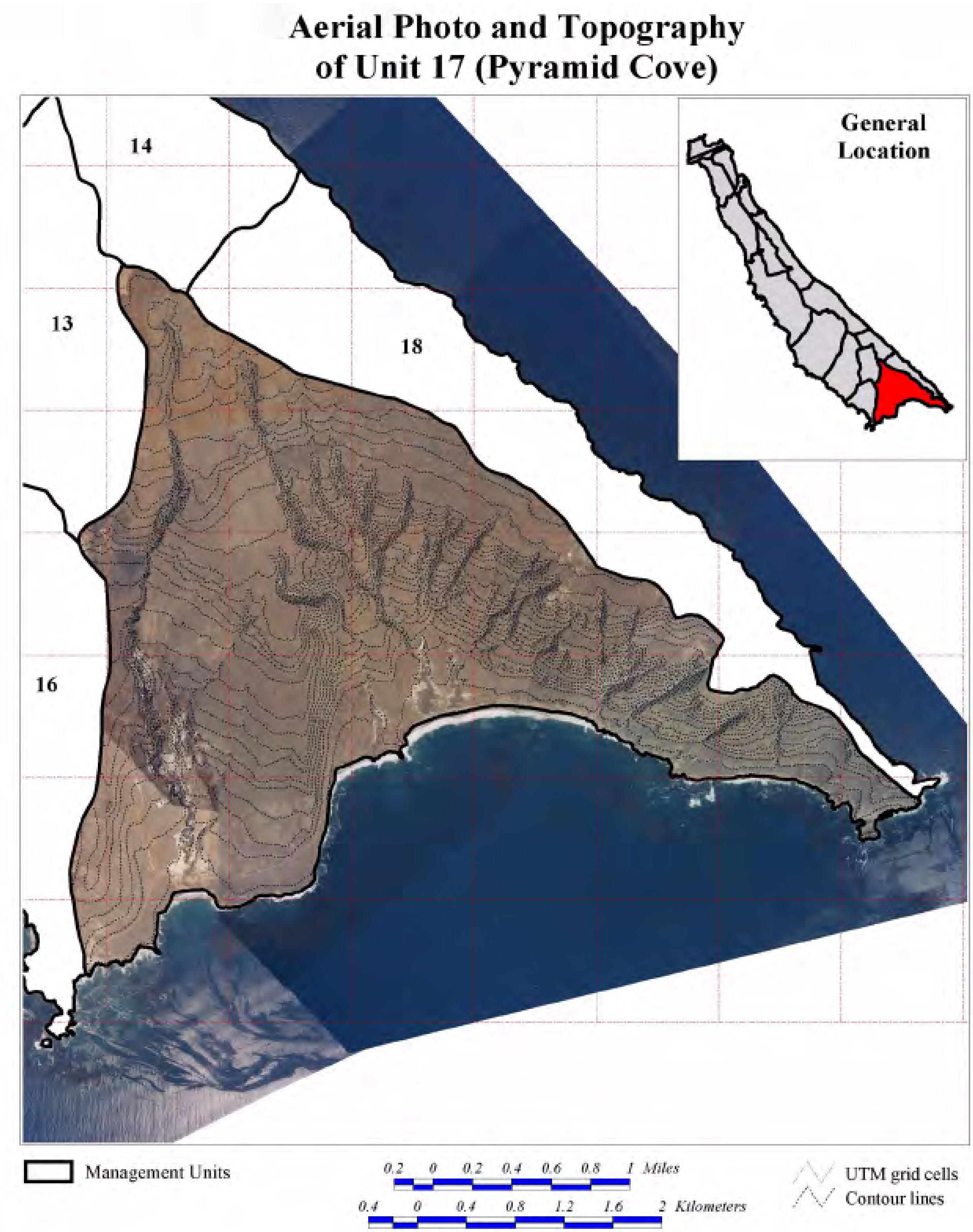
- This is a high priority fire management area due to high fire risk and sensitive resources that may benefit from light fires of controlled size.
- Control invasive exotic grasses using appropriate wildland fire management protocols.
- Control escape of fire from Impact Area 1 into the woodlands of east side canyons and into Horse Beach Canyon.
- Maintain shrub and woodland cover within the canyons at existing levels, or greater if this does not conflict with training needs.
- Promote a fire regime which allows native shrubs and herbaceous species to out-compete prickly pear and cholla and maintain existing shrubland boundaries at a minimum.
- Increase cover of *Euphorbia misera* where it currently exists from its 1992-93 baseline of less than 1%.
- Reduce exotics, mostly red brome, from the 1992-93 baseline condition of 40%.
- Minimize conflicts between training and snowy plover that might result in restrictions on training. If deemed necessary by NRO, conduct pre-training reconnaissance for western snowy plover during overwintering period and adjusting timing or location of training if possible. Wintering period is from the end of August through February.
- Avoid shoreline construction that results in a loss of coastal strand habitat. Clean up trash and debris.
- In the salt marsh, maintain the existing community boundaries, allowing no shrinkage. 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 of less than 1%.
- Reduce exotics, mostly red brome, from the 1992-93 baseline condition of 40% by maintaining the current pace of shrub recovery. Black mustard population expanding on road corridors.
- 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.
- Protect San Clemente Island bush mallow.
- Continue the current expansion of shrubs on the margins of toyon woodlands which is currently dramatically increasing.
- Avoid impacts to white abalone for siting of current and future uses.
- Avoid disturbance of and limit access to pinniped haul outs and rookeries during the breeding season May through August, which may result in stampeding and trampling of pups.
- 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 Wildland Fire Management Plan.
- For areas with very high military value, the usual boxthorn objectives will *not* apply. Consultation on the Fire Management Plan will focus on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn within five years. For a fire to be counted as a burn it must be at least a moderate burn (Score 3 on NPS scale 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.
- 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.
- Foster recruitment and improved age structure in woodlands. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturations, reproduction and recruitment are the biggest risks of fire.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- Protect Horse Beach Canyon from moderate intensity (NPS intensity 3) or hotter fires 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 *Sibara filifolia* seed. Compare habitat of *Sibara* 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 Sibara habitat.

Table5-17. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

17. Pyramid Cove

			Activities																				
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (> 100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****	X																X					
	Delphinium variegatum kinkiense*	X																					
	Lithophragma maximum*																						
	Lotus dendroideus traskiae*	X																					
	Malacothamnus clementinus*	X																X					
	Sibara filifolia*	X																					
	Brodiaea kinkiensis												Not Applicable										
	Lavatera assurgentiflora glabra																						
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius																						
	Active Dune Specialists																						
	Lotus argophyllus adsurgens	X	Low	Low	Low		Low											X					
	Euphorbia misera	X																		Low			
Management Focus Animal Species	**Terrestrial Mollusks**	X																X					
	Island night lizard*	X	Low	Low	Med		Med	Low	Med			Med						X					
	San Clemente sage sparrow*																						
	San Clemente Island fox	X																X					
	San Clemente loggerhead shrike*	X	Low	Low	Med^{S}		Med^{S}		Low^{S}			Low^{S}	Not Applicable					X					
	Western snowy plover*	X				High^{S}			Med		High^{S}	High^{S}						X					
	Xantus' murrelet																						
	Abalone*	X				?					?						Low						
	Pinniped Haulout	X																					

*** Effects related to fire are treated in a separate matrix.**



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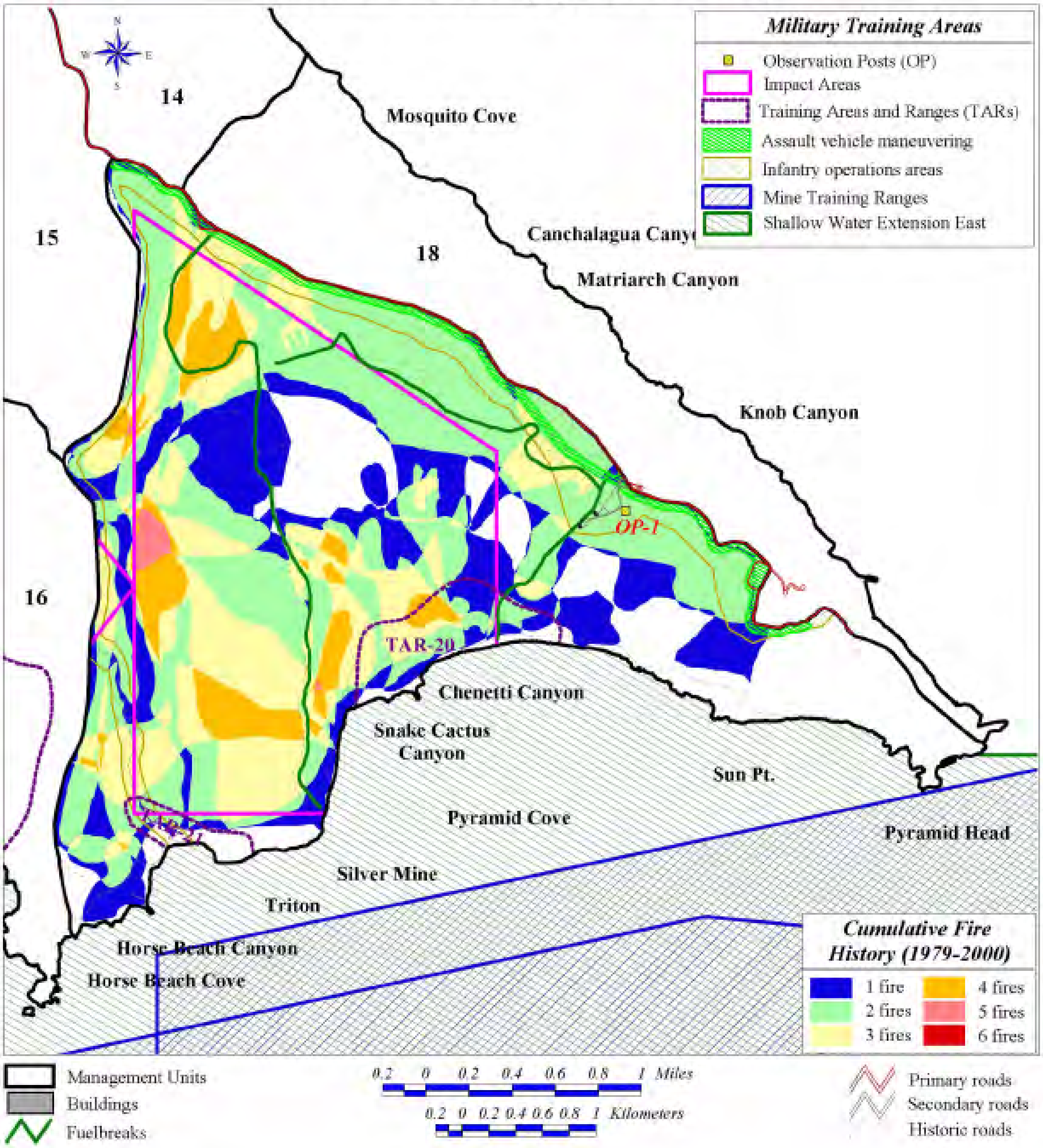
Facilities, Operational Areas, and Fire History within Unit 17 (Pyramid Cove)



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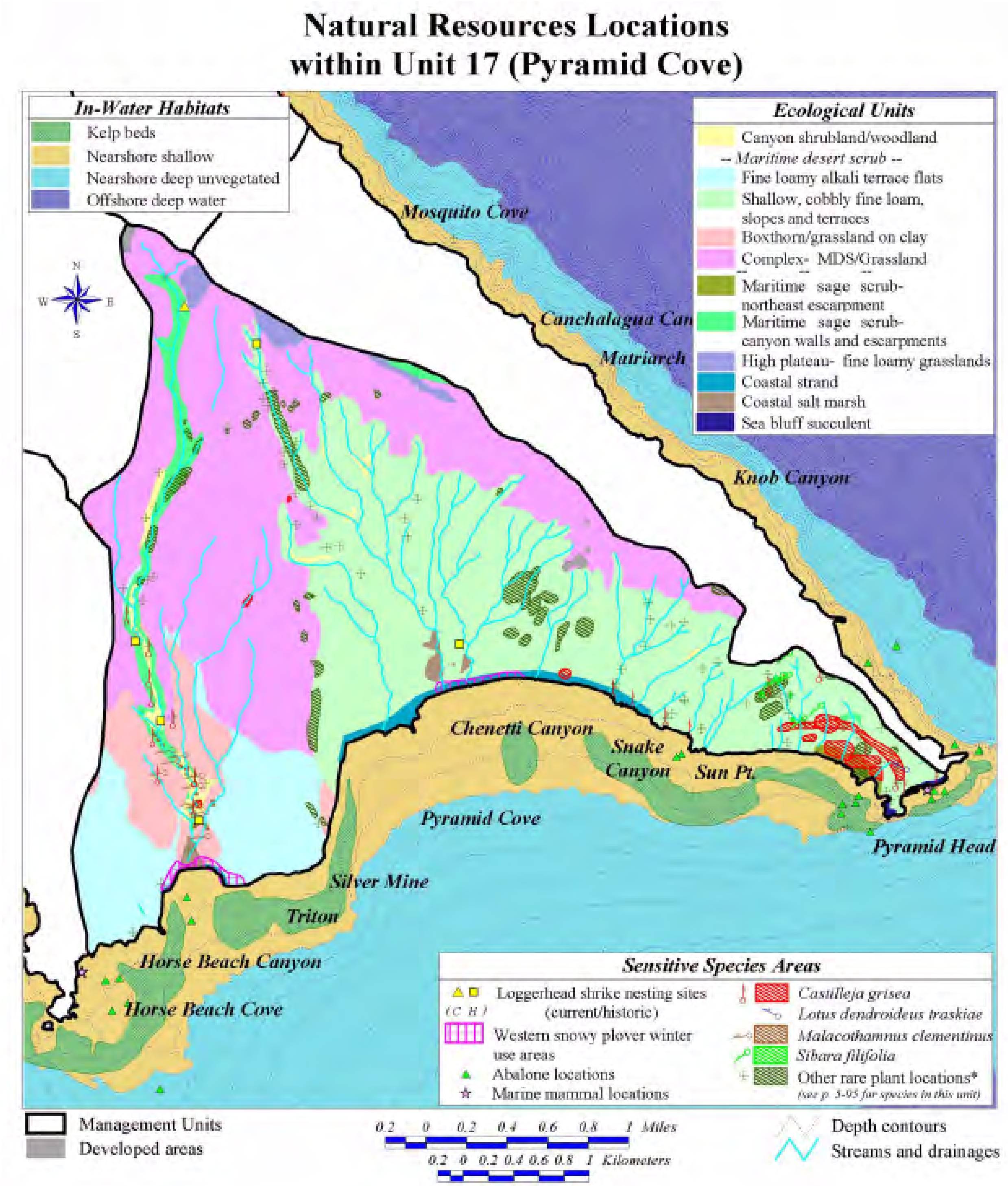

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Location: Unit 18 (Mosquito Cove)

Military Value: Lowest

Fleet Marine Ground

Ground Operations

Fire Support Coordination

THIRD Fleet

Multiwarfare Operations

Prohibited Uses:

Recreational camping, fixed wing landings, parachute drops.

Other Uses:

Recreational diving and fishing areas offshore

Facilities:

Roads: Primary- 4.2 mi (6.7 km)
Secondary- 0.6 mi (1.0 km)

Natural Resource Value: High

Ecological Units:

Canyon woodland (183.4 ac)
MDS/Grassland complex (251.7 ac)
MDS Pyramid Cove/South-facing slopes (41.8 ac)
Maritime Sage Scrub(573.4 ac)
Grasslands, loamy soils (201.8 ac)
Coastal strand (<1 ac)
Sea bluff succulent (1.7 ac)
Sea stacks

Wildlife:

Loggerhead shrike*
Island night lizard*
Island fox
Orange-crowned warbler
**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants:

*Castilleja grisea**
Delphinium variegatum thornei
Dudleya virens virens
Eriogonum giganteum formosum
Eriophyllum nevinnii
Galium catalinense acrispum
Hazardia cana
Jepsonia malviflora
Lithophragma maximum
Lotus argophyllus adsurgens
Lotus dendroideus var. *traskiae**
Lupinus guadalupensis
Lyonothamnus floribundus asplenifolius
Rhamnus pirifolia
Stephanomeria blairii
Triteleia clementina
**Federal listed species- Endangered, Threatened, Proposed*

Special Management Emphases:

- Lowest military values, so management emphasis is aimed at maintaining those military values to the extent possible and with greatest flexibility for maintaining natural resource values as an integral part of day-to-day operations.
- Canchalagua Canyon is the benchmark site for Santa Cruz ironwood.
- High fire encroachment risk from the west.
- High value for Santa Cruz ironwood (71% of population occurs in this unit).

Management:

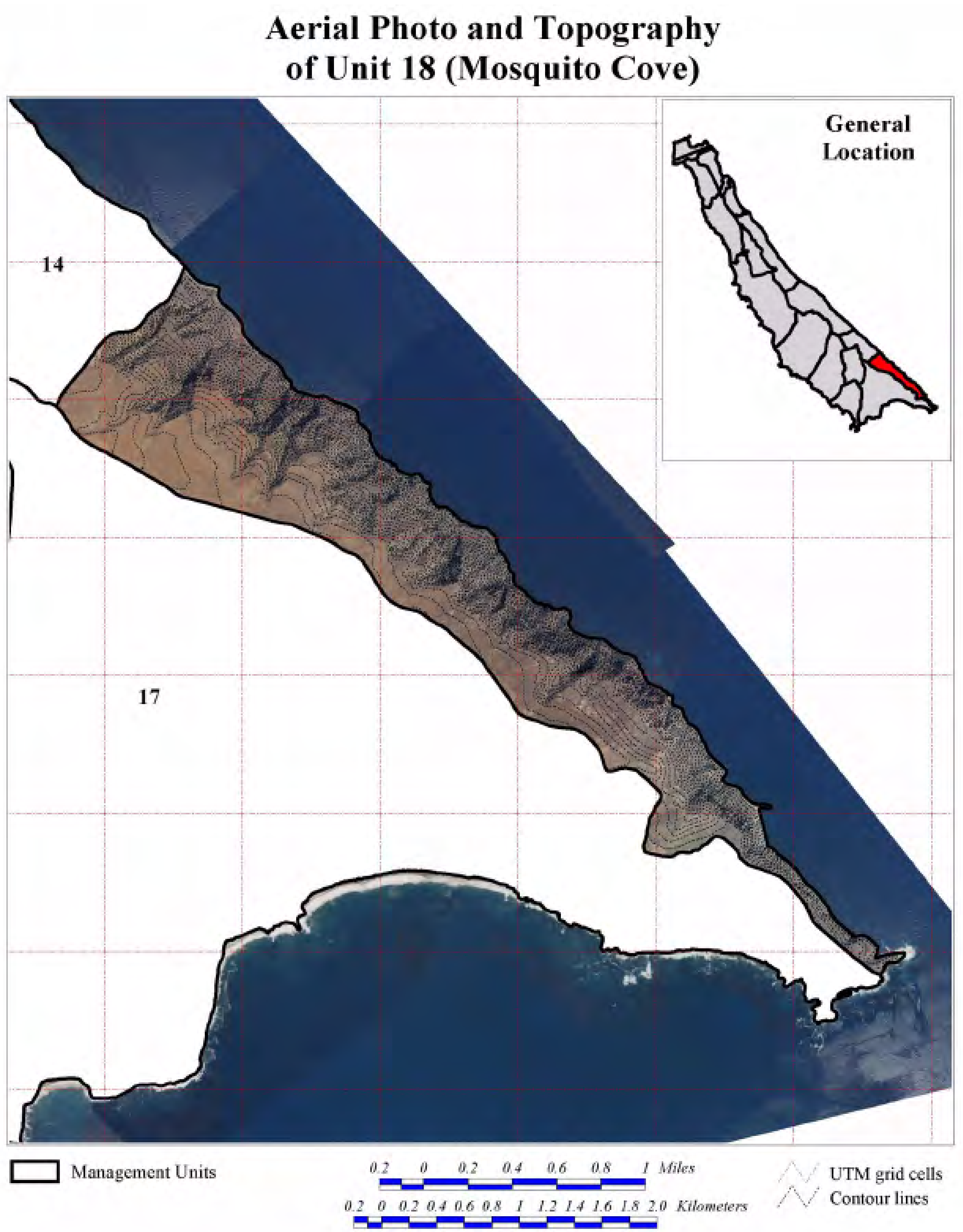
- Maintain populations of Trask's island lotus at current levels or increasing.
- Ensure fires do not cross SHOBA Ridge Road.
- The objective of fire management in shrublands and in woodlands is that recruitment exceeds mortality of all focus management species and all native trees, that shrubland or 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. Oaks and other woodlands on eroding or erodible surfaces should develop on stable sites. Foster recruitment and improved age structure, especially oak and ironwood woodlands. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturations, reproduction and recruitment are the biggest risks of fire.
- Fire interval management will be determined after consultation on the Fire Management Plan.
- Fire patch size and intensity targets will be determined after consultation on the Fire Management Plan.
- Allow no mortality of any individual ironwood tree to excessively hot or frequent fire. Consider the use of prescribed fire to protect entire groves from catastrophic loss, to improve seedbed conditions, and reduce exotics.
- Promote a fire regime which allows native shrubs and herbaceous species to out-compete prickly pear and cholla.
- Invasive species management, especially for black mustard along Ridge Road.

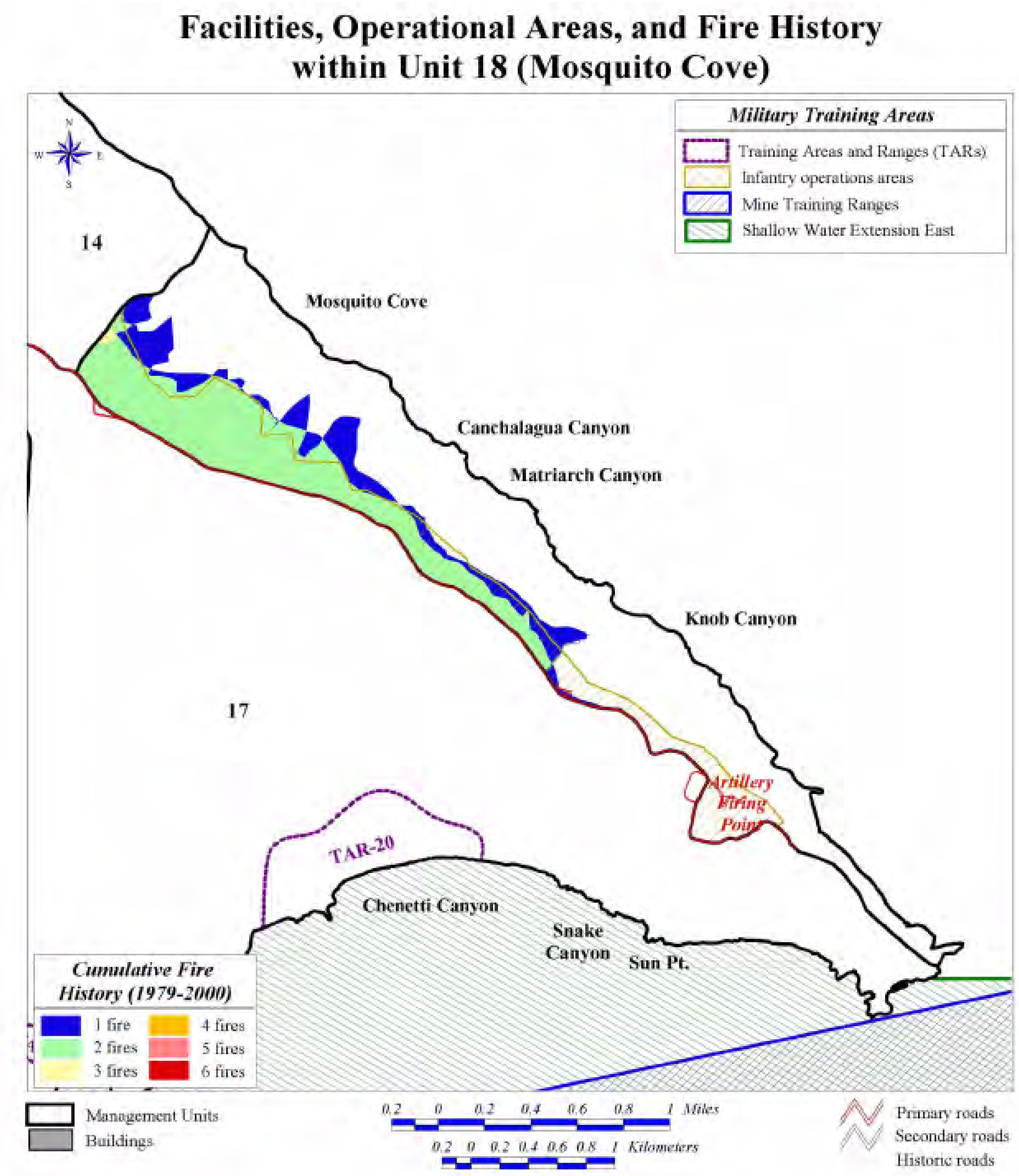
Table5-18. Human activities that could potentially impact focus management species on SCI and estimated probability of negative impact. Ratings of potential conflict are subjective and should be evaluated on a case-by-case basis. Effects related to fire are treated in a separate matrix.

18. Mosquito Cove

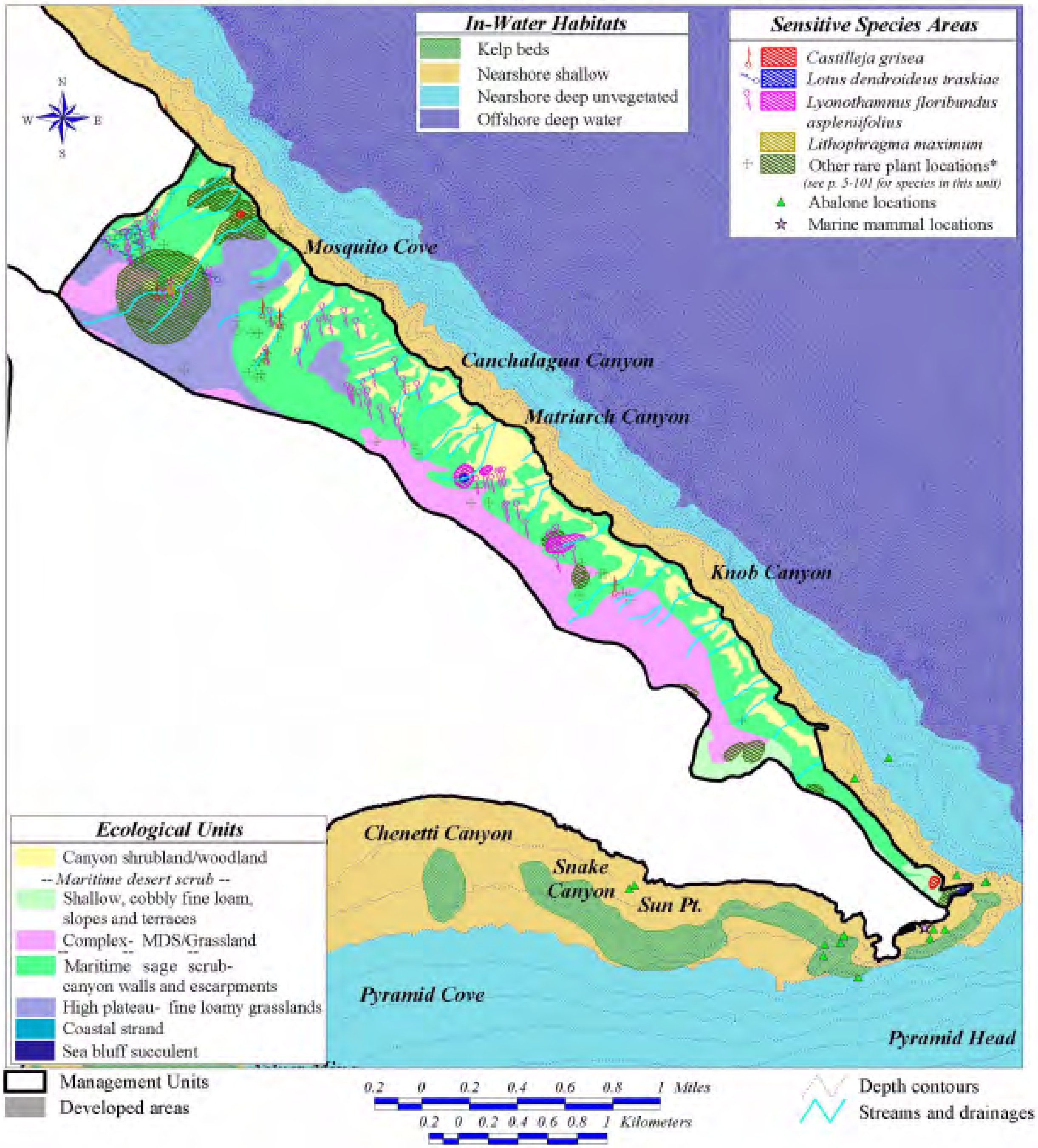
			Activities																				
			Infantry Ops (Battalion Landing) (New)						TARS (New and Existing)				SWATS (Existing)				MTR	FSA 1	FSA 2	General Increase in Tempo			
		Species Present in Unit	Individuals on foot (1-10)	Individuals on foot (10-100)	Individuals on foot (>100)	Beach Landing	Operational camping	Off-road vehicle traffic	Land Demolitions	Underwater demolitions	Over-the-beach landing	Individuals on foot (1-50)	Land demolitions	Underwater demolitions	Individuals on foot (1-50)	Diving operations	Underwater demolition	Species Present in boundary	Species Present in boundary	Foot traffic	Off-road vehicle traffic	On-road vehicle traffic	Associated Increase in Fire*
Management Focus Plant Species	***Castilleja grisea****	X											Not Applicable					Not Applicable	Not Applicable				
	Delphinium variegatum kinkiense*																						
	Lithophragma maximum*																						
	Lotus dendroideus traskiae*	X																					
	Malacothamnus clementinus*																						
	Sibara filifolia*																						
	Brodiaea kinkiensis																						
	Lavatera assurgentiflora glabra																						
	Quercus tomentella																						
	Lyonothamnus floribundus aspleniifolius	X																					
	Active Dune Specialists																						
	Lotus argophyllus adsurgens	X	Low	Low	Low		Low																
	Euphorbia misera																						
Management Focus Animal Species	**Terrestrial Mollusks**	X											Not Applicable					Not Applicable	Not Applicable				
	Island night lizard*	X			Low		Low																
	San Clemente sage sparrow*																						
	San Clemente Island fox	X																					
	San Clemente loggerhead shrike*	X																					
	Western snowy plover*																						
	Xantus' murrelet																						
	Abalone*	X																					
	Pinniped Haulout																						

*** Effects related to fire are treated in a separate matrix.**


Aerial Photo and Topography
of Unit 18 (Mosquito Cove)
General
Location
14
17
Management Units
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2.0 Kilometers
UTM grid cells
Contour lines


Facilities, Operational Areas, and Fire History within Unit 18 (Mosquito Cove)
Military Training Areas
Training Areas and Ranges (TARs)
Infantry operations areas
Mine Training Ranges
Shallow Water Extension East
14
Mosquito Cove
Canchalagua Canyon
Matriarch Canyon
Knob Canyon
17
Artillery Firing Point
TAR-20
Chenetti Canyon
Snake Canyon
Sun Pt.
Cumulative Fire History (1979-2000)
1 fire
2 fires
3 fires
4 fires
5 fires
6 fires
Management Units
Buildings
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
Primary roads
Secondary roads
Historic roads

Natural Resources Locations within Unit 18 (Mosquito Cove)



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6.0 Planning

San Clemente Island and its associated offshore ranges are a major national asset for defense training and readiness. As military use intensifies onto fewer installations with the Base Realignment and Closure program, sound natural resource policy, collaborative planning with military, regulatory agency and private partners, and improved organizational capacity become more central to a lasting resolution of environmental conflict. Also necessary will be enhanced communication and effective leadership 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.

6.1 Integrated Land Use and Natural Resource Decisions

DoD policy seeks to ensure that current and planned installation activities (e.g. site development plans, construction requests, site approval requests, host-tenant agreements, and outleases) are effectively coordinated and consistent with activities described in this INRMP. To be comprehensive, all of the existing planning-related documents should become integrated and missing planning components should be added. Future planning should examine these land use subjects together, and not separately.

This INRMP references sections from other planning documents for SCI, as appropriate, to assure integration. Land use and natural resource decisions are supported by existing DoD, SECNAV, DoN, and installation-specific Instructions, current BOs, the current draft Operations Management Plan, and other plans. Federal legislation and regulations, and DoD and Navy policy further guide land use management (Appendix F).

Planning should also be integrated with the Environmental Quality Assessment (formerly Environmental Compliance Evaluation) process. As required by OPNAVINST 5090.1B, this annual review is meant to assist COs in identifying and correcting compliance gaps. It is essentially an audit of the CO's potential environmental compliance liabilities.

The broad conceptual strategy outlined below is developed in greater detail in the subsequent sections of this Chapter.

Proposed Strategy for Integrated Land Use and Natural Resource Decision Making

Objective: ***Ensure that natural resource planning decisions protect the mission of the military commands that use SCI and seek to resolve environmental conflicts by full integration with other planning processes.***

I. Decisions to select among competing uses of SCI shall be based on these principles:

- ***A.*** The Navy's Title 10 national security responsibilities to organize, train and equip Naval forces for sustained military operations receives first priority.
- ***B.*** Important decisions should consider alternative locations for competing uses and the relative impacts of each alternative. Environmental impacts shall be balanced with economics and military training needs. Significant environmental impacts from land use can, at some point, inhibit military missions.
- ***C.*** All land use decisions should be supported by a concise record of the basis for the decision and approval of the CO. NEPA documentation shall be used as this record.
- ***D.*** Project plans including military construction (MILCON) projects coordinated through SWDIV should be consistent with this INRMP.

II. Develop and sustain the natural resource planning capability.

- ***A.*** Hire and assign appropriate land use and natural resource personnel to achieve the above objective.
    1. Determine where, organizationally, such individuals should reside.
    2. Set a desired standard for performance and expertise, and help provide any additional training needed to meet this standard.
    3. Provide for enforcement of natural resource laws and regulations by professionally trained personnel (USDoD Instruction 4715.3 (3 May 1996), and identify who is responsible for this task.

III. Seek an agreement on an explicit policy for how environmental review and impacts are paid for, considering direction provided in OPNAV 5090 "At Sea Policy." The costs associated with the review of land use for military or non-military purposes should be paid by the party making the request. Consider that shifting the financial burden of environmental compliance from

CNRSW to the type and fleet commanders who utilize SCI will also shift control away from CNRSW, but the decision-makers remain CINPACFLT and CNRSW. This may require phased implementation, if accepted, through use of an Instruction, Inter-Service Support Agreement (ISSA), or both. Consider also the complexity of obtaining funding from multiple organizations from throughout DoD when joint exercises are increasingly common. Many commands schedule their exercises and equipment testing to run contemporaneously with other exercises and tests, reducing costs for everyone by utilizing operational assets for multiple activities simultaneously.

A. A program shall be funded by the operational community if such is tied to a specific operational requirement and is not associated with the management, recovery, or preservation of a biological or cultural resource due to natural causes, and the program:

1. will require mitigation, as the result of an EA or EIS (under NEPA), Programmatic MOU (under the NHPA), or BO (under the ESA), for a specific operational program, test, or training exercise;

2. will survey to assess the potential environmental effects of a specific operational program, test, or training exercise; or

3. will provide protection for or management of natural resources solely due to the consequences of a specific operational program, test or training exercise.

IV. There shall be a detailed understanding of the management responsibilities of both host and tenant commands.

V. SCI, as land owner shall avoid any unlawful discrimination in the consideration of non-military uses of its lands.

VI. CNRSW should ensure land use and natural/cultural resource management plans and planning processes are relevant and useful for SCI's and military user needs.

A. Evaluate existing planning documents for their level of integration, internal consistency, and compatibility. Identify gaps of policy direction or information necessary to make informed management decisions.

B. Provide for regular updating of all plans, including this INRMP.

C. Coordinate planning activities with the NEPA process to ensure they integrate.

D. Use benchmarks to monitor and evaluate outcomes, with clear, specific accountability measurements.

E. Ensure self-Environmental Quality Assessments are conducted annually.

1. Develop tasks, time, and cost estimates to close out findings within one year.

2. Develop a protocol for repeat and non-closed findings.

F. Develop criteria and procedures for monitoring the effectiveness of SCI's natural resources management decisions, based on considerations described in 6.2 "Supporting Sustainability of the Military Mission."

VII. Request appropriate funds to support the missions at SCI.

VIII. CNRSW should ensure that the decision-making process is flexible to changing mission requirements and site-specific problems.

A. Incorporate a dynamic, continuous process for evaluating existing strategies and projects implemented under the INRMP, to make future changes or additions to the INRMP.

B. Implement adaptive management to accommodate new strategies resulting from monitoring, scientific findings, or new management policies.

C. Review existing biological opinions for consistency with ecosystem management, current mission requirements, and future operational needs.

6.2 Supporting Sustainability of the Military Mission

The following section provides guidance for protecting flexibility of the military mission and environmental compliance. Policies are enumerated which are intended to set a course for excellence in environmental stewardship and compliance at improved efficiency, timeliness, and reduced cost.

6.2.1 Military Mission and Sustainable Land Use

In order to accomplish the mission of national security, the public has endowed the Navy with an investment in public lands. The common denominator between national security and public land stewardship is the concept of sustainability. Sustainability is a relative condition of the ecosystem and the military mission that can be measured. The most widely used definition of sustainability was developed by the Brundtland Commission (1987): "[Sustainable resource management is]...the capacity to meet the needs of the present without compromising the ability of future generations to meet their own needs." Measures of sustainability are scale-dependent.

In order to accomplish the mission of national security, the public has endowed the Navy with an investment in public lands. The common denominator between national security and public land stewardship is the concept of sustainability. Sustainability is a relative condition of the ecosystem and the military mission that can be measured. The most widely used definition of sustainability was developed by the Brundtland Commission (1987): "[Sustainable resource management is]...the capacity to meet the needs of the present without compromising the ability of future generations to meet their own needs." Measures of sustainability are scale-dependent.

Sustainability of training lands may be considered as having five components–military use facilitation, soil and water resource protection, ecological integrity, cultural resource protection, and range safety for current and future use. These five components are explained in more detail below.

Military use facilitation

Military use facilitation seeks to keep intact the long-term carrying capacity of the range. SCI lands support the mission by providing:

- Availability of *multiple media* (land, air, sea) to coordinate combined exercises.
- Availability of *sufficient space* to conduct training.
- Capability of supporting *sufficient instrumentation* to support training.
- Availability of *effective infrastructure* to support training.
- Capability to *support live-fire* training scenarios on certain properties.
- Capability to support *essential training tempo and intensity* to attain sufficient readiness to deploy.
- Capability to *successfully coordinate and deconflict environmental compliance* and training requirements to provide realistic warfare training opportunities.
- For the purpose of this plan, an impact to mission accomplishment has occurred when any of the are constrained *or* as follows: “Quality of military training impacted by natural resource restrictions.”

For the purpose of this Plan, an impact to mission accomplishment has occurred when any of the above are constrained *or* when one of the following conditions occurs:

- Quality of military training is impacted by natural resource restrictions.
- Training qualification objectives to deploy are not accomplished without significant delay or conflict.
- Scheduled rotations are hampered by environmental issues.
- Conflict resolution impacts training intensity or tempo and the target resource condition is impacted.

Soil and Water Resource Protection

Soil and water resource protection ensures that the training range does not permanently lose the ability to recover from disturbance or maintain its carrying capacity for use. Protection of soil and water resources will protect the capacity of the ecosystem to recover from disturbance, and sustain its natural carrying capacity to support plants and animals and provide a realistic training environment. Soil surface stabilization is needed to minimize erosion, and maximize opportunities for soils to self-stabilize after disturbance. Water supply, natural hydrologic processes, and water quality are essential to most ecological functions including recoverability from disturbance. Managing for sustainability means preventing damage that will eliminate an area from use for the foreseeable future, or for which restoration or mitigation is excessively costly. The threshold beyond which an area loses its capability to sustain its original training load is loosely termed the carrying capacity.

Ecological Integrity

Compliance under the SAIA for mission sustainability (“no net loss”) is also defined in this Plan to include the ecological integrity of training lands, since this integrity will carry these lands into the long-term future with all the elements that allow self-recovery to remain intact. Keeping all the pieces (habitats and species) that allow the ecosystem to function at various scales and at the highest level possible, given the mandate for land use, is the third component to protecting sustainability. Use of focal (indicator) management species, when combined with physical or biological disturbance indicators are a means to track whether management is keeping all the key ecosystem pieces and relationships intact. A long-term monitoring program which tracks ecological integrity, soil and water status, and military use sustainability will allow the Navy to be responsive and adaptive in management approach and to respond to management and regulatory challenges in a timely and science-based manner (Section 4.19 "Tracking Progress Over Time: Inventory, Monitoring and Research").

Cultural Resource Protection

Over the last two decades, the large majority of NBC lands have been subjected to intensive, often overlapping, cultural resource surveys.

Long-term strategies include cultural resources surveys of areas that are not targeted for immediate use. Some of these areas may be opened to training in the future. Under Section 110 of the NHPA, federal land managers are directed to inventory cultural resources on lands under their control even when no activity or undertaking is planned. This inventory is usually accomplished through sample surveys designed to characterize the resource base and make projections. Such investigations aid in long-term planning and also contribute to the archaeological context that is developed to evaluate resources.

Range Safety for Current and Future Use

Ability to keep the range clean of hazardous material and unexploded ordnance aids in assuring the safety of the range not just for current training purposes but potentially for an alternate future use.

Policy Strategy for Military Mission and Environmental Compatibility

Objective:* *Achieve no net loss of military value by aligning current and future land use (location, extent, timing, and intensity) with environmental value protection over the next five years, while minimizing the cost of environmental conflict resolution and mitigation.

I. All infrastructure (roads, faciliteis, etc.) and land use shall be aligned to contribute to Fleet readiness, accommodating other uses only as readiness remains uncompromised in either the short or long term.

II. Safety and security of personnel and assets are of paramount importance. Enforcing safety and security is the largest single obligation of the CO.

III. As far as military use and natural resource values are compatible, align carrying capacity for military use with ecosystem carrying capacity to prevent future losses of species, constituent elements of critical habitat, long-term sustainability, and ecosystem processes that are key to the system's resilience to military use. This is proper use management, and will also help prevent future ESA listings and consultations.

- ***A.*** As far as uses are compatible and the military mission is not compromised, align location, spatial extent, timing, seasonality, intensity, and tempo of use with resource carrying capacity and natural resource conservation.
- ***B.*** When conflict and incompatiblities arise, apply principles described above to resolve them (Section 5.1 "Integrated Land Use and Natural Resource Decisions").

IV. Due to the extreme value of SCI lands for endangered species support, ensure that any enhancement, restoration and measures of success are written in formal agreements, and that progress in achieving the agreement objectives is closely tracked (Section 6.2.2 “Natural Resource Consultation”).

A. Ensure any stipulation of BOs is followed, but kept within the terms of the agreement and does not exceed them without amendment. This is in order to avoid inadvertent take of a listed species due to improved habitat conditions and subsequent occupation by federally protected species in areas not covered under the agreement. It is also to ensure habitat and species improvements are properly credited to the Navy, or identified in a mitigation bank, as mitigation against future projects impacts. Finally, this is also to avoid inadvertent harm to cultural resources.

B. Ensure that all personnel are kept informed of the terms and conditions of these agreements, and that their compliance is mandatory

V. Enhance planning that links support of the Pacific Fleet and other DoD assets with environmental protection.

A. Implement the new DoD Directive on Sustainable Ranges as it is finalized.

B. Use a regional Strategic Plan that follows the guidelines of the Government Performance and Results Act (GPRA) as the primary vehicle by which the military mission and environmental compliance are integrated.

1. Ensure that consistency in application of natural resource policy is maintained throughout SWDIV and no precedent is inadvertently set.

C. Continue to use the NEPA decision-making process as a basic decision tool for project site selection and related decision-making (Section 6.3 “Planning for NEPA Compliance”).

1. Continue to use NEPA documentation to guide specific projects.

2. Project site selection, proposed construction, and training activities must be evaluated for compliance with the ESA and active BOs. Where federally threatened or endangered species occur, informal or formal consultation (Section 6.2.2 “Natural Resource Consultation”) should be initiated with USFWS early in the planning process.

3. Catalog and keep BMPs on hand, such as in an Appendix to this INRMP, for projects and general land use and maintenance needs with regard to erosion control, storm water management, and other topics.

4. Develop, implement, and catalog new BMPs based on sound scientific principles, ensuring that they are specifically appropriate to the particular installation’s ecosystem.

5. Follow up on mitigation measures proposed in NEPA documents in order to maintain a consistent relationship of trust with regulatory agencies.

6. Keep a file on past projects reviewed.

D. Develop policies to protect the integrity of important habitat areas while allowing projects that enhance the mission of supporting Fleet readiness.

1. Planning should consider natural resource conflicts up front to reduce impacts and mitigation costs.
2. New construction shall take place within existing developed areas whenever possible. Planning should consider natural resources conflicts up front to reduce impacts and mitigation costs.
3. Unneeded roads or other infrastructure should be closed and the area secured from future erosion or alteration of site hydrology, which can happen even without road use. Restore, if feasible, to native habitat.
   a. The decision on what roads or other infrastructure are not needed should be made with all appropriate stakeholders at the table including operators, Public Works, and NRO, but the final decision remains with the Public Works Officer and CO. The Fleet Project Team may an appropriate venue for SCI road needs.

E. Minimize conflicts by maintaining communication with neighboring users and communities (Section 6.6.2 "Public Outreach").

1. Establish policy for collecting and informing Public Affairs and Command of emerging issues.
2. Develop a team that includes the Regional Environmental Council (REC) to review and respond to projects and proposals that would negatively affect military operations and training.

VI. Pursue incentive-based conservation planning (Section 6.2.2 "Natural Resource Consultation").

A. Work with USFWS and other resource and regulatory agencies to arrive at a strategy for programmatic agreements that results in basic incentives for SCI to continue conserving and enhancing sensitive species habitat.

B. Consideration should be given to establishing formal mitigation banking-style agreements so that beneficial activities and programs do not result in future military constraints due to increased opportunity for military activity and species conflicts (Section 6.2.2 "Natural Resource Consultation").

VII. Monitor land condition to document management effectiveness using long-term monitoring, remote sensing, and the health of federally listed and other focal management species, as well as ecological communities (Section 4.19 "Tracking Progress Over Time: Inventory, Monitoring and Research").

A. Define and identify measures for "no net loss" of military training value, and seek agreement among resource and regulatory agencies on these measures during INRMP planning updates, NEPA review, and ESA consultations.

1. Define and identify measures of military training sustainability that are consistent with the DoD Directive on Sustainable Ranges and this INRMP.
2. Consider measures that quantify the components of sustainability as described above (in the introduction to this Section).

a. Incorporate measures of ground cover, residual biomass, or other indicators of soil and watershed health, as well as ecological integrity to support the evaluation of sustainability.

B. Maintain and update databases and maps of land use and environmental resources as needed to support sound land management decisions (Section 6.2 “Data Integration, Access and Reporting”).

C. In conjunction with all tenant and non-tenant commands, NRO will maintain and update a compatibility and proposed constraints map once a year; distribute to operators; and hold a follow-on, working meeting with operators to address operators’ questions, and solicit operational concerns relative to proposed constraints.”

D. Acquire updated real estate data from Cadastral and the Real Estate Branch and systematically incorporate into the revision.

E. Adapt planning and management strategies as needed based on data from monitoring and analysis.

VIII. Implement a review and amendment process for the INRMP and key plans that it integrates (Section 7.1 “INRMP Implementation”).

IX. Seek appropriate partnerships with agencies, academic institutions, and other organizations to achieve sound environmental decision-making (Section 6.5 “Beneficial Partnerships and Collaborative Resource Planning”).

6.2.2 Natural Resource Consultation

The Navy and Marine Corps continues to partner with the USFWS Carlsbad Office to mutually enhance working relationships and products. The partnership recently sponsored a symposium on the southwestern arroyo toad, and plans a future symposium on wildland fire. Figure 6-1 depicts this agreement.

PARTNERING CHARTER
U.S. Fish & Wildlife Services and the Department of the Navy

May 18, 1995

We, the partners in resource management and protection, commit to develop a joint, proactive process that involves and enables the customer to meet their needs -- project and long term --while preserving natural resources -- short and long term – through the following goals and objectives:

- **Information Sharing - Long Term Processes**
  Improve effectiveness of quarterly meetings.
  Development of integrated approach for long term planning on military installations.

- **Information Sharing - Short Term Project Specific**
  Develop effective and proactive technical communication tools that promote timely information sharing.

- **Mutual Agreement on a Long-Term Natural Resources Stewardship and a Jointly Developed Strategy to Realize It**
  Installation plans that contribute to cooperatively developing (based on past experience and present requirements) Regional Conservation Plans.

- **Cross Training**
  Conduct formal and informal inter-agency training to more effectively achieve natural resource conservation.

- **Bring Customers Into Above Processes**
  Identify and include customers in the planning and consultation process.

Figure 6-1. Partnership charter between USFWS Carlsbad Field Office and Department of Navy.

Policy Strategy for Natural Resource Consultation

***Objective:* Improve the soundness of decisions made during consultation under the ESA, CWA, and other laws with respect to long-term military mission sustainability and ecosystem health.**

I. Pursue incentive-based conservation planning and agreements with regulatory and resource agencies.

A. Improve the programmatic approach to consultation to ensure that decisions:

1. Protect against short term, project-by-project erosion of military mission flexibility.
2. Are considered at appropriate biological scales and time frames so that de-conflicting of natural resource and military values can benefit from the "bigger picture" view of the problem.
3. Are aligned with broader ecosystem management goals.

B. Structure agreements so that flexibility of use is granted in exchange for mutually agreed-upon performance measures.

1. Seek mutual agreement on indicators of long-term success in programmatic agreements with respect to military range sustainability and ecosystem health.
2. Provide funding preference to projects that define measures of success in advance.

C. Ensure undesirable precedence is not set that may have negative ramifications to the Navy mission.

D. Modify the existing partnership agreement or negotiate a newly styled Performance Partnership between the USFWS Carlsbad office and CNRSW for the San Diego region.

1. Build on the existing DoN-USFWS Partnering Charter (Figure 6-1) and existing guidelines for BAs.
2. Model the agreement after similar partnerships such as the National Environmental Performance Partnership between the EPA and a consortium of states that implements EPA policy.
3. Use performance- or results-based statements of desired end outcomes to the partnership in the style and spirit of GPRA.
4. Consider developing a statement of desired outcomes and performance measures for environmental agreements between USFWS and DoD, by which agreements may be evaluated.
   a. Agreements allow for performance-based flexibility in land use when federally listed species are present (accountability for outcomes, while maximizing flexibility for progress towards mutually agreed-upon targets)
   b. Benefit to species.
   c. Supports ecosystem goals.
   d. Targets results rather than activities or processes. Targets are defined jointly.

e. Incentive-based, consistently rewarding investment in good stewardship.

f. Certainty and predictability.

g. Assured access to natural resources in support of the military mission.

h. Cost and time effectiveness.

II. Recognize that good working relationships and follow-through on agreements build trust and will, in the long term, foster flexibility and adaptive management as agreements are implemented.

III. Future consultations should use this INRMP as the fundamental basis and programmatic approach to SCI natural resource management. Consultations should tier off of this program.

6.3 Planning for NEPA Compliance

NEPA applies to any major federal agency action significantly affecting the quality of the human environment. NEPA itself does not impose substantive duties mandating particular results, but simply prescribes the necessary process for preventing uninformed, rather than unwise, agency decisions. If the adverse environmental effects of a proposed action are adequately identified and evaluated, an agency is not constrained by NEPA from deciding that other values outweigh the environmental costs. An agency may have many factors to consider when making a final decision and economic, operational, and political realities in addition to the need to meet any agency mandate sometimes counter balance environmental concerns. NEPA requires an informed decision and not an optimal environmental result.

One of the following three levels of analysis is required if NEPA is triggered by a proposed agency action:

- *Categorical Exclusion (CATEX):* The CATEX applies to specific categories of actions the Navy has concluded do not have a significant effect on the human environment individually or cumulatively under normal circumstances, and, therefore, do not require an EA or EIS. A signed Record of Categorical Exclusion is used to document the applicability of a specific CATEX to a proposed action. A proposed action that would normally come within the scope of a CATEX may be excluded fro coverage, however, if unique circumstances exist for potential significant environmental impacts.
- *Environmental Assessment:* An EA is an analysis of the potential environmental impact of a proposed action. An EA must be prepared when it is to known beforehand whether a proposed action will significantly affect the human environment or be controversial regarding environmental effects. An EA will either result in a FONSI, or, if a significant impact is expected, preparation of an EIS.
- *Environmental Impact Statement:* An EIS provides a full and unbiased discussion of significant environmental impacts and informs decision makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment.

CNRSW and NRO administer NEPA to assure compliance. NEPA documentation for projects is currently performed by SCI staff or under contract to SWDIV. NBC INST11013.3F establishes procedures for obtaining approval of new construction, alterations, space assignments, equipment installations, structure modifications, repairs and maintenance of class 1 (land) and class 2 (buildings) properties. It also provides criteria to be used for building designs, roads, parking areas, fencing, signs, painting, planting, etc. The following points are made in the Instruction:

- The Public Works Office will be responsible for the review and coordination of all Project Approvals. The Project Approval process will be used for all new construction, alteration, modification, repairs, maintenance, equipment installations and space assignments. A Publics Work Office, Planning member reviews the request and determines what level of review is needed based on the scope of work. Basic guidance for site approval is listed below.
- New construction, larger scopes of work and projects requiring additional review will require the Site Approval Process.
- Site Approval: In addition to the Work Approval procedures the Site Approval Process will include reviews, if applicable by the Natural and Cultural Office, Environmental Office, Real Estate Office, Safety (Airfield, Ordnance and Electromagnetic) and NEPA.
- The Natural and Cultural Office will review for: threatened, endangered or Sensitive Species, Wetlands, Archeological Issues and State Historic Preservation Issues.
- The Environmental Office will review for: underground storage tanks, contaminated soils, IR sites, Solid Waste Management Unit (SWMU) Sites, Hazardous Materials and ensure all appropriate permits are obtained.
- Safety Review will ensure the Site is not encumbered by Airfield Safety, Explosive Safety (ordnance etc.) or electromagnetic radiation (radar etc.) safety issues.
- The Real Estate Office will ensure all Land Acquisitions (Purchase/Lease) have been identified, all Easements / Outgrants (Road & Railroad Crossings, Utility easements etc.) have been identified and changes, relocations and or cancellations of existing easements /outgrants have been identified.
- NEPA will ensure all environmental planning documents are completed (CATEX, EA or EIS), all required permits have been identified and a Coastal Zone Consistency Determination (CCD) is not required.

A site approval checklist (Figure 6-2) has been designed for use by the PWC and is completed as early as possible in the project planning stages. This checklist ensures that cultural and natural resources potentially affected by a project are considered prior to the projects initiation.

Currently there are a number of projects planned for the Island, described in Table 6-1 (USDON, SWDIV 2001). Other projects currently under development include NAVSPECWAR waterfront facilities in Northwest Harbor, and upgrading of communications support.

SAR # : PROJECT:
LOCATION : SCI ACTIVITY:

PLANNING: Poc / Phone : Mike Mozda, 545-1124___________ Rcv'd Date:_______________ Cmpl'd Date:_____________
_______ 1. Site conditions and topography are suitable for proposed construction.
_______ 2. The project is located outside the 100 Year Floodplain.
_______ 3. The proposed site is consistent with the Regional Shore Infrastructure Plan (RSIP).
_______ 4. The project will have no adverse impact on adjacent off-base land.
_______ 5. There are no known off-base structures, functions, physical barriers or conditions that will adversely affect the function or the operation of the proposed project.
_______ 6. There are no off-site projects that are under construction or planned that would adversely affect this project.
_______ 7. There is sufficient area available for parking, material laydowns , etc.
_______ 8. There are no known subsurface foundations, structures, utilities, and rocks, etc. which would adversely affect the project.

SAFETY : Poc / Phone : _________________________________ Rcv'd Date: ________________ Cmpl'd Date:_____________
_______ 1. This site is not encumbered by Airfield Safety, Explosives Safety (Ordnance, etc.) or Electromagnetic Radiation (Radar, etc.) Safety issues.

REAL ESTATE : Poc / Phone : Esther Ewell, 532-1164__________ Rcv'd Date:_______________ Cmpl'd Date:____________
_______ 1. All necessary land acquisitions (purchase/lease) have been identified.
_______ 2. All easements/outgrants (road & railroad crossings, utility easements, etc.) that are required have been identified.
_______ 3. Any required changes, relocations, or cancellations to existing easements/outgrants have been identified.

NATURAL/CULTURAL RESOURCES: Poc: Steve Barnhill, ~~545-1130~~ 524-0043 or 545-3703 Rcv'd Date: Cmpl'd Date:___________
_______ 1. The project is outside of any historic district.
_______ 2. The project site is not listed on the National Register of Historic Places.
_______ 3. The site has no known discovery potential for archeological artifacts.
_______ 4. The project does not renovate a historic building or structure.
_______ 5. The project is not located in or near a wetland.
_______ 6. Mitigation and wetlands permits are not required.
_______ 7. No known threatened, endangered or sensitive species inhabit the site.

ENVIRONMENTAL : Poc / Phone : Marvin Johnson, 545-4943____Rcv'd Date:_______________ Cmpl'd Date:____________
_______ 1. All required permits have been identified.
_______ 2. There are no known underground storage tanks.
_______ 3. There is no contaminated soil on the proposed site.
_______ 4. This is not located on an Installation Restoration (IR) site or a Solid Waste Management Unit (SWMU) site.
_______ 5. There is no existing hazardous material (asbestos, lead, etc.) which would adversely affect the proposed project.
_______ 6. There are no air quality permits required.

Figure6-2. SCI site approval process check list.

Table6-1. Construction projects currently planned on SCI (USDON, SWDIV 2001).

Project ID	Type	Cost	Description
P-137	Port Operations	$6,100,000	Test and evaluation pier replacement
R16-99	Port Operations	$1,100,000	Repair small boat ramp
R8-00	Port Operations	$5,000,000	Replace/repair buoys
P-377	Air Operations, Fire Protection	$4,520,000	Aircraft fire and rescue facility
P-577	Air Operations	$9,400,000	Air operations building/ control tower/radar air traffic control center
P-461	Air Operations	$2,100,000	Hot refueling facility/piping
R21-01	Air Operations	$1,316,000	Runway repair
P763	Training/Ranges	$14,000,000	MOUT facility
-	RDT&E	$83,000(est.)	Upgrade Station Stone facilities
-	Ordnance	-	Security fencing for Mills Circle magazine compound
-	Ordnance	-	Install vindicator system to magazines at Mills Circle compound
P-767	Warehousing, Recreation/Community Support	$14,800,000	Replace existing ships store and Morale, Welfare, and Recreation complex.
P-191	Utilities	$5,000,000	Renewable energy systems- wind/desalination
P-493	Circulation	$15,100,000	Operational access to SHOBA
R20-01	Circulation	$4,356,000	Repair roads
P-468	Fire Protection	$2,780,000	Replace existing fire station
P-740	Housing	$16,000,000	Bachelor Enlisted Quarters
P-741	Housing	$15,520,000	Bachelor Enlisted Quarters

Proposed Management Strategy—NEPA Compliance and Project Planning

Objective:* *Conduct planning of mission activities having potential environmental effects by applying NEPA's requirements and policies to enhance the mission-related use and the protection of natural resources. Seek opportunities for streamlining environmental assessment procedures.

I. Assess the environmental consequences of each proposed action that could affect the natural environment, and address the significant impact of each action through analysis, planning, mitigation, and prevention.

A. Ensure that any proposed SCI action that has the potential for physical impact on the human environment undergoes the NEPA process, unless it is excluded in a previous document.

1. Include new activities, substantive changes in continuing actions, specific actions, or adoption of programs, for example:

a. Routine grounds maintenance such as erosion control measures or the use of herbicides and pesticides.

B. Conduct thorough evaluation, including prior public comments, of a project to preclude preparation of NEPA documentation at an inappropriate level (i.e. CATEX, EA, EIS).

II. The NEPA planning process should facilitate project planning and integrate project-specific plans with overall land use and natural resource management plans.

A. Integrate NEPA planning early with regular planning functions of each office.

1. Technical assistance should be provided by staff to support other offices, when needed, *before* and after a proposed action is submitted for NEPA review, giving guidance on:

a. Project design, site selection, and scope of work.

b. Development of reasonable alternatives, including alternative sites.

c. Selection of appropriate mitigations so the proposal integrates mitigation from the beginning; mitigation design should remain flexible and creative, and "not cookbook."

d. Importance of implementing BMPs as mitigation measures for environmental protection.

2. Prepare and regularly update a NEPA Handbook which clearly and simply outlines step-by-step procedures for the management and preparation of NEPA documents.

3. Develop NEPA non-compliance notification system to correlate with other established Environmental non-compliance Command reporting.

B. Design NEPA forms for project proponents using the Site Approval Checklist as a model. Forms should be understandable, easy to complete, avoid extraneous background data, and provide sufficient data for project review and decision-making.

1. Maximize use of checklists, graphs and tables, and minimize lengthy descriptions;

2. Standardize terms and categories used in project descriptions, including types of military actions.

3. Provide list of approved mitigations for project proponents to select from.

4. Reference appropriate environmental protection and mitigation policies from this Plan. Also provide for creative and flexible mitigations.

5. Make available to project planners updated GIS maps of sensitive resources on the property to assist in evaluating potential impacts of proposed projects and in recommending appropriate mitigations.

C. Communicate directly with all affected parties during NEPA process to avoid misunderstandings and delays.

1. Contact off-site interested and affected agencies and parties as soon as possible on projects with potentially significant environmental impacts, particularly if controversial.

2. Cooperate with state and local agencies to the maximum extent practicable to fully address joint needs: environmental research and studies, public hearings and scoping sessions, EAs, and EISs.

III. Organize natural resource and military usage information and make easily accessible to project planners to support impact and cumulative effects analysis.

- ***A.*** Make GIS maps available to project planners, *updated regularly at least once per year,* of sensitive resources to assist in evaluating potential impacts of proposed projects and in recommending appropriate mitigations.
- ***B.*** Provide an annual summary of uses and activities based on SEAL and other user schedules to support environmental evaluation for NEPA as well as long-term monitoring objectives.
- ***C.*** Track site approvals, all NEPA documents including from tenants, requirements for these actions, and terms and conditions required under BOs. Keep a list in the Appendix of this INRMP and update each year.
- ***D.*** Document all land use agreements in the Appendix of this INRMP and keep up-to-date.

IV. Communicate directly with all affected parties during NEPA process to avoid misunderstandings and delays.

- ***A.*** Keep a stakeholder contact list. Contact off-site interested and affected agencies and parties as soon as possible on projects with potentially significant environmental impacts, particularly if controversial.
- ***B.*** Cooperate with state and local agencies to the maximum extent practicable to fully address joint needs: environmental research and studies, public hearings and scoping sessions, EAs, and EISs.

V. Standardize cumulative effects analysis and reporting so that various NEPA documents may be considered together. Report effects by land management unit as well as other scales and time frames.

VI. Prepare a concise EA when a CATEX cannot be used, or the significance of the impacts are unknown.

VII. Reduce paperwork and delay during the EIS process.

6.3.1 Mitigation Planning

Proposed Management Strategy for Mitigation Planning

Objective: Plan mitigation to avoid or minimize effects on special status resources.

I. As part of mitigation planning at SCI, careful consideration will be given to the siting of proposed actions and potential compensating mitigation relative to the various installations early in the planning process. As part of SCI ongoing efforts to avoid and/or minimize impacts on special status species and wetlands, first consideration will be given to use of lower value management areas. This will assist SCI planners in avoiding areas supporting the regulated resources located in (i.e., the primary objective of mitigation planning). This will, in turn, enable planners to reduce costs (in terms of funding, manpower, and time) to plan, obtain regulatory approvals, and implement proposed actions.

II. Persons planning and/or preparing mitigation actions should be aware that military lands cannot be set aside as permanent environmental preserves, despite ESA responsibilities that “all federal departments and agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of this act [ESA}.” Alternative means must be sought first. Therefore, the DoD must maintain the flexibility to adapt its defense mission to political and technological developments (per USDoD Instruction 4715.3, paragraph F.1.i[4]).

III. Mitigation guidance should derive from the most current natural resource map of regulated resources available from NRO. While the discussion of these resources and associated maps should be valuable for initial planning, this data should not be used exclusively without additional field verification and up-to-date data evaluating the area of potential effect in more detail. Planners should always contact NRO if more detailed depiction of management areas is required or prior to contracting for supplemental surveys.

IV. During the active growing and breeding season, many species and habitats are more sensitive to disturbance that may cause harm, harassment, or severe damage. Limitations on the timing of activities to avoid and minimize adverse effects can appear to leave little time for work. This will especially be the case in the spring when the loggerhead shrike and sage sparrow are likely to be nesting or where multiple threatened and endangered species occur. Wetland resources are most sensitive during and shortly after the rainy season when the ground is still wet (about 1 November–30 April; annual variation will occur and actual situation should be verified by a qualified biologist prior to actions). Threatened and endangered species found on SCI are most sensitive during the spring/summer season (15 February–31 August for planning). Where these resource issues may be directly affected, planners need to be careful to consider such timing requirements so that habitat-disturbing activities are focused to occur during September. USFWS should be contacted early on in the planning process to help define other species and timing restrictions that may be necessary.

V. Often, careful planning can show that impacts to the differing resources can be phased or avoided. Where the conduct of activities cannot be planned to avoid these most sensitive periods, project specific authorizations and appropriate additional impact minimization measures should be planned for and expected from regulatory agencies.

VI. When planning for impacts to natural plant communities and habitats, identification of suitable sites for compensatory actions must be an early consideration. Resource agencies from which authorizations must be obtained have specific requirements for siting compensatory mitigation actions. Usually for actions where habitat compensation is for permanent impacts, habitat restoration may only occur at degraded sites that would not naturally provide such resources in the reasonably foreseeable future.

A. Identify areas suitable for mitigation banking on SCI.

VII. The cost of mitigating impacts to natural resources should be considered when evaluating proposed action alternative locations and planning for funding. Mitigation must be treated as part of the project that will be fully funded by the action proponent. Some environmental authorizations and permitting require mitigation funding to be secured and assured prior to causing adverse affects. Resource mitigation costs can be highly variable depending on the specific details of the project (i.e., extent of habitat impacts, type of habitat impacted, duration of impacts, habitat compensation, site conditions, and technologies). Cost considerations for impact prevention during action implementation need to be accounted for, as well as habitat restoration and/or compensation (i.e., biological monitoring, placing protective signs/fencing, sedimentation controls, etc.).

A. Any requirement for the obligation of funds for mitigation projects shall be subject to the availability of funds appropriated by Congress, and none 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. § 1341, et seq.

VIII. Adopt General Mitigation Requirement for All Actions. Many components of mitigation actions are common to most situations. The following mitigation measures should be planned for all proposed actions unless a determination can be made, in consultation with NRO staff, that they are not appropriate:

A. Because the primary purpose of mitigation is to lessen the severity of an action, the first step in mitigation planning should be avoidance of impacts. Once avoidance has been implemented to its fullest extent, remaining impacts should be minimized prior to consideration of off-site compensation for damage resources as a last resort. This must be the first step in the mitigation planning process because numerous regulatory authorizations require demonstration of maximum impact avoidance and minimization before authorization may be given.

B. Indirect effects of a proposed action must be addressed when planning mitigation. Indirect effects have an impact at some point later in time. This may be the case where use and maintenance of a new facility is likely to have an adverse effect beyond the building “footprint” following construction. For example, fencing may be necessary to prevent landscape maintenance and concentrated human foot traffic from damaging naturally occurring resources that were avoided by the construction of a building. Often, maintenance and safety considerations associated with new or re-utilized facilities, such as wildfire fuel breaks, are overlooked by planners and are not realized until use is implemented. Such considerations must be treated as part of the initial project and mitigated accordingly.

C. In addition to direct habitat loss, less tangible direct and indirect effects may result from a proposed action. Some examples of indirect effects can include: lights; noise; increased access by vehicles, ORVs, humans, pets (increased pet use of natural areas [with housing]; invasive weed or exotic plant introductions; shading; need for fire suppressions or fuel modification (setbacks or clear zones); irrigation runoff; pesticides, herbicides and/or fertilizer overspray or runoff; oil, grease and gasoline runoff; erosion and sedimentation; and operation and maintenance of new facilities. Most common concerns are noise associated with construction and subsequent use that extends beyond the immediate work or activity area, outdoor lighting that may require shielding, visual harassment by human activities and equipment operation, changes to wetland hydrology, and sedimentation from construction sites to wetlands. Often the temporary effects that may result from construction are avoided by performing work outside the sensitive breeding and growing seasons as presented in this planning guidance. Potential effects must be evaluated. Effects that are likely to have a longer or permanent adverse effect must be mitigated.

D. Threatened or endangered species presence or absence determinations must be made using survey guidelines developed by the USFWS or other means acceptable to them. Where no such guidelines or protocols exist, surveys must be conducted by qualified persons (as defined below) using methods recognized and accepted in the scientific and professional consulting field. When making presence/absence determinations relative to a project, areas where indirect effects may affect species must be considered as well. If a habitat is used by a species for some important part of their life cycle, it is considered occupied regardless of the presence of the species at any one time. Corridors for animal movement are important considerations in the overall analysis.

E. A biological monitor should be retained during construction projects to educate workers, oversee and implement impact avoidance and minimization, document impacts, and guide revegetation efforts for all proposed actions that require active avoidance or actually will affect threatened or endangered species, wetlands (including vernal pools), require active revegetation, or habitat compensation. At a minimum, this individual must have: (1) a bachelor's degree with an emphasis in ecology, natural resource management or related science; (2) demonstrated local experience with resource(s) involved; and (3) a good understanding of the regulations regarding wetlands and endangered species. Section 10(a)1A permits under the ESA are required for biological monitors that check federally listed bird nests, conduct trapping efforts for federally listed species, or otherwise handle federally listed species. These permits are obtained from USFWS. Requests for these permits should be submitted to both USFWS Regional office in Portland, Oregon and USFWS office in Carlsbad, California.

1. Large or non-routine military operations should be coordinated through NRO.

F. Proposed actions must include requirements for impact avoidance and minimization measures as part of implementation of any proposed action. Measures which should be considered, as applicable are: worker environmental protection briefings, signs, markers, protective fencing, biological monitoring, erosion and sedimentation prevention, noise baffling, and temporary impact restoration. These should be included as part of the environmental protection plan of the Environmental Protection requirements for all standard operating procedures, work requests, and contracts during planning.

G. Migratory birds are generally protected by the MBTA and implementing regulations and orders. On SCI, all birds are covered. Planners must review proposed actions with regard to conduct of actions during the active breeding season (can be January–September) and project caused loss of traditionally used nesting/roosting sites. Habitat clearing activities should be timed to avoid the breeding season to maximum extent practicable to avoid damage to active bird nests. Compensation for the loss of traditionally used nesting/roosting sites may be an issue for raptors. All contracts and work orders prepared for NBC must include provisions in the Environmental Protection section which prohibit harming, damage, or destruction of active bird nests while requiring "work arounds" without incurring additional cost. NRO can provide contractual language prepared and approved by the Navy for construction contracts on NBC.

H. Site evaluations and approvals for habitat compensation and enhancement must be initiated concurrently with Proposed Action planning, whenever possible.

I. All actions that require active habitat restoration, enhancement, and/or compensation must have an appropriate plan developed prior to implementation. Such plans must discuss the site conditions, methods to be implemented, monitoring and maintenance (usually three to five years), success criteria, remedial actions if expected success is not being achieved, and reporting requirements. The plans must ensure that all applicable requirements of regulatory approvals are incorporated. Often, regulatory agencies require that they have an opportunity to review and approve plans where their authorization for resource impacts is provided. Regardless, review and approval of plans must be accomplished through NRO.

IX. Navy lands should not be used for mitigation by outside entities.

X. The Navy is not required to consult on State-listed species.

6.3.2 Planning for Construction and Facility Maintenance

On occasion there is a need to build new facilities to ensure the ability of the installation to fulfill its military mission. The DoD military construction (MILCON) budget is a primary source of funds for construction. However, recent budget cuts have limited the MILCON project roster.

By EO, the President has directed that federal agencies shall design, use, or promote construction practices that minimize adverse effects on the natural habitat where cost-effective and to the extent practicable (EO 13112 1999).

Routine maintenance of roads, buildings, utility lines, and other infrastructure is important for safeguarding access to facilities that are central to support the military mission, as well as the safety of those involved in implementing the mission. Proper maintenance also prevents erosion and associated non-point source and air pollution. Guidelines for maintenance are needed that allow for protection of sensitive environmental resources and the timely, cost-effective completion of environmental documentation requirements, while ensuring full accomplishment of the military mission.

Of necessity, roads and other infrastructure will traverse sensitive environmental and cultural habitats. Routine maintenance may be hampered by the need to comply with requirements to protect these resources unless there is advanced early coordination. With foresight and proper planning, delays and impacts can be avoided or minimized.

Several laws are pertinent: CWA, Clean Air Act, ESA, NEPA, and Soil Conservation Act. Routine maintenance activities that may affect drainages fall under the Natural Resource Conservation Service's permitting authority under the Food Security Act on agricultural lands, and under USACOE authority from Section 404 of the CWA on non-agricultural lands.

Policy Strategy for Construction and Facilities Maintenance

I. Fish and wildlife conservation shall be considered in all site feasibility studies and project planning, design and construction. Per DoD 4715.DD-R 1996, appropriate conservation work and associated funding shall be included in project proposals and construction contracts and specifications.

- ***A.*** Develop or use proven BMPs for controlling soil erosion from construction and landscaping sites (Section 4.9.1 "Soil Erosion").
- ***B.*** Ensure NEPA protocols are followed when selecting sites for new construction projects.
  1. Consult with USFWS on all new construction projects that could potentially affect federally listed or proposed species. Hold meetings early in the planning stages of a project to discuss with USFWS, NMFS, CDFG, USEPA, RWQCB and CCC to discuss potential environmental issues that need to be addressed.
  2. Try to locate new structures in previously disturbed areas.
- ***C.*** If a project has the potential to affect nesting birds or nesting substrate (including trees used annually for nesting), a qualified biologist from SWDIV, Environmental Department NRO shall be contacted immediately to determine if there will be any violations of the MBTA.

6.4 Integration of Cultural Resource Management

Proposed Management Strategy—Integration of Cultural Resource Management

Objective: Continue to refine a legally defensible, scientifically sound program for stewardship of cultural resources.

Objective: Accomplish mission-related activities with a minimum of delay and maximum flexibility, while protecting the Island's cultural heritage.

I. Resolve uncertainty for sponsors of mission-related activities regarding which cultural resources are significant and what measures should be taken for their protection.

II. Safeguard resources and information to preserve the cultural heritage of SCI.

- ***A.*** Develop and adopt policies, standards, and BMPs for protecting resources.
- ***B.*** Support research on paleontological resources that is compatible with the military mission.

III. Determine stewardship responsibilities with respect to Native American values.

A. Establish access criteria and communication protocols for Native American with interests in SCI resources.

IV. Provide proper safeguards for cultural resources during fire management. Some of the most substantial and predictable effects of fire activities on cultural resources are from the use of equipment in burn area preparation, fire suppression, or burn area rehabilitation.

A. Sensitive locations include both known sites and areas that may contain buried deposits. These areas should be avoided if at all possible. New firebreaks should be avoided, but if needed should involve a qualified archaeologist and may need to go through the Section 106 process of the NHPA, including survey, test and evaluation of any sites, monitoring, and SHPO and tribal consultation. Mechanical equipment should not be brought into these areas and no fire lines should be cut.

B. Due to the nature of fires and the need to protect life and property, sensitive locations may not always be avoidable. Efforts should be made to minimize damage when work must be done in these locations. The affected area should be examined by a qualified archaeologist as soon as possible to determine if any cultural resources were impacted; Advisory Council on Historic Preservation (Council and SHPO may be required if resources are impacted).

C. As per 36 CFR Part 800.12 (a) emergency procedures for handling historic properties (cultural resources that are eligible to the National Register) can be developed in consultation with the SHPO and the Council. This would replace the 106 process during any legitimate emergency; emergency is defined in 36 CFR Part 800.12(a) as “a disaster or emergency declared by the President, a tribal government or the governor of a State or which respond to other immediate threats to life or property.” Emergency plans may also be a part of a Programmatic Agreement. If no plan is available, the Council and-SHPO should be notified and given at least 7 days to respond. If this is not possible, the Council and SHPO should be notified with as much time given as possible under the circumstances.

D. Historic structures will be fully protected. Use the minimum suppression measures possible to eliminate a potential threat.

E. Avoid use of bulldozers at cultural resource sites.

F. Prescribed burning can be an effective cultural resource management strategy, by reducing fuel loads and the potential for heat damage of artifacts at or near the surface from intense or long-duration fires. Prescribed fire sites containing cultural resources will be analyzed on a case-by-case basis.

G. Take advantage of improved visibility of the ground surface after both wildland and prescribed fires to conduct more thorough archeological surveys.

6.5 Beneficial Partnerships and Collaborative Resource Planning

Implementation of this INRMP will depend in part upon building mutually beneficial partnerships with other agencies, universities, environmental organizations and community groups. Cooperative agreements are one way to provide a framework for obtaining assistance from these groups and individuals for natural resource management.

Direction for management of DoD lands and waters is based on the concept of ecosystem management. Navy policy calls for its installations to expand involvement in regional ecosystem planning, management, and restoration initiatives (USDoN 1994a). Terms commonly used are ecosystem management, landscape ecology, multi-species, or bioregional (biological diversity) planning. What they all represent are a way to address real biological and water quality needs on natural scales instead of political ones which are based on artificial boundaries.

SCI has an important responsibility in the recovery of listed species, and should participate in regional conservation efforts along with other partners. Cooperative management of SCI's wildlife is required under the federal Sikes Act and the Fish and Wildlife Coordination Act. Like NEPA, the Fish and Wildlife Coordination Act is essentially procedural as no specific outcome is mandated.

The Sikes Act (as amended) requires that an INRMP reflect the mutual agreement of the Navy, the USFWS and State Wildlife Service concerning INRMP elements that address fish and wildlife conservation, protection and management. There are many benefits of planning partnerships, such as those described below:

- They fill a strategy vacuum, which can lead to uncertainty on the part of management and increasing potential for legal challenges to uses and users of SCI's resources.
- Pooling of financial resources for implementation can help spread the costs of restoration, enhancement, monitoring, and research.
- Project mitigation will be more beneficial and efficient because it is based on a consensus of prioritized need.
- Funding institutions, as well as regulatory agencies, can determine their own role in contributing to the Plan's success.
- Positive relationships, partnerships, and goodwill can result among all participants in the process by fostering understanding and collaborating on a common goal.
- The public is provided a consistent message that is an accurate reflection of the status and management of SCI.
- A more consistent and reliable regulatory process is better for everyone.

SWDIV is tasked with providing the technical and administrative guidance for the development of cooperative agreements to implement natural resources plans and execute cooperative agreements on behalf of installation commanders upon request (OPNAVINST 5090.1B). A cooperative agreement is used to acquire goods or services or stimulate an activity undertaken for the public good, for the maintenance and improvement of natural resources on, or to benefit natural resources research on DoD installations.

Cooperative agreements are authorized to implement INRMPs (OPNAVINST 5090.1B CH-2). A Sikes Act Cooperative Agreement, developed with State agencies, universities, non-governmental organizations, and individuals, typically gives shape to the organization formed to accomplish work addressed in the INRMP. Other options include contracts, in-house self-help processes, and use of volunteers from conservation programs such as the Student Conservation Association.

A MOU between the Installation, USFWS, and State may serve to address the responsibilities, expectations, and commitments of various partners (OPNAVINST 5090.1B CH-2). The MOU, or signatures of the appropriate USFWS and State officials on the INRMP title page (while not required), satisfies the Sikes Act mutual agreement requirement. Letters of endorsement, attached to the INRMP can also indicate mutual agreement.

Proposed Strategy for Beneficial Partnerships and Collaborative Planning

Objective:* *Be proactive in collaborative resource planning partnerships to create regional conservation, ecosystem, and water quality solutions of mutual benefit while also protecting the military mission.

I. Partner with other agencies, nonprofit organizations, and academic institutions to enhance conservation goals, improve management and facilitate the best management decisions.

II. Participate in regional conservation and ecosystem planning efforts.

- ***A.*** Base SCI's involvement on the following criteria:
  1. Evaluation of agreements that may encumber land or resources now or in the future. Emphasize the critical importance of ensuring continuation of the military mission and its unique attributes which cannot be replaced.
  2. Evaluation of the potential benefits to SCI's natural resources.
- ***B.*** Pursue pertinent DoD ecosystem management policies, including:
  1. Maintain and improve the sustainability and biological diversity of the ecosystem at the local landscape and other relevant ecological scales.
  2. Promote development of the best available scientific and field-tested information for use in land management decisions.
  3. Support Navy and USFWS partnering efforts through active participation.
- ***C.*** Provide for the military contribution to regional conservation goals without commitment of Navy lands, by recognizing the goals and aspirations of these efforts in this INRMP.
  1. Provide for continued coordination with federal and state fish and wildlife management agencies.
  2. Manage resources according to the guidelines of the Channel Islands Recovery Plan, where compatible with SCI's resources and military mission.
  3. Partner with Channel Islands National Park, the Catalina Island Conservancy, and other managers of the Channel Islands to enhance management effectiveness of SCI.
  4. Continue to contribute to DoD's Partners and Flight Initiative.

III. Consult with USFWS and CDFG at least annually to fulfill Sikes Act provisions and related inter-agency cooperative agreements.

A. Ensure compatibility with INRMP goals, objectives, and policies as well as internal consistency in future inter-agency agreements and plans.

B. Promote information sharing and scientifically-based, coordinated data collection and management planning.

IV. Provide funding to support beneficial partnerships.

V. Actively pursue outside funding sources for conservation projects (Section 7.1.2 "Scheduling and Funding"). Some opportunities for acquiring money through partnerships are:

- Strategic Environmental Research and Development Program (SERDP).
- USFWS Endangered Species Conservation Funds.
- USFWS Recovery Land Acquisition Grants.
- USFWS Candidate Conservation Agreement and Safe Harbor Grants.
- State Wildlife Grants.
- California Department of Forestry and Range Assessment Planning Program branch for studies on hardwoods.
- Disseminating a research prospectus to funding programs and universities of projects that would be in the Navy's interest to have others conduct.
- National Fish and Wildlife Foundation, Animal and Plant Health Inspection Service (APHIS), BLM, Bureau of Reclamation (BOR), DoD, EPA, NPS, Tennessee Valley Authority, USFWS and USDA Forest Service "Pulling Together: A Public/Private Partnership for Invasive and Noxious Plant Management".

6.6 Public Access and Outreach

6.6.1 Public Access and Outdoor Recreation

DoD installations are to provide for sustained public access and use of natural resources for educational or recreational purposes when such access is compatible with mission activities, and with other considerations such as security, safety, or resource sensitivity (USDoD 1996). Access to SCI can only be gained by obtaining prior approval from NBC's CO, who can be contacted through the Public Affairs department. The security of SCI personnel, assets, facilities, natural resources, and the visitors themselves should receive priority when granting access to Navy properties.

Outdoor recreation activities are intended to support the wise stewardship of DoD's natural resources. In the event of potential conflicts of use, sound biological management practices shall prevail.

- The SAIA (Conservation Programs on Military Installations), as amended, 16 U.S.C. 670(a) et. seq. requires installations to provide public access for natural resources uses to the extent it is appropriate and consistent with the military mission, including implementation of programs and projects called for within the Installation's Cooperative Outdoor Recreation Section of the Installation's INRMP. Cooperative plans may be developed in coordination with the NPS.

In response to the Sikes Act of 1960, a MOU between the DoI and DoD was signed which set up the NPS as a cooperator in developing outdoor recreation plans for military installations where there are suitable resources for such a program consistent with national security. The preparation of a recreational plan is necessary for SCI to comply with the SAIA. Provision of an Outdoor Recreation Instruction would help communicated outdoor recreation policies both to military personnel and the public.

SCI does not have the capability for an extensive public access and recreation program for several reasons, including:

- general security and liability issues;
- presence of federally endangered and threatened species; and
- fire safety.

The most prevalent public interest in access to SCI is to its nearshore waters for both commercial and recreational fishing, and recreational SCUBA diving. Access is also frequently requested by researchers, both for in-water and terrestrial studies, that are funded by non-Navy outside agencies.

Specific Concerns—Public Access and Outdoor Recreation

- The unauthorized presence of public vessels prior to or during military training activities can be costly and potentially dangerous.
- Over-harvesting or excessive disturbance to marine resources could potentially occur due to public access.
- If public vessels land on the Island, associated trash and pets can have adverse effects on wildlife species.
- Numerous public enterprises rely on waters surrounding SCI for at least part of their business.
- Boy and Girl Scout visits are enjoyed by on-Island personnel and the activity provides positive public relations for the Navy.

Policy Strategy for Public Access and Outdoor Recreation

- The SAIA (Conservation Programs on Military Installations), as amended, 16 U.S.C. 670(a) et. seq. requires installations to provide public access for natural resources uses to the extent it is appropriate and consistent with the military mission.

Objective:* *Ensure public access is compatible with the military mission, natural resource responsibility, safety, and security.

I. Establish clear, coherent policies and procedures for allowing temporary public access to SCI and adjacent waters.

A. Provide access for agencies and others to conduct natural resources research to the extent it does not interfere with the military mission or resource sensitivity.

B. Develop an Instruction that clarifies procedures and addresses concerns regarding public access, including any concerns about interference from boat radar systems. Planning for public access shall consider, but not be limited to, the following topics (USDoD 47155.DD-R 1996):

1. Eligible users of installation resources and facilities, including the installation's method of determining user eligibility and priorities.

2. In cooperation with the Public Affairs Officer, procedures required for the public to gain access.

3. Accessible and off-limits resources, areas and facilities.

4. Areas designated for special use.

5. Points of access and egress.

6. Periods of access.
7. List of permitted and prohibited activities.
8. Schedule of applicable fees and charges.
9. Installation personal injury and property liability policy.
10. Access agreements with agencies and organizations.
11. Installation-established access quotas to reflect installation operational, outdoor recreation, and wildlife carrying capacity.

C. Protect sensitive resources from incompatible public uses.

II. Protect the military's ability to fulfill its mission and the Island's natural resources while respecting responsible public use of waters surrounding SCI.

A. SCORE should continue to maintain a website <SCISLAND.ORG> and radio channel availability for up-to-date restrictions for fishers, scuba divers, and other mariners interested in using SCI waters.

B. If unauthorized presence of public vessels becomes unjustifiably costly or dangerous, evaluate the possibility of publicly declaring the zone within 300 yards of the shoreline a navigation Security Zone for the purposes of public safety, safe military training, and protection of nearshore natural resources.

C. Ensure public fishing and diving boats properly record and report their activities and harvest to the proper agencies.

D. Participate in monitoring programs to track the health of the marine ecosystem surrounding SCI.

1. If marine resources appear to be declining restrict the number of vessels entering Navy waters until the cause for the decline can be determined.
2. Every three years obtain and summarize harvest data for the Island to determine trends.

E. Post warning signs at the shore areas most frequently trespassed on by the public.

III. Maintain supervised access to a quality experience for boy and girl scouting groups while protecting natural resources and the military's ability to fulfill its mission.

A. Develop an environmental education program for scouts.

1. Encourage participation from on-Island, military and NRO personnel.
2. Examples of potential projects include:
    a. bird watching with NRO personnel using spotting scopes and binoculars;
    b. a bird banding demonstration from NRO personnel;
    c. fishing with Island personnel (children under the age of 16 do not require a license);
    d. tide pool or shoreline visit to view intertidal wildlife and plants.
3. Foster participation by scouts in Island nursery restoration work.

IV. Promote compatible, sustainable outdoor recreation opportunities which enhance quality of life for military personnel, while conserving natural resources, and without compromising Fleet readiness.

A. Identify and evaluate suitable outdoor recreation opportunities for installation personnel in developed areas.

B. Develop an outdoor recreation plan that includes both military personnel and public components.

1. The Plan should include wording for a Navy Instruction on outdoor recreation that includes maps of where outdoor recreation is allowed and not allowed, and whether it is permitted for the general public or military personnel and dependents only.

V. Seek strategies for compatible use, sustained yield, and overall protection of natural, cultural and outdoor recreation resources.

6.6.2 Public Outreach

The Navy's Title 10 national security mission is at times compromised by mitigation requirements and responsibilities to conserve federally listed species. Despite the clear, demonstrable benefit provided to recovery of these species by Navy management, the rationale for the allowance of impacts approved in cooperation with the USFWS under ESA consultation is questioned by the public and environmental groups. This is at least in part due to lack of understanding of what the Navy has accomplished and the circumstances under which this management takes place.

The Navy acknowledges its ESA responsibilities under Section 7(a) (1), which states that all federal agencies shall utilize their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of the ESA. "Conservation" is defined in the ESA as "to use...all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this [ESA] are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regular taking."

However, military lands cannot be set aside as permanent environmental preserves, despite ESA responsibilities. Alternative means must be sought first. The DoD must maintain the flexibility to adapt its defense mission to political and technological developments (per USDoD Instruction 4715.3, paragraph F.1.i[4]), and must not undertake a disproportionate burden in regard to other responsibilities (per DoD Instruction 4715, section 4.2.4).

With foresight and planning, future changes in military requirements can be accommodated while continuing to provide sanctuary to wildlife and plant communities. The Navy seeks to earn public confidence in its stewardship of the nation's natural heritage (USDoN SWDIV 1994a), and its adoption of the "ecosystem approach" to management (Section 1.5.1 "Ecosystem Management"). An emerging objective of natural resource programs is to gain proper public recognition of excellent stewardship and to educate the public about Navy investment in this stewardship. In addition, the Navy is an important member of the southern California land management community and can contribute much-needed experience and knowledge to the scientific community and to land managers. Public outreach may also encourage participation by outside funding sources or volunteer assistance.

- The Draft DoD Directive on Sustainable Ranges directs that programs and plans shall "institute ...coordination and outreach programs that promote sustainment of ranges and operating areas and resolution of the encroachment issue..." The Directive defines "outreach" as "the process of communicating the military mission and developing and maintaining stakeholder partnerships to ensure the continuation of mission-essential operations."

Finally, the Draft DoD Directive on Sustainable Ranges directs that programs and plans shall "institute multi-tiered (national, regional and local) coordination and outreach programs that promote sustainment of ranges and operating areas and resolution of the encroachment issue..." The Directive defines "outreach" as "the process of communicating the military mission and developing and maintaining stakeholder partnerships to ensure the continuation of mission-essential operations."

The Navy would benefit from public recognition for its natural resource conservation efforts. Public outreach may encourage participation by outside funding sources or volunteer assistance. Finally, the Navy is an important member of the southern California land management community and should be willing to share its experiences and knowledge with the scientific community.

Specific Concerns–Public Outreach

- The public has little and inadequate knowledge of the positive gains already made in ecosystem integrity through removal of feral grazers and other habitat improvement programs.
- The Navy would benefit from a public that understands the importance of the military mission and develop and maintain stakeholder partnerships to ensure the continuation of mission essential operations.
- SCI has the opportunity to be an example for successful land management in a seemingly difficult situation of combining intensive military training with responsible land stewardship.

Policy Strategy for Public Outreach

***Objective:* Improve public awareness and understanding of natural and cultural resources management for sustainable ranges and stewardship of SCI land and waters.**

I. Seek appropriate partnerships with agencies, academic institutions, and other organizations to achieve sound environmental decision-making (Section 6.5 "Beneficial Partnerships and Collaborative Resource Planning").

A. Continue regular, ongoing partnering meetings between USFWS, CDFG, and DoN representatives.

1. Update the current Navy-USFWS MOU that guides monthly meetings between the Service and Navy representatives.

B. Continue to partner and coordinate with neighboring and regional interests for mutually beneficial land use and environmental research and planning initiatives.

C. Seek mutually beneficial, inter-agency partnerships to enhance the effectiveness and ability to draw conclusions from long-term monitoring of land condition. Ensure that monitoring methods are compatible with those of other agencies, in order to draw stronger conclusion from existing information. Beneficial partners may include other military installations, FFD, USFWS, USGS, or NPS.

1. Involve military users in land and water use policies to ensure consistency with Navy programs and regulatory requirements,

- ***D.*** Support the offering of a formal conservation education program by one of the universities that services the base, in collaboration with all of the natural resource personnel that work on the Island, if such a course could be offered at no extra cost to the Navy and did not interfere with its training mission.

II. Identify and evaluate settings and forums which are suitable for enhancing community involvement, compatible with the military mission and security, as well as safety of the public.

III. Identify Audiences: federal departments and agencies, governor's councils, state legislature, state regulatory agencies, the local public, non-government agencies, Veteran's groups, Service-affiliated organizations, associated government contractors, think tanks, civic leaders, environmental groups, local media, academia, and tribal leaders.

IV. Outline themes to increase public awareness of SCI activities.

- ***A.*** Describe the objectives and results of ecosystem management on SCI property.
- ***B.*** Remind federal, state, and local regulatory agencies and the public that the Navy has been a responsible land steward, and that the sensitive species on Navy lands are carefully managed for.
- ***C.*** Broaden the internal Navy understanding that training areas are valuable parcels of land with associated airspace and seaspace vital both to training of our armed forces and ecosystem functioning.
- ***D.*** Communicate the idea of Sustainable Ranges within the context of ongoing efforts to maintain military readiness and community outreach.

V. Develop a public involvement strategy for this INRMP that coordinates local, regional and national efforts.

- ***A.*** Designate an environmental liaison to the PAO.
- ***B.*** Provide Navy personnel and those involved in sustainable range communications with information and tools to gain a better understanding of range sustainment issues and the messages needed to communicate effectively about these issues.
- ***C.*** Answer as accurately, completely, and expediently as possible inquiries from the media and the public regarding SCI's land management policies, including range values, airspace requirements, and encroachment issues.
- ***D.*** Sponsor speakers' forums and pursue speaking opportunities.
- ***E.*** Participate in the existing Channel Island monitoring work group comprised of Channel Island landowner representatives and researchers.
- ***F.*** Develop and place articles in scientific, professional, trade and general interest publications.
- ***G.*** Develop outreach, educational and communication materials to support the range and airspace stakeholder involvement program. These could include:
  1. Key messages

2. Fact sheets
3. Policies, procedures and regulations
4. News articles and newsletters
5. Brochures
6. Inputs for current training courses
7. Informational videos
8. Web-based material
9. Commanding Officer's Guides

- OPNAVINST 5090.1B states "Navy installations shall use appropriate volunteers to enhance natural resource conservation programs whenever practicable."
- "Professionally trained natural resources managers shall direct the performance of this work, following procedures and guidelines described in 10 USC 1588(a)(2)" (OPNAVINST 5090.1B).

VI. Benefit from the use of supervised community volunteers to achieve the goal and objectives of this INRMP.

A. SCI is a public resource and the public has shown interest in participating in its care. Considerable community volunteer talent, dedication, and energy could be engaged in monitoring and other activities.

B. No government agency can find sufficient funds for beneficial programs like long-term monitoring, and volunteer programs can provide high-quality, reliable data to supplement their own monitoring programs. While volunteer efforts can save money, their work often requires adequate supervision to sustain quality control. Supervisors must have adequate time and funding to oversee the volunteer programs.

1. Continue to benefit from Student Conservation Association volunteers to support needed work.

6.7 Encroachment

Specific Concerns—Encroachment

- SCI was originally chosen as a military installation because of its relative isolation from the mainland. Encroachment on the Island can directly hinder the military mission.
- The unauthorized presence of public vessels prior to or during military training activities can be costly and potentially dangerous.
- If public vessels land on the Island, associated trash and pets can have adverse effects on wildlife species.
- Numerous public enterprises rely on waters surrounding SCI for at least part of their business.

Proposed Management Strategy—Encroachment

Objective: ***Anticipate and protect against all additional encroachment on resources available for fulfilling the military mission and for protection of environmental resources.***

I. Review existing and anticipate potential conflicts of in-water uses with island activities.

A. Participate in the process for designating Marine protected Areas under the Marine Life Protection Act, led by CDFG.

II. Continue to use the SCISLAND.ORG website as an information tool for mariners.

III. Evaluate the necessity of publicly declaring the zone within 300 yards of the shoreline a navigation Security Zone for the purposes of public safety, safe military training, and protection of nearshore natural resources.

IV. Seek public recognition and support for excellent stewardship of the property.

6.8 Data Integration, Access and Reporting

Specific Concerns

- Valuable existing data are not accessible to natural resource decision makers.

Current Management

At present the NBC natural resource staff are served by desktop personal computers linked in a network and using Microsoft Windows-based software. GIS support is generally contracted out. There is currently no in-house GIS capability at CNRSW except for limited use of ARC/VIEW software.

Proposed Management Strategy—Data Integration, Access and Reporting

Objective: Ensure the technically sound, practical and appropriate use of library and computer technology to manage, analyze, and communicate natural resource information in support of management decisions.

I. Seek out existing technology and make investments in new technologies and innovative management techniques to solve environmental problems.

A. Facilitate better natural resource decisions by improving the capability to access, organize, and analyze maps, inventories, remotely-sensed data, and other natural resource planning documents.

1. Identify data needs and priorities. Document the current and future data needs for all land use functions, including why and when the information is needed, and prioritization of projects.

2. Build and catalog a library of resource materials to enhance day-to-day capability and reporting of natural resource concerns.

3. Install a centralized, 100-megabit server that can manage 100-200 gb of data to support natural resource staff.

4. Install Arc/Map on every machine, which has the advantage of an automatic, built-in cataloging feature to facilitate an organized file maintenance system.

5. Obtain training in Arc/Map for natural resource staff.

II. The GIS database (ARC/INFO) established for this Plan should be maintained to track updates on various implementation activities, such as results of resource inventories, and locations of restoration projects.

A. Distribute updated GIS layers once a year to user commands.

III. Coordinate the integration of natural resource information with mission-related planning.

A. Use site development plans (formerly called Master Plans) and information from the Regional Shore Infrastructure Program (RSIP) to integrate natural resources management objectives with mission activities and facilities development.

B. Write a policy for the sharing of SCIRC's natural resource data.

1. Control the dissemination of GIS data to persons outside NBC that may be used to justify encroachment pressures or legal challenges.

2. Develop provisions and policies for sharing appropriate natural resource information with federal and state agencies, nongovernmental organizations, researchers, and the general public (USDoD 1996).

IV. In support of daily tracking of the FDRS, shortened response time to wildland fire starts, and improving fire suppression tactics for the Battalion Chief, acquire a high-speed computer and video system at the Fire Department similar to that already in use by SSC SD.

A. Support efforts to improve the speed of computer links to the Island.

V. Strengthen the scientific basis for resource management by integrating research (USDoD 1996).

6.9 Training of Natural Resource Personnel

- Adquate training of natural resource personnel is important to the success of military sustainability and land management.

Adquate training of natural resource personnel is important to the success of military sustainability and land management. The 1998 Navy guidelines for prparing INRMPs Appendix III (page 21-Number 1-General) states that the INRMP should identify "environmental directorate training needs." OPNAVINST 5090.1B (Section 22-6.6a) requires that Navy commands develop, implement and enforce the management plan through personnel with professional training in natural resources. Natural resources programs shall support military readiness and sustainability and commands shall assign specific responsibility, provide centralized supervision and assign professionally trained personnel to the program. Natural resources personnel shall be provided an opportunity to participate in natural resource management job-training activities and professional meetings. The SAIA (Section 670g) also addresses this need, as well as DoD Instruction 4715.3 (3 May 1996) in Sections 4.1.7, 4.1.10, and 4.1.12.

Proposed Management Strategy-Training of Natural Resource Personnel

Objective: Achieve continually improving capability of natural resource staff to support military readiness, sustainable military lands, and natural resource compliance.

I. Fund job training and participation in professional meetings to enhance the capability of natural resource staff.

7.0 Implementation

7.1 INRMP Implementation

The CO has responsibility for implementation of the INRMP. The Environmental Division provides staff for implemention, and SWDIV NAVFACENGCOM provides technical assistance on request.

Policy Strategy for INRMP Implementation

***Objective:* Provide the organizational capacity, communication, planning functions, staffing, budgeting, and innovative technology support to ensure compliance with environmental laws, stewardship of natural and cultural resources, and continued use of SCI's lands by the Navy.**

I. Seek a balanced, multiple-use natural resources program through professional management (NAVFAC P-73 1987).

II. Establish a timeline during which refinement of the priorities in this Plan will be accomplished, considering scarce staff and funding, relating it to future ESA consultation needs, and while continuing those actions pursuant to BOs.

A. Consider the following management priorities identified by individual members of the Working Group (with no attempt at consensus). These priorities are not presented in any order and are more or less in individuals' own words.

1. Update the vegetation map.

2. Continue to conduct shrike release activities.

3. Expand and improve island fox monitoring to allow estimation of island population. Continue to evaluate status. Complete the Candidate Conservation Agreement.

4. Enforce reduced Island-wide speed limit to protect the island fox.

5. As the highest priority, accelerate restoration and enhancement activities, with emphasis on annual grass reduction and shrub re-establishment both within and outside of canyons. Expand the restoration program.

6. Improve efforts at erosion control. Minimize or eliminate ATV use. Incorporate improved erosion control into all road maintenance and improvement.

7. Develop and implement a propagation technique for ironwood.
8. Evaluate status and distribution of invasive ants.
9. Increase weed control.
10. Continue to refine fire management, including minimization of ignitions, rapid and effective suppression response, and use of controlled fire as a management tool.
11. Analyze why the 2001 fire acreage burned seems to be improving. What is working and what is having little effect? Is it the improvement in power lines, helicopter response, user awareness, restrictions on munitions?
12. Implement the fire management strategies in this order:
    a. firefighting helicopter,
    b. communications system improvement,
    c. fuelbreak installation and maintenance,
    d. wildland fire coordinator position, and
    e. prescribed burns for wildfire management and habitat restoration.
13. Implement the fire management strategies in this order:
    a. fuelbreak installation, and
    b. communications system improvement.
14. Implement fire management strategies in this order:
    a. firefighting helicopter,
    b. communications system,
    c. fuelbreak installation,
    d. prescribed burns,
    e. wildland fire coordinator, and
    f. grade and maintain SCI roads.
15. Implement fuelbreaks in the following order of priority: FSA I, FSA II, Missile Impact Range, Chukit Canyon, Ridge Road, and Eel Point.
16. Implement fuelbreaks in the following order of priority: FSA II, FSA I, Chukit Canyon, Northwest Harbor, Missile Impact Range, Ridge Road, Eel Point.
17. Prepare (yet another list!) showing the high-impact military activities versus the high-value natural resources by unit. The resulting list for all units should be a road map for deciding what issues should be the highest priority because they have the highest potential for conflict.
18. Finish the Fire Management Plan and integrate all the bureaucratic details. Get it done.
19. Prepare a short, one- to two-page paper outlining what the INRMP is and is not, and how it should be used by both military and natural resource managers.
20. Address issues of trigger points (such as allowable percentage disturbance for plant communities and fire return intervals) and how to set them, word them, and implement them.
21. Get lots of money!

22. Conduct studies on the effects of fire on various plant communities to determine:
    a. regrowth rate for woody species,
    b. effectiveness of weed control, and
    c. other experiments necessary to refine fire management targets and increase knowledge of fire effects on biological resources and erosion rates.
23. Noxious weed removal, at priority locations.
24. Conduct sage sparrow studies on habitat preferences and population dynamics.
25. Place additional monitoring transects in sage sparrow habitat (boxthorn).
26. Monitor ecological vital signs to:
    a. evaluate effects of military operations and adapt management to sustain goals,
    b. differentiate among regional environmental trends and human impacts,
    c. demonstrate accountability for natural resources, and
    d. guide and evaluate restoration efforts so that island managers are not "flying blind."
27. Restore native vegetation patterns and extent in order to reduce erosion and increase fog drip.
28. Prevent loss of native species.
29. Connect military operators emotionally to the Island ecosystem so they know and feel how special it is. Educate to develop sensitivity and awareness to help protect the Island.

III. Identify and ensure departments prioritize and allocate funding to support compliance requirements.

A. Funds will be requested for tasks within the INRMP, with priority given to Level 1, 2, and 3 projects in that order (Table 7-1). Examples of Level 1 projects at SCI are: protection of federal threatened and endangered animal and plant species and their habitat, like the San Clemente loggerhead shrike.

B. The Navy will implement the recommendations in the INRMP within the framework of regulatory compliance, national Navy mission obligations, anti-terrorism and force protection limitations, and funding constraints.

IV. Continue to ensure effective communication, adaptive oversight and policy leadership through the DoN Natural Resources Strategic Plan.

A. Incorporate a dynamic, continuous process for decision-making, including future changes or additions to the INRMP (DoD4715.DD-R 1996).

Table7-1. Programming and budgeting priorities for Conservation Programs.

PROGRAMMING and BUDGETING PRIORITIES FOR CONSERVATION PROGRAMS [Chief of Naval Operations (CNO) Funding Guidelines from the Program Objective Memorandum (POM) Fiscal Year 2004 Naval Environmental Requirements Guidebook]
Level 1 (Legal Requirement): Requirements derived from existing laws, regulations and EOs, which apply to Navy activities, installations, ships, aircraft, and operations. These OMB/EPA Class 0, I, or II projects/ongoing efforts include responding to applicable federal, state and local requirements (e.g. RCRA, CWA, CAA, SDWA, NEPA, TSCA; and EOs such as 12088 (Federal agency compliance), 12843 (ODS conversion/replacement), 12856 (P2 and EPCRA) and 13101 (recycling). level 1 includes overseas host nation laws and Final Governing Standards (FGS). Level 1 also includes costs of ongoing compliance, such as: manpower, training, travel and program management (OMB/EPA Class 0).
Level 2 (Navy Policy): Requirements are those derived form DoD and/or Navy policy. These projects/proposed efforts are not mandated by law or other federal, state, or local regulations/orders, but reflect implementation of Navy and DoD policy decisions and initiatives (e.g., PCB elimination).
Level 3 (Pending Regulation): Requirements derived from pending federal, state or local regulations under development (where publication is scheduled). Using, if available, model state regulation/permit standards.
Level 4 (Future Requirements): Requirements derived from future potential federal, state or local legislation. These requirements are speculative in nature.
Level 5 (Leadership Initiatives): Requirements based on local proactive Navy initiatives not mandated by law, regulation, EO or policy.

7.1.1 Organizational Enhancement, Roles and Responsibilities

Specific Concerns

- The SAIA specifically requires that there be “sufficient numbers of professionally trained natural resources management and natural resources enforcement personnel to be available and assigned responsibility” to implement an INRMP.
- There is a need to integrate natural resource management activities with SCORE scheduling and timely access for such management as operational tempos increase.
- There is logistical and organizational difficulty in accomplishing natural resource and wildland fire management objectives for natural resource protection.
- Logistical and communication deficits are pervasive, affecting the ability to accomplish tasks cooperatively among elements required to implement the INRMP.
- INRMP implementation will depend upon successful partnerships among the operations community, supporting host commands, and natural resource managers.
- INRMP implementation will depend upon successful partnerships between and NRO and contractors, universities, and others.

Current Management

Secretary of Navy Instruction (SECNAVINST) 6240.6E assigns responsibility for establishment, implementation and maintenance of the natural resources programs under the jurisdiction of the DoN to the Chief of Naval Operations. Regional command and coordination is provided by CINCPACFLT, the major claimant. SWDIV NAFACENGCOM is responsible for providing technical assistance and ensuring compliance with directives for managing natural resources found at military installations under their command through appropriate land use planning. Preparation of this INRMP helps meet these governing directives for managing natural resources through appropriate land use planning.

The chart below depicts the organizational administration of CNRSW. In most cases, the Natural Resource Program Manager makes day-to-day land use decisions. This person also has responsibility for a number of other installations, with a staff of four professionals providing assistance on SCI issues among their other duties related to installations around the Navy Region Southwest: a wildlife biologist, San Clemente loggerhead shrike program manager, botanist, and cultural resources program lead. In addition, three support staff facilitate work of the professional staff.

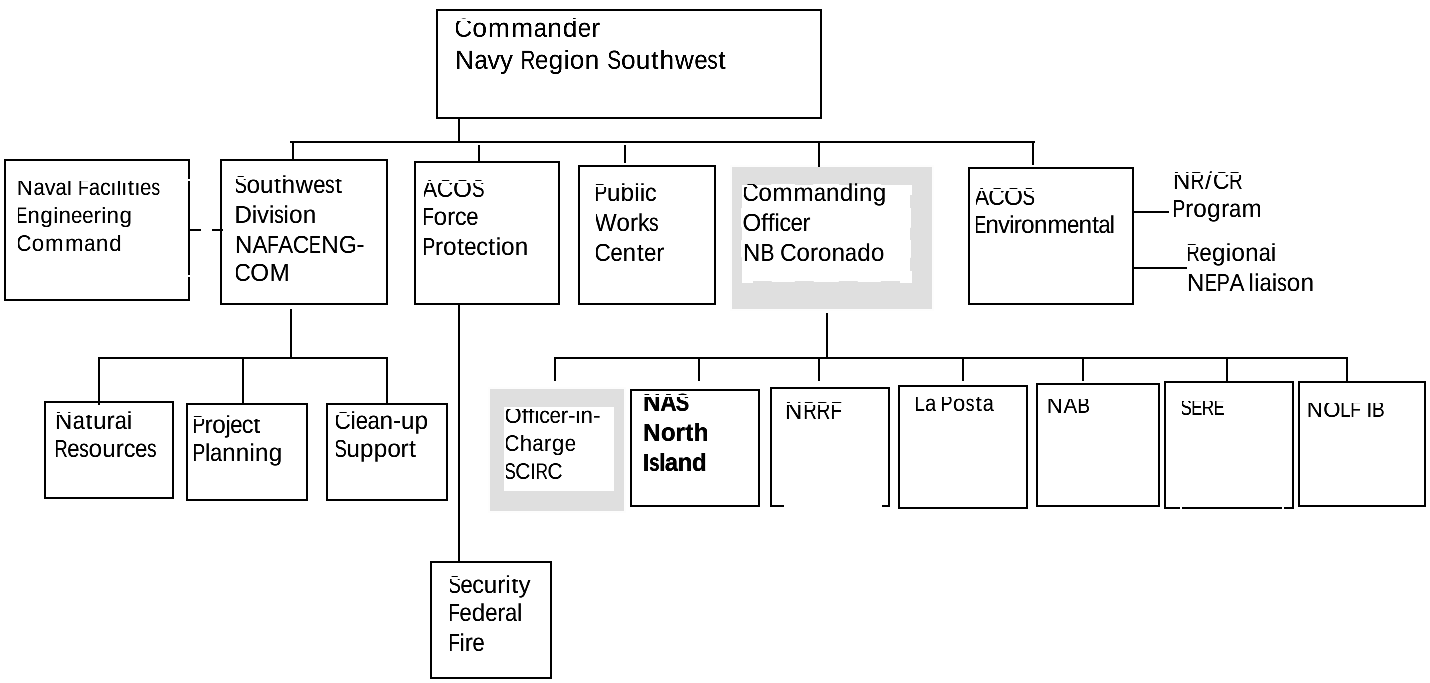

Figure7-1. Administrative organizational chart for CNRSW.

Proposed Management Strategy—Organizational Enhancement, Roles and Responsibilities

Objective: Provide the organizational capacity, support, and communication links necessary for effective implementation and daily administration of this INRMP.

I. Enhance communication among user commands and among user commands, supporting host commands, and NRO.

A. Continue the Fleet Project Team beyond the time frame of the Operations Plan EIS completion.

B. Re-think the team organization and structure to ensure the most effective and efficient way to achieve the first objective, above, once the EIS is finalized.

II. Hire a SCI Natural Resource Projects Coordinator. This person would:

- Coordinate and set objectives and priorities for natural resource projects.
- Collaborate with USFWS, CDFG, and other stakeholders on natural resource objectives and priorities.
- Facilitate logistical support for completion of natural resource projects.
- Recommend to the CO, NBC, means to improve organizational support of the natural resource program.
- Recommend to the CO, NBC, means to improve the consistent and predictable enforcement of natural resource compliance.
- Resolve conflicts among projects and between the natural resource program and other parties.
- Participate in Channel Island and other regional partnerships.
- Oversee data compilation, standardization, and availability to users and managers.
- Participate in and coordinate with the Fleet Project Team.

III. Decide where a Natural Resource Liaison billet hired within the operations community to represent user commands should reside.

A. This person should have a professional background in natural resources and conflict resolution.

IV. Hire a Wildland Fire Coordinator in the Federal Fire Department or Natural Resources.

V. Decide at what level Instructions should be re-written or written (NBC, CNRSW, or other) to enhance implementation of this INRMP and the natural/cultural resource program.

A. An Instruction should be written such that host commands, including natural and cultural resource components, are fully informed and accountable for their role and responsibility, coordinate well with each other, and core values of excellence and quality are communicated and implemented.

B. Update and implement new Instructions for implementing this INRMP already identified, including:

1. an Instruction regarding a policy to ensure no invasive species are introduced on SCI;
2. renew Instruction regarding feral animals and their control on SCI;
3. an Instruction to prevent the introduction of exotic marine and coastal species to SCI, as a first priority for control;

4. a BASH Instruction that institutes an uncomplicated bird hazard reporting system that ensures that SCI is informed of incidents no matter where pilots are based;
5. an Island-wide Instruction such that tenant users and all others that need to know are fully informed of Island rules and regulations, including fire-related ordnance and back-up support requirements, communication and coordination requirements, as well as protocols for all other activities that carry risk of fire ignition and may require fire response;
6. an Instruction for landscaping and maintenance;
7. an Instruction for use of herbicides/pesticides; and
8. a clear and concise set of environmental precautions and restrictions to be used by personnel in the form of an Instruction or a brochure and should be reviewed annually.

C. Implement the drafted Instruction on sick, injured, or dead animals.

VI. Evaluate existing MOUs periodically for consistency with the current military mission and ecosystem approach to natural resource management.

A. Update the existing memorandum of agreement between the Navy and CDFG regarding access to SCI and enforcement of state laws.

VII. Improve the reliability, consistency, and predictability of range scheduling such that natural resource personnel may complete complicated logistical tasks while minimizing interference with military activities.

7.1.2 Scheduling and Funding

Specific Concerns

- Clarification and policy are needed regarding who should fund activities that are inherently operational versus natural resource-based for short- and long-term management (Section 6.1).
- No organization has sufficient funds to accomplish sufficient long-term monitoring to guide natural resource decision-making with any certainty. Regional collaboration and pooled resources are necessary.

Some of this Plan's strategies will require special funding to implement. Some can probably be carried out through annual budgets or presently available funding sources, while others may require the creation of new sources. Sustaining adequate funding levels is always a challenge but need not be a distracting or permanent obstacle.

A list of existing funding sources that are available to institutions involved with the natural resources of the Island can be found in Table 7-2. These funds are usually available in the form of project grants and can often be obtained by agencies, academic institutions, or nonprofit organizations. Some programs are very narrow in their eligibility requirements while others are very broad. Matching funds (cash and/or in-kind) are frequently required. The level of annual funding varies considerably for each program, with national programs usually more competitive than state or local ones.

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. § 1341, et seq.

Table7-2. Available primary funding sources for plan implementation.

Source/Program	Purpose—By Category/Level of Available Funding[1]
Federal	
■ Direct appropriation	All/varies
■ Federal agencies' budgets	All/varies
■ Department of Defense—Corps of Engineers—WRDA Sec. 206 Aquatic ecosystem restoration/and Sec. 1135 project modification	2/Medium
■ Commander Naval Region Southwest budgets	All/varies
■ EPA—Clean Water Act programs	(see below: State/SWRCB/RWQCB)
■ EPA—Environmental Education Grants Program	4/Medium
■ EPA—Water Quality Cooperative Agreements (CWA Sec. 104[b][3])	1, 4, 5/High
■ Multiple—Coastal America Partnership	2, 4/Low?
■ National Sea Grant College—Aquatic Nuisance Species Program and Special Initiatives Program	4, 5/Low
■ NOAA—Ocean Resources Conservation and Assessment Program	1, 5/Low
■ NOAA—Coastal Service Center Cooperative Agreements	1, 2, 4/Medium
State	
■ SWRCB and RWQCB: CWA Nonpoint Source Grant Programs (Planning Sec. 205[j], Implementation Sec. 319 [h])	1, 2, 6/High
■ SWRCB and RWQCB: State Revolving Fund Loan Program	1, 2/High
■ Coastal Conservancy: Watershed Enhancement Program	2, 6/
■ Southern California Wetlands Recovery Project	2, 5/Medium
■ Wildlife Conservation Board:	2/High
■ Department of Education: Environmental Education Grant Program	4/?
Private	
■ National Fish and Wildlife Foundation: Challenge Grants	1, 2, 4, 5/Medium
■ Packard Foundation: Conservation Program, West Coast of North America	1, 2, 5, 6/High
■ Other Foundations, such as the local Oceans Foundation	varies/Low to High

1. Categories: 1—Management Practices and Mitigation; 2—Restoration, Enhancement and Remediation; 3—Regulation, Permitting, and Enforcement; 4—Education, Outreach and Training; 5—Monitoring, Assessments and Research; 6—Planning and Coordination. Levels of Annual Program Funding: Low=<$1 million; Medium=$1–20 million; High=>$20 million.

Proposed Management Strategy—Scheduling and Funding

Objective: ***Ensure that all avenues are investigated and sought for achieving the goals and objectives of this INRMP, for the best possible management and most efficient use of funds.***

I. Expand the funding base for natural resource projects on SCI.

A. Identify new funding sources from federal, state, local, and nonprofit organizations with an interest in achieving the goals and objectives of this Plan in partnership with NBC.

II. Highest priority funding should be accomplished within two years of a request.

III. Ensure funding requests are planned to take into consideration the seasonal requirements of biological surveys, to avoid unnecessary delays or poor survey results due to seasonality.

7.1.3 Annual Review and Management Performance Evaluation

Specific Concerns

- Adaptive management is necessary due to the uncertainty of natural resource decision making, which is always done in the context of insufficient information.
- Intensive and expensive activity related to endangered species recovery requires specialists that may have little knowledge of broader issues outside their field of expertise. Work must be facilitated but continually evaluated for its relevance and priority in relation to this INRMP's goal and objectives.

Proposed Management Strategy—Annual Review and Management Performance Evaluation

Objective: ***Continually adapt and improve the effectiveness of this INRMP for achieving the Plan's goal.***

I. Conduct an annual review of INRMP implementation in January.

A. Decide what stakeholders should participate in this review, including those involved through the NEPA process, and considering those that participated in this INRMP.

B. As part of contractual obligations, require all project managers to submit annual reports in time for this meeting.

II. Track implementation to guide and learn from past experience.

A. Derive the most benefit possible from learning and experience by documenting it and disseminating the information to others.

B. To track the progress of each of the Plan's strategies, a spreadsheet program (e.g.Paradox, Access) should be constructed and maintained. Fields can be included to help (a) build queries; (b) track progress by location, type, sponsor, year, etc.; and (c) provide different types of reports.

C. Consider developing a website for the Plan to help track implementation. Public accessibility could be allowed or controlled by way of safety and security measures implemented on the website.

7.2 Project Summary

Table7-3. Implementation Summary.

Section and INRMP pg refer-ence	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year						Projected Comple-tion Date	Esti-mated Cost	Comments on Timing, Mainte-nance, Labor, Materials, Permits, NEPA Requirements
			On-going	02	03	04	05	06			
	Threatened/Endangered Species Management										
4.5.3	INL management plan	1/ESA	X								complete as required by the INL BO
4.5.3	INL population surveys in the INLMA	1/ESA	X								should be con-ducted every five years
4.5.3	Annual INL report (quantify cumulative area impacted by construction and/or operations; report take)	1/ESA	X								required by BO
4.5.3	INLMA invasive plant species surveys and control	1/ESA	X								required by BO
3.5.2.2/ 4.5.3	INLMA unused road closure and restoration	1/ESA	X								especially fishing area access roads
4.5.4	Loggerhead shrike captive breeding program	1/ESA	X								
4.5.4	Loggerhead shrike predator control	1/ESA	X								mostly feral cats and rats; also SCI fox and raptors
4.5.4	Loggerhead shrike reintroduction	1/ESA	X								
4.5.4	Loggerhead shrike monitoring program	1/ESA	X								
	a) continually monitor during breeding season										
	b) Island wide surveys every 3 months during non-breeding season										
	c) monitor during firebreak installation										
4.12	Loggerhead shrike habitat restoration	1/ESA									

Table7-3. Implementation Summary. (Continued)

Section and INRMP pg refer-ence	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year						Projected Comple-tion Date	Esti-mated Cost	Comments on Timing, Mainte-nance, Labor, Materials, Permits, NEPA Requirements
			On-going	02	03	04	05	06			
4.5.4	Loggerhead shrike ecology research	1/ESA	X								need better under-standing of habi-tat requirements
4.4.4	Loggerhead shrike incidental take permit	0/ESA									
4.5.4	Sage sparrow monitoring	1/ESA	X								
4.5.4	Sage sparrow predator control	1/ESA	X								mostly feral cats and rats
4.5.4	Sage sparrow core habitat id and delineation (these areas may need some level of protection from military operations)	1/ESA			X						provide sufficient habitat and buffer to sustain popula-tion numbers
4.12	Sage Sparrow habitat restoration	1/ESA									
4.1.2/ 4.5.4	Sage sparrow habitat sustainability index model	2/ESA			X						
4.5.4	Sage sparrow management plan					X					develop and incorporate into INRMP
4.4.7	Island fox Candidate Conservation Agreement	3/ESA									develop and implement
4.5.5	Western snowy plover monitoring surveys	2/ESA	X								conducted biannually
	a) additional monitoring required prior to hover-craft landings										
4.5.9	Participate in white abalone recovery planning	2/ESA		X							
3.5.2.7	Participate in white abalone surveys	2/ESA	X								participated in 2000
4.5	Protect listed plant species	1/ESA	X								
4.10.2	Programmatic BA for all listed species (consider routine maintenance & operations)	1/ESA					X				use INRMP, EIS, and completed studies to develop

Table7-3. Implementation Summary. (Continued)

Section and INRMP pg reference	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year						Projected Completion Date	Estimated Cost	Comments on Timing, Maintenance, Labor, Materials, Permits, NEPA Requirements
			On-going	02	03	04	05	06			
several	Evaluate all new activities for potential impacts to federally listed species at a minimum	1/ESA/NEPA	X								
	Wildlife Inventory and Management										
4.5.2	Baseline invertebrate survey	1/SAIA			X						special emphasis on ants and endemics
4.5.3	Baseline amphibian survey	1/SAIA				X					
4.5.4	Bird monitoring program	2/ESA/EO					X				MAPs station or breeding bird survey
4.5.7	Baseline bat survey	1/SAIA						X			
4.24.1	Baseline small mammal survey	1/SAIA					X				
4.5.7	SCI fox radio-telemetry study	1/ESA	X								tied to shrike predator control
3.5.2.3	Raptor surveys	1/ESA	X								tied to shrike predator control
3.5.2.3	Raptor Management Plan	1/ESA			X						tied to shrike predator control
4.8	BASH program	0/ DoD & Navy Instruct.			X						design and implement as described in INRMP
5.0	Limit access to pinniped haul outs and rookeries during breeding season (prevents stampeding and trampling of pups)	1-2/MMPA	X								breeding season May through August
	Pest Management										
4.5.2	Argentine ant surveys and control	2/EO13112				X					

Table7-3. Implementation Summary. (Continued)

Section and INRMP pg refer-ence	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year						Projected Comple-tion Date	Esti-mated Cost	Comments on Timing, Mainte-nance, Labor, Materials, Permits, NEPA Requirements
			On-going	02	03	04	05	06			
	a) if present determine the distribution on scope of the problem										
	b) develop inspection criteria for equipment, building materials, soil, landscaping plants, etc.										
	c) develop and implement a control strategy with sensitive species in mind										
4.7	Island wide feral cat and rat control (spot man-agement can only be partially effective)	1/ESA			X						eliminate feeding sources as first step
4.6	Marine invasives control policy	2/NISA/ EO13112			X						
	a) develop a brochure or instruction with infor-mation on how to ID marine invasives and how to report them										post on website
	b) provide training to key personnel										
	c) inspect all vessels and marine gear										
	d) continue to implement NASNorth Island Instruction										
4.1/4.6 4.24.1	Island wide invasive plant species control	2/ESA/ EO13112 Federal Nox-ious Weed Act of 1974	X	X							
	a) survey for invasives (exotic) species										
	b) update list of exotic species on Island										
	b) prioritize for removal										
	c) determine appropriate method of removal										
	d) implement removal program										

Table7-3. Implementation Summary. (Continued)

Section and INRMP pg reference	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year						Projected Completion Date	Estimated Cost	Comments on Timing, Maintenance, Labor, Materials, Permits, NEPA Requirements
			On-going	02	03	04	05	06			
	e) implement methods to control introduction or reintroduction from off Island										i.e. use only SCI Nursery grown native plants, periodic monitoring surveys
	Pest Management Plan update	2/SAIA/ OPNAVINST			X						update so compatible with INRMP
	Sensitive Plant/Habitat Management										
4.1	Sensitive plant species propagation study (develop propagation techniques)	2/ESA/SAIA			X						emphasis on oaks and ironwood
4.1.1	Determine age of oak groves					X					
4.1.1	Determine microsite needs and achieve oak and ironwood seedling establishment						X				
4.1.1	Oak and ironwood outplanting experiment							X			
4.1.3/ 4.13	Boxthorn Restoration Plots	2/ESA/SAIA					X				
4.12	Native grass restoration	3/SAIA									
4.12	Island oak reforestation	3/SAIA									
4.1.3/ 4.13	Island Tree Mallow Restoration	3/SAIA						X			experiment with restoring to historic locations
4.5.1	Maintain accurate and updated lists of listed and endemic plant species and voucher specimens				X						
	Wildland Fire Management										
4.9	SCI Fire Management Plan	1/ESA		X							complete and implement
	a) adopt fire management units										
	b) adopt fire danger rating system										

Table7-3. Implementation Summary. (Continued)

Section and INRMP pg reference	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year						Projected Completion Date	Estimated Cost	Comments on Timing, Maintenance, Labor, Materials, Permits, NEPA Requirements
			On-going	02	03	04	05	06			
	c) maintain RAWS fire weather stations for consistent information										
	d) create and maintain firebreaks as needed										work with USFWS
	e) develop effective presuppression treatments										test effectiveness of fire retardants and prescribed burns
	f) build fire fighting assets - including equipment and personnel										
	g) improve radio and telephone communications										
	h) record all fires by mapping boundaries and fire intensity										
4.1/4.6	Prescribed fire burns (must be carefully evaluated and planned due to T/E species issues)	1/ESA				X					to control fuel load, reduce exotic species, and restore vegetation communities
4.9	SCI fire management instruction	1/ESA		X							ensure wide distribution
4.9/4.18	Upgrade Fire Departments tracking system (model off of SSC SD's system)	0/ESA		X							
4.9/6.4.2	Wildland Fire Manager position	0		X							
4.9	Seasonal Fire Fighter positions	0		X							
	Wetlands										
3.4.13	COE jurisdictional waters & wetlands survey and mapping	1/CWA/SAIA		X							project has been initiated but needs additional funds

Table7-3. Implementation Summary. (Continued)

Section and INRMP pg reference	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year						Projected Completion Date	Estimated Cost	Comments on Timing, Maintenance, Labor, Materials, Permits, NEPA Requirements
			On-going	02	03	04	05	06			
	Protect vernal pools and salt marsh for sedimentation (erosion control) and invasive species	1/CWA/ EO11990		X							
	Marine Nearshore Habitat Inventories and Management										
4.1.14/ 4.5.9/ 4.24.1	Intertidal monitoring with the Multi-Agency Resources Integrated Network Effort (MARINE).	1/SAIA		X							
4.1.15/ 4.24.1	Kelp forest subtidal surveys (partner with NPS)	1/SAIA/ESA			X						Partnering can reduce cost of surveys
	Integrated Ecological Surveying, Restoration and Monitoring										
4.1/4.5 4.24.1	Vegetation Map Update	2/ESA			X						
	a) update plant community boundaries based on long term vegetation monitoring plots										communities have been changing rapidly since feral goat removal
	b) revise plant community descriptions to reflect new composition										
4.1/ 4.24.1	Long Term Vegetation (LCTA) Monitoring Plots (read periodically, establish new plots as necessary)	2/ESA	X								should be read every 5-7 years, may need photographic monitoring in some areas
4.1.8/ 4.13	Grassland restoration plots	2/SAIA						X			
4.4	Special Emphasis Area Designations	1-3 ESA/SAIA					X				ID and protect
	Soil Erosion Prevention and Management										needed for ongoing habitat recovery

Table7-3. Implementation Summary. (Continued)

Section and INRMP pg refer-ence	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year						Projected Comple-tion Date	Esti-mated Cost	Comments on Timing, Mainte-nance, Labor, Materials, Permits, NEPA Requirements
			On-going	02	03	04	05	06			
4.10	SCI Erosion Control Program	1-2 CWA/ESA/SCA/SAIA/EOs		X							develop and incorporate into future INRMPs and Master Plans
	a) develop or adopt construction and mainte-nance BMPs										
	b) ensure BMPs are incorporated into all site fea-sibility studies, project planning, design, con-struction, & maintenance contracts and practices										
	c) ID erosion sources and erosion control problem areas										areas of high dis-turbance, areas of high runoff, etc.
	d) prioritize erosion control efforts										
	e) stabilize or correct problem areas using sound BMPs										may require struc-tures and/or revegetation/res-toration with native plants
	f) minimize road proliferation										ID necessary roads and keep well maintained
	g) monitor success of erosion control efforts and adjust methods and BMPs										
	Landscaping and Grounds Maintenance										
4.10/ 4.13/ 4.15	SCI native plant nursery (use for landscaping, restoration, T/E species propagation work)	2/ESA/ EO11987	X								fund annually as is fundamental to program
4.15	BEAP update (make sure that it lists native spe-cies or proven non-invasives for landscaping and outlines efficient irrigation practices)	2/EO11987/ EO12902 EO13112			X						usually funded outside of natural resources

Table7-3. Implementation Summary. (Continued)

Section and INRMP pg reference	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year						Projected Completion Date	Estimated Cost	Comments on Timing, Maintenance, Labor, Materials, Permits, NEPA Requirements
			On-going	02	03	04	05	06			
4.15	Implement INRMP landscape maintenance recommendations	2/EO11987/ EO12902									
	Outdoor Recreation										
4.16	SCI outdoor recreation instruction	1/SAIA			X						
	a) clearly delineate areas available for and areas off-limits to outdoor recreation										areas with federally listed species should be off-limits
	b) provide maps of these areas in instruction										
	c) define acceptable outdoor recreation activities										
4.16	SCI outdoor recreation brochure	2/SAIA/ESA				X					
	a) should incorporate maps from instruction										
	b) list acceptable and unacceptable activities										
	c) provide information about natural resources and Island history										
	Conservation Awareness/Environmental Instruction										requirement of BOs
4.17	Natural/Cultural resource instruction and/or environmental precautions manual	1/SAIA/ESA		X							create or update, and ensure widest distribution
3.5.2/ 4.17	Natural/Cultural resources briefing and materials (all military & civilian personnel and contractors must receive a briefing on T/E issues)	1/ESA		X							slide show, videos, brochures, species ID cards, etc.
4.17/ 6.4.2	SCI military mission overview & safety video (require new natural resources personnel & contractors to view)	0			X						aide new workers in understanding schedules, regulations, and safety issues
4.12	Demonstration garden	3/SAIA									

Table7-3. Implementation Summary. (Continued)

Section and INRMP pg reference	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year						Projected Completion Date	Estimated Cost	Comments on Timing, Maintenance, Labor, Materials, Permits, NEPA Requirements
			On-going	02	03	04	05	06			
4.17	Beach clean-up day	3/SAIA									make an annual volunteer event
4.17	Interpretive Signs	3/SAIA									
	Land Use and Environmental Planning										
6.1	1. Conduct Environmental Quality Assessments annually	0/all applicable									
	2. Conduct ECE every three years	0/all applicable									
6.2	3. Incorporate NEPA planning early in the project review process a) assess the environmental consequences of each proposed action b) design user friendly NEPA forms	1/NEPA									
6.2	4. Ensure NEPA documentation is current for all activities	1/NEPA	X								
6.4.2	5. Retain the Fleet Project Team (provides organizational & communication links needed to implement the INRMP)	1/SAIA		X							
6.4	6. Program funding for INRMP revisions	1/SAIA						X			
	Information Management										
4.24.1	Build and catalog a library of resource materials and SCI reports, studies & surveys	2/ESA									
4.24.1	Data quality review (review past report data for quality and determine if it should be integrated into the management program)	2/ESA									data has been collected but not analyzed
4.24.1	Historic Imagery Library (collect historic aerial photographs and satellite imagery for SCI)	2/ESA									
4.24.1	SCI Aerial Photographs (whole Island)	2/ESA/SAIA/SCA									new sets should be obtained every 5-7 years

Table7-3. Implementation Summary. (Continued)

Section and INRMP pg refer-ence	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year On-going	02	03	04	05	06	Projected Comple-tion Date	Esti-mated Cost	Comments on Timing, Mainte-nance, Labor, Materials, Permits, NEPA Requirements
6.4.4	SCI GIS system and database (build & maintain)	0-1 ESA/SAIA			X						build on ARCinfo database created for this INRMP
	Access and Encroachment										
4.1.9/ 4.1.10	Restrict access to active and stable dunes	2 NHPA/SAIA	X								sensitive species and cultural resources present
4.5.7	Warning signs or website message (warning boaters not to bring dogs onshore)			X							bring diseases that could wipe out SCI fox
4.21	Consider declaring 300 yards off the shoreline a navigation Security Zone					X					
	Cultural Resources Management										
4.22	Ensure that natural resources projects do not impact cultural resources (i.e. fire presuppression activities)	1/NHPA		X							coordinate with Archeologist
4.22	Support ICRMP	1 NHPA/ARPA		X							
	Mission Support										
6.4.2	SCI Natural Resource Projects Coordinator posi-tion	0/SAIA		X							
6.4.2	Natural Resources Liaison position	0/SAIA		X							
6.4.2	Revise instructions to provide guidance in imple-menting INRMP	1/SAIA/ESA		X							
4.5.9/ 6.3	Participate in regional conservation and eco-system planning efforts	2/SAIA/ESA		X							provide represen-tative to Channel Islands Science Panel
6.1	Natural resources training for key personnel	0/SAIA		X							

Table7-3. Implementation Summary. (Continued)

Section and INRMP pg reference	Project or Activity	Class/Driver (NEPA requirement)	Possible Implementation Year						Projected Completion Date	Estimated Cost	Comments on Timing, Maintenance, Labor, Materials, Permits, NEPA Requirements
			On-going	02	03	04	05	06			
6.3	Encourage partnerships with other agencies and DoD mandated programs (PIF)	3/DoD Dir Navy Instruction									provides opportunities for cost sharing
4.20	Encourage volunteer efforts to support conservation programs where practicable	3/DoD Dir Navy Instruction									provides additional manpower & benefits public relations

Notes:

Class I Compliance Projects being funded through the POM process should be addressed first, as they are must funds. Class II, III, and IV Projects, and Projects funded with forestry, agricultural outlease, fish and wildlife, Legacy, or other fund sources, which are stewardship-type projects, should be listed next.

Refer to the Navy Environmental Requirements Cookbook, Chapter 12, Natural Resources Requirements.

Most projects listed here will not require further NEPA documentation as they will be covered under the EA/EIS prepared for the INRMP. Other projects not specifically addressed in the INRMP, or modified projects, will usually be closely enough related to the INRMP that they can be Categorically Excluded. Only in very special circumstances will an individual natural resources project require its own EA or EIS.

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Appendix A: Acronyms

Acronym	Identification
AAV	Amphibious Assault Vehicle
ACOS	Assistant Chief of Staff
AMSL	Above Mean Seal Level
ASBS	Area of Special Biological Significance
ASUW	Anti-surface Warfare
ASW	Anti-submarine Warfare
ATCT	Air Traffic Control Tower
ATG	Amphibious Task Group
ATGPAC	Afloat Training Group Pacific
BA	Biological Assessment
BEQ	Bachelor Enlisted Quarters
BL&P	Blind, Loaded and Plugged
B.P.	Before present
BUDS	Basic Underwater Demolition School
CAA	Clean Air Act
CalCOFI	California Cooperative Oceanic Fisheries Investigation
CAS	Close Air Support
CATS	Consolidated Area Telephone System
CCMP	California Coastal Management Plan
CDFG	California Department of Fish and Game
CEQ	Council of Environmental Quality
CG	Guided-missile Cruiser
CGN	Nuclear-powered Guided-missile Cruiser
CINCLANTFLT	CINC Atlantic Fleet
CINCPACFLT	Commander-in-Chief U.S. Pacific Fleet
CINCUSSOCOM	CINC US Special Operations Command
CMC	Commandant Marine Corps
CNO	Chief of Naval Operations
CNRSW	Commander Navy Region Southwest
CNSWG 1	Commander Naval Special Warfare Group One
CO	Commanding Officer
COMCARGRU ONE	Carrier Group ONE
COMEODGRU ONE	Commander Explosive Ordnance Disposal Group One
COMEWTGPAC	Expeditionary Warfare Training Group Pacific
COMMARFORPAC	Commander U.S. Marine Corps Forces Pacific
COMNAVAIRPAC	Commander Naval Air Forces U.S. Pacific Fleet
COMNAVBASE	Commander Naval Bases San Diego
COMNAVFACENGCOM	Commander Naval Facilities Engineering Command
COMNAVSPECWARCOM	Commander Naval Special Warfare Command
COMNAVSUBPAC	Commander Naval Submarine Forces U.S. Pacific Fleet
COMNAVSURFPAC	Commander Naval Surface Forces U.S. Pacific Fleet
COMSUBPAC	Submarine Forces Pacific
COMTHIRDFLT	Commander Third Fleet
COMTRAPAC	Commander Training Command U.S. Pacific Fleet
CRUDESGRU	Cruiser-Destroyer Group
CVBG	Aircraft Carrier Battle Group
CWA	Clean Water Act
CZARA	Coastal Zone Act Reauthorization Amendments
CZMA	Coastal Zone Management Act
DASN I&E	Deputy Assistant Secretary of the Navy for Installations and the Environment
DD	Destroyer
DDG	Guided-missile Destroyer
DEM	Digital Elevational Model

Acronym	Identification
DESRON	Destroyer Squadron
DoD	Department of Defense
DRSV	Deep Submergence Rescue Vehicle
DZ	Drop Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ERGM	Extended Range Guided Munition
ESA	Endangered Species Act
EW	Electronic Warfare
EWTGPAC	Expeditionary Warfare Training Group, Pacific
FAA	Federal Aviation Administration
FACSFAC	Fleet Area Control and Surveillance Facility
FAR	Federal Aviation Regulations
FCLP	Field Carrier Landing Practice
FDRS	Fire Danger Rating System
FE	Federally listed endangered
FFD	Federal Fire Department
FIWC	Fleet Information Warfare Command
FMF	Fleet Marine Force
FMFPAC	Fleet Marine Force Pacific
FO	Forward Observer
FORACS	Fleet Operational Readiness Accuracy Check Site
FSC	Federal species of concern
FSCEX	fire Support Coordination Exercise
FT	Federally listed threatened
FXP	Fleet Exercise Publication
GIS	Geographic Information Systems
GPRA	Government Performance and Results Act
ha	hectare
HC	Helicopter Combat Support Squadron
HE	High Explosive
HMMWV	High Mobility Medium Wheeled Vehicle
HQTRS	Headquarters
IHA	Incidental Harassment Authorization
I MEF	First Marine Expeditionary Force; a Three-Star General
INRMP	Integrated Natural Resource Management Plan
INS	Immigration and Naturalization Service
IR	Installation Restoration
ISSA	Intra-service Support Agreement
JSOC	Joint Special Operations Command
JSOW	Joint Stand-off Weapon
JTFEX	Joint Task Force Exercises
LAV	Light Armored Vehicle
LCAC	Landing Craft Air Cushions
LCTA	Land Condition Trend Analysis
LCU	Landing Craft Units
LHA	Amphibious Assault Carrier
LOA	Letter of Authorization
MARFORPAC	Marine Forces Pacific
MARINE	Multi-Agency Resources Integrated Network Effort
MAROPS	Maritime Operations
MBTA	Migratory Bird Treaty Act
MCM	Mine Countermeasures
MDS	Maritime Desert Scrub

Acronym	Identification
MEF	Marine Expeditionary Force
MIR	Missile Impact Range
MLLW	Mean Lower Low Water
mmpa	Marine Mammal Protection Act
MOU	Memorandum of Understanding
MOUT	Military Operations in Urban Terrain
mph	miles per hour
MPRSA	Marine Protection, Research, and Sanctuaries Act
MWR	Military Welfare and Recreation
NAF	Naval Air Facility
NALF	Naval Auxiliary Landing Field
NALF SCI	Naval Auxiliary Landing Field San Clemente Island
NASNI	Naval Air Station, North Island
NAS	Naval Air Station
NATACMS	Navy/Army Tactical Missile System
NAVFACENGCOM	Naval Facilities Engineering Command
NAVMEDCLINIC	Navy Medical Clinic
NAVSEA	Naval Sea Systems Command
NAVSEASYSCOM	Naval Sea Systems Command
NAVSPECWARCEN	Naval Special Warfare Center
NAVSPECWARCOM	Naval Special Warfare Command
NAVSPECWARDEVGRU	Special Warfare Development Group
NAVSPECWARGRUONE	Naval Special Warfare Group ONE
NAVSTA	Naval Station
NBC	Naval Base Coronado
NCEA	Non-Combat Expenditure Allocation
NCLP	Night Carrier Landing Practice
NEP	National Estuary Program
NEPA	National Environmental Policy Act
NEX	Naval Exchange
NGFS	Naval Gunfire Support
NIIMS	National Interagency Incident Management System
NM	Nautical Miles
NMC	Naval Medical Center
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOTS	Naval Ordnance Testing System
NPDES	National Pollution Discharge Elimination System
NRAD	Naval Command, Control and Ocean Surveillance Center Research, Development, Test and Evaluation Division
NRCS	Natural Resource Conservation Service
NRO	Natural Resources Office
NSWC	Naval Special Warfare Center
NSWG 1	Naval Special Warfare Group One
NUC	Naval Undersea Center
NUWC	Naval Undersea Warfare Command
NWAS	Naval Warfare Assessment Station
NWS	Naval Weapons Station
OCE	Officer Conducting Exercise
OIC	Officer-in-Charge
OIC NALFSCI	Officer-in-Charge San Clemente Island
OMP	Operations Management Plan
OP	Observation Post
OPAREA	Operating Area
OPNAVINST	Operational Navy Instruction
PAH	Polynuclear aromatic hydrocarbons

Acronym	Identification
POW	Prisoner of War
PWC	Public Works Center
RAWS	Remote Automated Weather Station
RDT&E	Research, Development, Test and Evaluation
REWS	Radar/Electronic Warfare Simulator
ROC	Range Operations Center
RSO	Range Safety Officer
RWQCBQ	Regional Water Quality Control Board
SACEX	Supporting Arms Coordination Exercise
SAIA	Sikes Act Improvement Act
SCCAT	Southern California Caulerpa Action Team
SCCWRP	Southern California Coastal Water Research Project
SCE	Staff Civil Engineer
SCI or Island	San Clemente Island
SCIRC	San Clemente Island Range Complex
SCIUR	San Clemente Island Underwater Range
SCORE	Southern California Offshore Range
SE	State-listed endangered
SEAD	Suppression of Enemy Air Defenses
SEAL	Sea, Air and Land Service
SFCP	Shore Fire Control Party
SHOBA	Shore Bombardment Area
SAM	Surface-to-Air Missile
SOAR	Southern California ASW Range
SOP	Standard Operating Procedure
SWDIVNAVFACENGCOM	Southwest Division Naval Facilities Engineering Command
SPAWARSYSCEN	Space and Naval Warfare Systems Command Systems Center
SPECBOATRON ONE	Special Boat Squadron ONE
SPECWAR	Special Warfare
spp.	Species
SSC SD	SPAWAR Systems Center San Diego
ssp.	Subspecies
ST	State-listed threatened
STS	Sonobouy Tracking Station
SWATS	Sea-based Weapons and Advanced Tactics School, Pacific
SWATSCOLPAC	Sea-based Weapons and Advanced Tactics School, Pacific
SWDIV	Southwest Division
SWRCB	State Water Resources Control Board
TACP	Tactical Sir Control Party
TAR	Training Areas and Ranges
T&E	Test and Evaluation
TERF	Terrain Flight
TORPFAC	Torpedo Facility
USACOE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USDoD	United States Department of Defense
USDoN	United States Department of the Navy
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
USN	United States Navy
var.	variety
VDS	Variable Depth Sonar
VSW	Very Shallow Water

Acronym	Identification
VTNF	Variable time non-fragmenting
WP	White Phosphorus
1ST MARDIV	First Marine Division
1ST SRIG	First Surveillance, Reconnaissance, and Intelligence Group
3RD MAW	Third Marine Air Wing

Appendix B: Comprehensive Species List

This species list is divided between faunal and floral species. Within the faunal list there is a further division between vertebrates and invertebrates. There are still many unknowns in regard to the insects and marine organisms. However, the reptile, bird, and mammal species are well known and documented. The floral list is also comprehensive, but the status and vegetative communities for many species may need to be updated in the future as SCI recovers from the damage caused by domestic and feral goats over the last hundred years.

Faunal List

The faunal list is a compilation of several sources and disciplines ranging in date from the 1970s through 2000. Most of these reports draw from data collected during that time period; however at least one report, a species list of avifauna, contains records from the turn-of-the-century onward. Bird names, both scientific and common, are from the American Ornithologists Union (AOU) Checklist of North American Birds (AOU web page: www.aou.org/aou/birdlist.html, September 2001), except in the case of subspecies.

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Floral List

Unless otherwise denoted the terrestrial plant species were taken from a list of SCI vascular plants created by Jennifer Stone at NAS North Island. Her list is a compilation of Tim Ross's list (1992, 1995). The marine plant species are a compilation of species from three different reports:

Cohen n.d.

Murray *et al.* 1978

Sims 1974

The lichen species are a compilation from two different reports:

Bowler *et al.* 1996

Bratt 1999

Symbols

Federal and State Codes

FE = Federally listed endangered

FT = Federally listed threatened

FC2 = Former Federal Candidate 2 Species

FSC = Federal species of concern

SE = State-listed endangered

ST = State-listed threatened

CSC= State species of concern

FP = Fully Protected (CDFG)

California Native Plant Society's Code

1A = Presumed extinct in California

1B = Rare or endangered in California and elsewhere

2 = Rare or endangered in California, more common elsewhere

3 = Plants for which more information is needed

4 = Plants of limited distribution - Watch List

Bird Status

Br = Breeds on Island

Tr = Transient, found during migration

Wr = Winter resident

Yr = Year-round resident

* = Non-native species

FLORA

TAXON		
sensitivity status	**scientific name**	**common name**
MARINE ALGAE		
	Cyanophyta	blue-green algae
		blue-green algae
		colonial blue-green algae
	Chlorophyta	green algae
	Chaetomorpha linum	
	Chaetomorpha spiralis	
	Cladophora graminea	
	Cladophora microcladioides	
	Cladophora trichotoma	
	Cladophoropsis fasciculatus	
	Codium fragile	
	Enteromorpha sp.	
	Ulva californica	
	Phaeophyta	brown algae
	Colpomenia sinuosa	
	Coilodesme rigida	
	Cylindrocarpus rugosa	
	Dictyopteris undulata	
	Dictyota flabellata	
	Ectocarpus spp.	
	Egregia laevigata	
	Egregia menziesii	
	Eisenia arborea	
	Endarachne binghamiae	
	Halidrys dioica	
	Hesperophycus harveyanus	
	Hydroclathrus clathratus	
	Macrocystis pyrifera	
	Pachydictyon coriaceum	
	Pelvetia fastigiata f. *gracilis*	
	Petalonia fascia	
	Petrospongium rugosum	
	Pseudolithoderma nigra	
	Ralfsia sp.	
	Sargassum agarhianum	
	Sargassum palmeri	
	Scytosiphon dotyi	
	Scytosiphon lomentaria	
	Zonaria farlowii	
	Rhodophyta	red algae
	Acrosorium uncinatum	
	Anisocladella pacifica	
	Bossiella orbigniana ssp. *dichotoma*	
	Callithamnion pikeanum	
	Callithamnion rupicolum	
	Carpopeltis divaricata	
	Centroceras clavulatum	

TAXON		
sensitivity status	**scientific name**	**common name**
	Ceramium sp.	
	Ceramium eatonianum	
	Chondria sp.	
	Corallina chilensis	
	Corallina vancouveriensis	
	Cryptopleura corallinara	
	Cryptopleura crispa	
	Endocladia muricata	
	Erythrocystis saccata	
	Gastroclonium coulteri	
	Gelidium coulteri	
	Gelidium nudifrons	
	Gelidium purpurascens	
	Gelidium pusillum	
	Gelidium robustum	
	Gigartina.canaliculata	
	Gigartina spinosa	
	Haliptylon gracile	
	Herpodiphonia plumula	
	Herpodiphonia tenella	
	Herpodiphonia verticillata	
	Hydrolithon decipiens	
	Jania tenelta	
	Laurencia pacifica	
	Laurencia snyderae	
	Laurencia spectabilis	
	Lithophyllum decipiens	
	Lithophyllum proboscideum	
	Lithothamnium sp.	
	Lithothrix aspergillum	
	Melobesia mediocris	
	Nemalion helminthoides	
	Ophidocladus califronica	
	Peyssonellia sp.	
	Plocamium cartilagineum	
	Plocamium coccineum var. *pacificum*	
	Plocamium violaceum	
	Porphyrella californica	
	Pterocladia capillacea	
	Pterosiphonia baileyi	
	Pterosiphonia dendroidea	
	Rhodoglossum affine	
	Rhodemia californica f. californica	
	Rhodymenia pacifica	
	Schizymenia pacifica	
	SPERMATOPHYTA	
	Phyllospadix torreyi	
LICHENS		
	Acarospora carnagiel	

TAXON		
sensitivity status	**scientific name**	**common name**
	Acarospora fuscata	
	Acarospora schleicheri	
	Acarospora smaragdula	
	Amandinea punctata	
	Aspicilia caesiocinerea	
	Aspicilia calcarea	
	Aspicilia cinarea	
	Aspicilia contorta	
	Buellia cerussata	
	Buellia halonia	
	Buellia oidalea	
	Buellia retrovertens	
	Buellia turgescens	
	Caloplaca bolacina	
	Caloplaca californica	
	Caloplaca catalinae	
	Caloplaca cerina	
	Caloplaca coralloides	
	Caloplaca epithaillna	
	Caloplaca ferruginea	
	Caloplaca ignea	
	Caloplaca luteominia	
	Caloplaca oregona	
	Caloplaca rosei	
	Caloplaca saxicola	
	Caloplaca stanfordensis	
	Caloplaca stantonii	
	Candelariella coralliza	
	Candelariella rosulans	
	Candelariella vitellina	
	Catillaria columbiana	
	Chrysothrix candelaris	
	Cladonia pyxidata	
	Cladonia scabriuscula	
	Dendrographa leucophaea	
	Dendrographa alectoroides	
	Dermatocarpon miniatum	
	Dimelaena radiata	
	Dimelaena thysanota	
	Diploicia canescens	
	Diploschistes actinostomus	
	Diploschistes scruposus	
	Dirina catalinariae catalinariae	
	Dirina catalinariae sorediata	
	Endocarpon pusillum	
	Endocarpon prunastri	
	Evernia prunastri	
	Flavoparmelia caperata	
	Flavopunctelia flaventior	
	Flavopunctelia soredica	

TAXON		
sensitivity status	**scientific name**	**common name**
	Fuscopannaria leucophaea	
	Fuscopannaria praetermissa	
	Heppia lutosa	
	Heterodermia erinacea	
	Heterodermia leucomelos	
	Lecanactis dimelaenoides	
	Lecania brunonis	
	Lecania dudleyi	
	Lecania neegelii	
	Lecanographa hypothallina	
	Lecanora caesiorubella Ach. ssp. *merrillii*	
	Lecanora demissa	
	Lecanora gangaleoides Nyl. sensu	
	Lecanora meridionalis	
	Lenora horiza	
	Lecanora muralis	
	Lecanora rupicola	
	Lecanora subcarnea	
	Lecanora xanthosora	
	Lecidea mannii	
	Lecidella asema	
	Leprocaulonmicroscopicum	
	Leptochicium albociliatum	
	Leptogium californicum	
	Leptogium lichenoides	
	Lichenothelia tenuissima	
	Lichinella nigritelia	
	Lichinella stipatuis	
	Melanelia fuliginosa	
	Mobergia angelica	
	Neofuscelia verruculifera	
	Nephroma parile	
	Niebla cepalota	
	Niebla ceruchis	
	Niebla ceruchoides	
	Niebla dissecta	
	Niebla homalea	
	Niebla isidiascens	
	Niebla laevigata	
	Niebla laminaria	
	Niebla procera	
	Niebla robusta	
	Niebla soradiata	
	Niebla sorocarpia	
	Niebla testudinaria	
	Opegrapha brattiae	
	Parmelia sulcata	
	Parmotrema chinense	
	Parmotrema hypoleucinum	
	Parmotrema stuppeum	

TAXON		
sensitivity status	**scientific name**	**common name**
	Peltula amphalize	
	Peltula euploca	
	Peltula patellata	
	Pertusaria amara	
	Pertusaria cf. bispora	
	Pertusaria flavicunda	
	Phaeophyscia cernohorskyi	
	Phlyctis argena	
	Physcia adscendens	
	Physcia callosa	
	Physcia clementei	
	Physcia phaea	
	Physcia stellaris	
	Physcia tenella var. *tenella*	
	Physcia tribacia	
	Physconia enteroxantha	
	Physconia isidiigera	
	Placidium chilense	
	Placidium lecinulatum	
	Pleopsidium chlorophenum	
	Polycauliona coralloides	
	Protoparmelia badia	
	Psora decipiens	
	Psora pacifica	
	Psora tuckermanii	
	Psorula scotopholis	
	Punctelia borreri	
	Punctelia stictica	
	Punctelia subrudecta	
	Pyrrhospora quernea	
	Ramalina canariensis	
	Ramalina farinacea	
	Ramalina fastigiata	
	Ramalina lacera	
	Ramalina leptocarpha	
	Ramalina menziesii	
	Ramalina pollinaria	
	Reinkella parishii	
	Rimelia reticulata	
	Rimularia insularis	
	Rinodina bolanderi	
	Rinodina conradii	
	Rinodina hallii	
	Rinodina luridata	
	Roccella babingtonii	
	Roccella fimbriata	
	Schizopelte californica	
	Sclerophyton californicum	
	Sclerophyton cerebriforme	
	Sigridea californica	

TAXON		
sensitivity status	**scientific name**	**common name**
	Sticta fuliginosa	
	Syzygospora physciacearum	
	Teloschistes californicus	
	Teloschistes chrysophthalmus	
	Teloschistes exilis	
	Teloschistes flavicans	
	Tephromela atra	
	Tephromela nashii	
	Texosporium sancti-jacobi	
	Thelomma mammosum	
	Thelomma santessonii	
	Toninia ruginosa	
	Toninia tristis	
	Umbilicaria phaea	
	Usnea esperantiana	
	Usnea rubicunda	
	Vermilacinia acicularis	
	Vermilacinia cerebra	
	Vermilacinia nylanderi	
	Vermilacinia pumila	
	Xanthoparmelia coloradoensis	
	Xanthoparmelia conspersa	
	Xanthoparmelia cumberlandia	
	Xanthoparmelia mexicana	
	Xanthoparmelia plittil	
	Xanthoparmelia somloensis	
	Xanthoria candelaria	
	Xanthoria fallax	
VASCULAR CRYPTOGAMS		
	Adiantum jordani	California maidenhair
	Cheilanthes newberryi	
	**Cyrtomium falcatum*	holly fern
	Dryopteris arguta	coastal woodfern
	Pellea andromedaefolia var. *pubescens*	coffee fern
	Pellea mucronata spp. *mucronata*	bird's foot fern
	Pentagramma triangularis var. *triangularis*	goldback fern
	Pentagramma triangularis var. *viscosa*	sticky goldback fern
	Polypodium californicum	California polyplody?
	Selaginella bigelovii	spike moss
ANGIOSPERMAE—DICOTS		
	Abronia maritima	red sand verbena
	Abronia maritima X Abronia umbellata	
	Abronia umbellata	sand verbena
	Achillea millefolium	yarrow
	Achyrachaena mollis	blow-wives
	Adenostoma fasciculatum	chamise
	Allophyllum glutinosum	sticky false gillyflower

TAXON		
sensitivity status	**scientific name**	**common name**
	Amblyopappus pusillus	dwarf coastweed
	Ambrosia chamissonis var. *bipinnatisecta*	silver beach-burr
	Amsinckia menziesii var. *intermedia*	Rancher's fireweed
Channel Island Endemic	*Amsinckia spectabilis* var. *nicolai*	seaside fiddleneck
	Amsinckia spectabilis var. *spectabilis*	fiddleneck
	**Anagallis arvensis*	scarlet pimpernel
	Anemopsis californica	yerba mansa
	Antirrhinum nuttallianum ssp. *subsessile*	Nuttal's snapdragon
	Aphanes occidentalis	
1B	*Aphanisma blitoides*	aphanisma
	Apiastrum angustifolium	wild celery
	**Apium graveolons*	celery
	Artemisia californica	California sagebrush
Channel Island Endemic (CNPS 4)	*Artemisia nesiotica*	Island sagebrush
Channel Island Endemic (CNPS 4)	*Astragalus miguelensis*	San Miguel milkvetch
SCI Endemic (FC2; CNPS 1B)	*Astragalus nevinii*	San Clemente Island milkvetch
	Astragulus didymocarpus ssp. *didymocarpus*	two-seeded milkvetch
	Athysanus pusillus	common sandweed
	Atriplex argentea ssp. *mohavensis*	silverscale
	Atriplex californica	California saltbush
	Atriplex coulteri	Coulter's saltbrush
	Atriplex lentiformis ssp. *breweri*	big saltbrush
	Atriplex leucophylla	beach saltbush
	Atriplex pacifica	South Coast saltscale
	**Atriplex semibaccata*	Australian saltbrush
	Atriplex watsonii	Watson's saltbrush
	Baccharis pilaris	coyotebrush
	Baccharis salicifolia	mulefat
	**Bassia hyssopifolia*	
	Batis maritima	saltwort
	Bergerocactus emoryi	velvet, snake or golden-spine cactus
	**Beta vulgaris* ssp. *maritima*	beet
	Bowlesia incana	hoary bowlesia
	**Brassica nigra*	black mustard
	**Brassica rapa*	turnip
	**Cakile maritima ssp. maritima*	sea rocket
	Calandrina ciliata var. *menziesii*	fringed redmaids
	Calandrina maritima	seaside pussypaws
	Callitrache marginata var. *marginata*	water star-wort
Channel Island Endemic (FC2; CNPS 4)	*Calystegia macrostegia* ssp. *amplissima*	Island false bindweed or Island morning-glory
	Calystegia soldanella	seashore false bindweed
	Camissonia cheiranthifolia ssp. cheiranthifolia	beach evening primrose
SCI Endemic (FC2; CNPS 1B)	*Camissonia guadalupensis* ssp. *clementina*	San Clemente Island evening primrose
	Camissonia micrantha	
	Camissonia robusta	robust suncup
	**Caprobrotus chilensis*	sea fig
	**Caprobrotus edulis*	hottentot fig
	**Capsella brusa-pastoris*	Shepard's purse
SCI Endemic (FE;SE; CNPS 1B)	*Castilleja grisea*	San Clemente Island Indian paintbrush
Channel Island Endemic (CNPS 4)	*Ceanothus megacarpus* ssp. *insularis*	Island big-pod ceanothus

TAXON		
sensitivity status	**scientific name**	**common name**
	Ceanothus megacarpus ssp. megacarpus	bigpod
	**Centaurea melitensis*	tocalote
	Centuarium davyi	centaury
	**Cerastium glomeratum*	mouse-eared chickweed
	Chenopodium californicum	California pigweed
	**Chenopodium murale*	nettleleaf goose foot
	Cirsium occidentale	cobwebby thistle
	Clarkia epilogioides	canyon fairyfan
	Claytonia perfoliata ssp. *mexicana*	Miner's lettuce
	Claytonia perfoliata ssp. *perfoliata*	
	Collinsia heterphylla	Chinese houses
	Convolvulus simulans	
	**Conyza bonariensis*	asthmaweed
	**Conyza canadensis*	Canadian horseweed
	**Conyza coulteri*	conyza
	Coreopsis gigantea	giant coreopsis
	Crassula connata var. *erectoides*	pygmyweed
	Cressa truxillensis var. *vallicola*	spreading alkaliweed
1B	*Crossosoma califronicum*	Island apple-blossom
	Cryptantha clevelandii var. *clevelandii*	Cleveland's catseye
	Cryptantha intermedia	
	Cryptantha maritima	Guadalupe catseye
Channel Island Endemic (FC2; CNPS 1B)	*Cryptantha traskiae*	Trask's cryptantha
	Cuscuta californica	chaparral dodder
	Cuscuta californica var. *breviflora*	
	Daucus pusillus	American wild carrot
Channel Island Endemic (CNPS 4)	*Deinandra clementina*	Island tarplant
SCI Endemic (FE; SE; CNPS 1B)	*Delphinium variegatum* ssp. *kinkiense*	San Clemente Island larkspur
SCI Endemic (FC2; CNPS 1B)	*Delphinium variegatum* ssp. *thornei*	Thorne's royal larkspur
Extirpated (FC2, CNPS 4)	*Dendromecon harfordii* ssp. *rhamnoides*	Channel Island tree poppy
	Dodecatheon clevelandii ssp. *insulare*	Cleveland's shooting star
	Draba cuneifolia var *integrifolia*	wedgeleaf whitlowgrass
FC2, CNPS 1B	*Dudleya virens*	green liveforever
FC2, CNPS 1B	*Dudleya virens virens*	Island green dudleya
	Emmenanthe penduliflora	whispering bells
	Encelia californica	California brittlebush
	Epilobium canum ssp. *canum*	California fuchsia
	Erastrum filifolim	lavender woolstar
	Eremalche exilis	
	Eremocarpus setigerus	turkey mullein
SCI Endemic (FC2; CNPS 1B)	*Eriogonum giganteum* var. *formosum*	San Clemente Island buckwheat
Channel Island Endemic (CNPS 4)	*Eriogonum grande* ssp. *grande*	Island buckwheat
	Eriophyllum confertiflorum var. *confertiflorum*	
Channel Island Endemic (FC2; CNPS 1B)	*Eriophyllum nevinii*	Nevin's eriophyllum
	**Erodium botrys*	pinclover
	**Erodium brachycarpum*	
	**Erodium cicutarium*	red-stem filaree
	**Erodium moschatum*	green-stem filaree
	**Eschscholzia californica*	California poppy
Channel & Baja Island Endemic (CNPS 4)	*Eschscholzia ramosa*	Island poppy

TAXON		
sensitivity status	**scientific name**	**common name**
	**Eucalyptus globulus*	blue gum
	Eucrypta chrysanthemifolia var. *chrysanthemifolia*	
	Euphorbia misera	cliff spurge
	**Euphorbia peplus*	pretty spurge
	**Euphorbia spathulata*	
	Filago arizonica	Arizona cottonrose
	Filago californica	California cottonrose
	**Filago gallica*	narrowleaf cotton rose
	**Foeniculum vulgare*	fennel
	Frankenia salina	alkali heath
	**Galium aparine*	goose grass
SCI Endemic (FC2; SE; CNPS 1B)	*Galium catalinense* ssp. *acrispum*	San Clemente Island bedstraw
Channel & Baja Island Endemic (FC2; CNPS 1B)	*Galvezia speciosa*	showy Island snapdragon
	Gilia angelensis	chaparral gilia
Channel & Baja Island Endemic (CNPS 4)	*Gilia nevinii*	Nevin's gilia
	Gnaphalium bicolor	two color cudweed
	Gnaphalium californicum	ladies' tobacco
	Gnaphalium canescens ssp. *beneolens*	
	Gnaphalium canescens ssp. *microcephalum*	
	**Gnaphalium luteo-album*	
	Gnaphalium palustre	Western marsh cudweed
	Guillenia lasiophylla	
Channel & Baja Island Endemic (FC2;CNPS 1B)	*Hazardia cana*	Southern Island hazardia
	Heliotropium curassavicum ssp. *oculatum*	heliotrope
Channel Island Endemic (CNPS 4)	*Hemizonia clementina*	Island tarplant
	Hemizonia fasciculata	clustered tarweed
	**Herniaria cinerea*	
	Hesperevax sparsiflora	
	Hesperocnide tenella	Western nettle
Channel & Baja Island Endemic	*Heteromeles arbutifolia* ssp. *macrocarpa*	Christmas berry or toyon
	Heterotheca grandiflora	telegraph weed
	**Hypochoeris glabra*	smooth cat's ear
	**Hypochoeris radicata*	rough cat's ear
	Isocoma menziesii var. *menziesii*	goldenbush
	Isocoma menziesii var. *vernoniodes*	
	Isomeris arborea	bladderpod
Channel & Baja Island Endemic (FC2, CNPS 4)	*Jepsonia malvifolia*	Island jepsonia
	Keckiella cordifolia	heartleaf penstemon
	Lasthenia californica	goldfields
	Lathyrusvestitus var. *vestitus*	
	**Latuca serricola*	prickly lettuce
Channel Island Endemic (FC2, CNPS 1B)	*Lavatera assurgentiflora* ssp. *glabra*	Southern Island tree mallow
	**Lavatera cretica*	cornish mallow
	Layia platyglossa ssp. *campestris*	tidytips
1B	*Lepidium lasiocarpum* var. *lasiocarpum*	
	Lepidium latipes	San Diego pepperweed
	Lepidium nitidum	shining pepperweed
	**Lepidium oblongum*	
	Lepidium oblongum	
CNPS 1B	*Lepidium virginicum robinsonii*	Robinson's pepper-grass

TAXON

sensitivity status	scientific name	common name
	Lepidium virginicum var. *pubescens*	
	Lianthus bicolor ssp. *bicolor*	
	**Limonium perezii*	sea lavender
Channel & Baja Island Endemic (CNPS 1B)	*Linanthus pygmaeus* ssp. *pygmaeus*	
	Linaria canadensis var. *texana*	Texas toadflax
SCI Endemic (FE; SE; CNPS 1B)	*Lithophragma maximum*	San Clemente Island woodland star
	**Lobularia maritima*	sweet alyssum
Channel & Baja Island Endemic (FC2; CNPS 1B)	*Lomatium insulare*	San Nicolas Island lomatium
	Lonicera hispidula var. *vacillans*	hairy honeysuckle
SCI Endemic (FC2; SE; CNPS 1B)	*Lotus argophyllus* ssp. *adsurgens*	San Clemente Island silver hosackia
	Lotus argophyllus ssp. *ornithopus*	silver birdsfoot trefoil
SCI Endemic (FE; SE; CNPS 1B)	*Lotus dendroideus* var. *traskiae*	San Clemente Island broom
	Lotus hamatus	San Diego birdsfoot trefoil
	Lotus strigosus var. *strigosus*	
	Lupinus bicolor ssp. *microphyllus*	minature lupine
	Lupinus bicolor ssp. *umbellatus*	annual lupine
	Lupinus concinnus	bajada lupine
Channel & Baja Island Endemic (FC2; CNPS 1B)	*Lupinus guadalupensis*	Guadalupe Island lupine
	Lupinus hirsutissimus	stinging lupine
	Lupinus succulentus	arroyo lupine
	Lupinus truncatus	collared annual lupine
	Lycium brevipes var. *brevipes*	boxthorn
Extirpated (CNPS 1B)	*Lycium brevipes* var. *hassei*	Santa Catalina Island desert-thorn
	Lycium californicum	California box-thorn
	**Lycopersicon esculentum*	tomato
Channel Island Endemic (FC2; CNPS 1B)	*Lyonothamnus floribundus* spp. *asplenifolius*	Santa Cruz ironwood
	Madia sativa	coast tarweed
SCI Endemic (FE; SE; 1B)	*Malacothamnus clementinus*	San Clemente Island bush mallow
Channel Island Endemic (CNPS 4)	*Malacothrix foliosa* var. *foliosa*	leafy malacothrix
	Malacothrix incana	dundelion?
	**Malacothrix saxatilis* var. *tenuifoia*	
	**Malephora crocea*	coppery mesemb
	Malosma laurina	laurel sumac
	**Malva parviflora*	cheeseweed
	Malvella leprosa	alkali mallow
	Marah macrocarpus var. *major*	wild cucumber
	**Medicago polymorpha*	California burclover
	**Medicago sativa*	alfalfa
	**Melilotus alba*	white sweetclover
	**Melilotus indica*	sour clover
	**Mentzelia affinis*	yellowcomet
	Mentzelia micrantha	San Luis blazingstar
	**Mesembryanthemum crystallinum*	crystalline iceplant
	**Mesembryanthemum nodiflorum*	slender-leaved iceplant
	Microseris douglasii ssp. *douglasii*	
4	*Microseris douglasii* ssp. *platycarpha*	
	Microseris elegans	elegant silverpuffs
	Mimulus aurantiacus	monkeyflower
	Mimulus floribundus	manyflowered monkeyflower
	Mimulus guttatus ssp. *guttatus*	seep monkeyflower

TAXON		
sensitivity status	**scientific name**	**common name**
	Minuartia douglasii var. *douglasi*	sandwort
	Mirabilis californica	wishbone bush
	Monolepis nuttalliana	poverty weed
	**Myoporum laetum*	ngaio tree
	Navarretia atractyloides	hollyleaf pincushion plant
	Navarretia hamata ssp. leptantha	skunkweed
	Oligomeris linifolia	lineleaf whitepuff
	**Opuntia ficus-indica*	Indian fig
	Opuntia littoralis var. *littoralis*	prickley pear
	Opuntia oricola	chaparral prickley pear
	Opuntia prolifera	coastal cholla
	Orobanche uniflora	naked broomrape
	**Oxalis pes-caprae*	Bermuda buttercup
	Parietaria hespera var. *califronica*	
	Parietaria hespera var. *hespera*	
	Pectocarya linearis ssp. *ferocula*	sagebrush combseed
	Perityle emoryi	Emory's rock daisy
	**Perlargonium x hortorum*	garden geranium
	Phacelia cicutaria ssp. *hispida*	catepillar scorpionweed
	Phacelia distans	distant phacelia
Channel & Baja Island Endemic (FC2; CNPS 1B)	*Phacelia floribunda*	San Clemente Island phacelia
	Phacelia lyonii	Lyon's Phacelia
	Pholistoma auritum	fiesta flower
	Pholistoma racemosum	racemed fiesta flower
	**Pinus halepensis*	aleppo pine
	Plagiobothrys canescens	valley popcorn flower
	Plagiobothrys collinus var. *gracilis*	Cooper's popcorn flower
	Plantago erecta ssp. *erecta*	California plantain
	**Plantago lanceolata*	English plantain
	Plantgo insularis	desert Indianwheat
	**Ploygonum aviculare*	prostrate knotweed
	**Polygonum arenastrum*	common knotweed
	**Polygonum argyrocoleon*	sliversheath knotweed
	Prunus ilicifolia ssp. *lyonii*	Catalina cherry
	Psilocarphus brevissimus var. *brevissimus*	dwarf woolly-heads
	Psilocarphus tenellus var. *tenellus*	
	Pterostegia drymariodes	woodland pterostegia
Channel & Baja Island Endemic (CNPS 4)	*Quercus tomentella*	Island oak
	Rafinesquia californica	California chicory
	**Raphanus raphanistrum*	jointed charlock
	**Raphanus sativus*	raddish
Channel & Baja Island Endemic (CNPS 4)	*Rhamnus pirifolia*	Island redberry
	Rhus integrifolia	lemonade berry
	Ribes malvaceum var. *malvaceum*	chaparral current
	**Ricinus communis*	castor bean
	**Rumex crispus*	culry dock
	Rumex salicifolius	willow dock
	Salicornia subterminalis	pickleweed
	Salicornia virginica	Virginia glasswort
	Salvia columbariae ssp. *columbariae*	chia

TAXON		
sensitivity status	**scientific name**	**common name**
	Sambucus mexicana	blue elderberry
	Sanicula arguta	sharptooth black snakeroot
	Sanicula crassicaulis var. *crassicaulis*	
	Saxifraga californica	California saxifrage
	**Schinus terebinthifolius*	Brazilian pepper tree
Channel Island Endemic (FC2, CNPS 1B)	*Scrophularia villosa*	Santa Catalina figwort
	Senecio flaccidus var. *douglasii*	
	Senecio lyonii	Island ragweed
	**Senecio vulgaris*	common groundsel
	Sescurainia pinnata ssp. *menziesii*	tansy mustard
Channel Island Endemic (FE; CNPS 1B)	*Sibara filifolia*	Santa Cruz Island rock cress
	Silene antirrhina	sleepy silene
	**Silene gallica*	common catchfly
	Silene laciniata ssp. *major*	cardinal catchfly
	Silene macrotheca ssp. *macrotheca*	sea spurry
	**Sisymbrium irio*	London rocket
	**Sisymbrium orientale*	Indian hedgemustard
	**Solanum americanum*	nightshade
	Solanum douglasii	greenspot nightshade
	**Sonchus asper*	prickly sowthistle
	**Sonchus oleraceus*	common sowthistle
	**Sonchus tenerrimus*	slender sowthistle
	**Spergularia bocconii*	Boccone's Sand Spurry
	Spergularia marina	salt marsh sand-spurrey
	**Spergularia villosa*	sand spurry
	Stebbinsoseris heterocarpa	
	**Stellaria media*	common chickweed
SCI Endemic (FC2; CNPS 1B)	*Stephanomeria blairii*	Everlasting nest straw
	Stephanomeria diegensis	wreathplant
	Stephanomeria virgata ssp. *virgata*	
	Stylocline gnaphaloides	everlasting nest straw?
	Stylomecon heterophylla	wind poppy
	Suaeda taxifolia - glabrous form	
	Suaeda taxifolia - pubescent form	wooly seablite
	**Tamarix* sp.	
	Thysanocarpus laciniatus var. *laciniatus*	lacepod
	Toxicodendron diversilobum	Western poison oak
	**Tragopogan porridolius*	salsify
	Trifolium depauperatum var. *amplectans*	
	Trifolium depauperatum var. *truncatum*	
	Trifolium fucatum	bull clover
	Trifolium gracilentum	pinpoint clover
Channel & Baja Island Endemic (CNPS 4)	*Trifolium gracilentum palmeri*	Palmer's clover
	Trifolium microcephalum	smallhead clover
	Trifolium willdenovii	
	**Tropaeolum majus*	garden nasturium
	Tropidocarpum gracile var. *gracile*	
	Verbena bracteata	
	Verbena lasiostachys	Western vervain
	Vicia hassei	Hasse's vetch

TAXON		
sensitivity status	**scientific name**	**common name**
	Vicia ludoviciana var *ludoviciana*	
	Viola pedunculata	Johnny jump up
	Yabea microcarpa	
ANGIOSPERMAE-MONOCOTS		
	Agrostis pallens	thingrass
	Allium praecox	early onion
	Aristida adscensionis	six-weeks three awn
	**Asphodelus fistulosus*	asphodel
	**Avena barbata*	slender wild oat
	**Avena sativa*	cultivated oat
SCI Endemic (FC2, CNPS 1B)	*Brodiaea kinkiense*	San Clemente Island brodiaea
	Bromus arizonicus	Arizona brome
	Bromus carinatus	California brome
	**Bromus diandrus*	ripgut grass
	**Bromus hordeaceus* ssp. *molliformis*	soft chess
	**Bromus madritensis* ssp. *rubens*	foxtail chess
	**Bromus trinii*	Chilean chess
	Carex tumulicola	splitawn sedge
	**Cynodon dactylon*	Bermuda grass
	**Dactylus golmerata*	orchard grass
	Deschampsia danthonioides	annual hairgrass
	Dichelostemma capitatum	blue dicks
Presumed Extinct (CNPS 1A)	*Dissanthelium californicum*	California dissanthelium
	Distichlis spicata	saltgrass
	Eleocharis macrostachya	pale spikerush
	**Erharta calycina*	veldt grass
	**Gastridium ventricosum*	nit grass
	**Hainardia cylindrica*	
	Hordeum intercedens	bobtail barley
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	**Hordeum murinum* ssp. *glaucum*	
	**Hordeum murinum* ssp. *leporinum*	
	**Hordeum vulgare*	common barley
	Juncus bufonius	toad rush
	Juncus patens	common rush
	**Lamarckia aurea*	golden top
	Leymus condensatus	giant wild-rye
	**Lolium multiflorum*	Italian annual ryegrass
	**Lolium perenne*	perennial rye grass
	**Lolium temulentum*	darnel
	Melica imperfecta	California melic
	Muhlenbergia appressa	muhly
	Muhlenbergia microsperma	littleseed muhly
	Nassella cernua	nodding needlegrass
	Nassella lepida	foothill needlegrass
	Nassella pulchra	purple needlegrass
	**Parapholis incurva*	sickle grass
	**Phalaris caroliniana*	Carolina canary grass
	Phalaris lemmonii	Lemon’s canarygrass
	**Phalaris minor*	littleseed canary grass

TAXON		
sensitivity status	**scientific name**	**common name**
	**Phalaris paradoxa*	hood canary grass
	**Piptatherum miliaceum*	smilo grass
	**Poa annua*	annual bluegrass
	Poa secunda	sandberg bluegrass
	**Polypogon interruptus*	ditch beard grass
	**Polypogon monspeliensis*	annual beard grass
	Ruppia maritima	ditchgrass
	**Schismus arabicus*	Arabian schismus
	**Schismus barbatus*	common Mediterranean grass
SCI Endemic (FC2, CNPS 1B)	*Triteleia clementina*	San Clemente Island triteleia
	**Triticum aestivum*	
	**Vulpia bromoides*	
	Vulpia microstachys var. *pauciflora*	
	**Vulpia myuros* var. *hirsuta*	
	**Vulpia myuros* var. *myuros*	

FAUNA

TAXON		
sensitivity status	**scientific name**	**common name**
TERRESTRIAL VERTEBRATES		
REPTILES		
	Uta stansburiana	side-blotched lizard
FT, CSC	*Xantusia riversiana*	Island night lizard
BIRDS		
	Gaviiformes	
Wr/Tr	*Gavia pacifica*	Pacific loon
(CSC) Tr/Wr	*Gavia immer*	common loon
Tr	*Gavia stellata*	red-throated loon
	Podicipediiformes	
Tr	*Podilymbus podiceps*	pied-billed grebe
Wr/Tr	*Podiceps nigricollis*	eared grebe
Yr	*Aechmophorus occidentalis*	Western grebe
Tr	*Aechmophorus clarkii*	Clark's grebe
	Procellariiformes	
Tr	*Phoebastria immutabilis*	laysan albatross
Tr	*Phoebastria nigripes*	black-footed albatross
Tr	*Fulmarus glacialis*	Northern fulmar
Tr	*Puffinus creatopus*	pink-footed shearwater
Tr	*Puffinus bulleri*	Buller's shearwater
Tr	*Puffinus griseus*	sooty shearwater
Tr	*Puffinus opisthomelas*	black-vented shearwater
Tr	*Puffinus puffinus*	manx shearwater
Tr	*Puffinus tenuirostris*	short-tailed shearwater
Tr	*Oceanites oceanicus*	Wilson's storm-petrel
Tr	*Oceanodroma leucorhoa*	Leach's storm-petrel

TAXON		
sensitivity status	**scientific name**	**common name**
(FSC, CSC) Tr	*Oceanodroma homochroa*	ashy storm-petrel
(CSC) Tr	*Oceanodroma melania*	black storm-petrel
Tr	*Oceanodroma microsoma*	least storm-petrel
	Pelecaniformes	
Tr	*Phaethon aethereus*	red-billed tropicbird
Tr	*Sula nebouxii*	blue-footed booby
Tr	*Pelecanus erythrorhynchos*	American white pelican
FE; SE Yr	*Pelecanus occidentalis californicus*	California brown pelican
Br	*Phalacrocorax penicillatus*	Brandt's cormorant
CSC Br	*Phalacrocorax auritus*	double-crested cormorant
Wr	*Phalacrocorax pelagicus*	pelagic comorant
	Ciconiiformes	
Yr	*Ardea herodias*	great blue heron
Tr	*Ardea alba*	great egret
Tr	*Egretta thula*	snowy egret
Tr	*Egretta tricolor*	tricolored heron
Tr	*Bubulcus ibis*	cattle egret
Tr	*Butorides virescens*	green heron
Tr	*Nycticorax nycticorax*	black-crowned night-heron
Tr	*Plegadis chihi*	white-faced ibis
Tr	*Cathartes aura*	turkey vulture
	Anseriformes	
Tr	*Anser albifrons*	greater white-fronted goose
Tr	*Chen rossii*	Ross' goose
Tr	*Branta canadensis*	Canada goose
Tr	*Branta bernicla*	brant
Tr	*Anas strepera*	gadwall
Tr	*Anas americana*	American wigeon
Tr	*Anas platyrhynchos*	mallard
Tr	*Anas discors*	blue-winged teal
Tr	*Anas cyanoptera*	cinnamon teal
Tr	*Anas clypeata*	Northern shoveler
Tr	*Anas acuta*	Northern pintail
Tr	*Anas crecca*	green-winged teal
Tr	*Aythya valisineria*	canvasback
Tr	*Aythya americana*	redhead
Tr	*Aythya collaris*	ring-necked duck
Tr	*Aythya affinis*	lesser scaup
Wr/Tr	*Melanitta perspicillata*	surf scoter
Tr	*Melanitta fusca*	white-winged scoter
Tr	*Melanitta nigra*	black scoter
Tr	*Bucephala clangula*	common goldeneye
Tr	*Bucephala islandica*	Barrow's goldeneye
Tr	*Mergus merganser*	common merganser
Wr/Tr	*Mergus serrator*	red-breasted merganser
Wr/Tr	*Oxyura jamaicensis*	ruddy duck
Tr	*Branta bernicla*	black brant
	Falconiformes	
Extirpated (CSC) Tr	*Pandion haliaetus*	osprey
(FP) Br/Wr/Tr	*Elanus leucurus*	white-tailed kite

TAXON		
sensitivity status	**scientific name**	**common name**
Extirpated (FT; SE) Tr	*Haliaeetus leucocephalus*	bald eagle
(CSC) Wr/Tr	*Circus cyaneus*	Northern harrier
(CSC) Wr/Tr	*Accipiter striatus*	sharp-shinned hawk
(CSC) Tr	*Accipiter cooperii*	Cooper's hawk
Tr	*Buteo swainsoni*	Swainson's hawk
Br	*Buteo jamaicensis*	red-tailed hawk
Tr	*Buteo platypterus*	broad-winged hawk
(FSC, CSC) Tr	*Buteo regalis*	ferruginous hawk
Br	*Falco sparverius*	American kestrel
(CSC) Wr/Tr	*Falco columbarius*	merlin
(SE) Wr/Tr	*Falco peregrinus*	peregrine falcon
Tr	*Falco mexicanus*	prairie falcon
	Galliformes	
Br	**Alectoris chukar*	chukar
Br	**Callipepla gambelii*	Gambel's quail
	Gruiformes	
Tr	*Rallus limicola*	Virginia Rail
Tr	*Porzana carolina*	sora
Tr	*Fulica americana*	American coot
	Charadriiformes	
Wr/Tr	*Pluvialis squatarola*	black-bellied plover
Tr	*Pluvialis dominica*	American golden plover
Wr/Tr	*Pluvialis fulva*	Pacific golden plover
(FT, CSC) Br	*Charadrius alexandrinus nivosus*	Western snowy plover
Tr	*Charadrius vociferus*	killdeer
Tr	*Charadrius semipalmatus*	semiplamated plover
(FPT, CSC) Tr (former Wr)	*Charadrius montanus*	mountain plover
Tr	*Haematopus palliatus*	American oystercatcher
Br	*Haematopus bachmani*	black oystercatcher
Tr	*Himantopus mexicanus*	black-necked stilt
Tr	*Recurvirostra americana*	American avocet
Tr	*Tringa melanoleuca*	greater yellowlegs
Tr	*Tringa flavipes*	lesser yellowlegs
Tr	*Tringa solitaria*	solitary sandpiper
Tr	*Catoptrophorus semipalmatus*	willet
Wr/Tr	*Heteroscelus incanus*	wandering tattler
Wr/Tr	*Actitis macularia*	spotted sandpiper
Wr/Tr	*Numenius phaeopus*	whimbrel
(CSC) Tr	*Numenius americanus*	long-billed curlew
Tr	*Limosa fedoa*	marbled godwit
Wr/Tr	*Arenaria interpres*	ruddy turnstone
Wr/Tr	*Arenaria melanocephala*	black turnstone
Tr	*Calidris canutus*	red knot
Wr/Tr	*Calidris alba*	sanderling
Tr	*Calidris pusilla*	semipalmated sandpiper
Tr	*Calidris mauri*	Western sandpiper
Tr	*Calidris minutilla*	least sandpiper
Tr	*Calidris bairdii*	Baird's sandpiper
Tr	*Calidris melanotos*	pectoral sandpiper
Tr	*Calidris alpina*	dunlin

TAXON		
sensitivity status	**scientific name**	**common name**
Tr	*Tryngites subruficollis*	buff-breasted sandpiper
Tr	*Limnodromus griseus*	short-billed dowitcher
Tr	*Limnodromus scolopaceus*	long-billed dowitcher
Tr	*Gallinago gallinago*	common snipe
Tr	*Phalaropus tricolor*	Wilson's phalarope
Tr	*Phalaropus lobatus*	red-necked phalarope
Tr	*Phalaropus fulicaria*	red phalarope
Tr/Wr	*Stercorarius pomarinus*	pomarine jaeger
Tr/Wr	*Stercorarius parasiticus*	parasitic jaeger
Tr/Wr	*Stercorarius longicaudus*	long-tailed jaeger
Tr	*Larus atricilla*	laughing gull
Tr	*Larus philadelphia*	Bonaparte's gull
Yr	*Larus heermanni*	Heermann's gull
Tr	*Larus canus*	mew gull
?	*Larus delawarensis*	ring-billed gull
(CSC) Wr	*Larus californicus*	California gull
Wr	*Larus argentatus*	herring gull
Tr	*Larus thayeri*	Thayer's gull
Tr	*Larus glaucoides*	Iceland gull
Br	*Larus occidentalis*	Western gull
Tr	*Larus glaucescens*	glaucous-winged gull
Tr	*Rissa tridactyla*	black-legged kittiwake
Tr	*Sterna caspia*	caspian tern
(CSC)Yr	*Sterna maxima*	royal tern
(FSC, CSC) Tr	*Sterna elegans*	elegant tern
Tr	*Sterna hirundo*	common tern
Tr	*Sterna paradisaea*	arctic tern
Tr	*Sterna forsteri*	Forster's tern
Tr	*Chlidonias niger*	black tern
Tr	*Rynchops niger*	black skimmer
Tr	*Uria aalge*	common murre
Tr	*Cepphus columba*	pigeon guillemot
(FSC, CSC) Br	*Synthliboramphus hypoleucus*	Xantus' murrelet
Tr	*Synthliboramphus antiquus*	ancient murrelet
Wr/Tr	*Ptychoramphus aleuticus*	Cassin's auklet
(CSC) Tr	*Cerorhinca monocerata*	rhinoceros auklet
	Columbiformes	
Br	**Columba livia*	rock dove
Tr	*Columba fasciata*	band-tailed pigeon
Tr	**Streptopelia chinensis*	spotted dove
Tr	*Zenaida asiatica*	white-winged dove
Br	*Zenaida macroura*	mourning dove
	Cuculiformes	
Tr	*Coccyzus americanus*	yellow-billed cuckoo
	Strigiformes	
Br	*Tyto alba*	barn owl
(FSC, CSC) Wr	*Athene cunicularia*	burrowing owl
(CSC) Tr	*Asio otus*	long-eared owl
(CSC) Wr/Tr	*Asio flammeus*	short-eared owl
	Caprimulgiformes	

TAXON		
sensitivity status	**scientific name**	**common name**
Wr/Tr	*Phalaenoptilus nuttallii*	common poorwill
	Apodiformes	
(CSC) Tr	*Chaetura vauxi*	Vaux's Swift
Br	*Aeronautes saxatalis*	white-throated swift
Tr	*Selasphorus platycerous*	broad-tailed hummingbird
Tr	*Archilochus alexandri*	black-chinned hummingbird
Wr	*Calypte anna*	Anna's hummingbird
Tr	*Calypte costae*	Costa's hummingbird
Tr	*Stellula calliope*	calliope hummingbird
Tr	*Selasphorus rufus*	rufous hummingbird
Channel Island Endemic Br	*Selasphorus sasin sedentarius*	Allen's hummingbird
	Coraciiformes	
Tr	*Ceryle alcyon*	belted kingfisher
	Piciformes	
Tr	*Melanerpes lewis*	Lewis's woodpecker
Tr	*Melanerpes formicivorus*	acorn woodpecker
Tr	*Sphyrupicus nuchalis*	red-naped sapsucker
Tr	*Sphyrapicus ruber*	red-breasted sapsucker
Wr/Tr	*Calaptes auratus*	Northern flicker
	Passeriformes	
(CSC) Tr	*Contopus cooperi*	olive-sided flycatcher
Tr	*Contopus pertinax*	greater pewee
Tr	*Contopus sordidulus*	Western wood pewee
(SE) Tr	*Empidonax traillii*	willow flycatcher
Tr	*Empidonax hammondii*	Hammond's flycatcher
Tr	*Empidonax wrightii*	gray flycatcher
Tr	*Empidonax oberholseri*	dusky flycatcher
Channel Island Endemic Br	*Empidonax difficilis insulicola*	Pacific-slope flycatcher
Wr/Tr	*Sayornis nigricans*	black phoebe
Tr	*Sayornis poebe*	Eastern phoebe
Wr/Tr	*Sayornis saya*	Say's phoebe
Tr	*Pyrocephalus rubincus*	Vermilion flycatcher
Tr	*Myiarchus cinerascens*	ash-throated flycatcher
Tr	*Tyrannus melancholicus*	tropical kingbird
Tr	*Tyrannus vociferans*	Cassin's kingbird
Tr	*Tyrannus verticalis*	Western kingbird
Tr	*Tyrannus tyrannus*	Eastern kingbird
Tr	*Tyrannus forficatus*	scissor-tailed flycatcher
SCI Endemic (FE, CSC) Br	*Lanius ludovicianus mearnsi*	San Clemente loggerhead shrike
Tr	*Vireo bellii*	bell's vireo
Tr	*Vireo vicinior*	gray vireo
Tr	*Vireo plumbeus*	plumbeous vireo
Tr	*Vireo cassinii*	Cassin's vireo
Tr	*Vireo huttoni*	Hutton's vireo
Tr	*Vireo gilvus*	warbling vireo
Tr	*Vireo philadelphicus*	Philadelphia vireo
Tr	*Vireo olivacens*	red-eyed vireo
Br	*Corvus corax*	common raven
Channel Island Endemic Br	*Eremophila alpestris insularis*.	horned lark
Tr	*Tachycineta bicolor*	tree swallow

TAXON		
sensitivity status	**scientific name**	**common name**
Tr	*Tachycineta thalassina*	violet-green swallow
Tr	*Stelgidopteryx serripennis*	Northern rough-winged swallow
(ST) Tr	*Riparia riparia*	bank swallow
Tr	*Petrochelidon pyrrhonota*	cliff swallow
Br	*Hirundo rustica*	barn swallow
Tr	*Progne subis*	purple martin
Tr	*Sitta canadensis*	red-breasted nuthatch
Br	*Salpinctes obsoletus*	rock wren
Tr	*Catherpes mexicanus*	canyon wren
Tr	*Thryomanes bewickii*	Bewick’s wren
SCI Endemic Presumed Extinct Br	*Thryomanes bewickii leucophrys*	San Clemente Bewick’s wren
Wr/Tr	*Troglodytes aedon*	house wren
Tr	*Cistothorus palustris*	marsh wren
Tr	*Regulus satrapa*	golden-crowned kinglet
Wr/Tr	*Regulus calendula*	ruby-crowned kinglet
Wr/Tr	*Polioptila caerulea*	blue-gray gnatcatcher
Wr/Tr	*Sialia currucoides*	mountain bluebird
Tr	*Sialia mexicana*	Western bluebird
Tr	*Myadestes townsendi*	Townsend’s solitaire
(CSC) Tr	*Catharus ustulatus*	Swainson’s thrush
Wr/Tr	*Catharus guttatus*	hermit thrush
Wr/Tr	*Turdus migratorius*	American robin
Tr	*Ixoreus naevius*	varied thrush
Tr	*Dumetella carolinensis*	gray catbird
Br	*Mimus polyglottos*	Northern mockingbird
Wr/Tr	*Oreoscoptes montanus*	sage thrasher
(CSC) Tr	*Toxostoma bendirei*	Bendire’s thrasher
Br	**Sturnus vulgaris*	European starling
Wr/Tr	*Anthus rubescens*	American pipit
Tr	*Bombycilla cedrorum*	cedar waxwing
Tr	*Phainopepla nitens*	phainopepla
Tr	*Vermivora pinus*	blue-winged warbler
Tr	*Vermivora peregrina*	Tennessee warbler
Channel Island Endemic Br	*Vermivora celata sordida*	dusky orange-crowned warbler
Tr	*Vermivora celata*	orange-crowned warbler
Tr	*Vermivora ruficapilla*	Nashville warbler
Tr	*Virmibora virginiae*	Virginia’s warbler
(CSC) Tr	*Dendroica petechia*	yellow warbler
Tr	*Dendroica pensylvanica*	chestnut-sided warbler
Tr	*Dendroica magnolia*	magnolia warbler
Tr	*Dendrocia tigrina*	Cape May warbler
Tr	*Dendorica caerulescens*	black-throated blue warbler
Wr/Tr	*Dendroica cornata*	yellow-rumped warbler
Tr	*Dendroica nigrescens*	black-throated gray warbler
Tr	*Dendroica virens*	black-throated green warbler
Wr/Tr	*Dendroica townsendi*	Townsend’s warbler
Tr	*Dendroica occidentalis*	hermit warbler
Tr	*Dendroica fusca*	blackburnian warbler
Tr	*Dendroica discolor*	prairie warbler
Tr	*Dendroica palmarum*	palm warbler

TAXON		
sensitivity status	**scientific name**	**common name**
Tr	*Dendroica castanea*	bay-breasted warbler
Tr	*Dendroica striata*	blackpoll warbler
Tr	*Mniotilta varia*	Black-and-white Warbler
Tr	*Setophaga ruticilla*	American redstart
Tr	*Protonotaria ccitrea*	prothonotary warbler
Tr	*Seiurus aurocapillus*	ovenbird
Tr	*Seiurus noveboracensis*	Northern water thrush
Tr	*Oporornis tolmiei*	Macgillivray's warbler
Wr/Tr	*Geothlypis trichas*	common yellowthroat
Tr	*Wilsonia pusilla*	Wilson's warbler
Tr	*Wilsonia canadensis*	Canada warbler
(CSC) Tr	*Icteria virens*	yellow-breasted chat
(CSC) Tr	*Piranga rubra*	summer tanager
Tr	*Piranga ludoviciana*	Western tanager
Tr	*Piranga olivacea*	scarlet tanager
Tr	*Pipilo chlorurus*	green-tailed towhee
Wr/Tr	*Pipilo maculatus*	spotted towhee
Channel Island Endemic Extirpated Br	*Pipilo maculatus clementae*	San Clemente (spotted) towhee
Tr	*Aimophila cassinii*	Cassin's sparrow
Tr	*Aimophila ruficeps*	rufous-crowned sparrow
Tr	*Spizella arborea*	American tree sparrow
Yr	*Spizella passerina*	chipping sparrow
Tr	*Spizella pallida*	clay-colored sparrow
Tr	*Spizella breweri*	Brewer's sparrow
Tr	*Spizella atrogularis*	black-chinned sparrow
Wr/Tr	*Pooecetes gramineus*	vesper sparrow
Wr/Tr	*Chondestes grammacus*	lark sparrow
Tr	*Amphispiza bilineata*	black-throated sparrow
SCI Endemic (FT, CSC) Br	*Amphispiza belli clementae*	San Clemente sage sparrow
Tr	*Calamospiza melanocorys*	lark bunting
Wr/Tr	*Passerculus sandwichensis*	Savannah sparrow
(CSC) Br	*Ammodramus savannarum*	grasshopper sparrow
Wr/Tr	*Passerella iliaca*	fox sparrow
Wr/Tr	*Melospiza melodia*	song sparrow
Channel island Endemic Extirpated Wr/Tr	*Melospiza melodia clementae*	San Clemente song sparrow
Wr/Tr	*Melospiza lincolnii*	Lincoln's sparrow
Tr	*Zonotrichia querula*	Harris's sparrow
Tr	*Zonotrichia albicollis*	white-throated sparrow
Wr/Tr	*Zonotrichia leucophrys*	white-crowned sparrow
Wr/Tr	*Zonotrichia atricapilla*	golden-crowned sparrow
Wr/Tr	*Junco hyemalis*	dark-eyed junco
Tr	*Calcarius lapponicus*	lapland longspur
Tr	*Calcarius ornatus*	chestnut-collared longspur
Tr	*Pheucticus ludovicianus*	rose-breasted grosbeak
Tr	*Pheucticus melanocephalus*	black-headed grosbeak
Tr	*Guiraca caerulea*	blue grosbeak
Br	*Passerina amoena*	lazuli bunting
Tr	*Passerina cyanea*	indigo bunting
Tr	*Spiza americana*	dickcissel
Tr	*Dolichonyx oryzivorus*	bobolink

TAXON		
sensitivity status	**scientific name**	**common name**
Tr	*Agelaius phoeniceus*	red-winged blackbird
Br	*Sturnella neglecta*	Western meadowlark
Tr	*Xanthocephalus xanthocephalus*	yellow-headed blackbird
Tr	*Euphagus carolinus*	rusty blackbird
Wr/Tr	*Euphagus cyanocephalus*	Brewer's blackbird
Yr	*Molothrus ater*	brown-headed cowbird
Tr	*Icterus cucullatus*	hooded oriole
Tr	*Icterus bullocki*	Bullock's oriole
Tr	*Icterus galbula*	Baltimore oriole
Tr	*Icterus parisorum*	Scott's oriole
Tr	*Carpodacus purpureus*	purple finch
Channel Island Endemic Br	*Carpodacus mexicanus clementis*	San Clemente house finch
Tr	*Carduelis pinus*	pine siskin
Yr	*Carduelis psaltria*	lesser goldfinch
Tr	*Carduelis lawrencei*	Lawrence's goldfinch
Tr	*Carduelis tristis*	American Goldfinch
Tr	**Carduelis carduelis*	European goldfinch
Br	**Passer domesticus*	house sparrow
MAMMALS		
	Canidae	
	**Canus familiaris*	domestic dog
	Carnivora	
ST	*Urocyon littoralis clementae*	San Clemente Island fox
	Chiroptera	
	Myotis californicus	California bat
	Myotis thysanodes	fringed bat
	Plecotus townsendii	Townsend's big-eared bat
	Tadarida brasiliensis	free-tailed bat
	Felidae	
	**Felis domesticus*	house cat
	Rodentia	
	**Mircrotus californicus*	California vole
	**Mus musculus*	house mouse
	Peromyscus maniculatus clementis	San Clemente Island deer mouse
	**Rattus rattus*	black rat
	**Reithrodontomys megalotis*	harvest mouse
	Ungulata	
	**Bos taurus*	cattle
	**Capra hircus*	domestic goat
	**Odocoileus hemionus*	mule deer
	**Ovis aries*	domestic sheep
	**Sus scrofa*	pig
MARINE VERTEBRATES		
MAMMALS		
	Pinnipedia	
	Mirounga angustirostris	Northern elephant seal

TAXON		
sensitivity status	**scientific name**	**common name**
	Phoca vitulina richardsi	harbor seal
	Zalophus californianus	California sea lion
	Fissipedia	
FT	*Enhydra lutris*	sea otter
	Mysticeti	
	Balaena glacialis	right whale
	Balaenoptera acutorostrata	minke whale
FE	*Balaenoptera borealis*	sei whale
	Balaenoptera edeni	Bryde's whale
FE	*Balaenoptera musculus*	blue whale
FE	*Balaenoptera physalus*	finbackwhale
	Eschrichtius robustus	gray whale
FE	*Megaptera novaengiliae*	humpback whale
	Odontoceti	
	Delphinus delphis	common dolphin
	Globicephala macrorhynoa	short-finned pilot whale
	Grampus griseus	Risso's dolphin
	Kogia breviceps	pygmy sperm whale
	Lagenorhynchus obliquidens	white-sided dolphin
	Lissodelphis borealis	Northern right whale dolphin
	Mesoplodon carlhubbsi	Hubb's beaked whale
	Mesoplodon ginkgodens	ginko-toothed whale
	Mesoplodon hectori	Hector's beaked whale
	Orcinus orca	killer whale
	Phocoenoides dalli	Dall's porpoise
	Physeter macrocephalus	sperm whale
	Pseudorca crassidens	false killer whale
	Stenella coeruleoalba	long-beaked dolphin
	Tursiops truncatus gilli	Pacific bottlenose dolphin
	Ziphius cavirostris	Cuvier's beaked whale
CHONDRICHTHYES (CARTILAGENOUS FISH)		
	Alopias sp.	thresher shark
	Carcharodon carcharias	great white shark
	Galeorhinus galeus	soupfin shark
	Heterodontus francisci	horned shark
	Prionace glauca	blue shark
OSTEICHTHYES (BONY FISH)		
	Anoplopoma fimbria	sablefish
	Antherinidae	silversides
	Atherinops affinis	topsmelt
	Bathylagus ochotensis	popeye blacksmelt
	Caulolatilus princeps	ocean whitefish
	Chromis punctipinnis	blacksmith
	Citharichthys sp.	sanddab
	Clupea pallasi	Pacific herring
	Cynoscion nobilis	white seabass
	Embiotoca jacksoni	black perch
	Engraulis mordax	Northern anchovy
	Eopsetta jordani	petrale sole

TAXON		
sensitivity status	**scientific name**	**common name**
	Girella nigricans	opaleye
	Glyptocephalus zachirus	rex sole
	Halichores semicinctus	rock wrasse
	Hypsypops rubincunda	garibaldi
	Icichthys lockingtoni	medusafish
	Leuroglossus stilbius	California smoothtongue
	Lycodes (Aprodon) cortezianus	bigfin eelpout
	Lyopsetta exilis	slender sole
	Medialluna californiensis	halfmoon
	Merluccius productus	Pacific whiting
	Microstomas pacificus	dover sole
	Mycotophidae	lanternfish
	Oncorhynchus gorbuscha	pink salmon
	Oncorhynchus keta	chump salmon
	Oncorhynchus mykiss	steelhead
	Oncorhynchus tshawytscha	chinook salmon
	Oxyjulis californica	senorita
	Paralabrax clathratus	kelp bass
	Paralichthys californicus	California halibut
	Pimelometopon pulchrum	wrasse
	Porichthys notatus	plainfin midshipman
	Protomyctophum crockeri	California flashlightfish
	Sarda chiliensis	Pacific bonito
	Sardinops sagax	sardine
	Sardinops sagax caeruleus	Pacific sardine
	Scomber japonicus	Pacific mackerel
	Sebastes entomelas	widow rockfish
	Sebastes jordani	shortbelly rockfish
	Sebastes spp.	rockfish
	Semicossyphus pulcher	California sheephead
	Seriola dorsalis	yellowtail
	Sphyraena argentea	California/Pacific baracuda
	Squalus acanthias	spiny dogfish
	Stenobrachius leucopsarus	Northern lampfish
	Stereolepis gigas	black sea bass
	Tarletonbeania crenularis	blue lanternfish
	Thunnus alalunga	albacore
	Thunnus thynnus	bluefin tuna
	Trachurus symmetricus	Jack Mackerel
	Triphoturus mexicanus	Mexican lampfish
	Xiphias gladius	swordfish
UROCHORDATA (TUNICATES)		
	Didemnum carnulentum	colonial tunicate
	Synoicum parfustis	tunicate

TERRESTRIAL INVERTEBRATES

ARTHROPODA

	Coleoptera (Beetles)	
SCI Endemic	*Amara insularis*	beetle
Channel Island Endemic	*Apsena grossa*	beetle
SCI Endemic	*Attalus transmarinus*	beetle
SCI Endemic	*Celia clementina*	beetle
SCI Endemic	*Cleonus basalis*	beetle
Channel Island Endemic (FSC)	*Coelus pacificus*	Channel Islands dune beetle
SCI Endemic (FSC)	*Coenonycha clementina*	SCI coenonycha beetle
SCI Endemic	*Colaspidea subvittata*	leaf beetle
Channel Island Endemic	*Coniontis lata*	darkling beetle
SCI Endemic	*Dasytes clemente*	beetle
Channel Island Endemic	*Eleodes laticollis apprimus*	darkling beetle
Channel Island Endemic	*Eusattus robustus*	beetle
SCI Endemic	*Melanopthalma insularis*	beetle
SCI Endemic	*Pterostichus gliscans*	ground beetle
SCI Endemic	*Sciopithes insularis*	root weevil
Channel Island Endemic	*Trichochorus pedalus*	beetle
Channel Island Endemic	*Xarifa insularis*	beetle
SCI Endemic	**Diptera (Flys)**	
SCI Endemic	*Efferia clementi*	robber fly
SCI Endemic	*Mythicomyia discreta*	fly
	Hemiptera (True Bugs)	
	Agapostamon femoratus	sweat bee
	Agapostemon texana	
SCI Endemic	*Agonopterix toega*	moth
	Agrotis venerabilis arida	cutworm moth
SCI Endemic	*Ammophila azteca clemente*	wasp
	Anthidium collectum	resin bee
	Anthophora (urbana) clementina	common solitary bee
	Anthophora edwardsii	bee
Channel Island Endemic	*Aphaenogaster patruelis*	ant?
SCI Endemic	*Argyrotaenia fraciscana insulana*	moth
	Arotrura longissma	moth
SCI Endemic	*Bembix americana dugi*	wasp
	Bombylias lucifer	long-nose bee
	Brephidium exilis	pygmy blue butterfly
Channel Island Endemic	*Camponotus bakeri*	harvester ant
	Celastrina argiolus echo	spring azure
Channel Island Endemic	*Cerostoma lyonothamnae*	moth
	Characoma nilotica	moth
Channel Island Endemic	*Coleotechnites n. sp.*	moth
	Colias eurytheme	alfalfa butterfly
	Diadasia rinconis	bee
	Erynnis funeralis	funereal dusky-wing butterfly
SCI Endemic	*Heliococcus clemente*	mealybug
	Hypochrotaenia formula	bee
	Melecta separata callura	bee
	Noctueliopsis grandis	moth
	Oncocnemis augusta	moth
	Oncocnemis nita	moth

Channel Island Endemic	*Palmodes insularis*	wasp
	Papilio zelicaon	anise swallowtail
SCI Endemic	*Pergama near giganteus*	moth
SCI Endemic	*Pheidole clementensis*	harvester ant
	Pieris protodice	
	**Pieris rapae*	cabbage butterfly
	Plebejus acmon acmon	acmon blue
SCI Endemic	*Pterotaea crinigera*	moth
	Pterotaea crinigera	moth
SCI Endemic	*Scrobipalpula* n. sp.	moth
SCI Endemic	*Scrobipalpula* n. sp. *nr. chiquitella*	moth
Channel Island Endemic	*Stigmella n. sp.*	
	Strymon melinus	gray hairstreak
	Synalonia actuosa	solitary bee
	Vanessa annabella	thistle butterfly
	Vanessa cardui	painted lady
	Vanessa virginiensis	thistle butterfly
	Vejovis minimus minimus	scorpion
Channel Island Endemic	*Vladimiria? n. sp.*	
Channel Island Endemic	*Ypsolopha lyonothamnae*	moth
Channel Island Endemic	*Zosteropoda clementei*	moth
	Dermaptera (Earwigs)	
SCI Endemic	*Cnemotettix pulvillifer*	cricket
SCI Endemic	*Tigolene clementius*	millipede
	Chelicerata	
Channel Island Endemic	*Ixodes peromysci*	shield tick
SCI Endemic	*Lutica clemntea*	spider
SCI Endemic	*Protolphus cockerelli*	spider?
MOLLUSCA		
	Catinella oregonensis	snail
Presumed Extinct	*Micrarionta agnesae*	land snail
Presumed Extinct	*Micrarionta feralis*	land snail
SCI Endemic (FSC)	*Micrarionta gabbi*	Gabb’s snail
SCI Endemic	*Micrarionta intercisa*	land snail
	Quickella rehderi	snail
Channel Island Endemic	*Sterkia clementina*	San Clemente Island blunt-top snail
SCI Endemic	*Vertigo californaica longa*	snail
Channel Island Endemic	*Vertigo californica catalinaria*	snail
SCI Endemic	*Xerarionta redimita*	land snail
MARINE INVERTEBRATES		
PORIFORA		
	Cliona celata	boring sponge
	Halichondria panicea	bread crumb sponge
	Ophlitaspongia pennata	red sponge
	Stelleta clarella	sponge
	Tethya aurantia var. *californica*	orange puffball sponge
CNIDARIA		
	Hydrozoa	
	Sertularella sp.	hydroid?

	Anthozoa	
	Anthopleura elegantissima	clonal anemone
	Anthopleura xanthogrammica	giant green anemone
	Astrangia lajollaensis	cup coral
	Coenocyathus bowersi	colonial cup coral
	Corynactis californica	strawberry corallimorpharian
	Epiactis prolifera	brooding anemone
	Lophogorgia chiliensis	red gorgonian
	Paracyathus stearnsi	brown cup coral
	Parazoanthus licificum	zoanthid anemone
ANNELIDA		
	Polychaeta	
	Euzonus dillonensis	annelid
	Phragmatopoma californica	tube worm
	Serpulidae	annelid
	Spirobranchus spinosus	annelid
	Spirorbis sp.	annelid
ARTHROPODA		
	Exocirolana chiltoni	arthropod
	Sicyonia ingentis	ridgeback prawn
	Cirripedia	
	Balanus glandula	barnacles
	Balanus tintinnabulum californcus	barnacles
	Chthamalus fissus/dalli	barnacle
	Pollicipes polymerus	goose neck barnacle
	Tetraclita squamosa ssp. rubescens	red barnacle
	Malacostraca	
	Ligia occidentalis	isopod
	Decapoda	
	Cancer antennarius	rock crab
	Lophopanopeus bellus	blackclaw crestleg crab
	Lophopanopeus leucomanus heathii	knobknee crestleg crag
	Pachygrapsus crassipes	striped shore crab
	Pagurus hirsutiusculus	hairy hermit crab
	Pagurus samuelis	blueband hermit crab
	Pandalus platyceros	spot shrimp
	Panulirus interruptus	California spiny lobster
	Paraxanthias taylori	arthropod
	Pugettia gracilis	graceful kelp crab
	Pugettia producta	Northern kelp crab
MOLLUSCA		
	Polyplacophora	
	Cyanoplax dentiens	chiton
	Cyanoplax hartwegii	chiton
	Mopalia acuta	chiton
	Nuttallina fluxa	chiton
	Gastropoda	
	Acanthina paucilirata	checkered unicorn
	Acanthina spirata	angular unicorn
	Astrea undosa	gastropod
	Barleeia sp.	gastropod

	Ceratostoma nuttali	gastropod
	Cerithiopsis carpenteri	gastropod
	Collisella conus	limpet
	Collisella digitalis	ribbed limpet
	Collisella insessa	limpet
	Collisella limatula	file limpet
	Collisella pelta	shield limpet
	Collisella scabra	rough limpet
	Collisella scutum	limpet
	Collisella strigatella	limpet
	Crepipatella lingulata	Pacific half-slippersnail
	Cypraea spadicea	chestnut cowry
	Dendropoma lituella/rastrum	flat or California wormsnail
	Fissurella volcano	volcano keyhole limpet
	Haliotis cracherodii	black abalone
	Haliotis fulgens	green abalone
	Haliotis kamtschatkana	pinto abalone
	Haliotis rufescens	red abalone
FE	*Haliotis sorensoni*	white abalone
	Haliotis walallensis	flat abalone
	Hipponix antiquatus	gastropod
	Homalopoma luridum	gastropod
	Littorina planaxis	gastropod
	Littorina scutulata	checkered periwinkle
	Lottia gigantea	limpet
	Macron lividus	livid macron
	Megathera crenulata	keyhole limpet
	Mitrella aurantiaca	golden dovesnail
	Mitrella carinata	gastropod
	Norrisia norrisi	norrissnail
	Notoacmea paleacea	surfgrass limpet
	Notoacmea scutum	plate limpet
	Ocenebra circumtexta	circled rocksnail
	Petaloconchus montereyensis	Monterey wormsnail
	Serpulorbis squamigerus	calcareous tube snail
	Tegula eiseni	turbin snail
	Tegula funnebralis	turbin snail
	Tegula gallina	turbin snail
	Vitrinella sp.	gastropod
	Bivalvia	
	Brachidontes adamsianus	Adams mussel
	Chama pellucida	rock jingle
	Lithophaga plumula	feather date mussel
	Mytilus californianus	California mussel
	Mytilus edulis	edible blue mussel
	Pseudochama exogyra	Pacific jewelbox
	Septifer bifurcatus	bifurcate mussel
	Cephalopoda	
	Octopus sp.	
	Loligo opalescens	market squid

ECHINODERMATA		
	Astrometis sertulifera	sea star
	Piaster ochraseous	sea star
	Strongylocentrotus franciscanus	common red urchin
	Strongylocentrotus purpuratus	common purple urchin

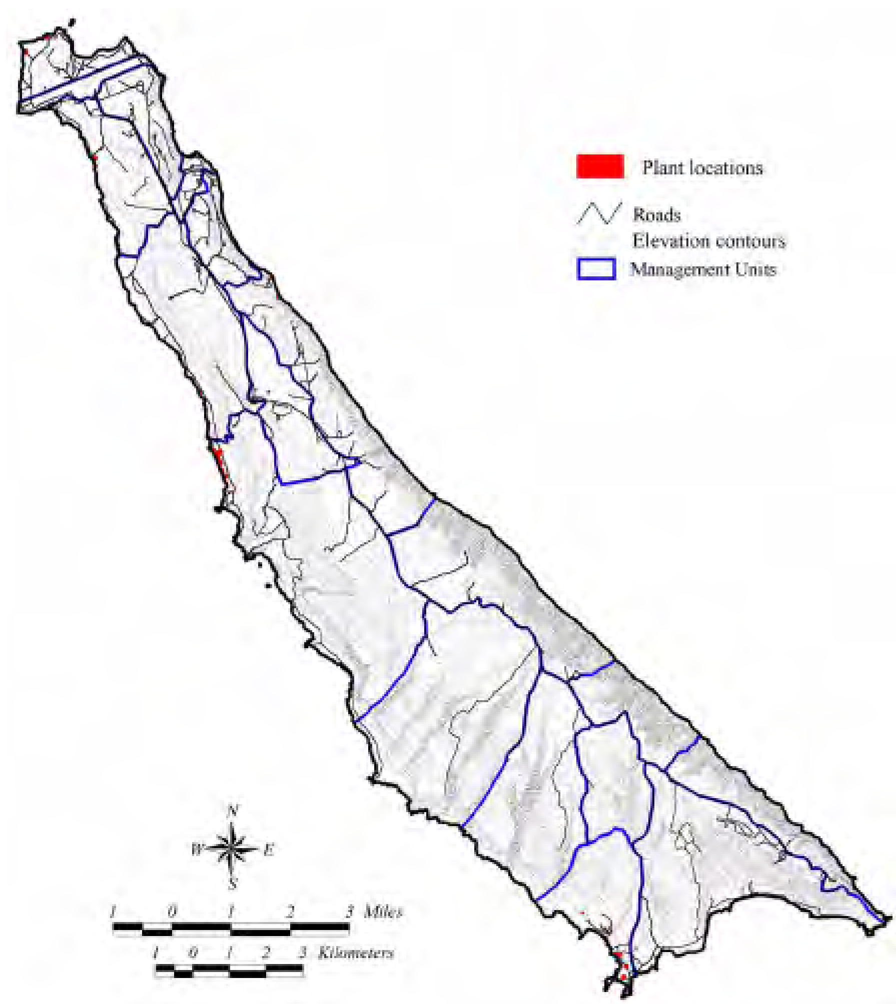
Appendix C: Rare Plant Locations and Status Summaries

Name: *Aphanisma blitoides*
Common Name: Aphanisma
Listing Status: Species of concern (USFWS)

Flowering Time: March-June
Distribution: Coastal CA and Baja CA; all CA Channel Islands except San Miguel; Los Coronados; Todos Santos, San Martin; Guadalupe; San Benito; Cedros; Natividad

Habitat: Maritime cactus scrub
Elevations between 10 and 40 m
Near coastline, flats immediately inland from beach
Current Status: (1996 and 1997)
21 occurrences of single plants to populations of 200 individuals
915 individuals

Reproductive Biology:
Bisexual flowers
Small flower size, reduced perianth, terminal inflorescences = wind-pollination
1 stamen per flower = self-pollination
dry fruit has single seed, dispersed by gravity/wind

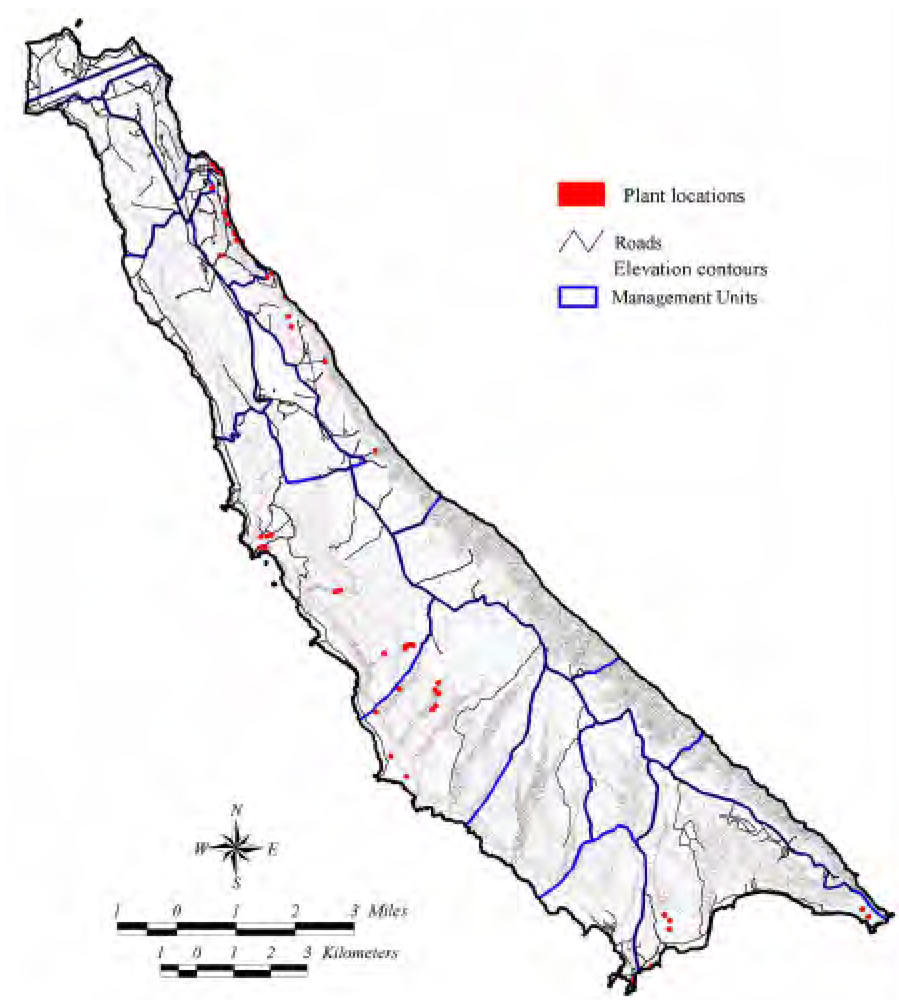


Name: *Artemisia nesiotica*
Common Name: Island sagebrush
Listing Status: no official status

Flowering Time: April-September
Distribution: Found only on Santa Barbara, San Nicolas, San Clemente islands

Habitat: Coastal scrub, coastal flats, open coastal slopes, steep canyon walls, floodplains in canyon bottoms
Elevations between 30 and 1,250 ft.
Current Status: (1996 and 1997)
52 occurrences of isolated individuals to populations of 4 to about 500 plants
2,500 individuals

Reproductive Biology: Apparently wind-pollinated (Faegri and van der Pijl 1979, Proctor *et al.* 1995)
Perfect flowers
Dispersed by wind
Most have high seed germination without treatment

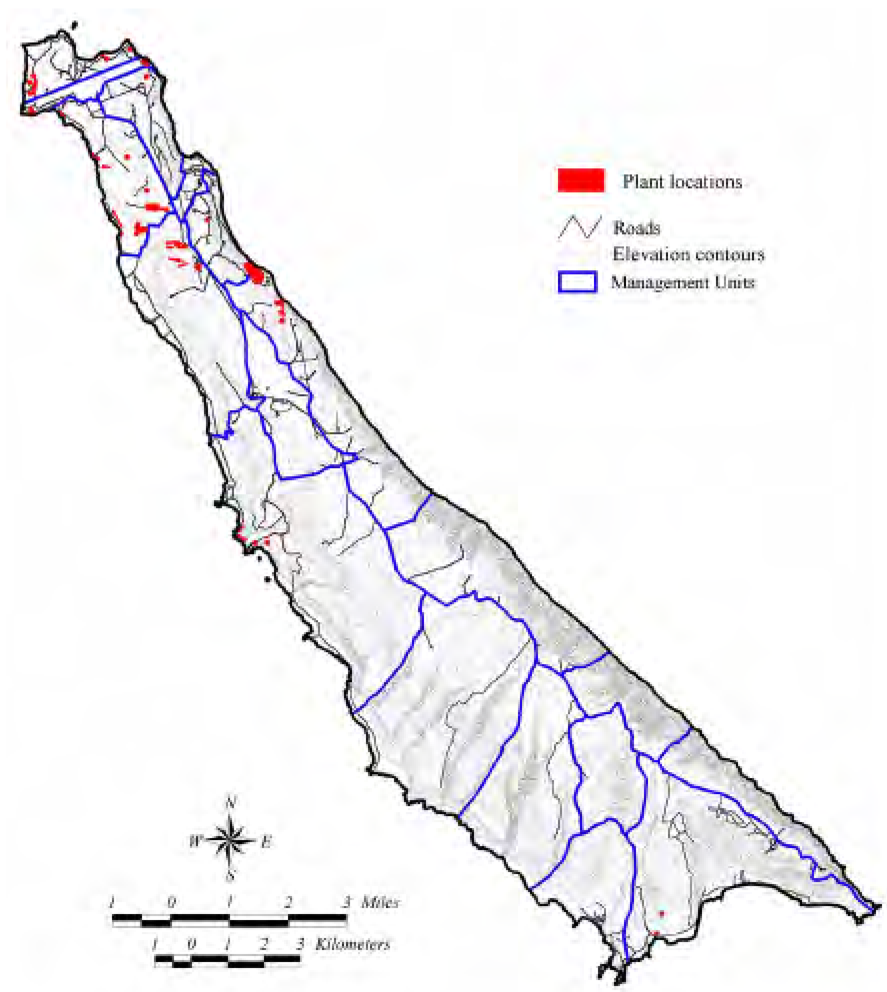


Name: *Astragalus miguelensis*
Common Name: San Miguel milkvetch
Listing Status: CNPS List 4, 1-1-3

Flowering Time: March – June
Distribution: Insular endemic to San Miguel, Santa Rosa, Santa Cruz, San Clemente, and Anacapa islands

Habitat: dunes, sandy bluffs, below cliffs
Current Status: Common on active dunes
Previously Reported Status: common on duens and sandy flats, occassional on sea bluffs (Raven 1963)
Reproductive Biology: unknown

Name: *Astragalus nevinii*
Common Name: San Clemente Island milkvetch, San Clemente Island loco-weed
Listing Status: Species of concern (USFWS)
Flowering Time: March-July
Distribution: Restricted to San Clemente Island
Habitat: Coastal flats, stabilized sand dunes
Elevations between 10 and 70 m
Few isolated – caliche soils on east side at elevations of up to 120 m
Species occurs on open sites, with fine-grained, well-drained substrates
Current Status: (1996 and 1997)
34 occurrences of isolated plants to populations with about 2,000 individuals
Over 6,000 individuals
Previously Reported Status: ~2200 outside of main dune complex, many thousands on dunes (1986).
Reproductive Biology: Bisexual flowers; Pollinate primarily by bees
May require insect visitation to ensure fruit and seed set
Apparently seeds germinate readily within 6-8 weeks following dispersal, do not require scarification prior to germination



Name: *Atriplex pacifica*
Common Name: South Coast saltscale
Listing Status: Species of concern (USFWS)

Flowering Time: March-October
Distribution: California mainland between Ventura County and northern Baja California
Found on all CA Channel Islands except San Miguel
Occurs on islands of Los Coronados, San Martin, Cedros, and Natividad

Habitat: Coastal flats and bluffs, open slopes and ridgetops
Elevations between 15 and 450 m
Gentle slopes or flats with south exposures
Current Status: (1996 and 1997)
14 occurrences of isolated plants to small populations of 5-15 individuals
Less than 100 individuals

Reproductive Biology: Monoecious, each pistillate flower produces 1-seeded fruit; Pollination effected by combination of selfing and outcrossing through wind pollination
Seeds generally require treatment, including dry storage prior to germination

Name: *Bergerocactus emoryi*
Common Name: golden cereus
Listing Status: CNPS List 2, 2-2-1

Flowering Time: May-June
Distribution: Occurs on Santa Catalina and San Clemente islands, San Diego Coast, and Baja

Habitat: canyon walls, boxthorn habitat on low-elevation terraces
Current Status: *no map coverage is available*
Previously Reported Status: Raven reported in 1963 that is was common on canyon walls, rocky slopes and at relatively low elevations throughout the island.

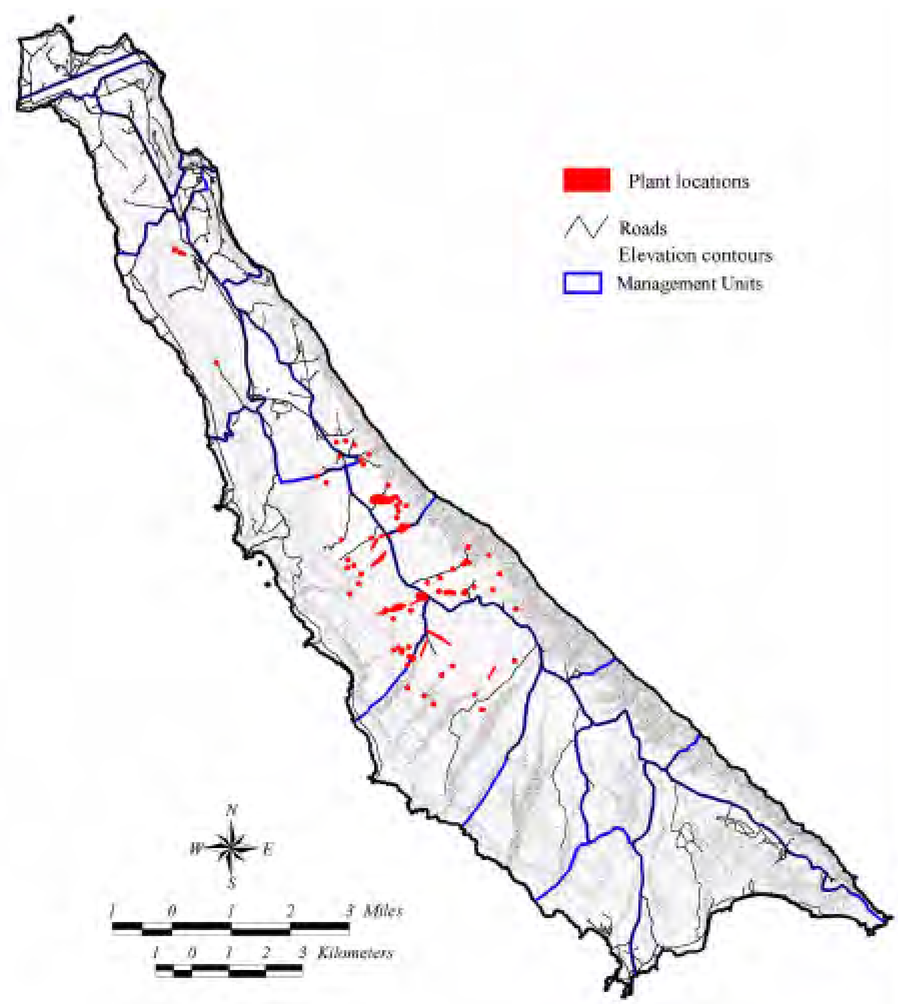
Reproductive Biology: unknown

Name: *Brodiaea kinkiensis*
Common Name: San Clemente Island brodiaea
Listing Status: Species of concern (USFWS)

Flowering Time: April-June
Distribution: Found only on San Clemente Island

Habitat: Grasslands, central portion of the mesa
Elevations between 300 and 565 m
Current Status: (1996 and 1997)
70 occurrences
21,000 individuals

Reproductive Biology: Bulbous herb
Bisexual flowers in terminal umbels
Self-incompatible, require insect visitation to ensure seed set
Passive seed dispersal, effected by wind
Seeds do not have pronounced dormancy, nor require treatment prior to germination
Populations enhanced by crack formation in deep clay soils, low densities of competitive annuals



Name: *Calandrinia maritima*
Common Name: seaside calandrinia
Listing Status: CNPS List 4, 1-2-1
Flowering Time: February – August
Distribution: Occurs on San Clemente and other Channel islands and on sea bluffs and sandy places from Santa Barbara County to Baja
Habitat: sandy soil, sea bluffs
Current Status: Not recorded
No map coverage available
Previously Reported Status: only one plant noted on entire island, on flat near sea (Raven 1963) Abundant on one rocky slope above a pebbly beach near Eel Point (Thorne 1969)
Reproductive Biology: unknown

Name: *Calystegia macrostegia* ssp. *amplissima*
Common Name: Island morning-glory
Listing Status: CNPS List 4

Flowering Time: March – December
Distribution: Insular endemic to San Clemente, Santa Barbara, and San Nicolas islands

Habitat: rocky outcrops and slopes, woodlands
Current Status: very common throughout island
No map coverage available.
Previously Reported Status: common on rockslides, in cactus patches, and on burshy slopes (Raven 1963)

Reproductive Biology: unknown

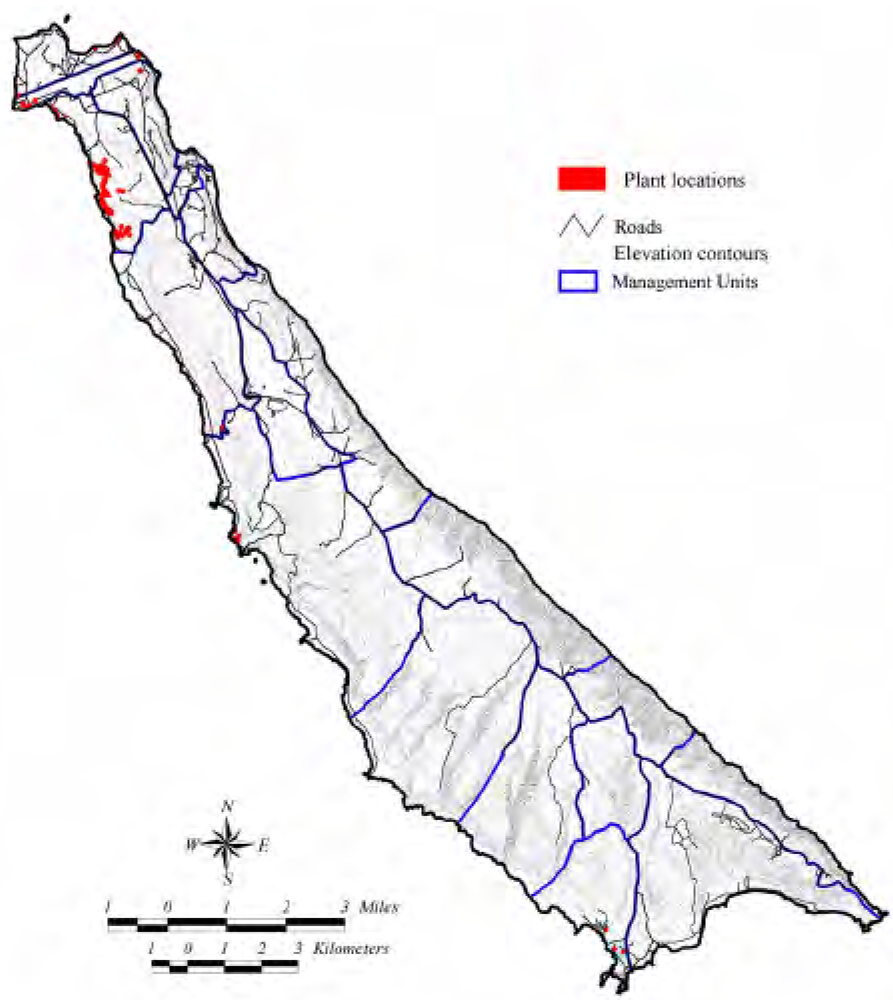
Name: *Camissonia guadalupensis clementina*
Common Name: San Clemente Island evening-primrose
Listing Status: Species of concern (USFWS)

Flowering Time: April-July
Distribution: This species is found only on the Channel Islands; the subspecies *C. g. clementina* only occurs on San Clemente Island.

Habitat:
Partially stabilized and unstabilized sand dunes, primarily on west side
Elevations between 10 and 85 m

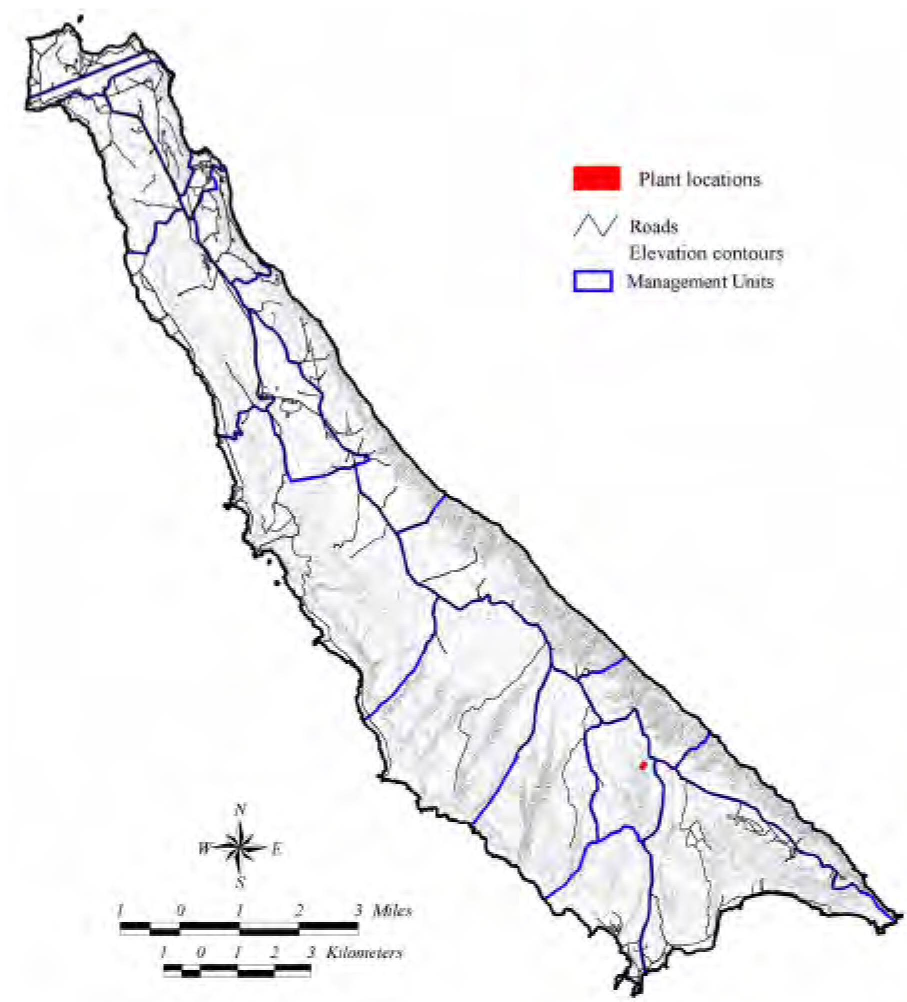
Current Status: (1996 and 1997)
33 occurrences of isolated individuals to populations of 10 to 1,000 plants
6,570 individuals
Previously Reported Status: Over 6,000 outside of main dune complex, many thousands (65% of taxon occurrence) on main dune complex (1986)

Reproductive Biology: Bisexual flowers in terminal, leafy spikes
Self-compatible, Self-pollinating



Name: *Castilleja grisea*
Common Name: San Clemente Island Indian paintbrush
Listing Status: Endangered (USFWS); Endangered (CDFG)
Flowering Time: (December-) February-May
Distribution: Found only on San Clemente Island
Habitat: Steep canyon walls, both sides
Coastal bluffs, slopes, flats around perimeter
Coastal sage scrub, maritime cactus scrub
Elevations between 10 and 365 m
Current Status: (1996 and 1997)
77 occurrences of isolated plants to populations of 4 to 600 individuals
3,500 individuals
Previously Reported Status: Less than 1,000 in six locations (1980, 1986)
Reproductive Biology: Hemiparasitic; Bisexual flowers in terminal spikes
Insect and hummingbird pollination/self-incompatible; Seeds passively dispersed
Seed germination few; absence of dormancy, requirement for host plants or seedlings at least at germination and early stages

Name: *Ceanothus megacarpus* ssp. *insularis*
Common Name: island big-pod ceanothus
Listing Status: Plant of limited distribution (CA Native Plant Society List 4)
Flowering Time: January-March
Distribution: Found on San Miguel, Santa Rosa, Santa Cruz, Anacapa, Santa Catalina, and San Clemente islands
Presumed extinct on San Miguel Island (not seen since 1880s)
Habitat: Coastal sage scrub
Elevations between 1,130 and 1,150 ft.
Current Status: (1996 and 1997)
12 occurrences
20 individuals
Previously Reported Status: one noted in Eagle Canyon (1980)
Reproductive Biology: bisexual flowers in terminal, or axillary, umbellate clusters
Self-compatibility and self-incompatibility reported
Scarification, heat, or hot water treatment required for germination
Rapid capsule dehiscence ejects the seeds

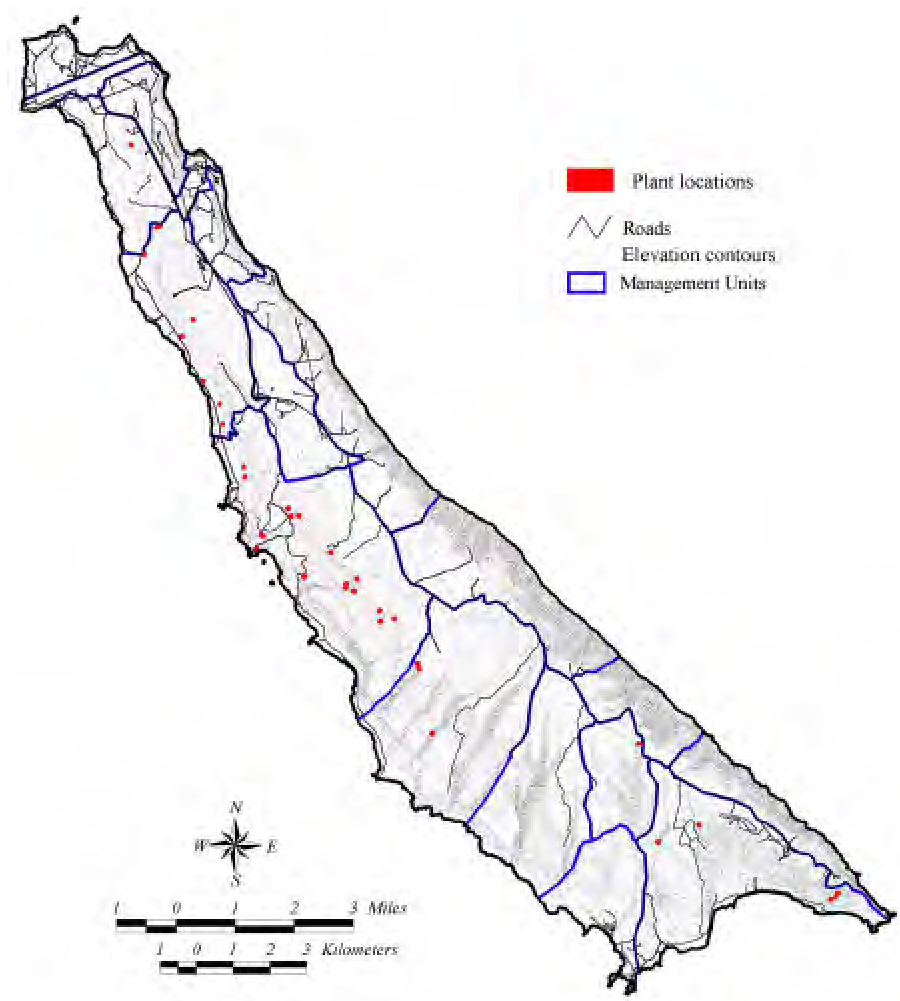


Name: *Crossosoma californicum*
Common Name: Catalina crossosoma
Listing Status: Plant of limited distribution (CA Native Plant Society List 4)

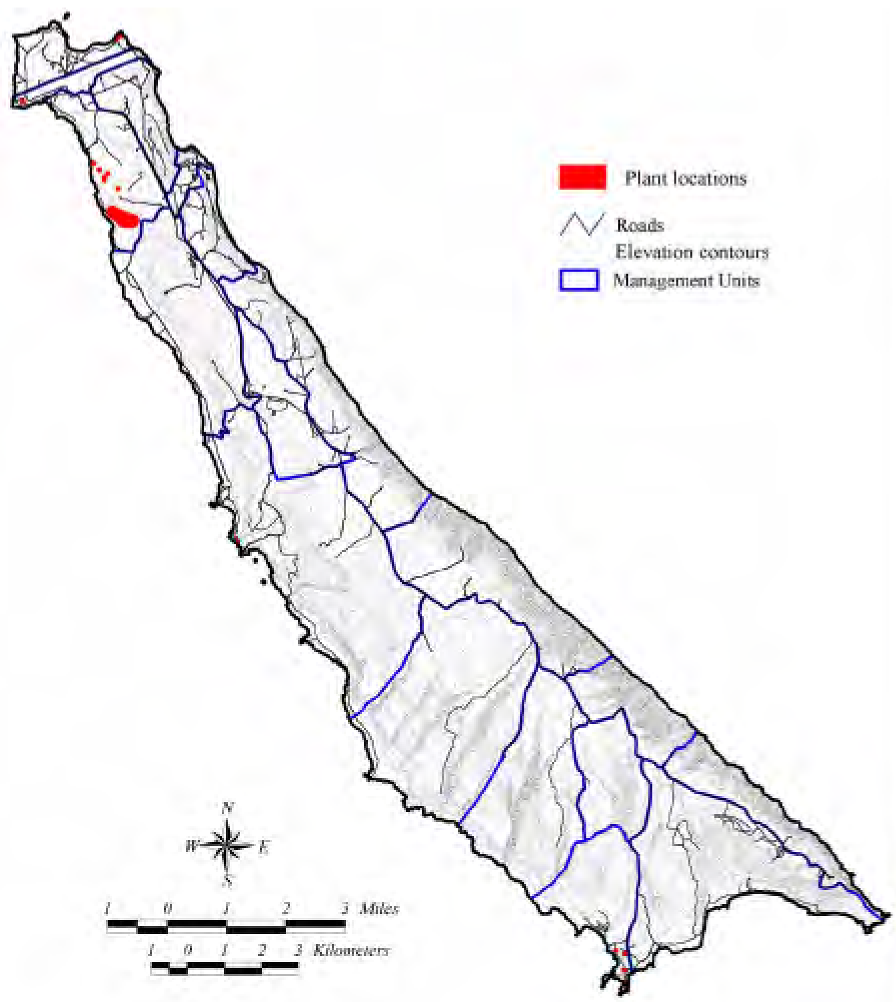
Flowering Time: December-March (-May)
Distribution: Restricted to the Palos Verdes peninsula on the CA mainland, and to the islands of Santa Catalina, San Clemente, and Guadalupe

Habitat: Rocky coastal slopes, canyon walls on west side
Flats and west- and south-facing slopes
Elevations between 60 and 1,340 ft in maritime cactus scrub

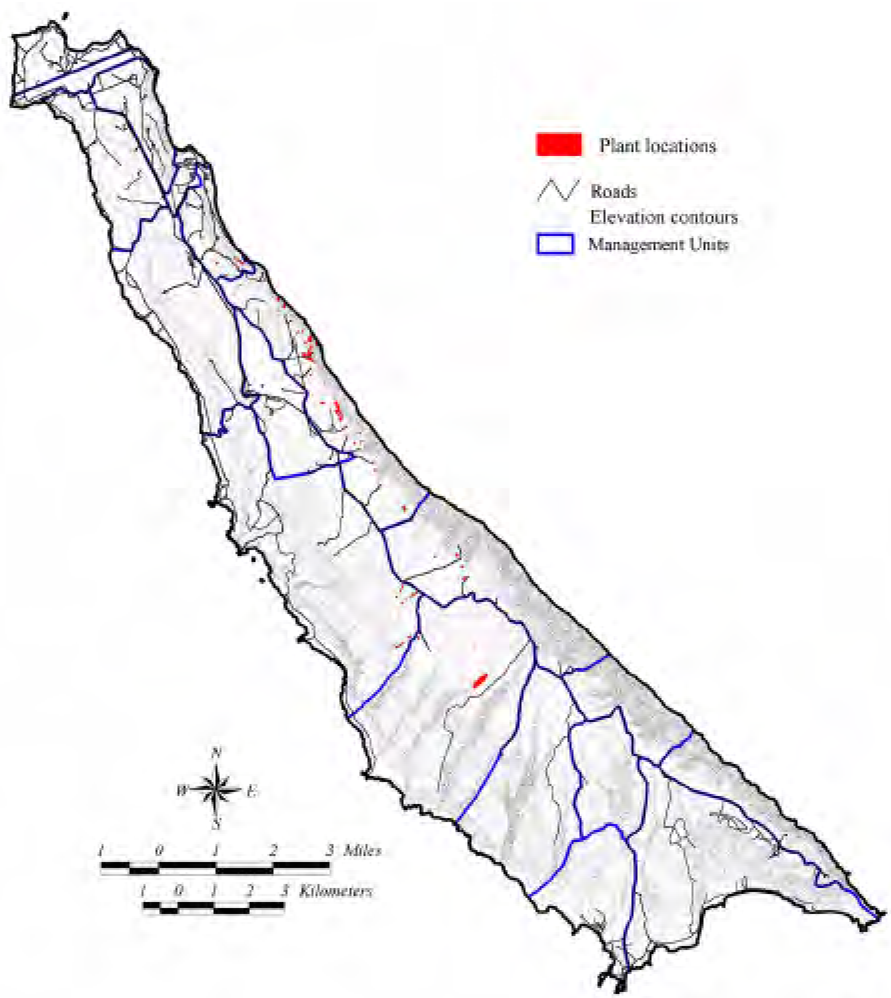
Current Status: (1996 and 1997)
41 occurrences
60 individuals
Isolated shrubs, two populations were comprised of 3 individuals each; one population included 4 individuals
Previously Reported Status: five isolated individuals (1980)
Reproductive Biology: Bisexual flowers borne in axils of terminal shoots
Naturally pollinated flowers = 13 seeds/fruit; Self-pollinating and outcrossed flowers
Seeds fall passively; No treatment is required prior to germination, absence of dormancy



Name: *Cryptantha traskiae*
Common Name: Trask's cryptantha
Listing Status: Species of concern (USFWS)
Flowering Time: March-May
Distribution: Restricted to San Nicolas and San Clemente Islands
Habitat: Sandy coastal flats, partially stabilized sand dunes near coast
Elevations between 10 and 70 m
Coastal flats- usually found in openings between maritime scrub dominants
Current Status: (1996 and 1997)
10 colonies comprised of 150 to more than 10,000 plants
23,000 individuals
Previously Reported Status: about 11,000 (1986)
Reproductive Biology: Bisexual flowers in dense, coiled spikes; 4 seeds/flower
Self-compatibility and self-pollination
Passive seed dispersal
Seed germination enhanced by treatment with water-soluble ashes or "charate"



Name: *Delphinium variegatum* var. *kinkiense*
Common Name: San Clemente Island larkspur
Listing Status: Endangered (USFWS); Endangered (CDFG)
Flowering Time: March-April
Distribution: Endemic to San Clemente Island
Habitat: East side of Island
Open grassy terraces; Rocky soils
Elevations between 80 and 255 m
Current Status: (1996 and 1997)
17 occurrences
5,700 individuals
Population range: 7- >1,400 individuals
Previously Reported Status: About 13 occurrences, 1500 individuals (1986)
Reproductive Biology: Bisexual flowers in terminal racemes, have 3 pistils w/1 style and stigma
Pistil functions independently, develops into a follicle at fruiting maturity
Mature follicles dehisce and release winged seeds passively, carried by wind
May require dormancy prior to germination



Name: *Delphinium variegatum* var. *thornei*
Common Name: Thorne's royal larkspur
Listing Status: Species of concern (USFWS)

Flowering Time: April-May
Distribution: Endemic to San Clemente Island

Habitat: Grassy, north-facing slopes
Often near heads of canyons on east side of island, or associated ridges or swales
Most in southern portion
Elevations between 400 and 550 m
Current Status:
17 occurrences
5,000 individuals
Isolated individuals to population sizes: 2 to >1,000 individuals
Previously Reported Status: three occurrences, 1,000 individuals (1986)
Reproductive Biology: Bisexual flowers in terminal racemes, 3 pistils w/1 style and stigma
Pistil develops into follicle at fruiting maturity

Name: *Dendromecon rigida* ssp. *rhamnoides*
Common Name: bush poppy
Listing Status: (believed to be extirpated from San Clemente Island)

Flowering Time: unknown
Distribution: Insular endemic to San Clemente and Santa Catalina islands. It is known from near Northwest Harbor and at the head of some precipitous dips near the south end of the island (Raven, 1963).

Habitat: unknown
Current Status: *believed extirpated*
Previously Reported Status: an open canyon mouth near NW harbor and at the hea of some of the canyons on the east side of the island (Trask 1903)

Reproductive Biology: unknown

Name: *Dissanthelium californicum*
Common Name: California dissanthelium
Listing Status: (believed to be extinct)

Flowering Time: March-April
Distribution: It was previously known from Santa Catalina, San Clement and Guadalupe islands.
Habitat: *D. californicum* had been found on "warm rocky slopes" on Guadalupe Island (Juneak andWilken, 1996).

Current Status: *Believed extinct.* It had been collected once on San Clemente, once on Santa Catalina, andonce on Guadalupe Island.

Reproductive Biology: unknown

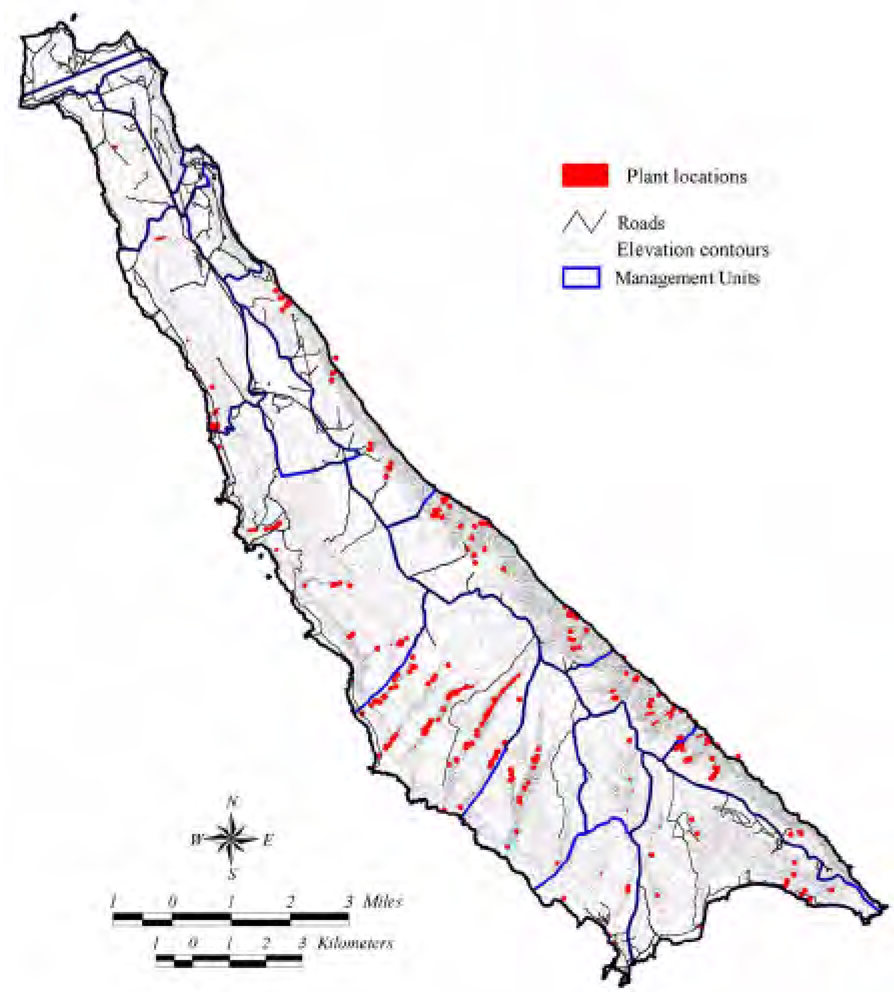
Name: *Dudleya virens* var. *virens*
Common Name: San Clemente Island live-forever
Listing Status: Species of concern (USFWS)

Flowering Time: May-June
Distribution: Endemic to San Clemente Island

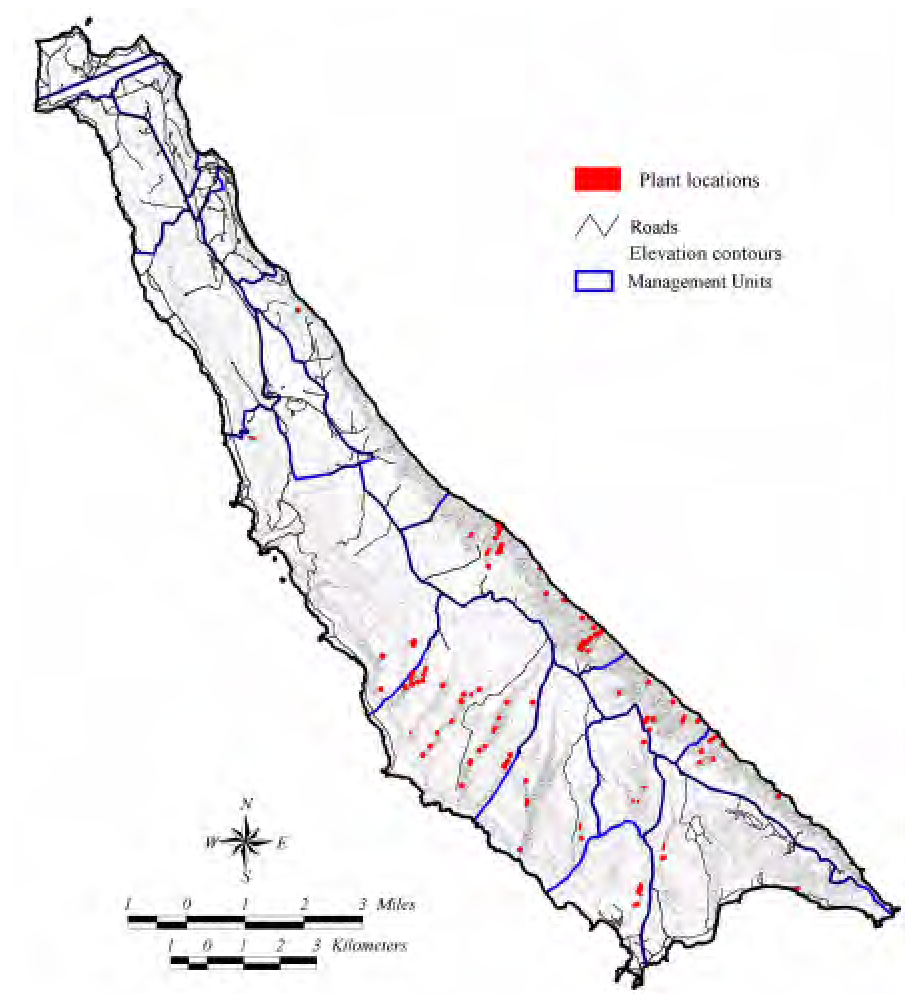
Habitat: Steep, rocky canyon walls
Coastal bluffs
Elevations between 10 and 530 m

Current Status: (1996 and 1997)
268 occurrences
17,000 individuals
Isolated individuals to population sizes: 2 to 1,900 individuals
Previously Reported Status: 20 occurrences of about 8,000 individuals (1986)

Reproductive Biology: White, bisexual flowers on 3-7 terminal spikes w/1 style and stigma
Each pistil can function independently w/respect to pollination; each develops into a follicle at fruiting maturity



Name: *Eriogonum giganteum* var. *formosum*
Common Name: San Clemente Island buckwheat
Listing Status: Species of concern (USFWS)
Flowering Time: June-October
Distribution: Endemic to San Clemente Island
Habitat: Coastal slopes and flats
Steep canyon walls
Canyon bottoms
Elevations between 10 and 455 m
Current Status: (1996 and 1997)
106 occurrences
3,500 individuals
Individuals to population sizes: 2 to 500 individuals
Previously Reported Status: less than 200 individuals in four locations
Reproductive Biology: Bisexual and radial flowers w/1 pistil, which develops into a single-seeded achene in fruit
Fruits fall from plant and are dispersed by gravity and wind



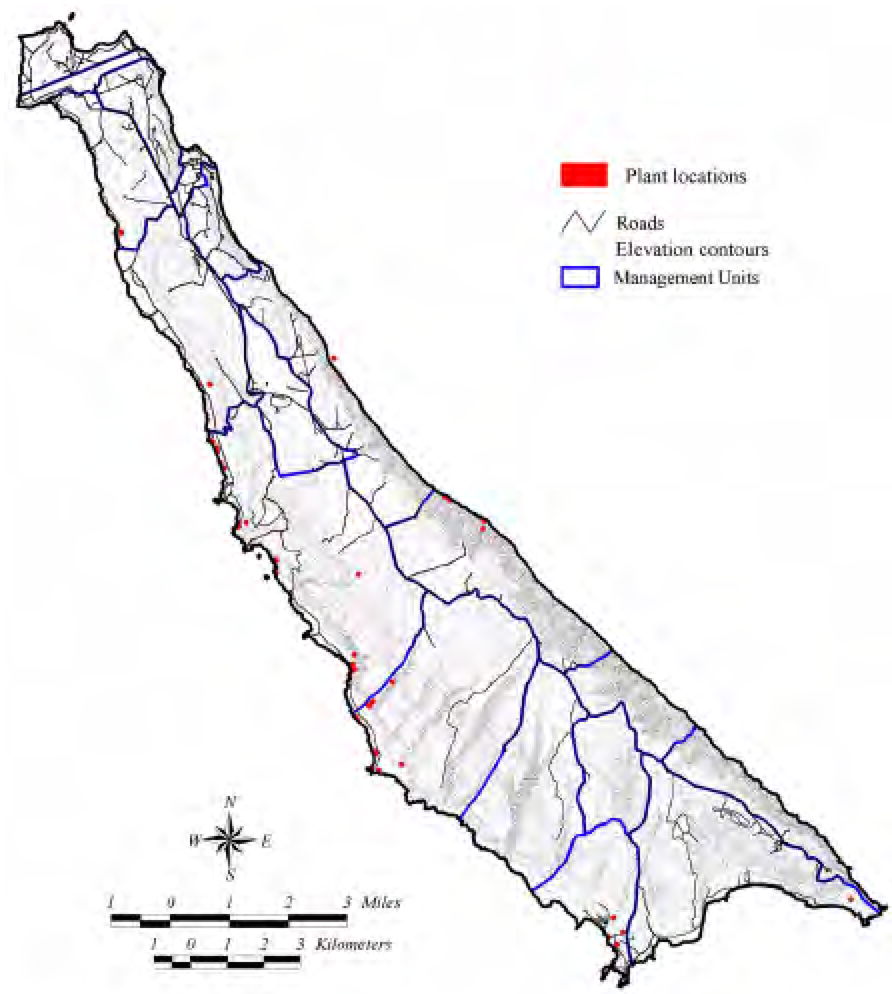
Name: *Eriophyllum nevinii*
Common Name: Nevin's wooly sunflower, Nevin's eriophyllum
Listing Status: CNPS Inventory 1B

Flowering Time: April – August
Distribution: Insular endemic to San Clemente, Santa Catalina, and Santa Barbara islands

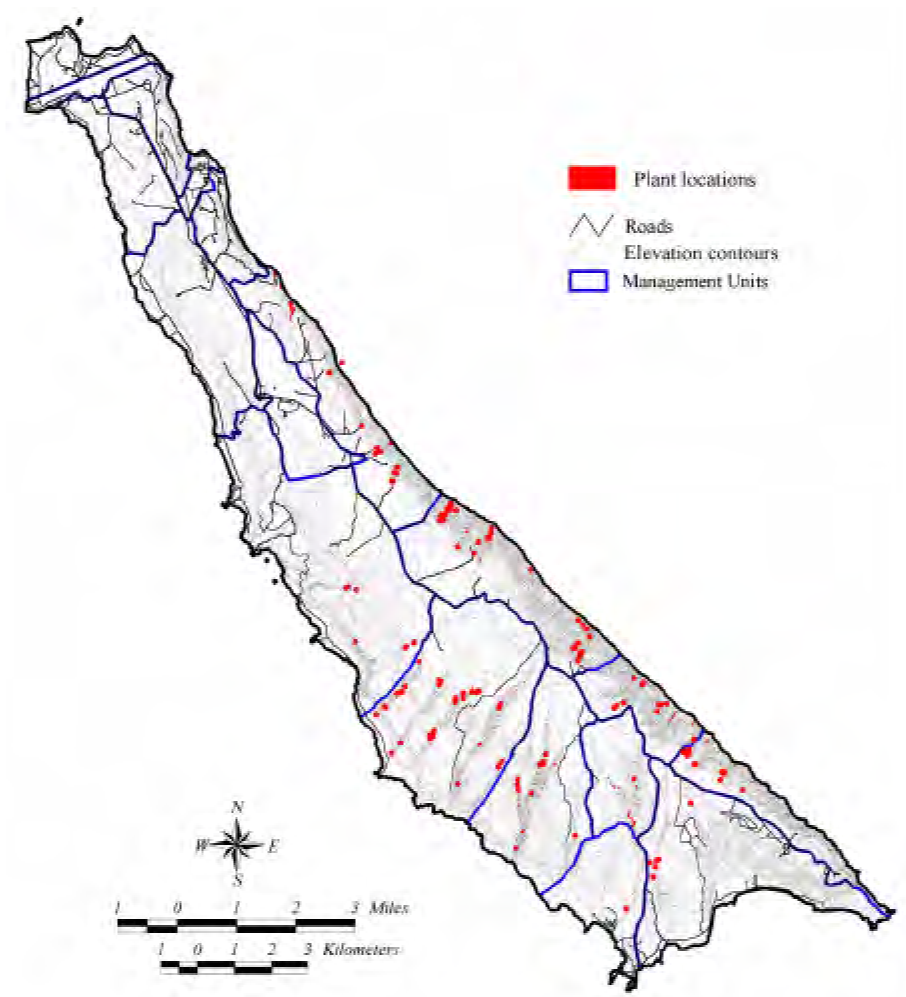
Habitat: coastal bluffs and cliffs in the lower reaches of canyons
Current Status: very abundant on canyon walls, sea bluffs and rocks
No map coverage available
Previously Reported Status: common on sea bluffs and on cliffs in the lower reaches of canyons all around the island (Raven 1963)

Reproductive Biology: unknown

Name: *Eschscholzia ramosa*
Common Name: island poppy
Listing Status: Plant of limited distribution (CNPS Inventory 3 and 4)
Flowering Time: February-May
Distribution: Insular endemic on 5 of the Channel Islands, not including San Miguel or Anacapa islands
Insular endemic on 7 islands off the west coast of Baja California including Guadalupe Island
Habitat: Canyon bottoms and coastal slopes and flats around the perimeter of the island, Elevations between 3 and 65 m
Current Status: (1996 and 1997)
50 occurrences
2,300 individuals
Isolated individuals to population sizes of about 450 individuals
Previously Reported Status:
Reproductive Biology: Bisexual flowers
Pollination by a variety of insects including bees, beetles, and flies
Self-incompatible
Seeds germinate readily without treatment but germination can be suppressed by light



Name: *Galium catalinense* ssp. *acrispum*
Common Name: San Clemente Island bedstraw
Listing Status: Species of concern (USFWS)
Flowering Time: March-May
Distribution: Endemic to San Clemente Island
Habitat: Open coastal slopes, steep canyon walls
Canyon bottoms
Elevations between 10 and 455 m
Current Status: 144 occurrences
1,300 individuals
23 occurrences comprised 1-2 individuals; 39 occurrences represent populations of 3-50 plants; one population of 75 plants was recorded.
Previously Reported Status: About 225 individuals in four occurrences (1986)
Reproductive Biology: Dioecious or polygamous subshrub (i.e., with various combinations of pistillate, staminate, and bisexual flowers on same plant)
Small flies, moths, and bees reported as pollinators

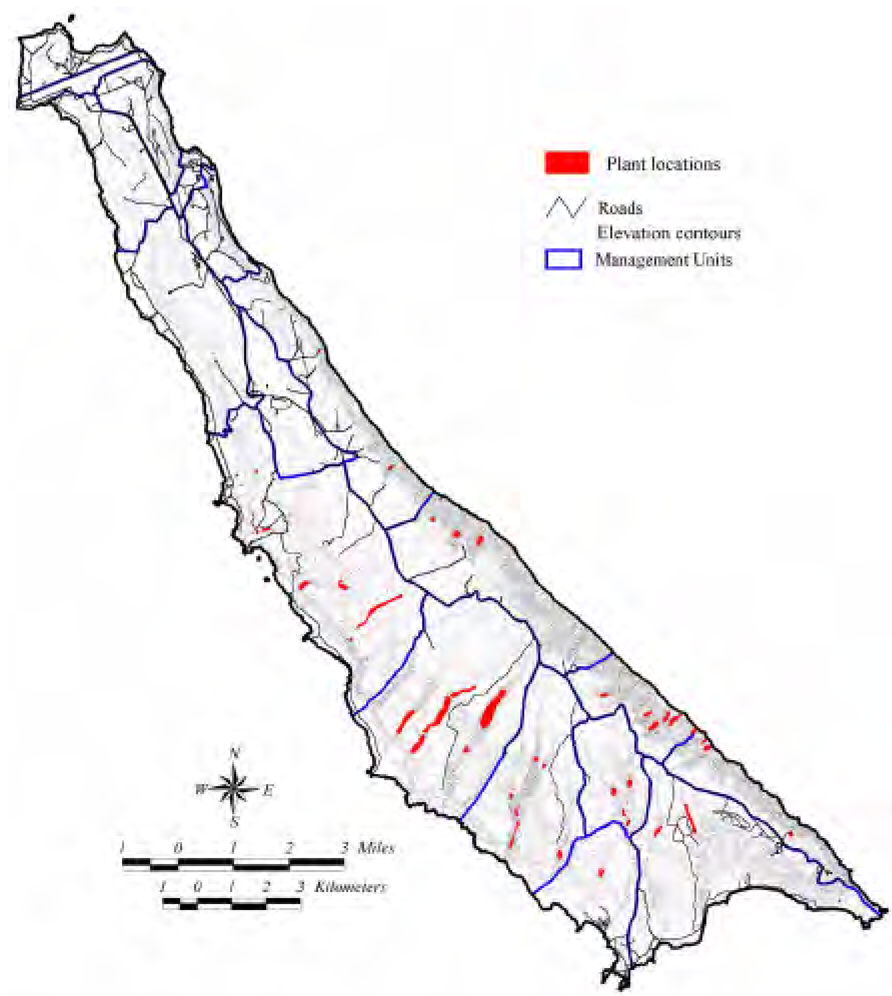


Name: *Galvezia speciosa*
Common Name: Galvezia, island snapdragon
Listing Status: Federal candidate, CNPS Inventory 1B

Flowering Time: February – June
Distribution: Insular endemic to San Clemente, Santa Catalina, and Guadalupe islands

Habitat: rocky cliffs, canyons
Current Status: common on canyon walls and in woodlands
Previously Reported Status: About six occurrences of 4200 individuals (1986)

Reproductive Biology: unknown



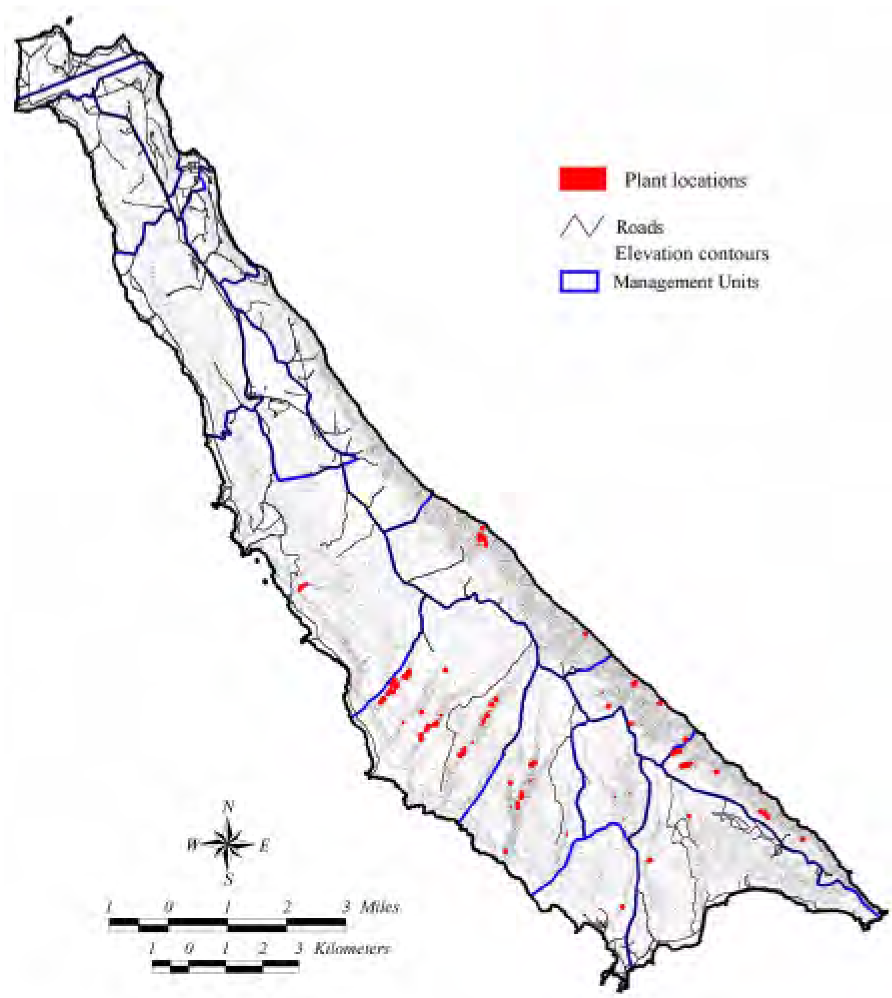
Name: *Gilia nevinii*
Common Name: Nevin's gilia
Listing Status: CNPS Inventory 3 and 4

Flowering Time: unknown
Distribution: Insular endemic to San Clemente, Santa Catalina, and Guadalupe islands

Habitat: Rocky, grassy slopes and coastal canyons
Current Status: (1996 and 1997)
No map coverage available
Previously Reported Status:

Reproductive Biology: Abundant on grassy slopes over the entire island

Name: *Hazardia cana*
Common Name: Southern island hazardia
Listing Status: Species of concern (USFWS)
Flowering Time: July-October (-December)
Distribution: Insular endemic to San Clemente and Guadalupe islands
Habitat: Steep canyon walls, canyon bottoms
Terrace faces
Elevations between 230 and 1220 ft
Current Status: (1996 and 1997)
83 occurrences
1,300 individuals
Isolated individuals to population sizes: 3 to 85 individuals
Previously Reported Status: three occurrences of 106 individuals (1986)
Reproductive Biology:
Bisexual flowers surrounded by a marginal series of 6-14 pistillate flowers
Fruits dispersed by wind



Name: *Hemizonia clementina*
Common Name: island tarplant
Listing Status: Federal candidate, CNPS Inventory 1B

Flowering Time: April-September
Distribution: Native to all Channel Islands except for Santa Rosa and San Miguel

Habitat: clay grassland and in boxthorn community
Current Status: *very common throughout the island. No map coverage is available.*
Previously Reported Status: Common and forming extensive colonies in open grassland of the north end, scattered down the west coast; rare on rocks and canyons along the east coast (Raven 1963).
Reproductive Biology: unknown

Name: *Heteromeles arbutifolia* ssp. *macrocarpa*
Common Name: Christmas berry, toyon
Listing Status: no official status

Flowering Time: unknown
Distribution: Insular endemic to San Clemente and Santa Catalina islands

Habitat: canyon benches, terrace faces and flats

Current Status: *no map coverage available*
Previously Reported Status: reported in Munz (1968) as occuring on Santa Catalina and San Clemente islands.

Reproductive Biology: unknown

Name: *Hordeum intercedens*
Common Name: vernal barley
Listing Status: CNPS List 3
Flowering Time: April
Distribution: Channel Islands; San Francisco Bay to Northwest Baja California
Habitat: vernal pools, dry saline streambeds, alkaline flats
Current Status: (1996 and 1997) *no map coverage available*
Previously Reported Status: Not recorded
Reproductive Biology: unknown

Name: *Jepsonia malvifolia*
Common Name: island jepsonia
Listing Status: CNPS Inventory 3 and 4

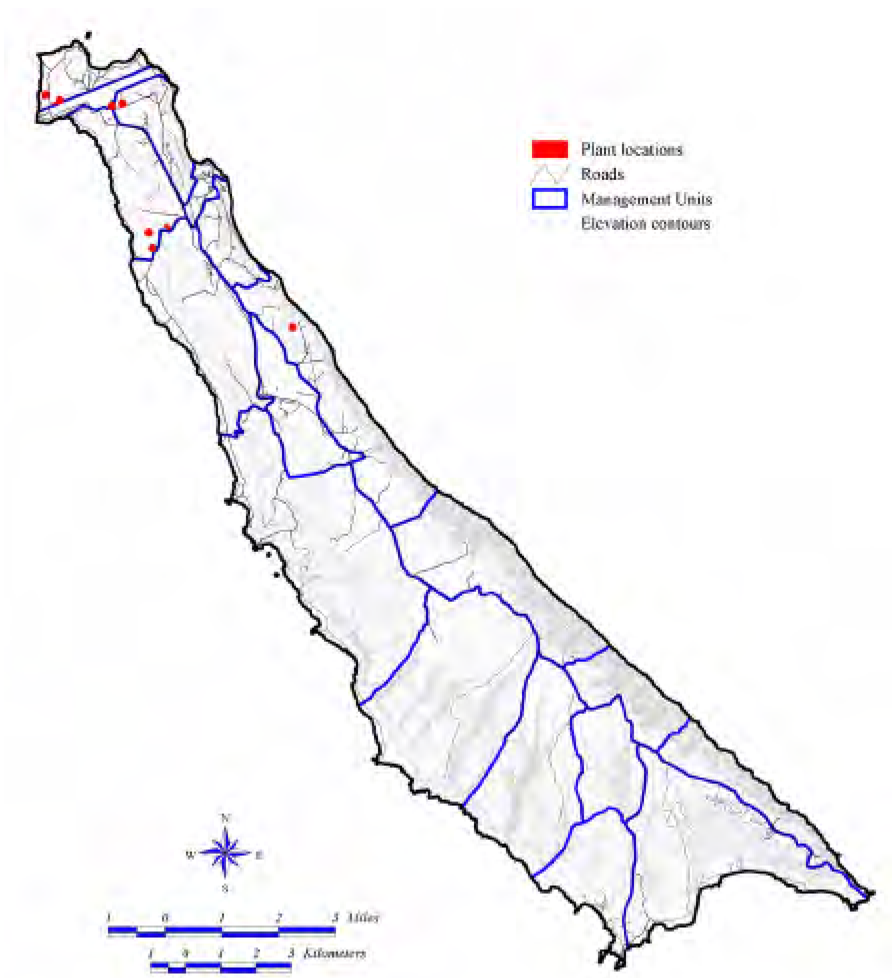
Flowering Time: October-February
Distribution: Insular endemic on San Clemente and Santa Catalina islands and the northern Channel Islands, known from Santa Rosa, Santa Cruz, San Nicolas, Santa Catalina, and Guadalupe islands

Habitat: rock outcrops, clay grassland
Current Status: (1996 and 1997)

Previously Reported Status: probably much commoner than few collections would indicate because it is so easily overlooked (Thorne 1969)

Reproductive Biology: unknown

Name: *Lavatera assurgentiflora* ssp. *glabra*
Common Name: Southern Island tree mallow
Listing Status: Species of concern (USFWS)
Flowering Time: March-July (-December)
Distribution: Insular endemic to Santa Catalina and San Clemente Islands
Habitat: Swale in northern and central portions of the island
West- and north-facing slope between elevations of 70 and 500 ft
Stabilized and active dunes
Current Status: (1996 and 1997)
5 occurrences
78 individuals
Populations of 3, 4, 5, 29, and 37 individuals
Previously Reported Status: 24 individuals (1986)
Reproductive Biology: Bisexual flowers, which are generally borne solitary in the axils of terminal, leafy shoots
Flowers produce 8 to 10 seeds each completely enclosed at fruiting maturity by both inner and outer walls
Fruits appear to fall as units

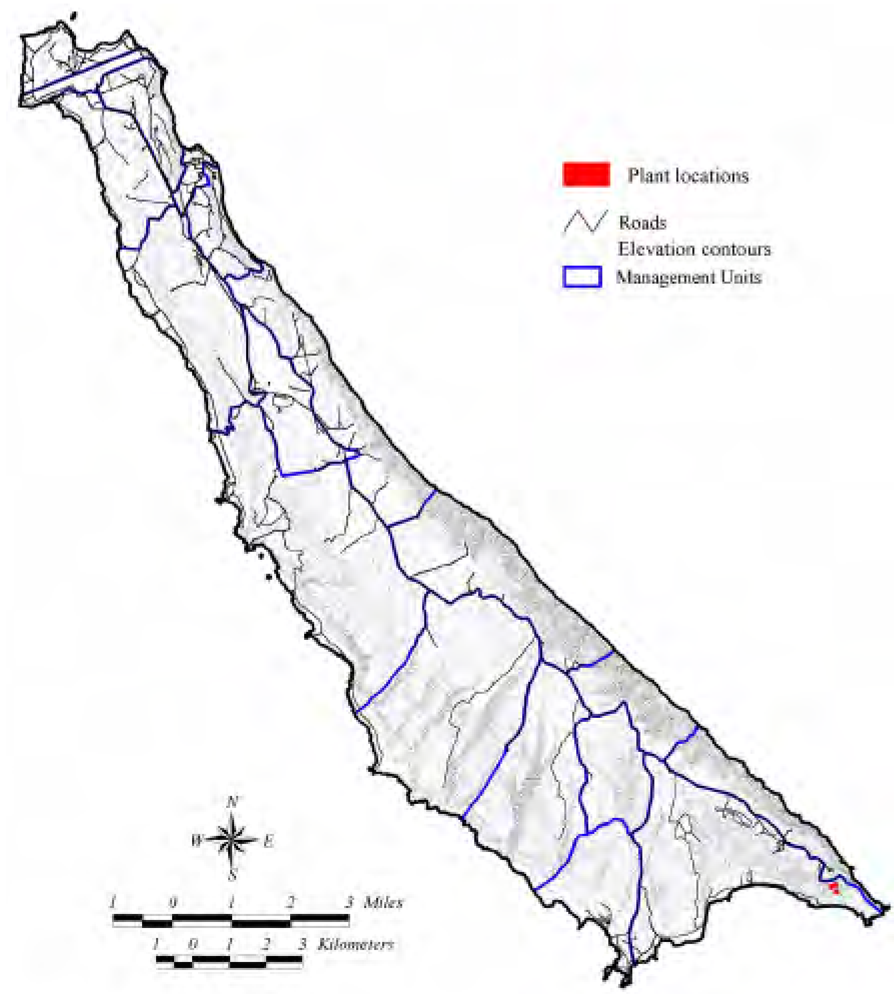


Name: *Lepidium virginicum* var. *robinsonii*
Common Name: Robinson's peppergrass
Listing Status: Rare or Endangered (CNPS Inventory 1B)

Flowering Time: February-April
Distribution: Known from San Clemente and Santa Cruz islands, and along the California coast from Monterey County to Baja California

Habitat: South-facing ridgetops and slopes at the south end of the island
Elevations between 350 and 520 ft
Current Status: (1996 and 1997)
3 occurrences
200 individuals
Previously Reported Status: unknown

Reproductive Biology: Small, bisexual flowers
Each fruit contains 2 seeds
Flowers suggest self-compatibility and self-pollination



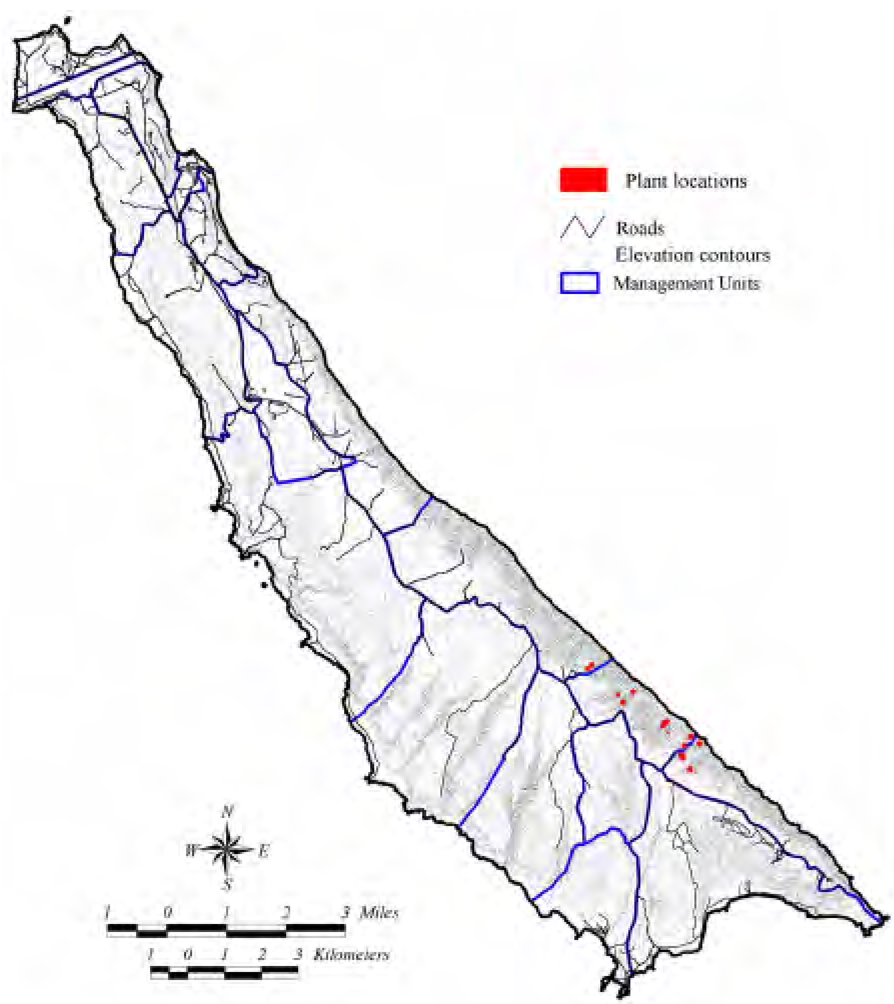
Name: *Linanthus pygmaeus* ssp. *pygmaeus*
Common Name: pygmy linanthus
Listing Status: CNPS List 1B

Flowering Time: April-June
Distribution: Insular endemic to San Clemente and Guadalupe islands

Habitat: high elevation grassland
Current Status: fairly frequent in *Nassella* grassland
No map coverage available
Previously Reported Status: Locally common in dry grassland on the south central part of the island (Raven 1963).

Reproductive Biology: unknown

Name: *Lithophragma maximum*
Common Name: San Clemente Island woodland star
Listing Status: Endangered (USFWS); Endangered (CDFG)
Flowering Time: February-April
Distribution: Endemic to San Clemente Island
Habitat: Gentle, north-facing slopes in moist canyon bottoms on east side of island
Elevations of 400 and 1100 ft
Restricted to a few canyons on the east escarpment between Vista Canyon and Mosquito Cove
Current Status: (1996 and 1997)
10 occurrences
465 individuals
Previously Reported Status: 15 in Eagle and 22 in Bryce (1980), 9 in Bryce (1986)
Reproductive Biology: Small, bisexual flowers w/1 pistil that matures into a capsule; Each flower may produce many seeds



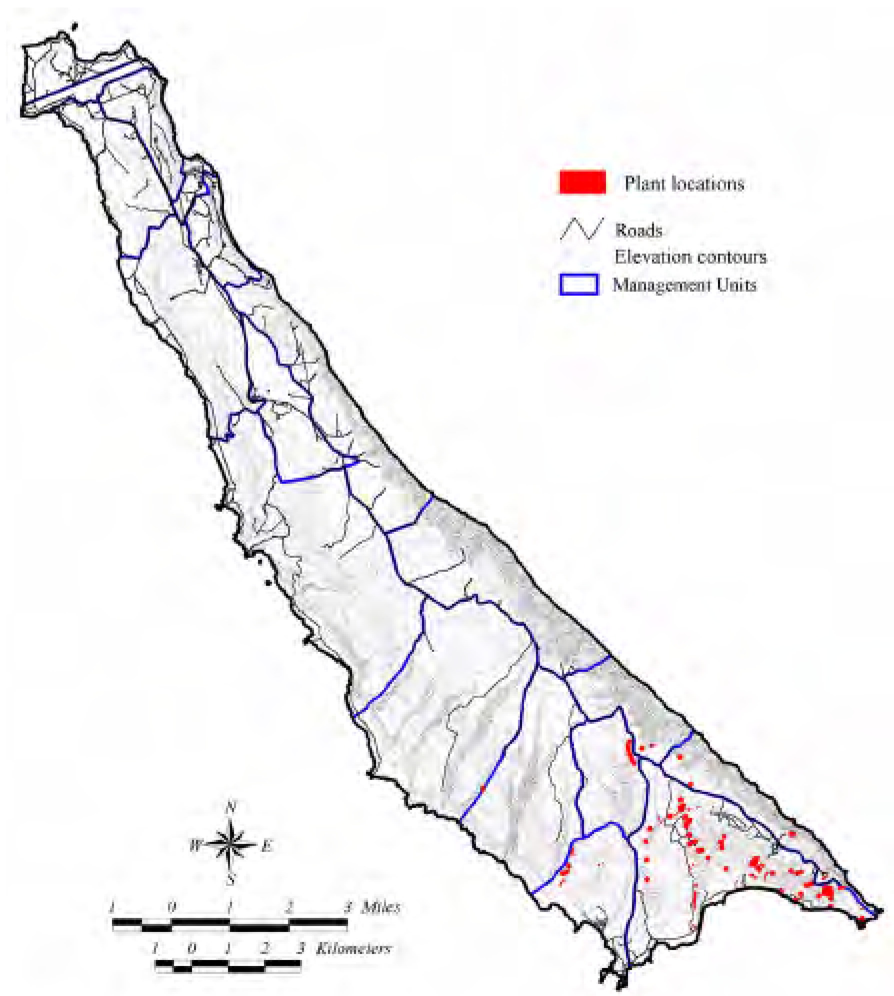
Name: *Lomatium insulare*
Common Name: San Nicolas Island lomatium
Listing Status: CNPS Inventory 2

Flowering Time: February-May
Distribution: Insular endemic to San Clemente, San Nicolas, and Guadalupe islands

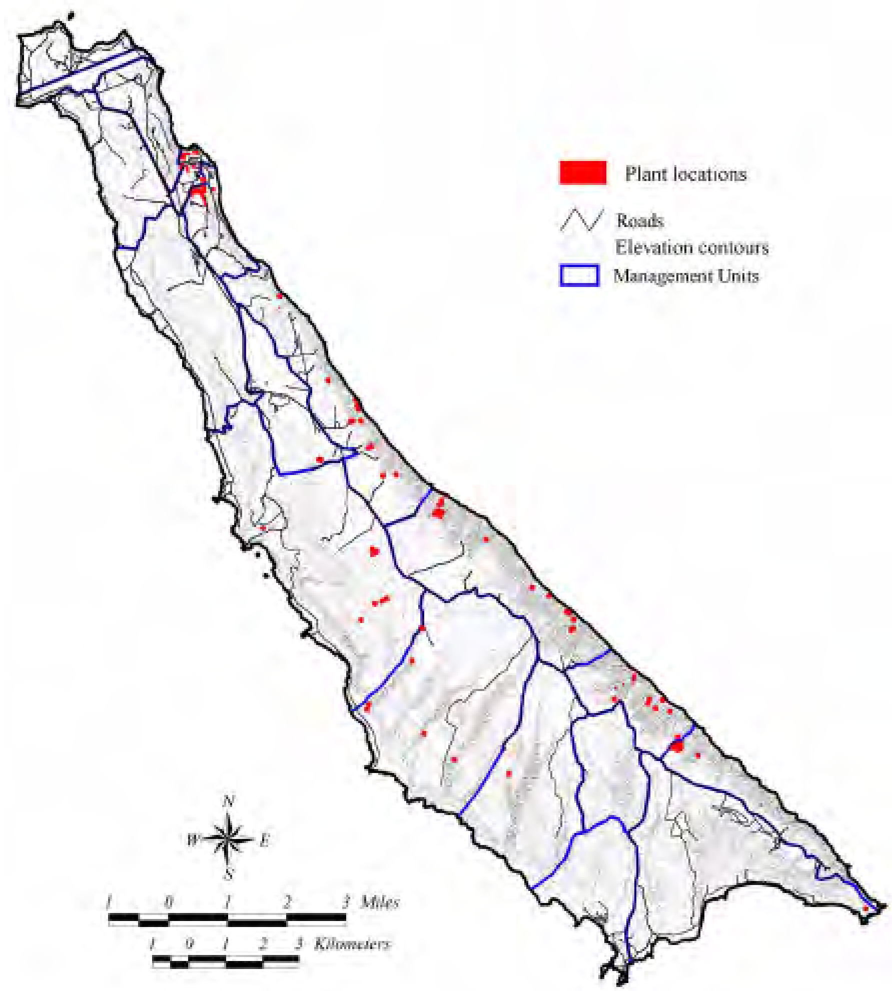
Habitat: sea bluff succulent
Current Status: not reported, *may be extirpated*
Previously Reported Status: Not seen in recent years (R.M. Beauchamp 1989).

Reproductive Biology: unknown

Name: *Lotus argophyllus* var. *adsurgens*
Common Name: San Clemente Island silver lotus
Listing Status: Species of concern (USFWS)
Flowering Time: April-August
Distribution: Endemic to San Clemente Island
Habitat: Open south-facing slopes and ridgetops at the south end of the island
Elevations between 20 and 1320 ft
Current Status: (1996 and 1997)
70 occurrences
2,400 individuals
Few isolated plants to populations sizes: 3 to 150 individuals
Previously Reported Status: about 30 (1980), 66 (1986)
Reproductive Biology: Small, bisexual flowers borne in dense clusters among the axils of terminal shoots
Flower size and morphology is consistent with pollination by small bees
Self-compatible, but require insect visitation for effective pollination
Fruit is indehiscent and generally contains one seed



Name: *Lotus dendroideus* var. *traskiae*
Common Name: San Clemente Island deerweed, Trask's island lotus
Listing Status: Endangered (USFWS); Endangered (CDFG)
Flowering Time: March-May
Distribution: Endemic to San Clemente Island
Habitat: North- and east-facing slopes and ridges
Elevations between 25 and 1400 ft
Current Status: (1996 and 1997)
64 occurrences
Over 3,000 individual
Isolated individuals to population sizes: 5 to 750 individuals
Previously Reported Status: about 9 occurrences of 1340 individuals (1980)
Reproductive Biology: Small, bisexual flowers, clustered in the axils of terminal shoots, w/1 pistil
Fruit is indehiscent

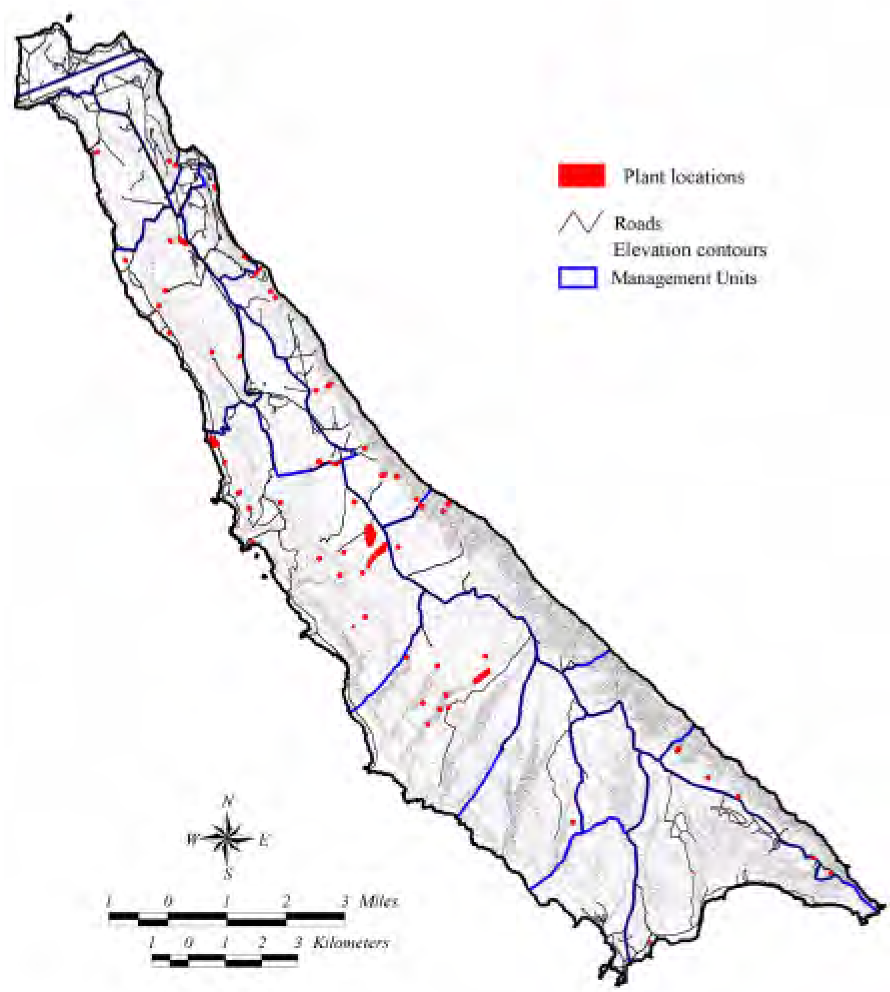


Name: *Lupinus guadalupensis*
Common Name: Guadalupe Island lupine
Listing Status: Species of concern (USFWS)

Flowering Time: February-May
Distribution: Endemic to San Clemente and Guadalupe Islands

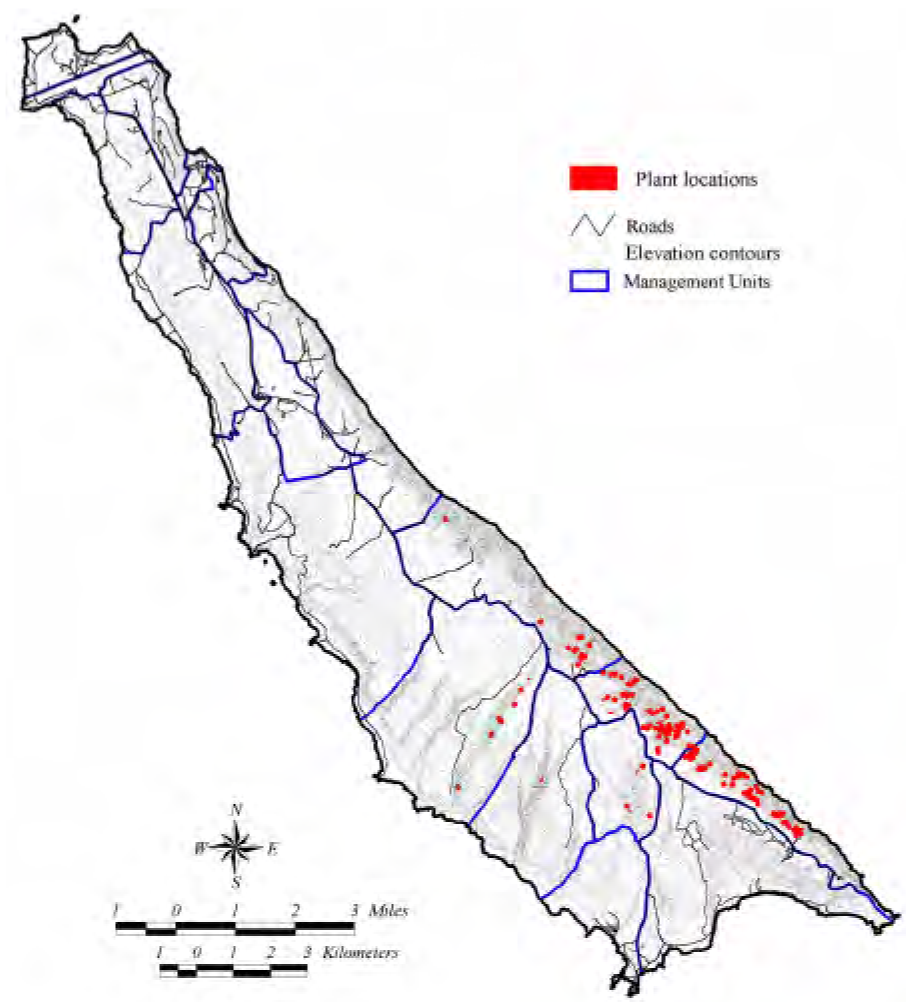
Habitat: Slopes and flats in grasslands
Open flats with maritime cactus scrub vegetation
Elevations between 40 and 1300 ft
Current Status: (1996 and 1997)
49 occurrences
6,300 individuals
Population sizes: 10 to >500 individuals
Previously Reported Status: about 2750 individuals (1986)

Reproductive Biology: Self-compatible with a wide range of out-crossing
Flowers pollinated by bumblebees and large solitary bees
Fruits dehisce explosively, thus dispersing seeds actively and presumably widely around the maternal plant



Name: *Lycium brevipes* var. *hassei*
Common Name: Santa Catalina Island desert thorn
Listing Status: Rare or endangered (CNPS List 1B)
Flowering Time: March-April
Distribution: Insular endemic to San Clemente, and Santa Catalina islands
Habitat: Coastal slopes
Elevations <200 ft
Current Status: (1996 and 1997)
No populations found
Previously Reported Status: One "small" tree grew at Northwest Harbor reported by Trask in 1903 and later reported dead by 1936 (Raven, 1963).
Reproductive Biology: Bisexual flowers
Seeds germinated without treatment and within 1 month after collection
The fruit, a berry, reportedly bears two to several seeds

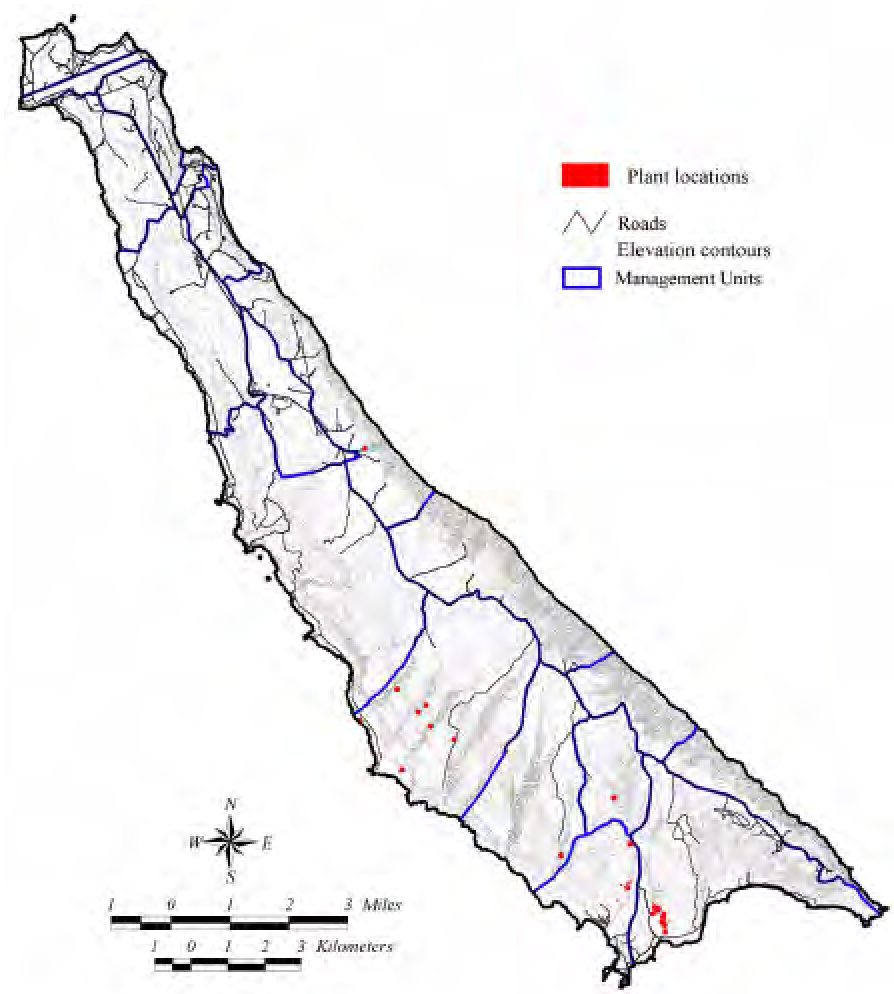
Name: *Lyonothamnus floribundus* ssp. *aspleniifolius*
Common Name: Santa Cruz ironwood
Listing Status: Species of concern (USFWS)
Flowering Time: May-August
Distribution: Found on Santa Rosa, Santa Cruz, and San Clemente Islands
Habitat: Steep north-facing canyon walls on the east escarpment
Elevations between 1000 and 1600 ft
Occasionally seen in canyon bottoms and on the west side of the island at elevations as low as 300 ft
Current Status: (1996 and 1997) 85 occurrences; each representing 5 groves of trees
Previously Reported Status: about 927 trees (1986)
Reproductive Biology: Bisexual flowers with 2 separate pistils, incidental observations indicate a high level of visitation by various insects foraging for both nectar and pollen
The small seeds fall passively and presumably are dispersed by wind; not all may be viable because either embryos, endosperm, or both may be lacking in putatively "plump" seeds
Germination is enhanced by hot water treatment
Most groves appear to be clonal



Name: *Malacothamnus clementinus*
Common Name: San Clemente Island bush mallow
Listing Status: Endangered (USFWS); Endangered (CDFG)

Flowering Time: April-August
Distribution: Endemic to San Clemente Island
Habitat: Southwestern portion of island on coastal flats with maritime cactus scrub vegetation
Vegetated flats in canyon bottoms
Mid-elevation terraces on west shore
Elevations between 50 and 775 ft
Current Status: (1996 and 1997)
18 occurrences, 290 individuals
Isolated individuals to population sizes: 3 to 50 clumps
Previously Reported Status: 28 (1980), 808 (1986) mostly in Horse Beach Canyon

Reproductive Biology: Bisexual flowers producing 10 seeds
Seeds completely enclosed at fruiting maturity by both inner and outer walls
Fruit dehisce slowly and irregularly on the plant, with seeds retained in the meticarp walls; Maximum 35% germination with fresh seeds; Successful reproduction by rhizomes



Name: *Malacothrix foliosa* ssp. *foliosa*
Common Name: leafy malacothrix
Listing Status: Uncommon CNPS Inventory 3 and 4
Flowering Time: March-July
Distribution: Insular endemic to San Clemente and Los Coronados islands
Habitat: coastal flats
Current Status: common
No map coverage available
Previously Reported Status: Abundant and colorful in grassland over the entire north end and down the west coast, rare in canyons on the east side (Rave, 1963).
Reporductive Biology: unknown

Name: *Microseris douglasii* ssp. *platycarpha*
Common Name: Douglas' silver-puffs, small-flowered microseris
Listing Status: CNPS Proposed List 1B

Flowering Time: March-April
Distribution: Santa Catalina and San Clemente Island

Habitat: grassland
Current Status: *no map coverage available*
Previously Reported Status: Dry slopes in the central part of the island (Raven, 1963).

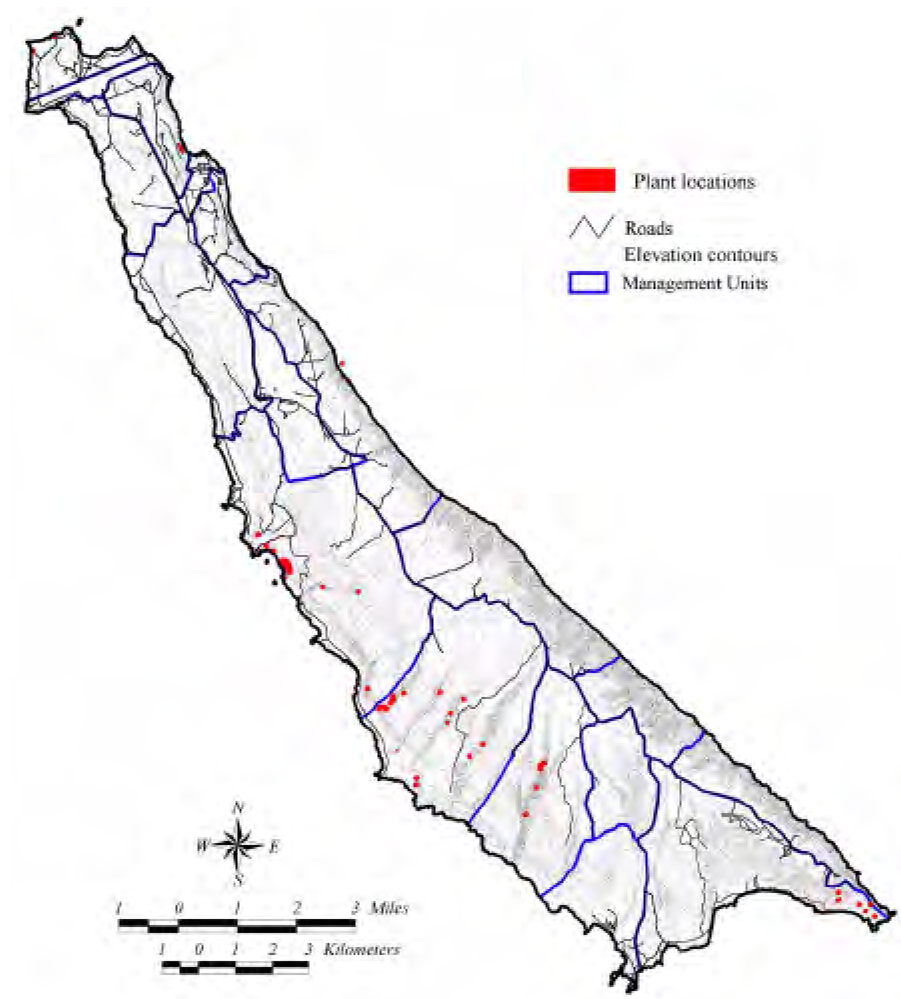
Reproductive Biology: unknown

Name: *Phacelia floribunda*
Common Name: San Clemente Island phacelia
Listing Status: Species of concern (USFWS)

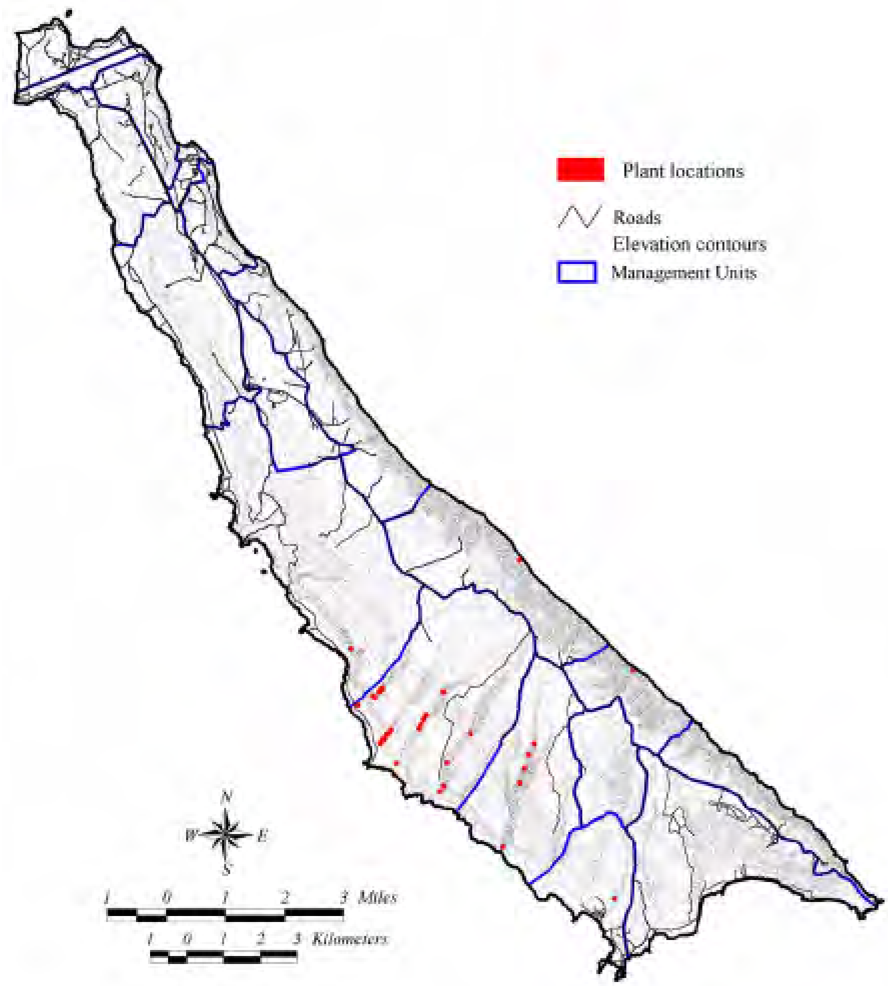
Flowering Time: March-July
Distribution: Endemic to San Clemente and Guadalupe Islands

Habitat: Loose talus slopes with large angular rocks
Rocky flats in canyon bottoms
Elevations between 10 and 1220 ft
Current Status: (1996 and 1997)
37 occurrences
1,600 individuals
Isolated individuals to population sizes: 5 to 1,500 individuals
Previously Reported Status: 5325 (1986); scattered on canyonsides, often in patches of cactus or on earth slides (Raven, 1963).

Reproductive Biology: Bisexual flowers disposed in terminal, coiled racemes; each flower has 4 ovules and is capable of producing up to 4 seeds



Name: *Phacelia lyonii*
Common Name: Lyon's phacelia
Listing Status: Species of local concern (no official status)
Flowering Time: April-June
Distribution: Insular endemic to San Clemente, and Santa Catalina islands
Habitat: Well-drained canyon bottoms in the central and southern portion of the island
Elevations between 50 and 1240 ft
Current Status: (1996 and 1997)
30 occurrences
270 individuals
Isolated individuals to population sizes: 3 to 53 plants
Previously Reported Status: unknown
Reproductive Biology: Bisexual flowers with 4 ovules capable of producing up to 4 seeds

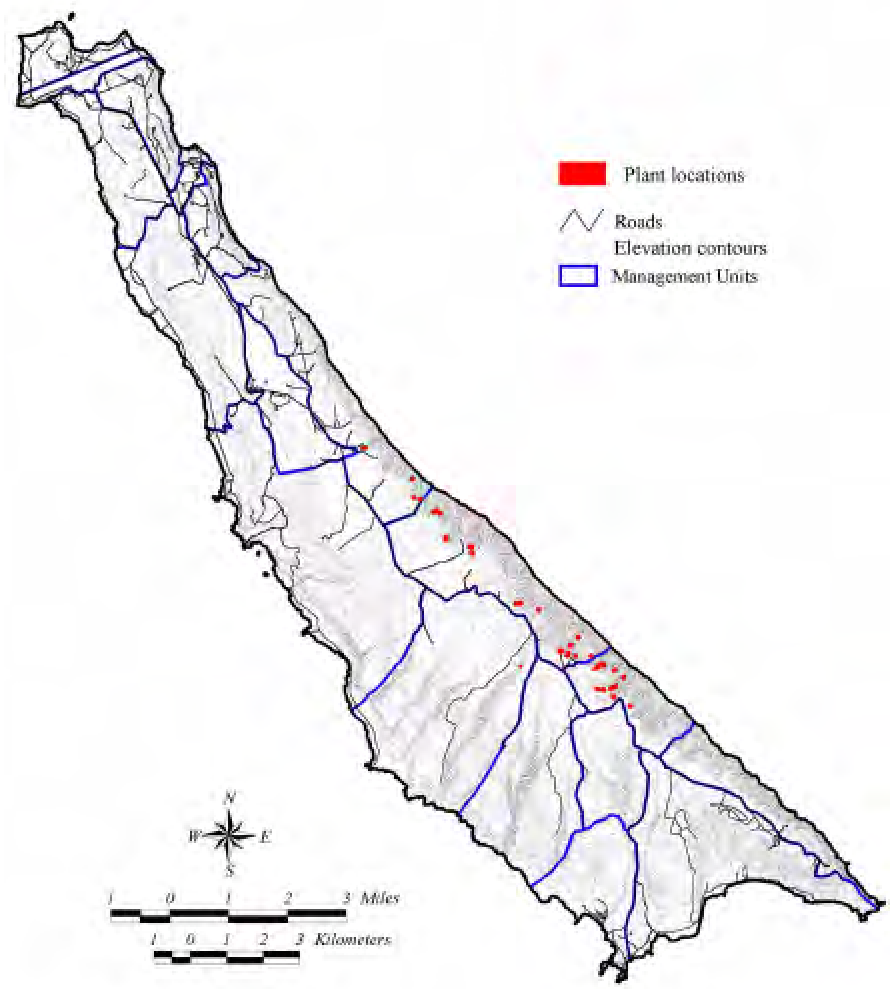


Name: *Quercus tomentella*
Common Name: island oak
Listing Status: Plant of limited distribution (CNPS List 4)

Flowering Time: May-July
Distribution: Endemic to Santa Rosa, Santa Cruz, Anacapa, Santa Catalina, San Clemente and Guadalupe islands

Habitat: North-facing slopes in canyons of east escarpment
Elevations between 700 and 1900 ft
Current Status: (1996 and 1997)
29 occurrences
37 groves
Previously Reported Status: 77 (1986)

Reproductive Biology: Monoecious and self-compatible
Seeds short-lived, but generally germinate best after 1-3 months of cold storage or if fresh seeds are planted under cool, moist conditions



Name: *Rhamnus pirifolia*
Common Name: island redberry
Listing Status: Species of local concern (no official status)

Flowering Time: March-July
Distribution: Insular endemic to Santa Rosa, Santa Cruz, Santa Catalina, San Clemente, and Guadalupe islands

Habitat: Steep north- and south-facing slopes in the central and southern portion of the island
Elevations between 25 and 1200 ft
Current Status: (1996 and 1997)
12 occurrences
44 individuals
Isolated individuals to population sizes: 2 to 10 individuals
Previously Reported Status: two occurrences in Bryce (1980)
Reproductive Biology: Dioecious with unisexual flowers
Each pistillate flower has 2 ovules; thus, each fruit may produce as many as 2 seeds
Flower size suggests pollination by small insects
Outer seed wall is hard, but scarification is apparently no required in fresh seeds; older seeds require 2-3 months of cold stratification

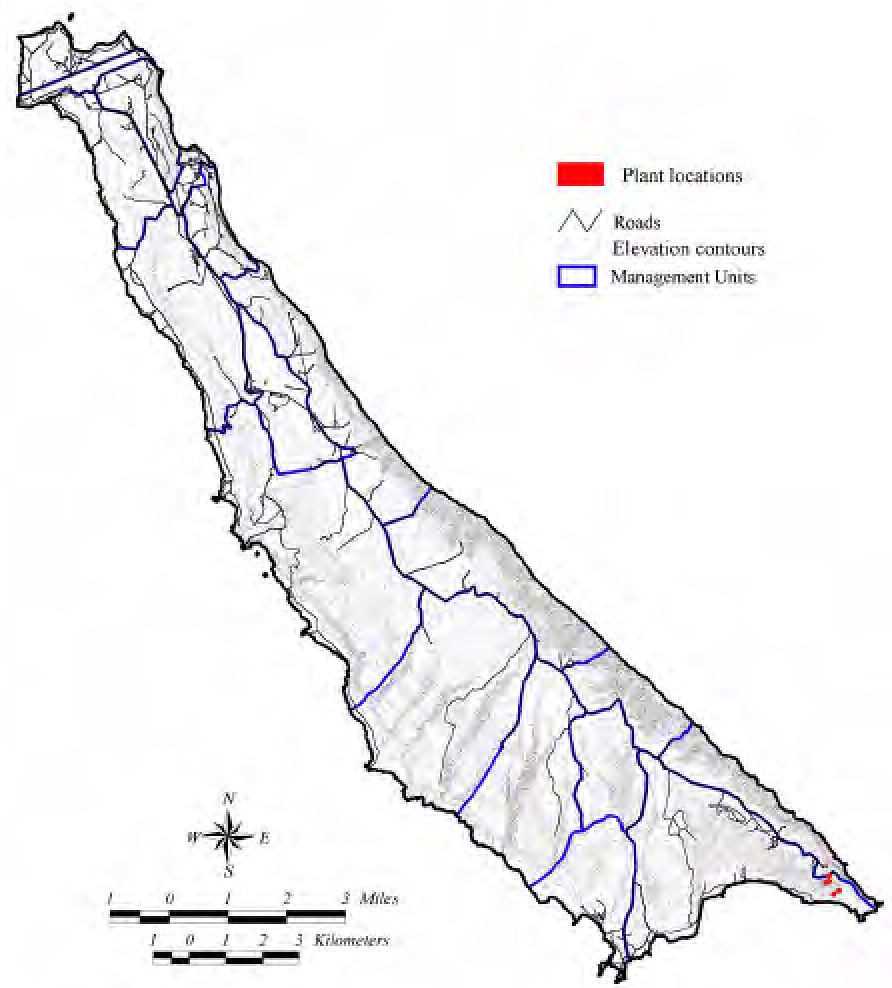
Name: *Scrophularia villosa*
Common Name: Santa Catalina figwort
Listing Status: Federal candidate, CNPS Inventory 1B
Flowering Time: March-May
Distribution: Insular endemic on San Clemente and Santa Catalina islands
Habitat: Open north- and east-facing slopes
Canyon bottoms of the east escarpment
Elevations between 20 and 1400 ft
Current Status: (1996 and 1997)
8 occurrences
100 individuals
Isolated individuals to population sizes: 3 to 60 individuals
Previously Reported Status: unknown
Reproductive Biology: Self-compatible, but require visitation to ensure full seed set
Seeds do not require treatment prior to germination

Name: *Sibara filifolia*
Common Name: Santa Cruz Island rock cress; island rock cress
Listing Status: Endangered (USFWS)

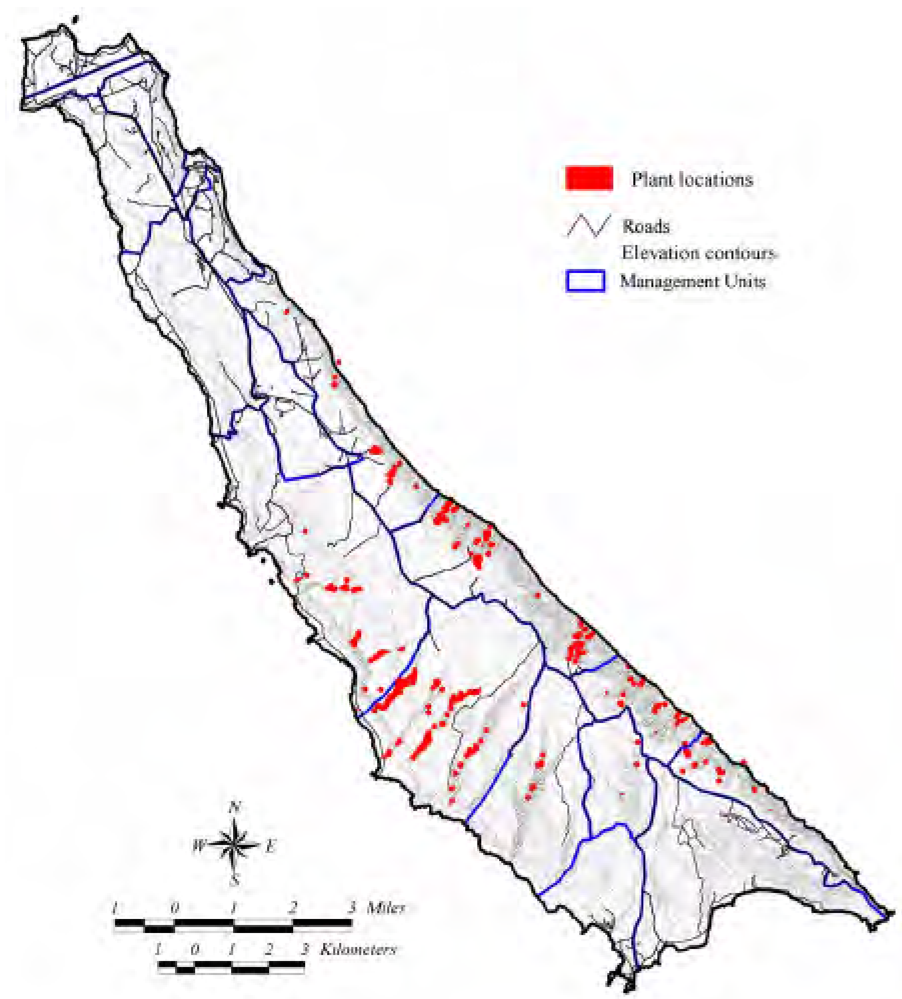
Flowering Time: January-March
Distribution: Endemic to San Clemente Island

Habitat: Occurs in several saddles on three adjacent, open ridgetops and on nearby flats at the southern end of the island
Elevations between 300 and 540 ft
Current Status: (1996 and 1997)
5 occurrences
One population had 29 individuals in 1996 and 208 individuals when resampled in 1997; about 550 additional plants were seen at four other sites in 1997
Previously Reported Status: two (1986)

Reproductive Biology: Small, bisexual flowers
Each fruit produces several seeds
Flowers suggest self-compatibility and self-pollination



Name: *Stephanomeria blairii*
Common Name: Blair's munzothamnus
Listing Status: Species of concern (USFWS)
Flowering Time: July-September (-November)
Distribution: Endemic to San Clemente Island
Habitat: North and west-facing canyon walls in the central and southern portions of the island
Very steep, very rocky canyon walls with little vegetative cover
Elevations between 20 and 1800 ft
Current Status: (1996 and 1997)
266 occurrences
6,000 individuals
Isolated individuals to populations sizes: 3 to 500 individuals
Previously Reported Status: three occurrences of 263 individuals
Reproductive Biology: Self-compatible
Presumably insect pollinated
Bisexual flowers
Fruits dispersed by wind



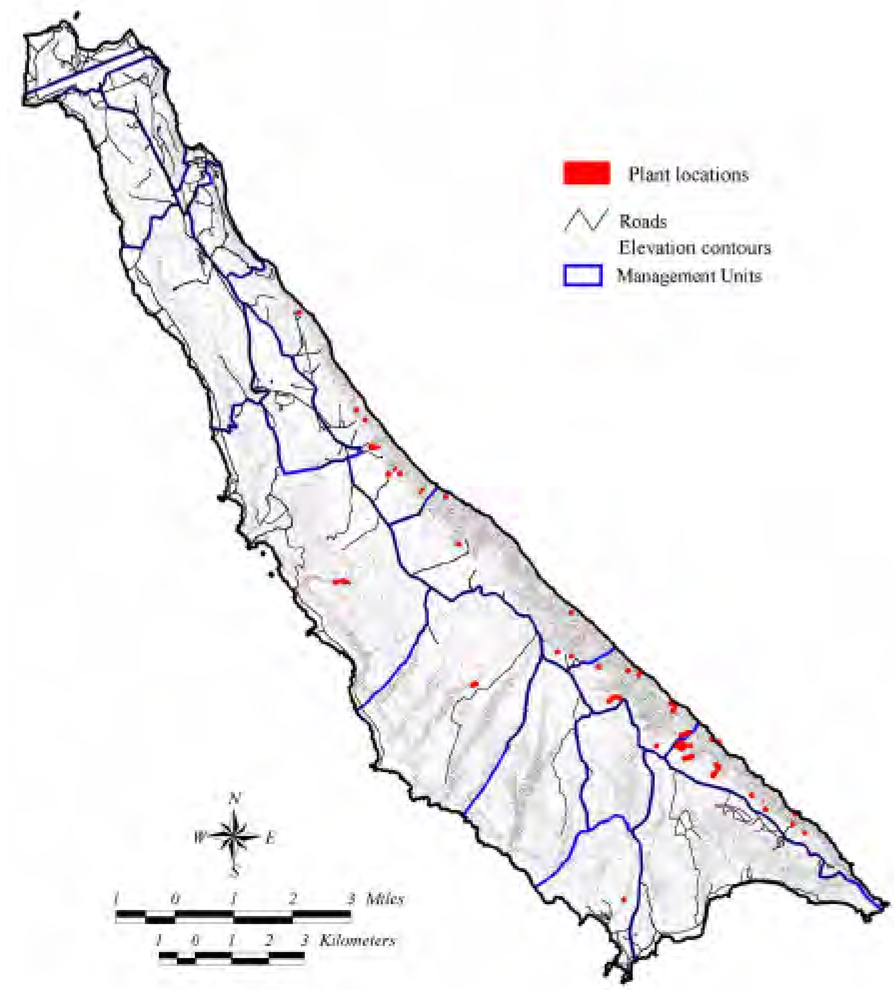
Name: *Trifolium gracilentum var. palmeri*
Common Name: Palmer's clover, southern island clover
Listing Status: CNPS List 4

Flowering Time: March-May
Distribution: Insular endemic to San Clemente, Santa Catalina, Santa Barbara, San Nicolas, and Guadalupe islands

Habitat: grassy areas near ocean
Current Status: common throughout island
no map coverage available.
Previously Reported Status: Raven (1963) reported that it was common in grasslands at relatively low elevations.

Reproductive Biology: unkown

Name: *Triteleia clementina*
Common Name: San Clemente Island triteleia
Listing Status: Species of concern (USFWS)
Flowering Time: February-March
Distribution: Endemic to San Clemente Island
Habitat: North-facing canyon walls of the eastern escarpment of the island
Elevations between 30 and 1500 ft
Current Status: (1996 and 1997)
62 occurrences
3,600 individuals
Population sizes: 4 to 385 individuals
Previously Reported Status: two occurrences of 315 individuals (1986)
Reproductive Biology: Bisexual flowers
Common pollinators probably include flies, butterflies, and bees
Seed dispersal is apparently passive, effected by wind
Seeds do not have a pronounced dormancy nor do they require treatment prior to germination



Appendix D: Focus Species Profiles

D.1 Plants

D.1.1 Santa Cruz Island Rock Cress (*Sibara filifolia*)

Background

Status: USFWS Endangered, CNPS List 1B

Photo courtesy of Elizabeth Kellogg.

General Information: The Santa Cruz Island rock cress (*Sibara filifolia*) is endemic to San Clemente, Santa Catalina and Santa Cruz islands. It is an annual with purplish flowers borne on terminal racemes.

Reproduction: The flowers of *Sibara filifolia* are small and bisexual. Flowers of this size suggest self-compatibility and self-pollination (Richards 1986, Rollins 1981 from Junak and Wilken 1998) which has been observed in cultivated individuals (Wall, pers comm.in Junak and Wilken 1998). Each fruit produces several seeds (Junak and Wilken 1998).

Predators: This species was probably eaten by feral grazers before their removal.

Competitors: Non-native annual grasses, such as *Avena barbata*.

Habitat: This delicate annual herb occurs on hot, volcanic scree-covered slopes below Guds and on Willy's Ridge (Pyramid Cove unit). This area is windy and receives the highest amount of solar radiation on the island. It grows in association with *Opuntia prolifera* , *Opuntia littoralis*, *Bromus madritensis* ssp. *rubens*, *Lasthenia californica*, *Vulpia myuros*, *V. bromoides*, *Filago arizonica*, *Selaginella bigelovii*, and occasionally with *Lotus argophyllus* ssp. *adsurgens* and *Euphorbia misera*. The SCI habitat contrasts with that described for the species on other islands; reports from Santa Cruz Island indicate that the plant "is to be sought in shady places on the northward slope" (Greene 1887). The stature of the specimens on San Clemente Island also seem to be at the low end of the 1.5 - 3 dm reported for the species (Hickman 1993).

Fire Tolerance: The effect of fire on this plant is complicated by its possibly relictual appearance on this site, its dependence on past winter rainfall, or summer fog, by its annual habit, and competition from exotic annual grasses. Native *Nassella* grasslands tend to have interspaces that support abundant forb growth in areas of the Island where they remain more intact. Perhaps *Sibara* was more adapted to this open grassland than those dominated by annual cover. A long-term transect located in this habitat was sampled in 1991, and ground cover was found to be 20-25% bare, 20-25% rock, and abundant lichen growth on the soil and rocks (30-40%). *Selaginella* was also abundant, which was noted to act as a seed bed for nearby species such as *Lotus argophyllus* ssp. *adsurgens*. *Avena barbata*, expected to be a competitor for resources with *Sibara*, was estimated at 5% cover in 1992 and 29% cover in 1994. It may have been this increased *Avena* cover that fueled the 1995 fire.

Abundance, Distribution, and Trends: It is difficult to determine whether populations of this plant are increasing or decreasing. Five occurrences were reported in Junak and Wilkens' 1996-1997 surveys on three adjacent ridgetops on the very southern tip of the island. Two additional occurrences have been reported since.

San Clemente Island rock cress (*Sibara filifolia*) was historically found on three islands: San Clemente, Santa Catalina (Thorne 1967) and Santa Cruz, apparently extirpated there by overgrazing (Hochberg *et al.* 1980). It was last seen on Santa Cruz island in 1936. It was recently re-discovered on Santa Catalina Island (Schuyler, pers. comm. 2001). This plant is difficult to see without a search image in mind, and populations have possibly been missed on all three islands. Adding to this difficulty is the fact that there are many island annuals whose populations fluctuate widely from year to year (Junak, pers. comm. 1996). One population was visited in 1996 and 29 individuals were counted; when revisited in 1997, 208 individuals were recorded at the same site (Junak and Wilken 1998).

Factors Influencing Population Numbers and Special Considerations Related to Management:

- *Avena barbata* is likely a competitor for resources, encroaching on open interspaces of native grasslands.
- A population trend of *Sibara filifolia* is unclear as it is a difficult plant to see and likely goes through population fluctuations from year to year.
- Only seven occurrences of this species are known for the island, and consequently, genetic variation is very low.
- The area where it occurs is windy and receives the highest amount of solar radiation on the island. It probably receives abundant rain (Resnick 1988), but also lacks the fog benefits of other areas on SCI.
- *Sibara* may be more adapted to open grassland than areas dominated by annual herb cover.

Management

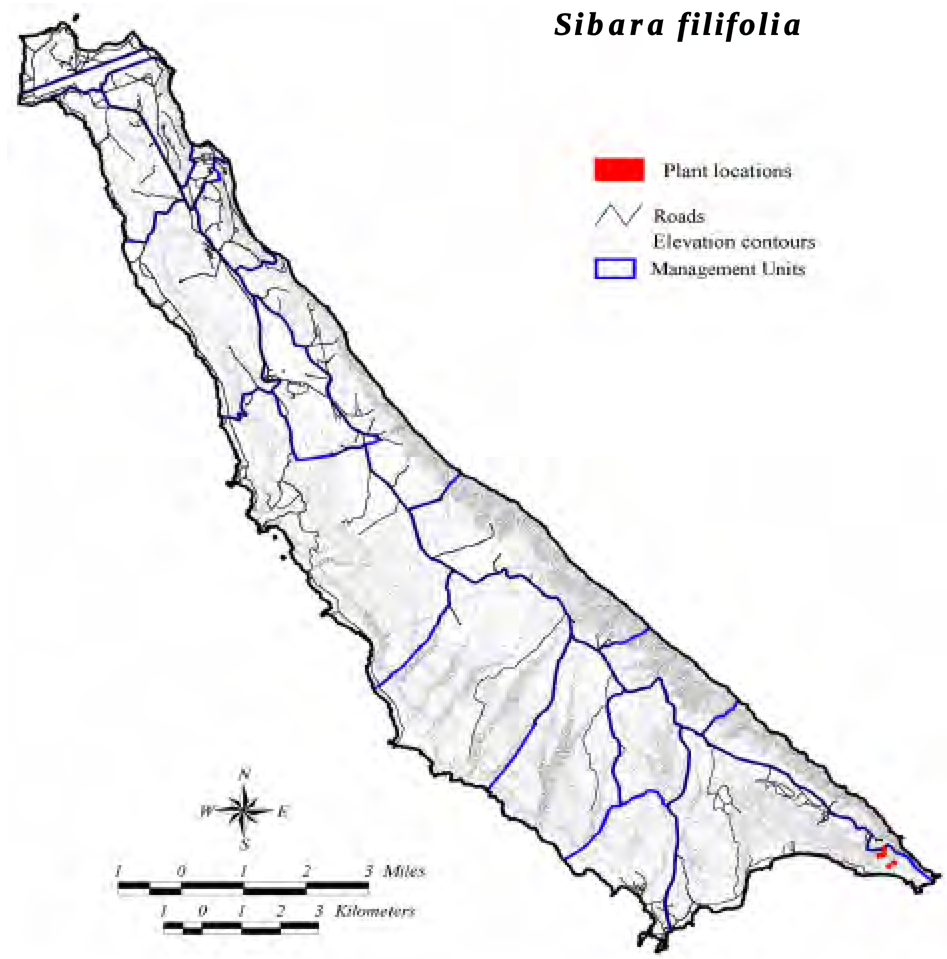
Current Management Environment: It has been listed as endangered by the USFWS since 1997. The Rancho Santa Ana Botanic Garden has deposited seed from this plant in its Conservation Program seedbank. No on-island management is directed toward this species except occasional monitoring.

Island-wide Desired Future Conditions:

- The eventual delisting of the species.
- Removal of non-native grasses, especially *Avena barbata*.
- Continued monitoring of this species in conjunction with other sensitive plants.
- Studies conducted on this species to determine its pollinators and its response to fire.

Applicable INRMP Management Units: 100% of *Sibara filifolia's* known population is located in Pyramid Cove.

Current Military Values of the INRMP Management Units: Highest: Pyramid Cove (17).



MapD-1. Current locations of Santa Cruz Island rock cress. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.1.2 Cliff Spurge (*Euphorbia misera*)

Background

Status: CNPS List 2

Photo courtesy of Elizabeth Kellogg.

General Information: Cliff spurge is a small shrub that can grow up to a meter tall. Its limited U.S range includes populations in Orange, Riverside, and San Diego counties, but it is more prevalent in Baja California. It is also found on SCI, Santa Catalina Island, Santa Cruz Island, and most Baja California islands (Junak *et al.* 1995). This species is an example of some of San Clemente Island's close affinities with Baja.

Reproduction: It has small, white flowers that can bloom from January to August. It is relatively easy to grow from seed in a nursery (Schuyler, pers. comm. 2001).

Habitat Use and Behavior: Cliff spurge is most commonly located on the hottest aspects near the west shore of SCI. It can be a localized dominant of some south-facing slopes. It is commonly associated with *Opuntia littoralis*, *Encelia californica*, *Bromus madritensis rubens*, and *Avena barbata*. Its habitat is distinctive on SCI, and may be related to fog patterns (Kellogg, pers. comm. 2001).

Abundance, Distribution, and Trends: Two known locations on SCI (though there may be more) include two slopes just north of Pyramid Head and just north of Eel Point. It also occurs on some of the terrace flats of Pyramid Cove.

Fire Tolerance: No information is available; however its location on SCI make it vulnerable to frequent fire.

Summary of Knowledge and Special Considerations Related to Management:

- This species is an example of some of the Island's close affinities with Baja.
- There is little information available about this species.
- Cliff spurge is most commonly located on the hottest aspects of the west coast of SCI.
- Its habitat is distinctive on SCI, and may be related to fog patterns (Kellogg, pers. comm. 2001).

Management

Current Management Environment: High cover of exotics.

Island-wide Desired Future Conditions: Reduce exotic annual grasses. Ensure no boundary change in locations where it is abundant, and sure current distribution is maintained.

Applicable INRMP Management Units: Seal Cove (10) and Pyramid Cove (17).

Current Military Values of the INRMP Management Units: Highest: Pyramid Cove, High: Seal Cove.

D.1.3 San Clemente Island Silver Lotus (*Lotus argophyllus adsurgens*)

Background

Status: USFWS Former Category 2, CDFG Endangered, CNPS 1B

General Information: Lotus agrophyllus adsurgens is a subspecies endemic to San Clemente Island. It is a perennial, suffrutescent subshrub with bright yellow flowers and silvery, silky-hairy leaves.

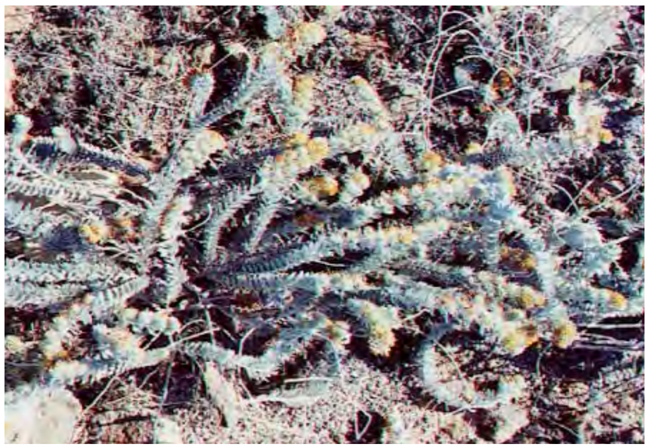


Photo courtesy of Elizabeth Kellogg.

Reproduction: Its small flowers are bisexual, yellow, and bloom from April to August. Its size and legume morphology are typical of plants pollinated by small bees, which were observed feeding on this species (Proctor *et al.* 1996 from Junak and Wilken 1998). All species in this genus are self-compatible, but depend on insects for effective pollination (Junak and Wilken, 1998). Each fruit bears one seed (Hickman 1993). Predation of fruit and seeds by weevils has been reported. Seeds do not appear to require scarification or a period of dormancy prior to germination (Junak and Wilken 1998).

Habitat: It inhabits hot, dry, rocky slopes and bluffs (Hickman 1993). On San Clemente Island, it spans the south end, mainly populating open south facing slopes, especially on the brows, and ridgetops. It may occur in areas without intense competition, since it appears to prefer open, rocky sites.

Fire Tolerance: There is no information regarding the effects of fire on this species, but other species in the genus resprout vigorously after fire.

Abundance, Distribution, and Trends: Surveys indicate that numbers of this species are increasing; it appears to be recovering well since the removal of non-native grazers. It increased from 30 individuals observed in 1980 to 66 individuals in 1986. 1996-97 surveys reported 2,400 individuals in 70 occurrences.

Factors Influencing Population Numbers:

- Appears to be increasing since removal of grazers.
- It inhabits hot, dry, rocky slopes and bluffs at the south end of SCI.
- Hybridization with other *Lotus* species is a potential threat.
- It is self-pollinating but also relies on insects for pollination.

- There is no information regarding the effects of fire on this species, but other species in the genus resprout vigorously after fire.

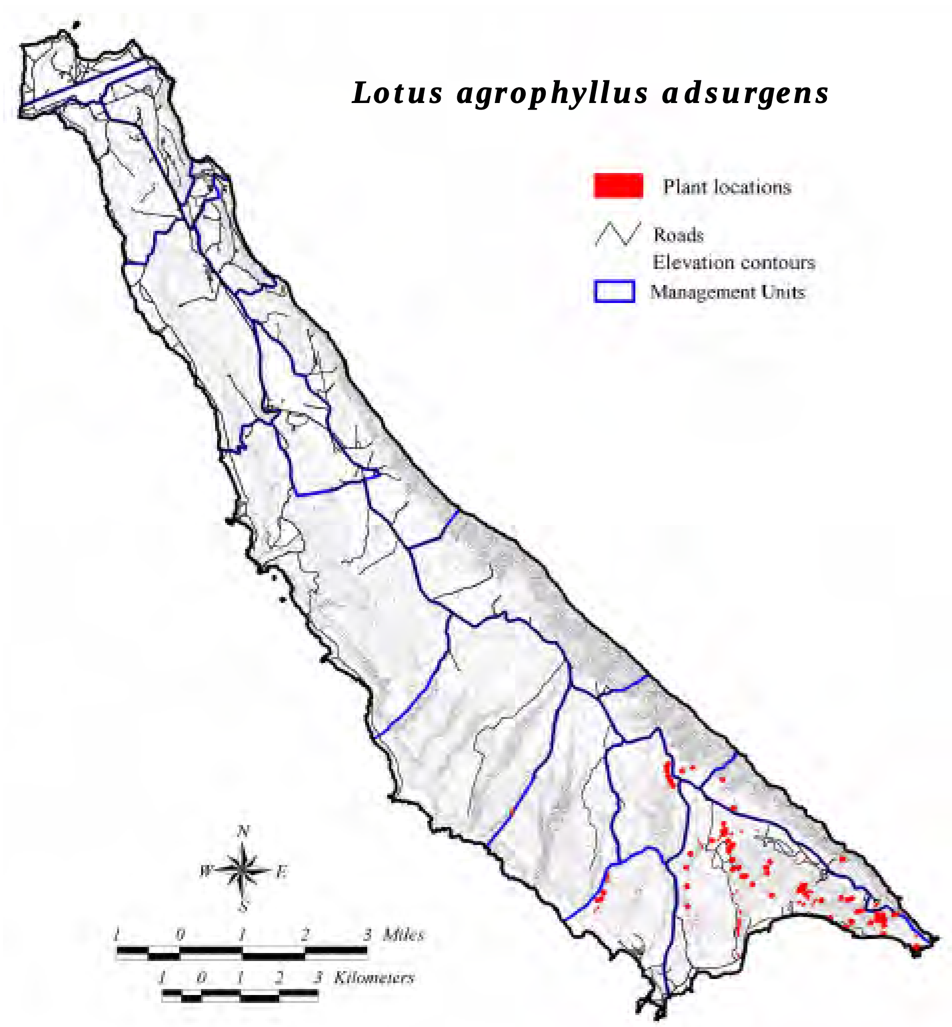
Management

Current Management Environment: There has been little management directed toward this species. It is currently being studied for its genetic makeup, and also is part of occasional sensitive species surveys. The major threat to this species' survival has been removed, that of herbivory by feral goats.

Island-wide Desired Future Conditions: Maintain current increasing trend in numbers. Control exotic annual grasses. Maintain cover of club moss which provides microsites for seedling establishment.

Applicable INRMP Management Units: 86.2% of the known population of *Lotus agrophyllus adsurgens* lives in the Pyramid cove fire management unit. 7.9% in Cave Canyon, 4.1% in China Canyon, 1% in Eagle Canyon, .7% in Mosquito cove, and .1% in Lost Point.

Current Military Values of the INRMP Management Units: Highest: Pyramid Cove (17), China Cove (16), Medium: Cave Canyon (13), Lowest: Eagle Canyon (14), Lost Point (12), Mosquito Cove (18).



MapD-2. Current locations of San Clemente Island bird's-foot trefoil.(Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.1.4 Trask's Island Lotus (*Lotus dendroideus* var. *traskiae*)

Background

Status: USFWS Endangered, CDFG Endangered, CNPS List 1B

General Information: Even early accounts of Trask's Island lotus (*Lotus dendroideus* var. *traskiae)* describe it as rare, well before sheep ranching or browsing by goats was at its peak. The subspecies occurs only on San Clemente Island. It is a distinctive shrub with dark green foliage and light brown legumes that can grow to about a meter tall.

Reproduction: Trask's island lotus has small, bisexual yellow flowers. Flowers of this size and color are generally pollinated by small bees, which have been observed foraging on the flowers. It flowers from March to May. All species in this genus are self-compatible but still depend on insects for effective pollination (Junak and Wilken 1998). Seeds are indehiscent. Seeds germinated readily after collection at rates similar for unscarified and scarified seeds. *L. dendroideus traskiae* hybridizes with *Lotus argophyllus adsurgens* when sympatric (Beauchamp, n.d.).

Predators: Feral grazers probably browsed this species.

Competitors: No information.

Habitat Use and Behavior: It grows somewhat colonially around rock outcrops in grassy areas or along the interface between grassland and Maritime Sage Scrub. It can be a prominent plant on rock outcrops. It occurs below 1,000 feet in well-drained soils, but where more soil moisture is available. Potential habitat may include most of the eastern escarpment and cooler slopes on the west shore. It is typically found on north and east facing slopes and ridges. It readily occupies disturbed sites (Beauchamp n.d.), and some locations are close to buildings, roads, and pipelines.

Fire Tolerance: Other species in the genus, including the mainland counterpart *Lotus scoparius*, seed prolifically following fire. The fire response of the short-lived *Lotus dendroideus* var. *traskiae* is not known. However, in a permanent monitoring plot established in Canchalagua Canyon, two adults were burned in 1995. In 1996, one adult and six seedlings were recorded (Kellogg, pers. obs.). At another site in the same canyon, two adults were burned and two seedlings later discovered. Scarification using sandpaper aided germination under nursery conditions (Beauchamp n.d.), suggesting light fire may benefit the species.

Abundance, Distribution and Trends: From all indications, *Lotus dendroideus* var. *traskiae* is expanding its range in habitats that vary from prickly-pear patches to rocky grassland. Over-grazing by non-native herbivores probably led to its decline. Only nine occurrences were known in 1980 and in 1996/97, 64 occurrences with a total of > 3,000 individuals were located. It is dispersed throughout the entire length of the Island on both the east and west shores.

Raven reported *L. dendroideus traskiae* on the west side of the island. It appears to have always occurred near Wilson Cove, although individual clumps come and go. Currently there are an estimated 1000 plants near Wilson Cove (Pivorunas, pers.comm. 2001), while 10 to 15 were reported in 1979. However, some of these plants are dying out possibly due to senescence as it is expected to be short-lived. Six populations for the entire island were mapped by 1984. A northwest-facing terrace-face site about midway down the island had been a stable site for this species. It was fenced, probably in the early 1980s. It currently contains 30 to 40 plants. During 1992 surveys, individual specimens were discovered in two canyons much further south than had been previously recorded (two historic references to the plant at Mosquito Cove and Pyramid Head were not confirmed by Mitch Beauchamp's rare plant surveys in the 1970s). Searches in 1995 re-established westshore sites in three canyons (Stone *et al*. 1995). In 1996, surveys revealed hundreds of specimens ranging from the bluffs at Pyramid Head, to the mouths of some western canyons near boulders, to the most populated sites near Wilson Cove, with many seedlings and small plants established (Junak, pers. comm. 1996). The plant is doing well in many canyons (Elvin 1996).

Factors Influencing Population Numbers and Special Considerations Related to Management:

- This plant was known to have been impacted by both goats and deer.
- Other species in the *Lotus* genus seed prolifically following fire. Some regeneration after fire has been observed in this species.
- *L. dendroideus traskiae* is dependent upon pollinators for reproduction, most likely small bees.
- Its population is currently stable and probably expanding.
- It tends to occur around rock outcrops in grassy areas or along the interface between grassland and Maritime Sage Scrub.
- It readily occupies disturbed sites (Beauchamp n.d.), and some locations are close to buildings, roads, and pipelines.
- Scarification using sandpaper aided germination under nursery conditions (Beauchamp n.d.), suggesting light fire may benefit the species.
- Hybridization with other lotus species is a threat.

- Some plants in Wilson Cove are dying out possibly due to senescence as it is expected to be a short-lived plant. Reproduction may be hindered by a lack of burning as mainland members of this genus have been shown to seed prolifically following fire.

Management

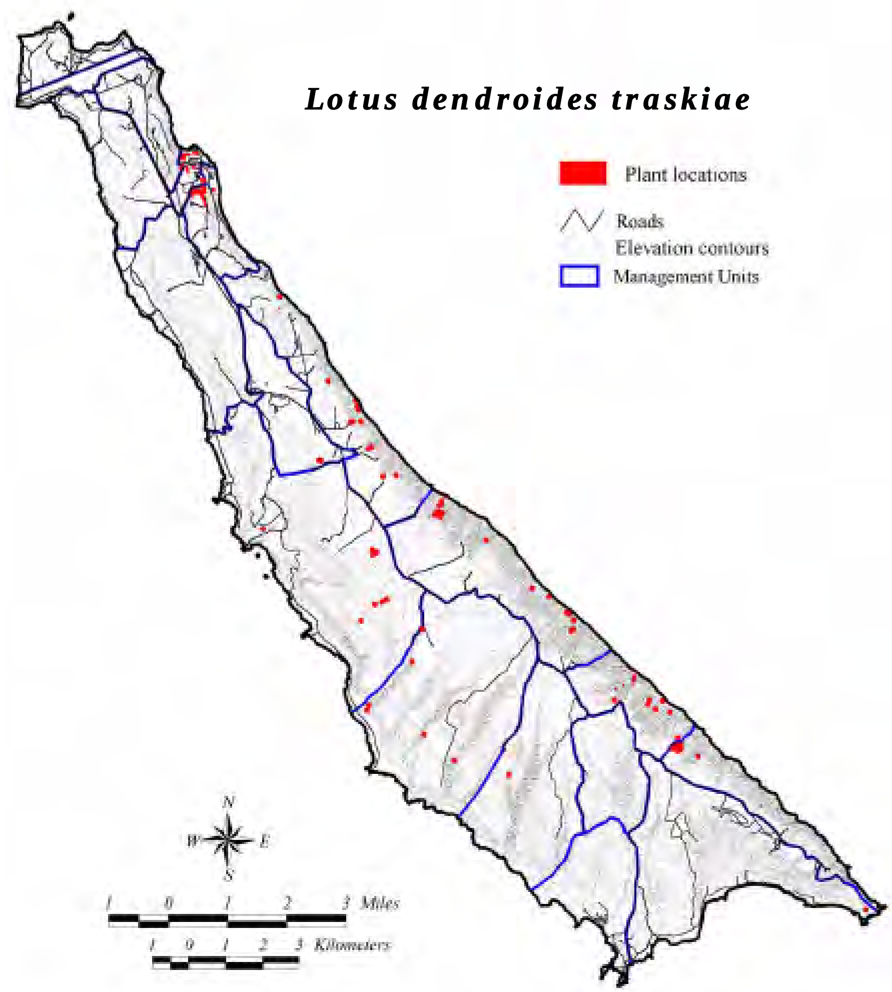
Current Management Environment: Trask's island lotus has been listed as endangered since 1977. Since removal of feral goats, there has been little management directed toward this species. It is being studied for its genetic makeup, and also is part of occasional sensitive species surveys.

Island-wide Desired Future Conditions:

- The eventual delisting of the species.
- Removal of non-native plant species and restoration of native grasses and scrub species.
- Continued monitoring of this species in conjunction with other sensitive plants.
- Studies conducted on this species to determine its pollinators and its response to fire.
- Inventory of SCI's insect population.

Applicable INRMP Management Units: Nots Pier (31.9% of population), Mt. Thirst (19.3%), Lemon Tank (17.2%), Wilson Cove (16.7%), VC3 (5.7%), Seal Cove (3.2%), Eagle Canyon (2.7%), Lost Point (2%), Mosquito Cove (1%), Pyramid Cove (.2%), Cave Canyon (.1%).

Current Military Values of the INRMP Management Units: Highest: VC3 (8), Pyramid Cove (17), High: Wilson Cove (5), Seal Cove (10), Nots Pier (6), Medium: Mt. Thirst (11), Cave Canyon (13), Low: Lemon Tank (9), Lowest: Mosquito Cove (18), Lost Point (12), Eagle Canyon (14).



MapD-3. Current locations of Trask's Island lotus. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.1.5 Island Oak (*Quercus tomentella*)

Background

Status: CNPS List 4

Photo courtesy of Elizabeth Kellogg.

General Information: The island oak is an evergreen tree normally reaching between 5 and 12 meters. Its bark is reddish brown, scaly, and becomes furrowed and gray. Island oaks are a relict species of a relatively warmer and moister climate that used to be prevalent in California.

Reproduction: Catkins bloom in April and May, and it produces fruit the second year (Roberts 1995). Species of *Quercus* are self compatible and monoecious (Richards 1986; Proctor *et al.* 1995, from Junak and Wilken 1998). Few seedlings have recently been located for this species. Two possible reasons for this are that most acorns produced prior to removal of non-native grazers were probably eaten by the grazers, and seedlings may be having a difficult time establishing themselves in the hard rocky soils degraded by grazers. No studies have specifically addressed recruitment in the island oak, but it is thought that recruitment and establishment is probably favored by moist, cool conditions, nutrient poor soils, and sporadic fires. This combination likely occurs infrequently (Pivorunas pers.comm. 2001, Minnich 1980; Myatt 1980 from Junak and Wilken 1998).

Habitat: Island oak is a representative of the island woodland community and is found on steep, north-facing canyon slopes on the eastern escarpment of SCI between 700 and 1,900 feet. It also can occur on the western side of the island as well. The canyon woodland community covers only about two percent of the island, but contains a disproportionately high degree of the island's floral and wildlife diversity. The woodlands create a complex structure to protect riparian beds, soils, and create habitat for wildlife. They inhabit microclimates that are neither too hot or too cold and that receive plenty of moisture from fog and rain (Pavlik *et al.* 1991).

Fire Tolerance: There are no studies about the effects of fire on this species, however, most oaks resprout well after infrequent, low-intensity fires.

Abundance, Distribution, and Trends: Island oak also occurs on Santa Rosa, Santa Cruz, Anacapa, Santa Catalina and Guadalupe islands. Surveys indicate that island oak numbers are on the decline. In 1986, 77 individual trees were reported on SCI. During Junak and Wilken's 1996-97 survey of the island, 29 occurrences representing about 37 groves were recorded. Each stand appeared healthy, but while many of the groves had sprouting from stumps, no seedlings were seen.

Factors Influencing Population Numbers and Special Considerations Related to Management:

- The genetic variability of this species is probably quite low.
- There are no studies about the effects of fire on this species; however, most oaks resprout well after infrequent, low-intensity fires.
- This is a key species for providing structure and food for wildlife.
- Seedlings and saplings exist but are few in number and may be insufficient for securing the future of this species on SCI.
- It provides important nesting substrate for loggerhead shrikes.
- It can probably grow in a variety of soils, but requires microclimates that are neither too hot or too cold and that receive plenty of moisture from fog and rain (Pavlik *et al.* 1991).
- Serious erosion problems in the past and some persist.
- There may be insufficient safe sites for seedline germination and survival.
- Their current watershed position is high on canyon slopes, possibly indicating their dependence on soil profile, water, and then runoff.

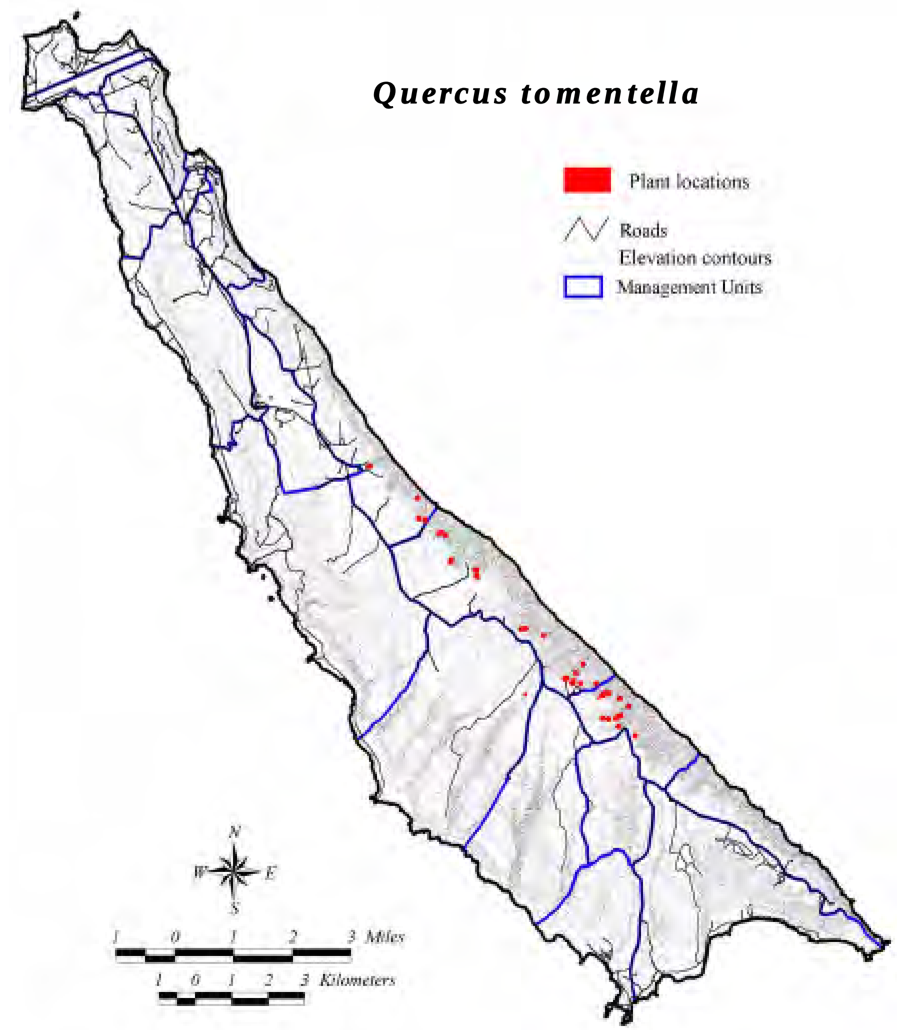
Management

Current Management Environment: Island oak is currently cultivated in the nursery, and a seed collection project is underway. Plants are also generally surveyed for genetic variability.

Island-wide Desired Future Conditions: A target condition is improved ages structure in this community. Maintain the current distribution. Increase numbers. Control erosion.

Applicable INRMP Management Units: 61.8% of the known population of *Quercus tomentella* lives in Mt. Thirst, 25.5% in Eagle Canyon, and 12.7% in Lemon Tank.

Current Military Values of the INRMP Management Units: Medium: Mt. Thirst (11), Low: Lemon Tank (9), Lowest: Eagle Canyon (14).



MapD-4. Current locations of the island oak on SCI. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.1.6 Southern Channel Island Tree Mallow (*Lavatera assurgentiflora glabra*)

Background

Status: USFWS Former Category 2, CNPS List 1B

Photo courtesy of Jonathan Dunn.

General Information: Southern Channel Island tree mallow *(Lavatera assurgentiflora glabra)* is an endemic species of Santa Catalina and San Clemente Island. It is a perennial shrub with showy purple-pink flowers. It usually grows 1 to 4 m high. This species is also referred to as malva rose.

Reproduction: The flowers of *L. assurgentiflora glabra* are bisexual and appear between March and July; feral honeybees as well as the native Megachilidae have been recorded as visitors. The flowers are probably self-compatible but the species also relies on insect pollination. Fruits on the ground underneath the parent plant appeared to have been gnawed by rodents (Junak and Wilken 1998). Flowers produce between 8 and 10 seeds (Jepson 1914).

Habitat: On SCI, *Lavatera assurgentiflora glabra* are found on north and west facing slopes towards the north end of the island, growing from 70 to 500 feet in elevation mostly associated with recently stabilized or on Pleistocene (ancient) dunes. In their 1996–1997 survey, Junak and Wilken noted several associated plants at these locations: *Ambrosia chamissonis, Artemisia nesiotica, Astragalus nevinii, Atriplex semibaccata, Avena fatua, Bromus diandrus, Calystegia macrostegia amplissima, Carpobrotus edulis, Chenopodium californicum, Dichelostemma capitatum, Hemizonia clementina, Heterotheca grandiflora, Melilotus indicus, Opuntia oricola, Salsola tragus,* and *Sonchus oleraceus.*

Fire Tolerance: No information.

Abundance, Distribution, and Trends: L.a.glabra's numbers have decreased dramatically in the last 100 years, and it is currently only known from two offshore rocks at Santa Catalina Island and four occurrences at SCI. In historical records, *Lavatera's* distribution on SCI is described as being widespread and relatively abundant: "the hill is covered with malva bushes and cactus..." (Greenwell 1890; refer to map 3.8). However, surveys done in 1996 and 1997 recorded it in only five locations, individuals numbering only 78. In surveys done since then, only four occurrences were recorded with fewer total individuals. It is cultivated and thrives around Wilson Cove.

Factors Influencing Population Numbers and Special Considerations Related to Management:

- Although this subspecies is not currently listed, it is in danger of extinction. The malva rose has declined over the past hundred years from abundant to a few remnant populations. It is therefore highly important that it continue to be monitored and managed.
- Genetic variation is low in this species.
- The flowers are probably self-compatible but the species also relies on insect pollination.
- Little habitat information and no fire tolerance information are available.
- Current levels of flowering and seed production do not appear to be limiting recruitment in this species.

Management

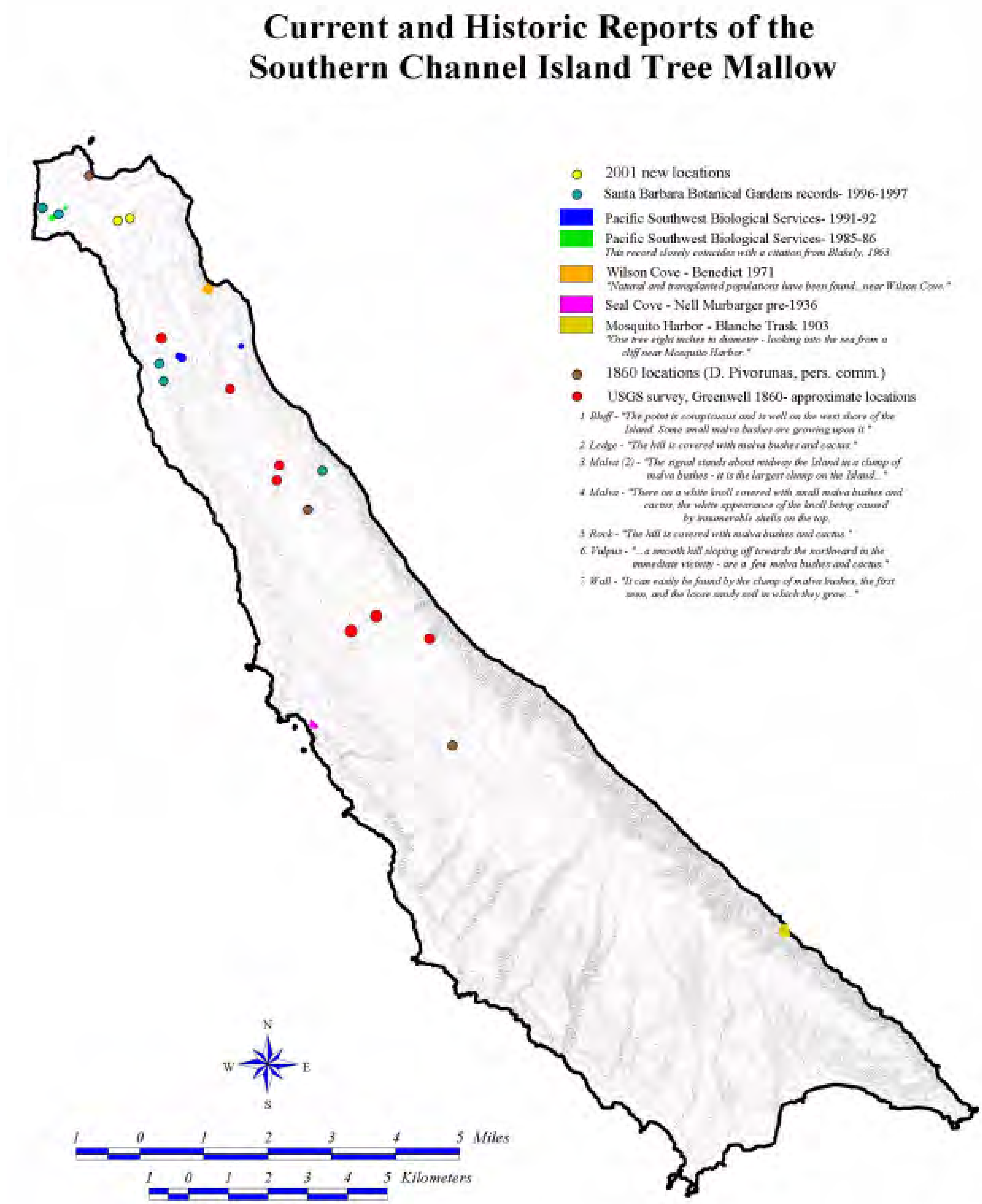
Current Management Environment: There has been little management directed toward this species. It is being studied for its genetic makeup, and also is part of occasional sensitive species surveys. It is also being grown in the Island's greenhouse in an attempt to bolster its populations.

Island-wide Desired Future Conditions:

- Increase numbers especially in known historic locations.
- Continued monitoring of this species in conjunction with other sensitive plants.
- Studies conducted on this species to determine its pollinators and its response to fire.
- Understanding reason for recent death of individuals.

Applicable INRMP Management Units: 84.6% of *Lavatera assurgentiflora glabra's* known population lives in Northwest Harbor, 11.5% in West Cove, and 3.8% in Lemon Tank.

Current Military Values of the INRMP Management Units: Highest: Northwest Harbor (1), Medium: West Cove (4), Low: Lemon Tank (9).



MapD-5. Current and historic locations of the southern Channel Island tree mallow on San Clemente Island. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.1.7 San Clemente Island Bush Mallow (*Malocothamnus clementinus*)

Background

Status: USFWS Endangered, CDFG Endangered, CNPS List 1B

General Information: The SCI bush mallow (*Malocothamnus clementinus*) is a low shrub reaching 70-100 cm tall. Its branches are tomentose when young with long, gray, stellate hairs. It produces a spike of densely crowded pink flowers (Munz 1974).

Reproduction: This plant reproduces sexually and vegetatively (Beauchamp n.d.; Munz 1974). It is probably pollinated by solitary agapostemon or andrenid bees (Beauchamp n.d.). Because the plant seems self-sterile (Tree of Life Nursery 1986 reported a lack of viable seed set in solitary populations, with Horse Beach Canyon producing the only viable seed), and it normally reproduces by underground runners, the genetic variability of the species is probably very low. Seedlings are rare. Seemingly isolated individuals may actually be connected to another plant as the underground runners extend as much as 30 feet from a plant (Junak, pers. comm. 1996). This combined with low numbers of approximately 300 known individuals (Junak and Wilken 1998) makes the future of this plant continue to be precarious, but improving. Flowers are pink and bloom in April.

Cultivated specimens live only four to six years; when the parent plant dies, all connected plantlets die also. However, wild plants had survived at Lemon Tank for more than a decade (USFWS 1984). It appears to be long-lived on SCI (Junak, pers. comm. 1996).

Predators: Some seeds have been observed to be preyed upon by insects, and susceptibility to fungi has been noted (Stone, pers. comm. 1996).

Competitors: Horse beach Canyon population is being outcompeted by native shrubs, and some appear to be senescing.

Habitat: The few existing populations of San Clemente Island's bush mallow (*Malocothamnus clementinus*) are located in a wide range of habitats. Historic sites include "on walls of canyons running into the sea," "rocky canyon walls" and ridges (probably because of goat foraging) and on an "open, south-facing hillside with *Mirabilis* and *Atriplex*." It currently occurs on rocky canyon walls, canyon bluffs, low canyon benches, alluvial deposits, rocky grassland sites of the plateau, and on coastal flats with maritime cactus scrub vegetation and the brows of terrace faces of the west shore (about mid-island). Additional evidence of SCI bush mallow's ecological amplitude comes from its ease of cultivation in diverse soil types (USFWS 1984). The plant may naturally seek out recently-disturbed (early-successional) situations.

Fire Tolerance: SCI bush mallow is expected to be a vigorous resprouter after fire, as are other members of the genus. However, a recent fire reportedly killed one or two individuals in upper Horse Beach Canyon (Elvin, pers. comm. 1996). Populations in the fire support area are scarred by fire but persist despite very frequent burns. Seeds of other species of *Malocothamnus* are stimulated by heat: "In the first growing season after fire, seedling populations are high, derived from the previously dormant soil seed bank. After this first year pulse, seedling recruitment is rare until the next fire. Dormancy is imposed by a more or less impermeable seed coat. Heat shock from the fire melts or cracks the cuticle or otherwise scarifies the seed coat" (Keeley 1987).

Abundance, Distribution, and Trends: Surveys indicate that populations of SCI bush mallow are stable or increasing. It currently occurs primarily on the southwestern portion of the island, "on coastal flats with maritime cactus scrub vegetation and on vegetated flats in canyon bottoms" (Junak and Wilken 1998). In 1963 the only known location of this striking mallow was at Lemon Tank Canyon in a pile of military scrap which apparently protected it from goats (Raven 1963). In 1977, a second colony of 2-3 plants was found in China Canyon on an inaccessible ledge. Five locations were reported in 1985 (Mills 1985, cited by Tree of Life Nursery 1986). This plant was reported in Lemon Tank, China Canyon, Horse Beach, Box, Waymuch and Middle Tank canyons and two plateau sites in the mid 1990s (Stone 1996). In 1996-1997 surveys, it was shown to occur at 18 sites, ranging from isolated plants to 3-50 clumps (Junak and Wilken 1998).

Factors Influencing Population Numbers and Special Considerations Related to Management:

- As fruits and seedlings are rare and the plant is mainly reproducing vegetatively, genetic variability is very low.
- More information is needed on pollinators.
- It is a vigorous resprouter after fire, as are other members of the genus.
- SCI population appears to be increasing since removal of grazers, but parts of Horse Beach Canyon population is being outcompeted by native shrubs.
- It has been located in a variety of habitats.
- Cultivated specimens live only four to six years; when the parent plant dies, all connected plantlets die also. However, wild plants had survived at Lemon Tank for more than a decade (USFWS 1984).

Management

Current Management Environment: Malacothamnus clementinus has been listed as endangered by the USFWS since 1977. Since removal of feral herbivores, there has been no management targeted specifically toward this species, with the exception of occasional monitoring.

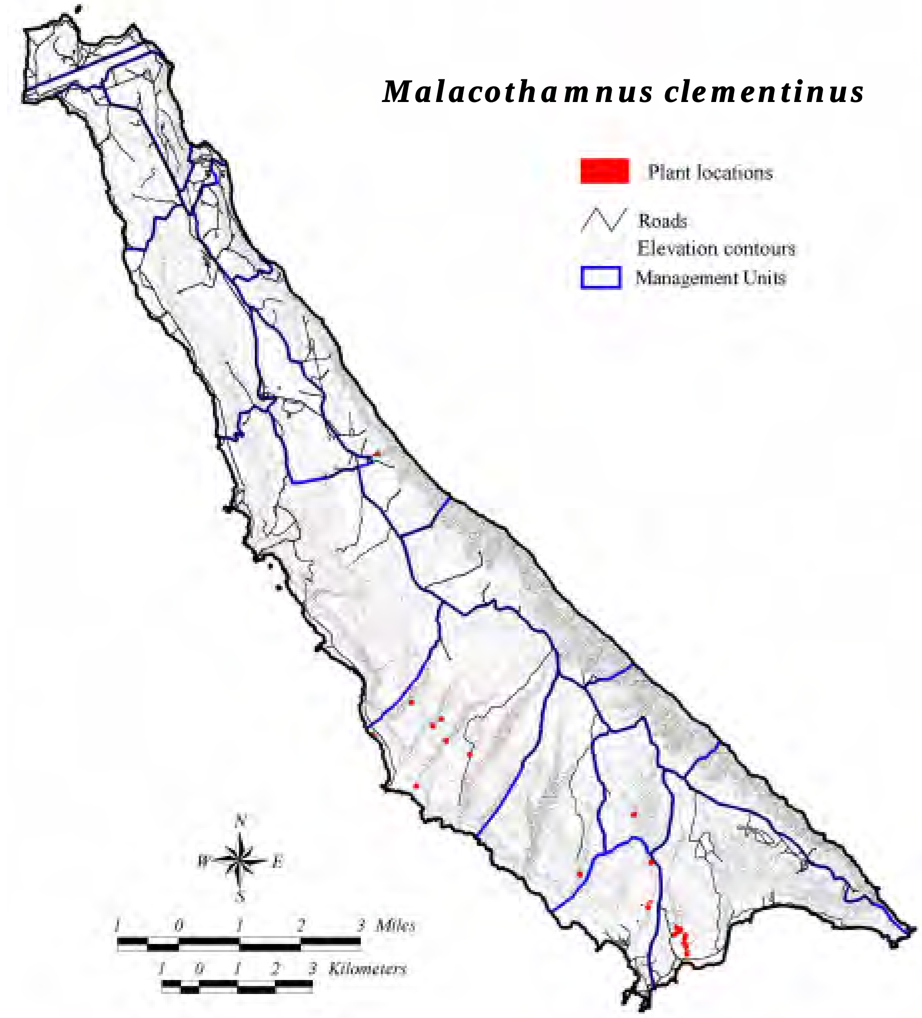
Island-wide Desired Future Conditions:

- The eventual delisting of the species.

- Removal of non-native plant species and restoration of native species.
- Continued monitoring of this species in conjunction with other sensitive plants.
- Studies conducted on this species to determine its pollinators and its response to fire.
- Inventory of SCI's insect population.

Applicable INRMP Management Units: Pyramid Cove (42.5%), Lost Point (30%), China Cove (27.2%), Cave Canyon (.3%).

Current Military Values of the INRMP Management Units: Highest: Pyramid Cove (17), China Cove (16), Medium: Cave Canyon (13), Lowest: Lost Point (12).



MapD-6. Current locations of SCI bush mallow. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.1.8 San Clemente Island Larkspur (*Delphinium variegatum kinkiense*)

Background

Status: USFWS Endangered, CDFG Endangered, CNPS List 1B

Photo courtesy of Jonathan Dunn.

General Information: The SCI Larkspur *(Delphinium variegatum kinkiense)* is an herbaceous perennial endemic to San Clemente Island. It generally grows to between 14 and 85 cm, and has white flowers arranged in a terminal raceme. Many species in this genus are highly toxic, causing death to grazers. It prefers coastal grasslands (Hickman 1993).

Reproduction: The SCI Larkspur has whitish bisexual flowers that bloom from March to May. Western North American species of larkspur with white and blue flowers are known to be pollinated by bumblebees. The plant may take 2–3 three years to reach flowering age (Beauchamp n.d.). Approximately 65-79% of all flowers produce fruit, and predation of both fruit and seeds have been reported. Many species of this genus are self-incompatible and require insect mediation for pollination. While information on this subspecies is lacking, Junak and Wilkens' (1998) observations regarding flower and fruit numbers are consistent with the self-incompatibility model. The seeds may require a dormancy period prior to germination.

Predators: No information.

Competitors: No information, although exotic annual grasses dominate some locations.

Habitat: Its habitat has been described as grassland on clay, but it has also been located on dark gray-brown loam, 5-10 inches deep. It grows mainly on gently sloping open grassland terraces between 80 and 255 m elevation. It has been associated with both annual grasses (*Avena* sp. and *Bromus* sp.) and with perennial grasses (*Nasella pulchra*) (Beauchamp n.d.).

Fire Tolerance: Field observation following fire suggests that this species is tolerant of fire during its dormant period (USFWS 1984). Other species of *Delphinium* respond favorably to fire, but burns prior to seed set and dormancy may be adverse, however this species probably depends more on resprouts than seed for fire recovery (Keeley, pers. comm. 1996). Fire adaptation may be increased by the plant's ephemeral nature and rapid seed set.

Abundance, Distribution, and Trends: SCI larkspur is a plant that can be easily missed if not in flower, so mapping efforts that reported very low population numbers over the past 40 years may not be completely reliable. Surveys indicate that population numbers are apparently increasing. Recent genetic studies indicate this species has a medium amount of variation within its population; however, genetic variation among populations is very low.

About 40 separate populations have been mapped since the 1960s. However, in 1979 during the goat grazing period, Howard Ferguson reported only two isolated patches remaining. These were fenced to prevent predation from feral pigs. One location he identified as having only a single plant, currently (in 1992) had about 100. This particular population is threatened by sheetwash and gullying, and possibly competition from the neighboring grassland species. This may also be true of other populations because of their typical position on the eastern, high-plateau *Nassella* grasslands on the northern and central parts of the island. Surveys in 1996 (Steve Burckhalter 1996) re-established the presence of this species as far south as Pyramid Head, as originally observed in 1969. At that time it was also reported in Mosquito Canyon. Junak and Wilken (1998) recorded 17 occurrences of this plant representing over 5,700 individuals in their 1996-1997 surveys. They note that many historical locations weren't visited in this survey, so actual occurrence numbers could be higher.

Factors Influencing Population Numbers and Special Considerations Related to Management:

- It occurs on gently sloping mesic grasslands (cooler aspects).
- SCI larkspur is a plant that can be easily missed if not in flower, so mapping efforts that reported very low population numbers over the past 40 years may not be totally reliable.
- Grazing and trampling by goats, sheep ranching, and uprooting by pigs were considered to be the principal threats to this species. One location previously identified as having only a single plant currently has approximately 100 individuals.
- Species is possibly threatened by competition from neighboring exotic annual grass species.
- More information is needed on pollinators. Native bees could be threatened by feral honeybees, although these are not known from SCI. It may be self-incompatible and require insects for reproduction.
- The plant may take 2-3 years to reach flowering age (Beauchamp n.d.).

- Recent genetic work has found the lone genetic difference between this species and *Delphinium* var. *thornei* is in the purple versus white color difference (Helenurm pers. comm 2001 [work in progress]). Lumping of these two varieties may hold validation, in which case many more individuals exist than previously known.

Management

Current Management Environment: SCI larkspur has been listed as endangered by the USFWS since 1977. Since removal of feral herbivores, there has been little management directed toward this species. It is being studied for its genetic makeup, and also is part of occasional sensitive species surveys.

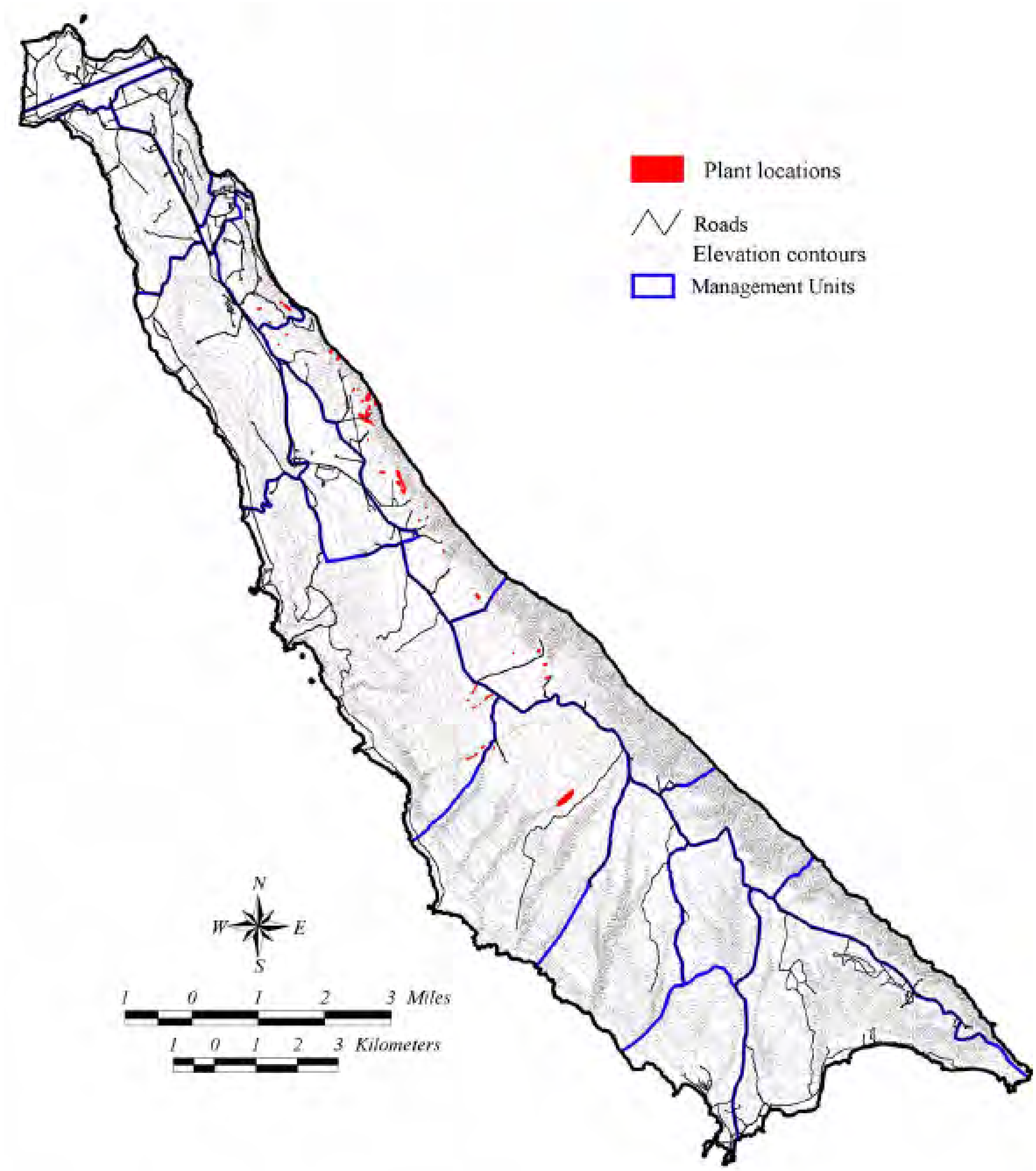
Island-wide Desired Future Conditions:

- The eventual delisting of the species.
- Removal of exotic grassland species and restoration of native grasses.
- Continued monitoring of this species in conjunction with other sensitive plants.
- Studies conducted on this species to determine its pollinators and its response to fire.
- Inventory of SCI's insect population.
- Control of erosion in or near vulnerable population.

Applicable INRMP Management Units: SCI larkspur is found in the Land Management Units: Lemon Tank (72.3% of total population), Mt. Thirst (26.8%), Terrace Canyon (5%), and West Cove (5%).

Current Military Values of the INRMP Management Units: Medium: Terrace Canyon (7), West Cove (4), and Mt. Thirst (11), Low: Lemon Tank (9).

Delphinium variegatum kinkiense



MapD-7. Current locations of SCI larkspur. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.1.9 Santa Cruz Ironwood (*Lyonothamnus floribundus aspleniifolius*)

Background

Status: USFWS Former Category 2, CNPS List 2

Photo courtesy of Elizabeth Kellogg.

General Information: Lyonothamnus is a genus endemic to the Channel Islands. The Santa Cruz ironwood occurs on Santa Cruz, Santa Rosa and San Clemente islands. It is an evergreen tree with gray to reddish brown bark that peels in strips. It has round, white bell-shaped flowers that bloom from May to August (Hickman 1993).

Reproduction: Flowers are bisexual, and the number of fruits (mean = 0.85) and seeds (mean = 0.47) per flower are much lower than might be expected. Junak and Wilken note that there have been several incidental observations suggesting that this species has a high level of insect visitation (Duff 1994). Most of the groves reported appear to be clonal (Junak 1987 from Junak and Wilken 1998) and recent studies of stands on Santa Rosa and Santa Cruz islands show this to be true (Duff 1994 from Junak and Wilken 1998). No new seedlings have been observed on SCI in recent decades.

Habitat: Ironwood prefers rocky slopes, canyons, oak woodland and chaparral (Hickman, 1993). On SCI, most groves are found on the eastern escarpment in steep canyons, although two large canyons on the western slope house them as well. They prefer north facing slopes and, occasionally, canyon bottoms (Junak and Wilken 1998).

Fire Tolerance: This species vigorously resprouts after fire (E. Kellogg, pers. comm.). However, individuals have been killed by over-hot or repeat fires.

Abundance, Distribution, and Trends: Surveys indicate that island ironwood numbers are decreasing. Surveys in 1986 found 927 individuals, while those done in 1996-1997 found only 425. However, the Junak and Wilken report does not contain a count of individual trees; sometimes whole groves of twenty or more trees are reported as an individual. This makes it difficult to draw a comparison between the two numbers. Not many large changes have been recorded overall to ironwood on the island since 1986, but since there is no recruitment detected yet from seedlings over the long term it is possible the plant will decrease as older individuals disappear. It is likely the population is stable or slightly decreasing overall (Pivorunas, pers.comm. 2001).

Junak and Wilken reported that many of the groves had old, dead upper branches with healthy looking new growth sprouting from their bases. No seedlings have ever been located. Some have been killed by fire that was either too hot or occurred too soon after a previous fire (Kellogg, pers. comm. 2001).

Factors Influencing Population Numbers and Special Considerations Related to Management:

- They prefer north facing slopes and, occasionally, canyon bottoms (Junak and Wilken 1998). They seem to occupy sites where water collects.
- It has very low fruit and seed productivity, however, genetic variability may still be high (Junak and Wilken 1998). Seed viability also appears to be low.
- Information is available about specific pollinators.
- It may not be setting adequate seed because many of the groves are colonial (Bushakra *et. al*., 1999).
- This species may be declining rapidly based on recent survey results.

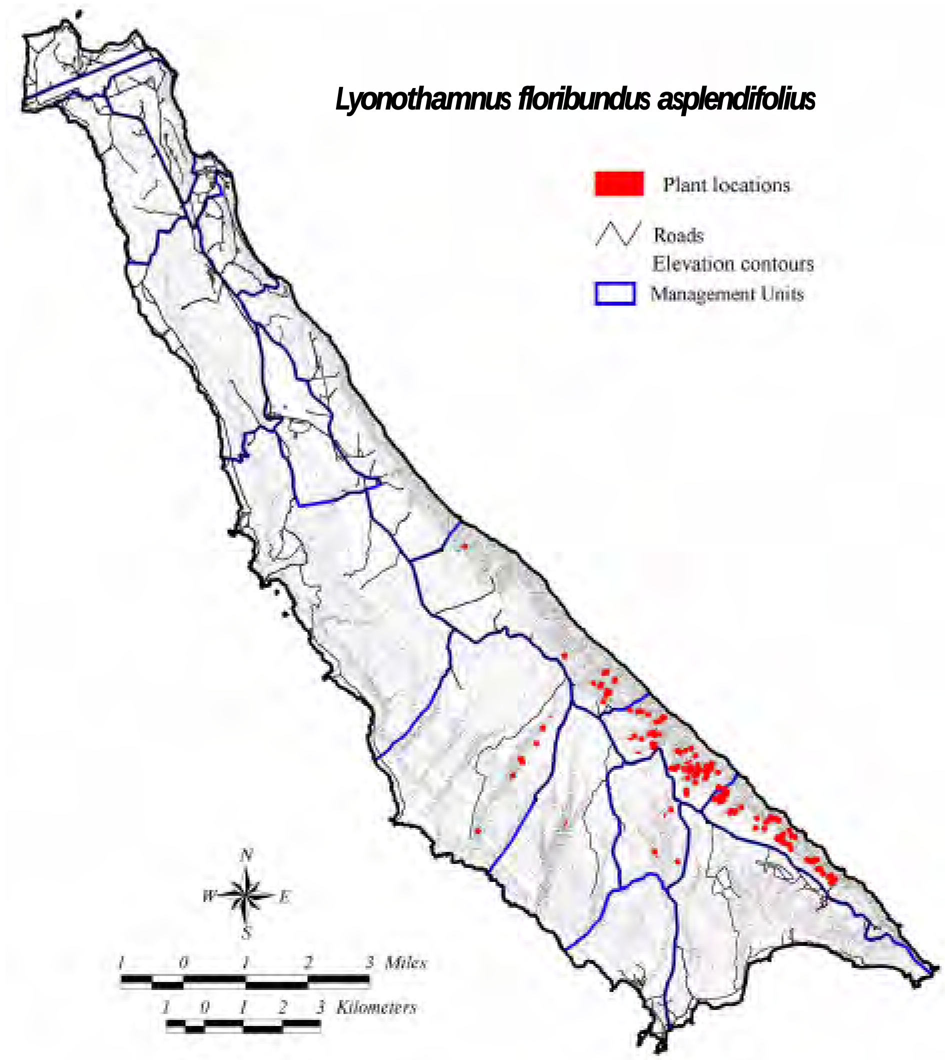
Management

Current Management Environment: There has been some management directed toward this species. It is currently being studied for its genetic makeup, and also is part of occasional sensitive species surveys. The Navy has also collaborated with genetic researchers on Santa Barbara Island.

Island-wide Desired Future Conditions: Improve age structure of community by establishing young. Maintain current distribution. Allow no more tree kill by fire. Reduce exotics.

Applicable INRMP Management Units: 71.2% of San Clemente Island's Lyonothamnus floribundus aspleniifolius lives in Mosquito Cove, 21.1% in Eagle Canyon, 4.7% in Mt. Thirst, 2.29% in Lost Point, and .8% in Cave Canyon.

Current Military Values of the INRMP Management Units: Medium: Cave Canyon (13), Mt. Thirst (11), Low: Mosquito Cove (18), Lowest: Lost Point (12), Eagle Canyon (14).



MapD-8. Current locations of the Santa Cruz ironwood on SCI. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.1.10 San Clemente Island Woodland Star (*Lithophragma maximum*)

Background

Status: USFWS Endangered, CDFG Endangered, CNPS List 1B

General Information: SCI woodland star (*Lithophragma maximum*) is endemic to San Clemente Island. Once thought extinct, it was rediscovered on SCI in 1978 by Mitch Beauchamp and Howard Ferguson. It was located on Santa Catalina Island in 2001 for the first time ever (Schuyler pers.comm. 2001). It is a perennial, rhizomatous herb that grows to 60 cm in height.

Reproduction: This species' flowers are small, bisexual and white and sometimes tinted towards pink. All other species in this genus are self-incompatible, and mainland species are mainly pollinated by moths and solitary bees (Junak and Wilken, 1998). Its seeds are spiny and apparently depend on wind or animals for dispersal. Consequently, it may initially require active seed dispersal efforts because its natural dispersal mechanisms are very slow. Scarcity of insect pollinators may affect the success of populations although we have no evidence this success is any worse than it has been in the past. The plant also reproduces from bulblets and rhizomes. This may make species survival a problem, because no genetic variation has been detected using allozyme data sets (Helenum, pers. comm. 2001)

Predators: Feral grazers probably browsed this species.

Competitors: No information.

Habitat: It prefers steep, moist north facing canyon slopes (Hickman, 1993). It is found in organic, mesic pockets in the vicinity of Bryce and Eagle canyons and Mosquito Cove where there is persistent, year-round moisture. It seems to occupy the coolest, moistest of niches in the canyons.

Abundance, Distribution, and Trends: This species was thought to be extinct until its rediscovery in 1979 in Eagle and Bryce canyons. A total of 465 individuals were located within 10 occurrences during 1996/97 surveys. Surveys over the past twenty years show that population numbers appear to be stable. Most sites where populations occur pose access challenges, and relocation of reported sites by new observers is similarly difficult. Additional locations of this taxon have been discovered in the past several years, including one on Santa Catalina Island, a first record for the island (Pivorunas, pers. comm. 2001).

Factors Influencing Population Numbers and Special Considerations Related to Management:

- No direct risk, other than an exceptional erosion event or competition from other plants, threatens the existing sites.
- Generally, the east side canyons have shown dramatic recovery since goats were removed (Kellogg and Kellogg 1995).
- Two attempts at artificial propagation from seed failed (USFWS 1984).
- Scarcity of insect pollinators may affect the success of populations although we have no evidence this success is any worse than it has been in the past.
- No genetic variation has been detected using allozymes.
- The effects of fire on this species are unknown.

Management

Current Management Environment: Lithophragma maximum has been listed as endangered by the USFWS since 1977. Since removal of feral herbivores, there has been little management directed toward this species. It is being studied for its genetic makeup, and also is part of occasional sensitive species surveys.

Island-wide Desired Future Conditions:

- The eventual delisting of the species.
- Removal of non-native plant species and restoration of native canyon vegetation.
- Control of ongoing erosion caused by historic goats browsing in canyons.
- Continued monitoring of this species in conjunction with other sensitive plants.
- Studies conducted on this species to determine its pollinators and its response to fire.
- Inventory of SCI's insect population.

Applicable INRMP Management Units: Mosquito Cove contains 57.2% of the island population, while Eagle Canyon contains 42.8%

Current Military Values of the INRMP Management Units: Lowest: Mosquito Cove (18), Eagle Canyon (14).

MapD-9. Current locations of SCI woodland star. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.1.11 San Clemente Island Indian Paintbrush (*Castilleja grisea*)

Background

Status: USFWS Endangered, CDFG Endangered, CNPS 1B

General Information: San Clemente Island Indian Paintbrush *(Castilleja grisea)* is a small, perennial shrub endemic to San Clemente Island. It grows to a height of 40-60 cm and has yellow flowers borne in terminal spikes. Its vegetative parts are green and densely hairy (Hickman 1993). Although as yet not demonstrated in this species, all members of this genus are facultatively hemiparasitic. Their roots tap into the root system of other species to ensure an adequate water, and possibly nutrient, supply (Junak and Wilken 1998). There is no information on which plant this paintbrush might be dependent on (it is found with a diversity of other species), although *Encelia californica, Opuntia littoralis* (DoN 1996), and *Isocoma veneta* (Beauchamp n.d.) have been proposed.

Reproduction: This species reproduces sexually and is probably pollinated by insects or hummingbirds (Beauchamp n.d.), though no specific pollinator information is available. It flowers from February to May and its seeds are passively dispersed from June through August (Beauchamp n.d.). On average, 67-71% of all flowers produce fruits and there is a wide range in the number of seeds per fruit. These observations may suggest that the species is self-incompatible or strongly dependent on insects or hummingbirds for pollination and seed set (Junak and Wilken 1998).

Predators: Feral grazers probably sought and browsed this species.

Competitors: No information.

Habitat: It inhabits the coastal sage scrub and maritime cactus scrub plant communities of the island. It can be found on rocky canyon walls, lower slope bluffs, alluvial benches, and sandy terraces (DoN 1996). On canyon walls it is highly correlated with *Opuntia littoralis*, which may have protected it from grazing. It can be a dominant shrub within the coastal sage scrub community (Beauchamp n.d.).

Fire Tolerance: Members of this genus tend to follow fire and other non-catastrophic disturbance, but this Island dweller is larger and more woody than its mainland counterparts and its adaptability may be different. However, evidence suggests occasional fires may help this species. A monitored population in Pyramid Cove peaked in 1984 after a fire in 1983, and declined for numerous years after that (DoN 1996).

Abundance, Distribution, and Trends: Plants are widely distributed from Jack Point south, on both the east and west sides of the island (Map 10). This species appears to be recovering well since the removal of non-native grazers. It increased from 6 known occurrences and less than 1,000 individuals observed during 1980 and 1986 surveys to 77 occurrences and more than 3,500 individuals during 1996/97 surveys. An additional 12 occurrences have been found since then. Genetic information shows medium amounts of total variation and variation between populations, but the differing alleles among populations are low in variation.

Factors Influencing Population Numbers and Special Considerations Related to Management:

- Grazing by non-native herbivores probably led to this species' decline.
- Members of this genus tend to follow fire and other non-catastrophic disturbance, but this Island dweller is larger and more woody than its mainland counterparts and its adaptability may be different. However, evidence suggests occasional fires may help this species (see above).
- It may do well after fire, but too frequent fire may inhibit recovery.
- The difficulty with evaluating this plant's status is separating natural population variations from that caused by unnatural disturbance, predation or disease. As with *Lotus dendroideus* var. *traskiae*, this plant is short-lived and seems to occupy a seral ecological niche. The two or three sites where we have any information on population numbers and trends have shown wide variation without any apparent interference.
- A further complication in identifying the cause of population fluctuations is that the species, if it is like its relatives, may be facultative hemiparasitic. Consequently, its health is tied directly to that of other adjacent plant species.
- Its success may also be tied to the presence of its pollinators which are currently unknown. Based on pollinator relationships of other members of this genus, hummingbirds are a likely pollinator, and insects may also contribute. Hummingbirds are present on the island.
- It is adapted to both steep cliffs and flat, open habitats.

Management

Current Management Environment: Listed as endangered by the USFWS in 1977. There is currently little management directed toward this species. It is being studied for its genetic makeup, and also is part of occasional sensitive species surveys.

Island-wide Desired Future Conditions:

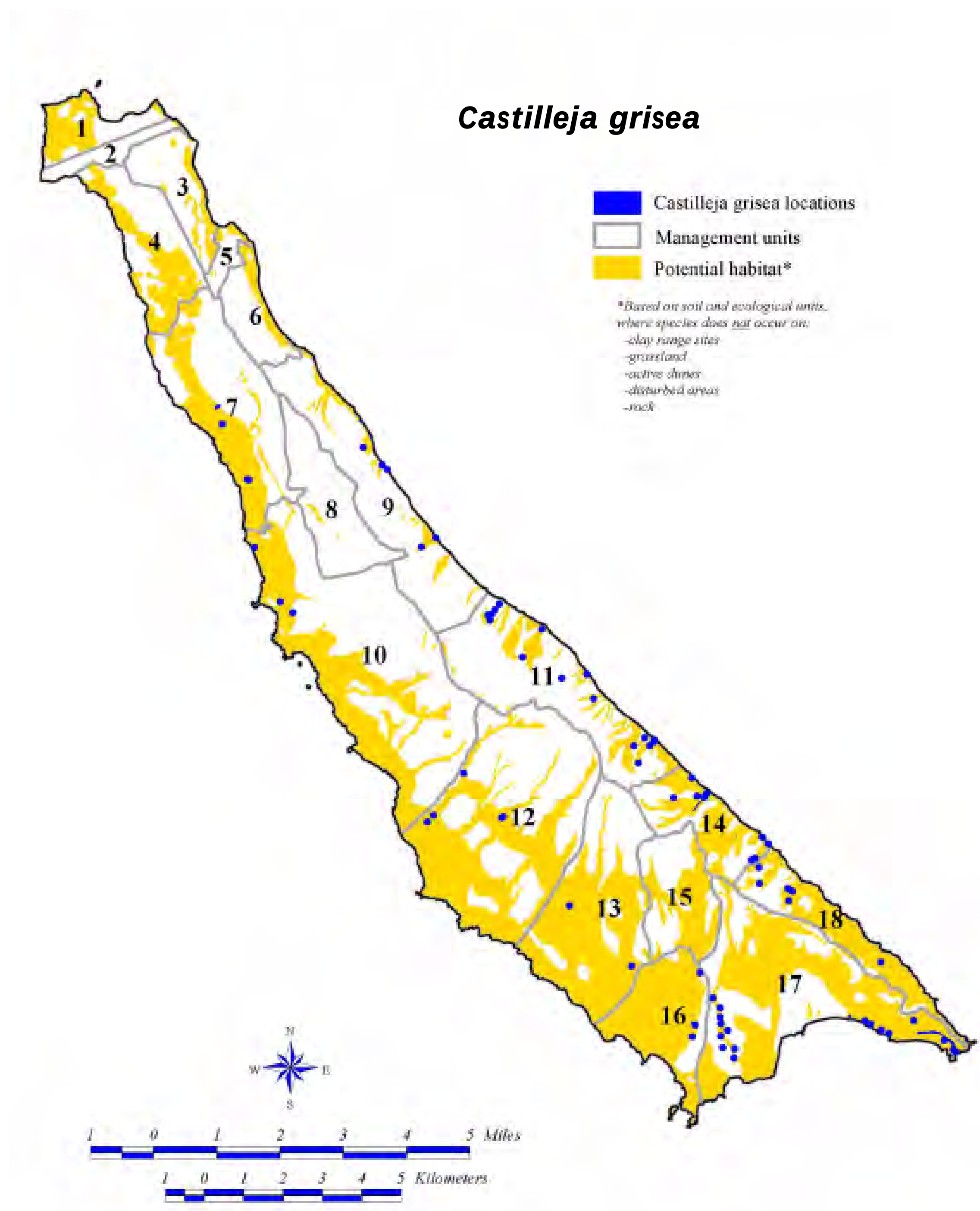
- The eventual delisting of the species.
- Continued recovery of the scrub communities inhabited by this species, but in different seral stages that allows for persistence of this early successor to fire and other non-catastrophic disturbance.
- Continued monitoring of this species in conjunction with other sensitive plants.

- Studies conducted on this species to determine: 1) its pollinators, 2) its host species (if it is determined to be facultative hemiparasitic), and 3) its response to fire.
- Inventory of SCI's insect population.

Applicable INRMP Management Units:

The largest populations of *Castilleja grisea* can be found in the Mt. Thirst and Pyramid Cove Land Management Units, containing 35.2% and 34.2% of its populations respectively. The next most densely populated units are Terrace Canyon and Eagle Canyon, with 13.4% and 8.3% of the total population each. Cave Canyon, China Cove, Lemon Tank, Lost Point, Mosquito Cove and Seal Cove all have low population levels of less than 3%.

Current Military Values of the INRMP Management Units: Highest: China Cove (16) and Pyramid Cove (17), High: Wilson Cove (5), Medium: Terrace Canyon (13), Cave Canyon (13), Mt. Thirst (11), Cave Canyon (13), Low: Lemon Tank (9), Lowest: Mosquito Cove (18), and Eagle Canyon (14).



MapD-10. Locations and potential habitat of Castilleja grisea *on San Clemente Island, based on a GIS model of possible compatibilities and restrictions derived from existing locations. This map models broad habitat categories;* Castilleja grisea *may occur in, for example, inclusions within clay range sites such as rock outcrops. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).*

D.1.12 Active Dune Specialists

Background

Species and Status: San Clemente Island Evening Primrose (*Camissonia guadalupensis clementina*): USFWS Former Category 2, CNPS List 1B and Trask's cryptantha (*Cryptantha traskiae*): USFWS Former Category 2, CNPS List 1B

Photo courtesy of Jonathan Dunn.

Photo courtesy of Jonathan Dunn.

General Information: Camissonia guadalupensis is endemic to California islands and the subspecies *clementina* is endemic to SCI. Trask's cryptantha is endemic to San Nicolas and San Clemente islands. Both of these species rely on unstabilized or partially stabilized sand dunes on SCI. They are both annuals that grow to about 20 cm in height.

Reproduction: The evening primrose has yellow, bisexual flowers that bloom from April to July in terminal spikes. It is largely self-pollinating though visitation from insects will increase genetic diversity. The seeds of most species of *Camissonia* do not require a dormant period or treatment prior to germination. Approximately 95% of all flowers produce fruits (Junak and Wilken 1998).

Trask's cryptantha has small white flowers that may be self-pollinating. However, little is known about the reproductive biology of this species. Low seed germination (29%) observed by Junak and Wilken (1998) may be due to a dormancy requirement or treatment of the seed coat.

Predators: No evidence of seed predation has been observed in either of these species.

Competitors: Competition from non-native plants including *Carpobrotus edulis*, *Herniaria hirsuta cinerea*, *Hordeum murinum*, and *Mesembryanthemum crystallinum* is a threat to both of these species (Junak and Wilken 1998).

Habitat Use and Behavior: Both species occur in the unstabilized or partially stabilized sand dunes on the north and west sides of SCI. Trask's cryptantha also inhabits sandy flats. The elevational range of both species is about 10-85 m.

Fire Tolerance: No information, but not located in fire-prone areas.

Abundance, Distribution, and Trends: The evening primrose population on SCI is probably currently stable, although today's population is much smaller than historically reported. Previous records reported more than 6,000 individuals outside of the main dune complex and many thousands more on the dunes. In 1996/97 surveys a total of 6,570 individuals were located. The total amount of genetic variation within the population was estimated to be low, but variation among populations was thought to be relatively high (Helenurm 2001).

Trask's cryptantha is currently increasing on SCI. In 1986, the island population was estimated at 11,000 individuals and in 1996/97 approximately 23,000 individuals were found in 10 locations. However, the unstabilized sand dunes at SCI are not currently being replenished and will become more stabilized in the future. Genetic variation of this species on SCI was estimated to be relatively low.

Factors Influencing Population Numbers and Special Considerations Related to Management:

- It is largely self-pollinating though visitation from insects will increase genetic diversity.
- The unstabilized sand dunes at SCI are not currently being replenished and will become more stabilized in the future.
- The population of evening primrose is currently stable on SCI and Trask's cryptantha is increasing.
- Competition from non-native plants including *Carpobrotus edulis*, *Herniaria hirsuta cinerea, Hordeum murinum*, and *Mesembryanthemum crystallinum* is a threat to both of these species (Junak and Wilken 1998).
- The total amount of genetic variation within the evening primrose population is low, but average for endemic species. Genetic differentiation among populations is very high.
- Genetic variation of Trask's cryptantha on SCI is extremely low, even for endemic species.

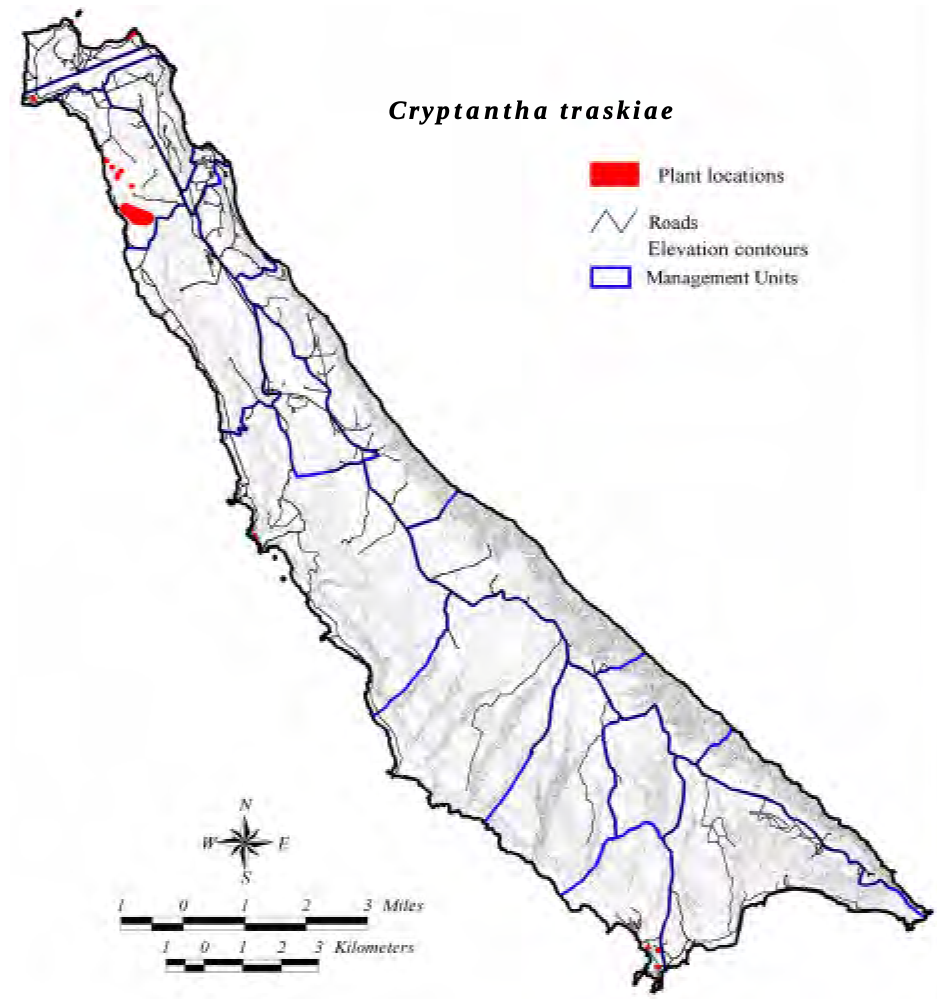
Management

Current Management Environment: The exotic weed control program on the dunes benefits native dune dwellers. In addition, restricted access to the dunes helps protect the natives. The dunes' off-limits status and ongoing spraying of iceplant constitute the existing management program.

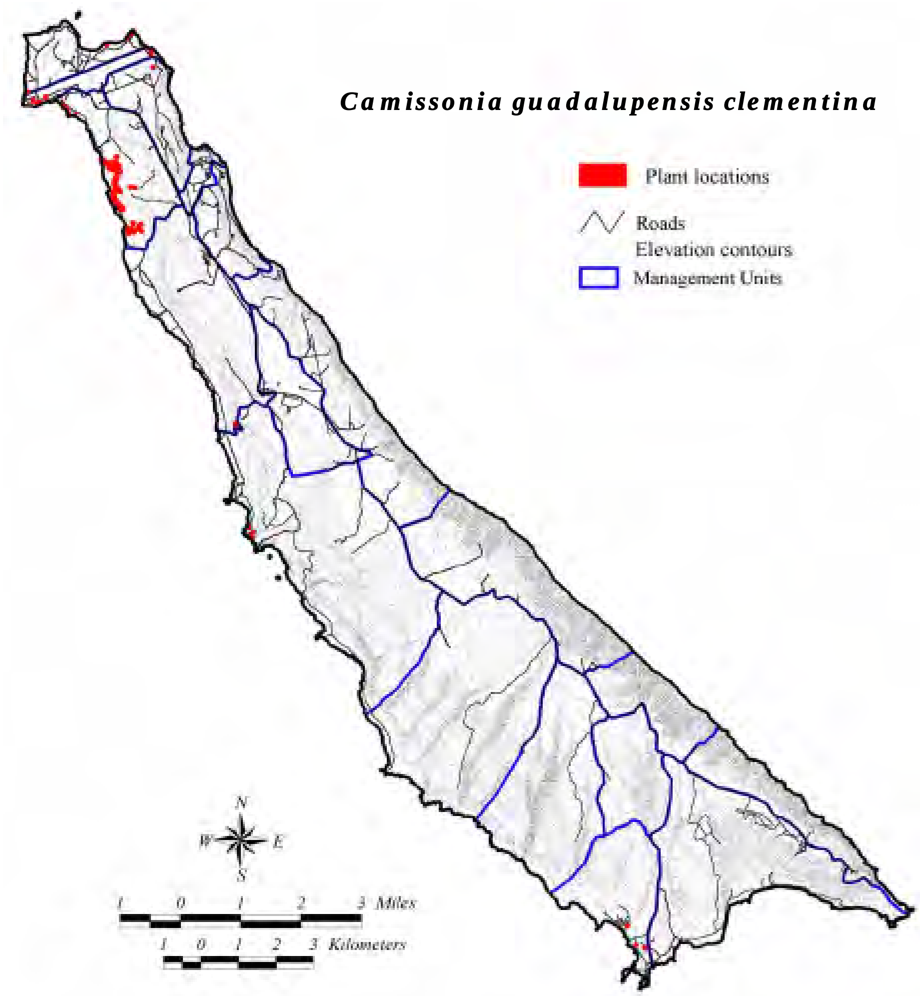
Island-wide Desired Future Conditions: Maintain the current distribution of these natives at a minimum. Reduce exotic competition.

Applicable INRMP Management Units: ***Cryptantha traskiae:*** Northwest Harbor: *49.7%, West Cove: 42.3%, Seal Cove: 4.3%, China Cove: 2.5%, Airfield: 1.2%.* ***Camissonia guadalupensis clementina:*** West Cove: 70.1%, Airfield: 12.4%, Northwest Harbor: 8.7%, Seal Cove: 5.6%, China Cove: 2.4%,Dolphin Bay: .8%.

Current Military Values of the INRMP Management Units: Highest: Airfield (2), China Cove (16), Northwest Harbor (1), High: Seal Cove (4.3), Medium: West Cove (4), Low: Dolphin Bay (3).



MapD-11. Current locations of Trask's cryptantha on SCI. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).



MapD-12. Current locations of San Clemente Island evening primrose. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

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D.2 Animals

D.2.1 Terrestrial Mollusks

Background

Species and Status: Micrarionta intercisa, M. gabbi (Federal Species of Concern), Xerarionta redimita, Vertigo californica longa, V.C. catalinaria, Quickella rehderi, Sterkia clenentina, and Catinella oregonensis.

General Information: The eight Channel Islands are home to 23 different species of snails, making it one of the richest clusters of land snails in the western United States. San Clemente Island has the largest population of all the Channel Islands; it has eight extant and two extinct species of snails. Four of the extant species are endemic to SCI: *Micrarionta gabbi and M. intercisa, Xerarionta redimita,* and *Vertigo californica spp. longa*. Two species, *Vertigo californica* ssp. *catalinaria* and *Sterkia clementina,* are endemic to the Channel Islands, and *Quickella rehderi* and *Catinella oregenensis* have populations on the mainland. Snails in the *Micrarionta* genus seem to be very slow growing; the larger ones measured on the island were likely 20 years old (Cohen, 1977b).

Reproduction: There is no information specific to SCI snails and the following information is general information about snails. Snails are hermaphroditic, but they require another snail of the same species to reproduce. One season a snail can behave as a male, and the next as a female. In some cases, snails fertilize one another during mating simultaneously. Mating typically occurs in late spring or early summer after a long juvenile phase. It can take several years for a snail to reach reproductive maturity. After mating, snails can store sperm for up to a year, but usually lay eggs within a few weeks (Thompson and Cheney).

Community Relationships:

Predators: Predation rates appear to be very low especially for adults. Some species of birds and lizards might be expected to prey on snails.

Prey: Vegetation, but there is no information specific to SCI.

Competitors: Possibly other species of snail, where ranges are sympatric.

Habitat Use and Behavior: Highest abundance of snails were found in Maritime Desert Scrub (MDS) and Maritime Sage Scrub communities. The MDS prickly pear and lycium phases had high numbers of *Micrarionta* sp. and at least low numbers of the other species (Table 0-1). The stabilized sand dunes had a low abundance of *Micrarionta* sp., and no mollusk species were found in grassland, woodland, or MDS cholla phase communities.

Within these habitats, all species seemed to prefer cactus pad litter at the base of *Opuntia littoralis*. In the case of *Micrarionta gabbi* and *Vertigo* spp., there could be as many as 20 snails per pad. *Micrarionta intercisa* and *Xerarionta redimita* snails also utilized rock boulders. Snails don't typically move unless there is adequate moisture in the form of rain or heavy dew. They are able to travel long distances when there is moisture, but Cohen (1977) noted low immigration rates on SCI.

TableD-1. Densities of mollusks in vegetation communities on San Clemente Island (Cohen 1977)

Mollusk Species	Maritime Desert Scrub, Lycium Phase	Stabilized Sand Dune	Maritime Sage Scrub	Maritime Desert Scrub, Prickly Pear Phase
Micrarionta intercisa	common	low	common	common
Micrarionta gabbi	low	low	low	common
Xerarionta redimita	common	low	common	common
Vertigo californica longa	--	--	--	common
Vertigo californica catalinaria	--	--	--	common
Quickella rehderi	very low	--	--	--
Sterkia clementia	--	--	--	--
Catinella oregonensis	--	--	--	--

Abundance, Distribution, and Trends: All information regarding abundance was collected in 1975-1977 (Cohen 1977b). All three species of *Micrarionta* sp. showed a sympatric distribution; their ability to coexist indicates that they either avoid competition through resource partitioning, or resources are not limiting. *Quickella rehderi, Vertigo californica longa* and *V.c. catalinaria* were found in such low numbers that it is difficult to define distributions for them. *Q. rehderi* was found only in MDS Lycium phase and in the northern coastal strands in very low numbers. It is possible that it went undetected in other areas. *V.c. longa* and *V.c. catalinaria* were found only in MDS Opuntia phase in highly dense patches. Similar localized patches may have gone undetected in other communities. *Sterkia clementina* and *Catinella oregonensis* were not found during this survey and may be extinct. Map13 shows estimated snail abundances and distribution on the Island based upon distribution of vegetation communities.

Special Considerations Related to Management:

- The three dominant species of snails on the island are *Micrarionta intercisa, M. gabbi and Xerarionta redimita* They appear to have healthy populations and primarily are found on *Opuntia littoralis*.
- Native plant recovery might negatively affect mollusk populations in that their observed primary habitat, *Opuntia littoralis*, would diminish. However, as snails were found in native plants, their recovery on the island could support an increase of the less common snails.
- Habitats destroyed by feral grazers may have resulted in the decline or extinction of some species.
- A non-native snail species from the mainland could potentially outcompete the native species if introduced on the Island.
- No surveys have been done since the removal of feral grazers on the island. It is unknown how native habitat recovery has affected snail distribution and abundance.

Management

Current Management Environment: There is currently no management directed toward terrestrial mollusks on SCI.

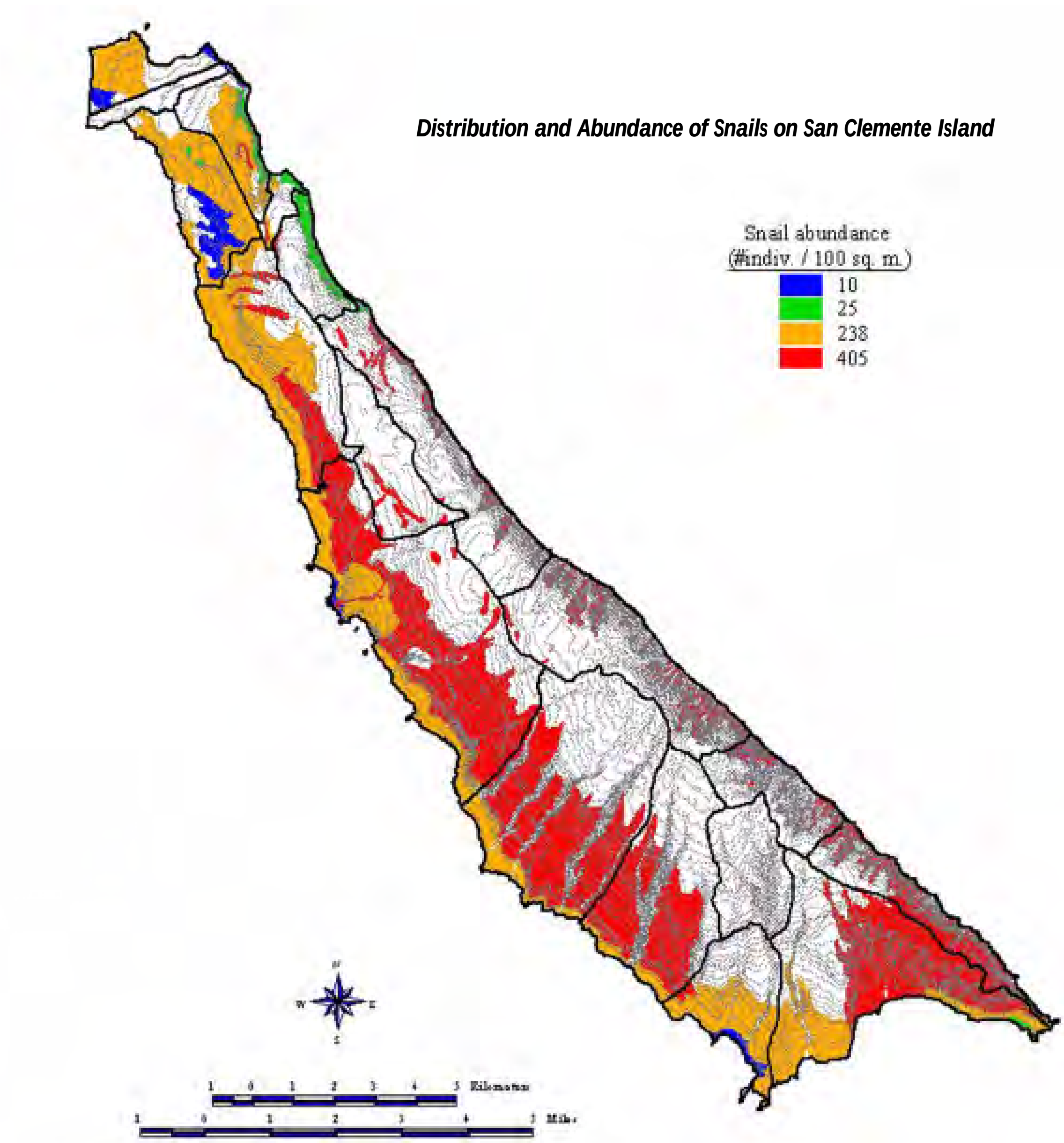
Island-wide Desired Future Conditions:

- A better understanding of the distribution and abundance of terrestrial mollusks on the Island.
- The removal of non-native vegetation which may be affecting the abundance of some mollusk species.

- The implementation of protocols to ensure items brought to SCI do not contain non-native snails which may out-compete native species.

Applicable INRMP Management Units: Based on the distribution of vegetation communities, all units with the possible exceptions of Upper China Canyon (15) and Airfield (2) may contain some terrestrial mollusks.

Current Military Values of the INRMP Management Units: Refer to Table 4-4.



MapD-13. Distribution and abundance of terrestrial mollusks on SCI based upon densities of snails found within different vegetation communities (adapted from Cohen 1977b). (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.2.2 Island Night Lizard (*Xantusia riversiana*)

Background

Status: USFWS Threatened, CDFG Protected

General information: The island night lizard is a small (6-10 cm vent-to-snout), reclusive reptile that confines its movements to areas of dense vegetation and rocks. Of any island vertebrate species in California, it shows the greatest divergence from its closest mainland relative, suggesting a relatively long period of isolation. To regulate their body temperature, night lizards exploit shafts of sunlight that pierce the canopy. They thermoregulate over a lower range of temperatures than most lizards and are intolerant of temperatures above 40 degrees Celsius. (Unless otherwise stated all information is from Mautz 2000).

Reproduction: Island night lizards start breeding in March and produce a brood of 2-7 (mean = 4) young in the fall. The population sex ratio is 1:1; however, only approximately half of all females within a population breed in a given year. Sexual maturity is delayed in night lizards compared to many other lizards and typically not attained until three years of age. Island night lizards also have a relatively long life span, sometimes more than 13 years.

Community Relationships:

Predators: Kestrel, raven, shrike, burrowing owl, island fox, feral cat. Predation rates are low.

Prey: Opportunistic feeder of various insects, plants, mollusks, new-born-mice. Plant material (stems, flowers, seeds, and leaves) comprise approximately 30% of the diet.

Competitors: Minor competition with mice, spiders, and predaceous arthropods.

Habitat Use and Behavior: Night lizards are found within all major habitats on San Clemente Island except active sand dunes and woodland areas. Habitat suitability appears to be a balance of having effective concealment cover from predators, while still allowing for sufficient light penetration for thermoregulation. The highest estimated mean densities occur in maritime desert scrub communities (Table 0-1) located along the western side of SCI. This habitat is dominated by prickly pear, cholla, or boxthorn and provides the low, dense shrubs preferred for cover and foraging. Because of the reclusive and sedentary behavior of this species, density is difficult to estimate accurately. Habitats containing loose stones on the soil surface and dense vegetation are particularly favorable micro-habitats for night lizards. Wooden boards and other debris will also attract night lizards.

TableD-2. Mean density and estimated total number of island night lizards by most frequently used habitat groups on San Clemente Island (adapted from Mautz 2000).

Habitat	Avg. Density[a]/Range[b] (individuals/acre)	Estimated Total No.Individuals[c] (millions)
Maritime Desert Scrub - prickly pear phase	1,036/639-2,015	7.60
Maritime Desert Scrub - lycium phase	783/211-966	4.45
Maritime Desert Scrub - cholla/prickly pear phase	576/NA	3.72
Grassland	462/144-434?	4.40
Eastern escarpment grassland and coastal sage	375/NA	1.01

[a] Midpoint of Regression and Lincoln Index estimates. [b] The lowest and highest estimates from either Regression or Lincoln Index estimates, whichever was more extreme. [c] Average density multiplied by number of hectares of habitat on SCI. NA means values were not reported.

Abundance, Distribution, and Trends: The island night lizard is endemic to San Clemente Island, San Nicolas Island, and Santa Barbara Island. SCI supports by far the largest population of the three islands, estimated in excess of 20 million individuals occupying most undeveloped areas of the island (Table 2). Night Lizard populations on Santa Barbara Island will always be very small and susceptible to catastrophic events because of the island's small size. The severely degraded habitat and generally poor soil quality for INL habitat on San Nicolas Island also precludes this location from producing larger populations. On SCI, multi-year sampling in the maritime desert scrub-lycium phase habitat between 1991 and 1998 indicates little change in the night lizard population during this initial recovery period following removal of the introduced grazers (Mautz 2000).

Special Considerations Related to Management:

- Ecology of the island night lizard on SCI is one of the best known of any animal on the island. Systematic habitat measurements are mostly lacking; however, qualitative suitability values have been assigned to major habitats in relation to varying lizard densities. Little is known about population response to habitat disturbance, but the data that do exist suggest some resiliency of the Island-wide population to local changes in vegetation during the island's recovery from introduced grazers and local fire events.
- Existing data for the night lizard on San Clemente Island indicates the population has remained large and stable over time, and there is no evidence to suggest that the population might be at risk in the foreseeable future. The successful removal of all introduced grazers about 10 years ago removed the primary threat to the species identified for the San Clemente population in the original species listing.
- The island night lizard is at highest densities in thickets of low shrubs and cacti that provide sufficient hiding and thermal cover, yet still permit some penetration by sunlight for thermoregulation. Hiding cover in the form of vegetation, loose surface stones, or crevices in the soil are also important biotic and abiotic habitat components.
- Low average reproductive rate (due to a combination of slow growth, late maturation, and the fact that only half of all mature females are reproductively active in a given year) may place severe limitations on

the ability of the population to respond to catastrophic events (severe habitat or population reduction over a short term), but little is known about population response to disturbance.

- The species is not greatly affected by fire unless fire size or frequency is so high as to remove the necessary thermal cover over excessively large areas or long periods of time (e.g. type conversion). The removal of the goats and sheep has resulted in vegetation cover and fuel loads not seen in decades in some areas and representing a greater threat of wildfire through night lizard habitats.
- The night lizard may be particularly susceptible to the introduction of non-native predators, competitors (especially the southern alligator lizard), and diseases. Introduced plants could detrimentally alter the habitat structure.

Management

Current Management Environment: The species was listed as Threatened under the Endangered Species Act in 1977 (42 FR 155:40682-40685, August 11, 1977), principally based on a perceived urgency to protect the species from the effects of introduced animals on San Clemente (extreme overgrazing by goats and sheep) and San Nicolas (possible competition with the alligator lizard). The introduced grazers were completely removed from San Clemente Island about 10 years ago.

The species is currently managed under the terms and conditions of a Biological Opinion, and a draft management plan for the island has been developed (Mautz 2000). Some of these conditions included: a limit on the amount of “superior quality” habitat that could be disturbed, the establishment of the INLMA, designation of best management practices for construction projects, enhancement of degraded quality habitat, and population monitoring every five years.

A special management area has been formally designated on the west side of San Clemente encompassing the habitat of highest lizard densities and collectively accounts for about 50% of the island population. The area is currently recognized by the US Department of the Navy in how they use that ground. Within this region all large-scale military construction or training will require review to assess the effects on the lizard (Mautz 2000).

Island-wide Desired Future Conditions:

- Strive for maintaining no less than 60% of the current island-wide population and no less than 90% of the current Island night lizard Management Area population.
- Protect the integrity of primary habitats in the Island Night Lizard Management Area and at least 80% in the remaining lizard habitats on the island. No net loss of primary habitat in the Island night lizard Management Area due to disturbance from military use (1:1 habit disturbance and restoration).
- Fire management provides for natural dynamics and to avoid catastrophic wildland fire that could dramatically alter large swaths of night lizard habitat.
- Dramatic reduction of exotic plants and animals and no new introductions.

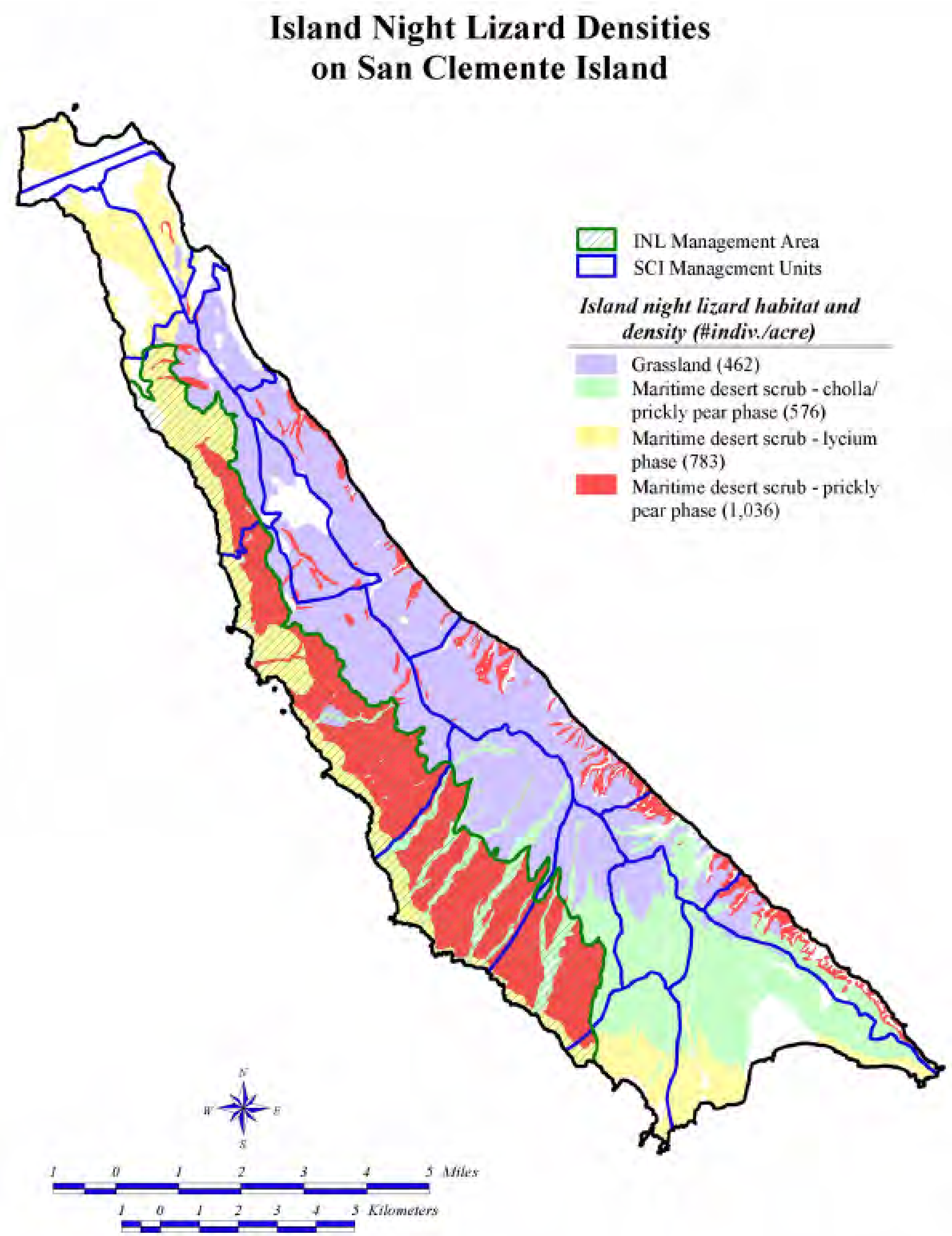
TableD-3. Area of suitable habitat for the Island night lizard occurring within INRMP management units on SCI. Suitable habitats are synonymous with the four vegetation communities recognized by Mautz (2000) as containing the majority of Island night lizards. See Table D-2 for lizard densities by habitat.

Management Unit	Unit Acres	Acres of MDSPP[1]	Acres of MDSLY[2]	Acres of MDSCP[3]	Acres of Grass-land	Total habi-tat (acres)	Estimated no. of lizards[4]	% of total population
1. Northwest Harbor	722	0	334	0	0	334	261,522	1.3
2. Airfield	363	0	1	0	0	1	783	0
3. Dolphin Bay	946	14	429	0	54	497	370,661	1.8
4. Dunes/West Cove	1,534	0	848	0	1	849	664,446	3.2
5. Wilson Cove	255	7	42	0	26	75	49,888	0.2
6. Nots Pier	735	10	1	0	486	497	193,393	0.9
7. Terrace Canyon	2,663	426	1,194	0	762	2,382	1,728,282	8.3
8. VC3	6,097	89	0	0	890	979	503,384	2.4
9. Lemon Tank	3,069	252	0	0	2,088	2,340	1,225,728	5.9
10. Seal Cove	6,100	2,440	976	52	1,744	5,212	4,127,728	19.8
11. Mt. Thirst	2,687	408	0	5	2,135	2,548	1,226,193	5.9
12. Lost Point	4,774	1,853	311	810	1,738	4,712	3,432,737	16.5
13. Cave Canyon	2,956	1,309	231	851	737	3,128	2,367,667	11.4
14. Eagle Canyon	1,205	107	0	355	496	958	501,332	2.4
15. China Cove	2,875	0	613	1,532	390	2,535	1,542,591	7.4
16. Pyramid Cove	3,937	0	856	2,407	45	3,308	2,077,470	9.9
17. Mosquito Cove	1,254	184	10	441	237	872	541,345	2.6
Total	42,172	7,099	5,846	6,453	11,829	31,227	20,815,150	

[1] Maritime desert scrub - prickly pear phase, [2] Maritime desert scrub - lycium phase, [3] Maritime desert scrub cholla/prickly pear phase, [4] To calculate lizard densities in grassland habitat within management units on the eastern shore of the island a density of 375 individuals/acre was used (Table 2).

Applicable INRMP Management Units: All management units are estimated to contain some Island night lizard habitat and animals. The large majority (73.3%) of the estimated population occurs in six management units on the western half of SCI: Seal Cove (19.8%), Lost Point (16.5%), Cave Canyon (11.4%), Pyramid Cove (9.9%), Terrace Canyon (8.3%), and China Cove (7.4%).

Current Military Values of the INRMP Management Units: Highest: China Cove, Pyramid Cove, High: Seal Cove, Medium: Terrace Canyon, Cave Canyon, Lowest: Lost Point.



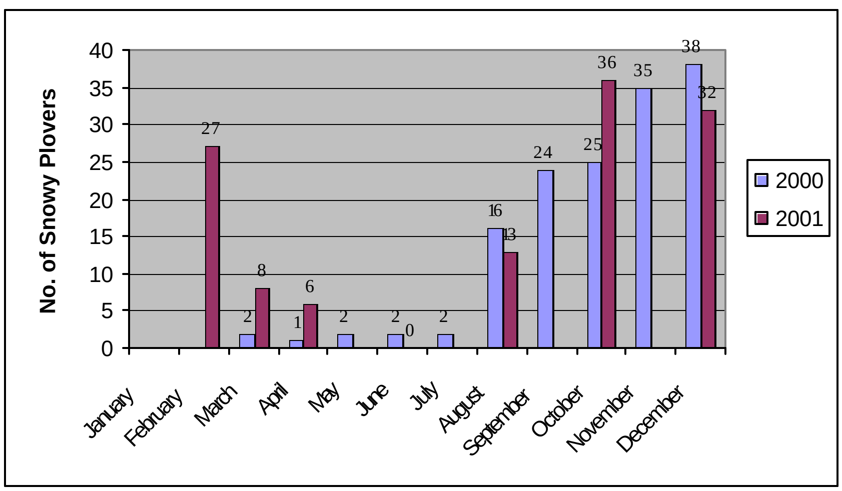
MapD-14. Suitable habitat present within management units on SCI for the Island night lizard. Densities of Island night lizards are not as high along eastern escarpment (not separated on map) according to Mautz (2000). (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.2.6 Western Snowy Plover (*Charadrius alexandrinus nivosus*)

Background

Status: USFWS Threatened, CDFG Species of Concern.

General Information: The western snowy plover is a small (15-17 cm from beak tip to tail tip), gray and white shorebird that nests in colonies on sandy beaches along the west coast of the United States and into southern Baja California (USFWS 1997). Snowy plovers are most frequently observed on SCI during the winter months (Figure FigureD-1.). Two banded wintering snowy plovers were recently observed at SCI and identified as individuals banded in San Diego County.



FigureD-1. Monthly observations of snowy plovers at SCI in 2000 and 2001 (Foster and Copper 2001). Data are the maximum amount of plovers seen at all survey sites during any one survey.

Reproduction: The first recorded breeding record at SCI was in April of 1989, and only two other nesting attempts have been recorded since then (Table D-4).

TableD-4. History of western snowy plover nesting at San Clemente Island, 1989-2000 (adapted from Foster and Copper [2001]). Only one nest was found at each location.

Date Located	Site	Contents of Nest	Outcome
22 April, 1989[a]	West Cove	1 chick	unknown
29 March, 1996[b]	Horse Beach	3 eggs	depredated
9 March, 1997	Horse Beach	3 eggs	probably hatched[c]

[a] Winchell 1990. [b] Foster 1998. [c] 2 hatch year fledglings observed at Pyramid Cove 31 May, 1997.

Snowy plovers may nest several times during the breeding season, which extends from March into mid-to-late September (Warriner *et al.* 1986; Terp 1996; Copper 1997a,b). Nests are typically just small depressions lined with a few pebbles, shell fragments, plant debris, or mud chips (Page *et al.* 1995). There are usually three eggs per clutch, and the chicks hatch in approximately 27 days. Fledging occurs approximately 30 days after hatching. Females typically incubate the eggs during the day and males incubate at night. Males tend to care for the chicks, while females will often nest again with a new mate (Terp 1996).

Trophic level and Community Relationships:

Trophic level: The snowy plover is a secondary consumer.

Predators: Raptors, feral cats, and island foxes probably prey on adults and chicks. Loggerhead shrikes and gulls probably feed on chicks. Foxes and great blue herons will prey upon chicks and eggs.

Prey: Adults and chicks feed on terrestrial and aquatic invertebrates such as amphipods, sand hoppers, flies, small crabs, beetles, and clams.

Competitors: Other shorebirds, including sanderlings and semipalmated sandpipers, may compete for prey.

Habitat Use and Behavior: Snowy plovers forage on sandy beaches, mudflats, tidal flats, and salt ponds. They seize their prey from the surface or probe shallowly into sand or mud. Kelp wrack provides an abundant food source of invertebrates, and plovers can be seen snapping their bill at flies that are flushed from these kelp piles. They nest on sandy beaches with little to no vegetation or driftwood.

Abundance, Distribution, and Trends: Its preference for nesting on sandy beaches has led to its decline along the west coast, where much of its habitat has been developed or is subject to moderate-to-heavy human use (Copper 1997b;Powell, pers. comm. 2001), especially since plover nests and chicks can be difficult to detect (Terp 1996). Pyramid Cove, China Beach, and West Cove were the three most frequently-used areas for wintering plovers at SCI (Foster and Copper 2001). The western snowy plover draft recovery plan (USFWS 2001) identifies five beaches on SCI as important for wintering birds: Pyramid Cove, Horse Beach, China Cove, West Cove, and Northwest Harbor. For the most recent data of abundance at SCI see Figure FigureD-1.

Special Considerations Related to Management:

- The western snowy plover draft recovery plan (USFWS 2001) identifies five beaches on SCI as important for wintering birds: Pyramid Cove, Horse Beach, China Cove, West Cove, and Northwest Harbor.
- Pyramid Cove, China Beach, and West Cove were the three most frequently-used areas for wintering plovers at SCI (Foster and Copper 2001).

- Intrusion of salt marsh vegetation, or of non-native vegetation, on plover nesting grounds may pose problems for plover chicks, possibly preventing them from moving freely to forage or escape incoming tides (Copper 1997a,b).
- Predation by birds and mammals (especially ravens, crows, and red fox) is the primary cause of reproductive failure for plovers (Copper 1997a,b; USFWS 1997). Nesting areas with predator control programs in place have shown marked improvements in reproductive success over unprotected sites (USFWS 1997). Trash accumulation on the beaches can also act as an attractant to certain predators such as ravens and crows (USFWS 1998).
- The first recorded breeding record at SCI was in April of 1989, and only two other nesting attempts have been recorded since then (Table 4).
- Snowy plovers are most frequently observed on SCI during the winter months (FigureD-1.).

Management

Current Management Environment: The western snowy plover was listed as Threatened by USFWS in 1993. The western snowy plover draft recovery plan (USFWS 2001) identifies five beaches on SCI as important for wintering birds: Pyramid Cove, Horse Beach, China Cove, West Cove, and Northwest Harbor. Surveys are conducted monthly at these locations, and they are also surveyed prior to training activities.

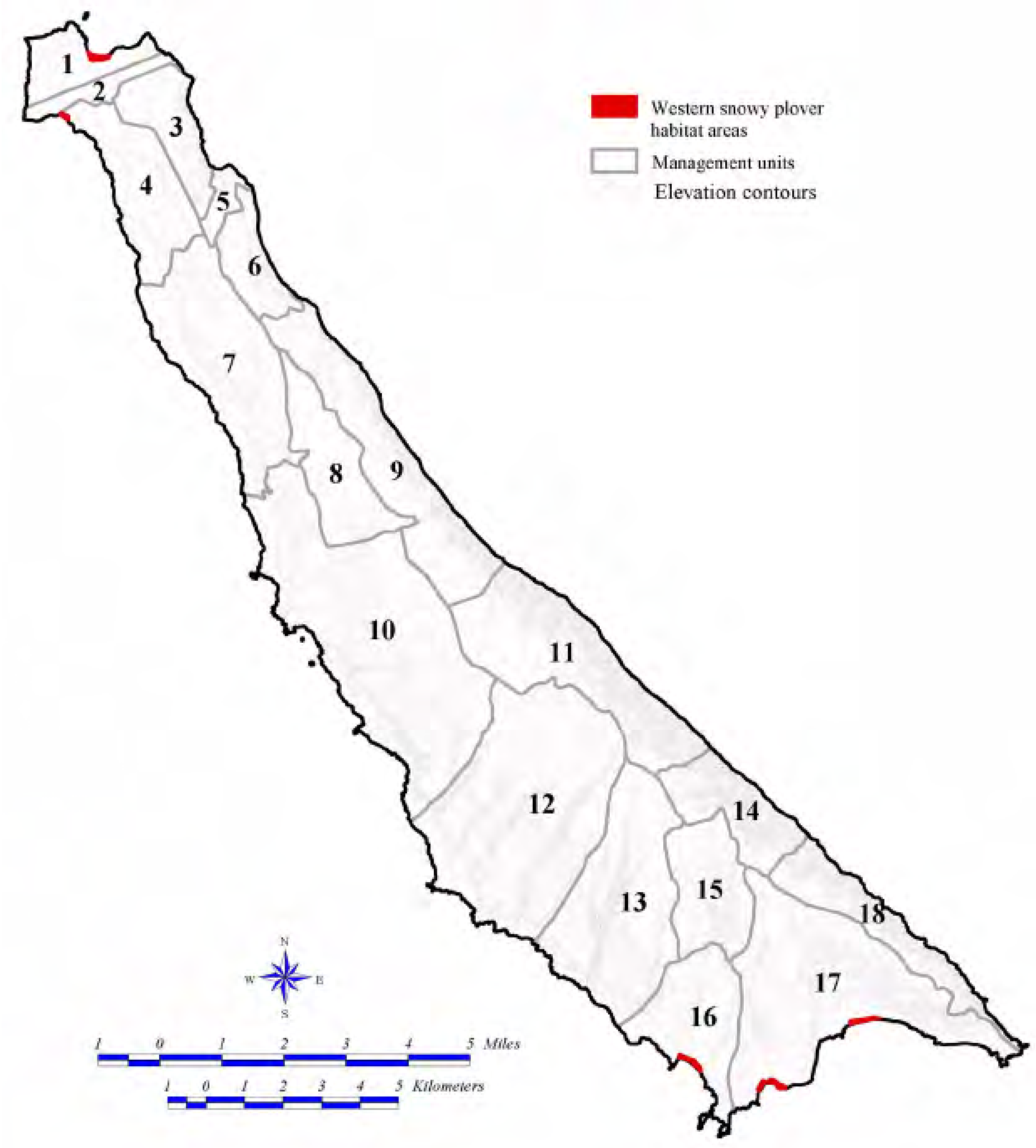
Island-wide Desired Future Conditions:

- Continued use of beaches at SCI by wintering snowy plovers.
- Removal of feral cats.
- Continued monitoring of snowy plovers prior to military exercises at beaches. Additional surveys conducted during the winter every three years.

Applicable INRMP Management Units: Northwest Harbor (1), West Cove (4), China Cove (16), Pyramid Cove (17).

Current Military Values of the INRMP Management Units: Highest: China Cove, Pyramid Cove, Northwest Harbor, Medium: West Cove.

Snowy Plover Locations on San Clemente Island



MapD-15. Locations of beaches used by snowy plovers at SCI. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.2.6 Xantus' Murrelet (*Synthliboramphus hypoleucus*)

Background

Status: CDFG Species of Concern

General Information: Xantus' murrelets are small penguin-like birds that grow to about 8 inches in length. They spend their life at sea except when they come ashore to breed. Males and females look similar with incomplete white eyerings and thin, short, dark bills. They are dark on top and white underneath. They use the Channel Islands for breeding from March through July (Garrett and Dunn 1981). California's entire population is only approximately 3,500 individuals, the bulk of which (95%) form colonies on Santa Barbara Island. The rest distribute themselves over Prince Island, Sutil Island, East Anacapa Island, Snag Rock, Gull Island, and San Clemente Island (Sowls *et al*. 1980). After breeding they move northward, most often being spotted in Monterey Bay (McCaskie *et al.* 1979).

Reproduction: Xantus's Murrelet is a colony breeder, utilizing rocky, isolated islands. It nests in crevices or cavities near cliff ledges. They have also been observed to nest beneath dense shrubs, agave foliage, in vacant rabbit burrows or under pelican nests (Harrison 1978). The nest is simply a shallow scrape or hollow on the ground with no lining. Offshore waters must be productive enough to support the colony.

Xantus' murrelets are monogamous and lay eggs between early March and late June, peaking between early April to early May. Clutches usually contain 2 eggs, but occasionally only a single egg is layed (Harrison 1978). Hatching and fledging begin in mid-April and last through August, with a peak from mid-May to late June (Hunt *et al.* 1979). Both parents incubate the eggs for a time period of 41 days (Hunt *et al.* 1979). The young birds fledge at 2 days (Sowls *et al.* 1980), leaving the nest at night to swim in the ocean with their parents (Hunt *et al.* 1979).

Predators: Peregrine falcons, western gulls, barn owls, deer mice, and island foxes. Feral rats can significantly impact a breeding colony (Sowls *et al.* 1980).

Prey: Larval fish, northern anchovies, pacific sauries and rockfish all are important prey species. It is thought that availability of northern anchovies can affect the murrelet's breeding success (Hunt and Butler 1980). They forage in pelagic waters adjacent to island colonies by diving and pursuing prey under the water (Sowls *et al*. 1980).

Habitat Use and Behavior: This species forages primarily at night during the breeding season to escape nest predation by diurnal predators such as gulls. Nest site selection, the changing of incubating duties, and fledging all take place at night (Hunt *et al.* 1980). They may roost at night on offshore cliffs and crevices.

Abundance, Distribution and Trends: On SCI, Xantus' murrelets are known to breed at least sporadically at China Cove and Seal Cove (Jorgensen and Ferguson 1984). In 1992, 125 individuals were found during the breeding season at SCI (Carter *et al.* 1992). Santa Barbara and Anacapa are the only islands which don't have island foxes, which is thought to explain why population numbers are larger there. Hunt, Pitman and Jones stated in their 1980 paper that "the almost insignificant murrelet population on SCI is probably held in check by the abundant terrestrial predators and the lack of offshore rocks." (Cohen 1977).

Factors Influencing Population Numbers and Summary of Knowledge and Special Considerations Related to Management:

- Current information on breeding murrelets on SCI is scarce.
- can significantly impact breeding colonies.

- Terrestrial predators, island foxes and feral rats, likely hold the small Xantus' murrelet population on SCI in check.
- They rely on larval fish, northern anchovies, pacific sauries and rock-fish caught in waters adjacent to nesting colonies for sustinence.
- Availability of northern anchovies affects their breeding success.
- Xantus' murrelet is very vulnerable to oil spills; a spill polluting the California Bight region would wreck havoc on its population (Sowls *et al.* 1980).

Management

Current Management Information: There is currently no management program for Xantus' murrelet on San Clemente Island.

Island-wide Desired Future Conditions:

- Removal of all feral rats and cats.
- Monitoring of breeding seabirds at SCI.

Applicable INRMP Management Units: Seal Cove (10) and China Cove (16).

Current Military Values of the INRMP Management Units: Highest***:*** China Cove (16), High: Seal Cove (10).

D.2.3 San Clemente loggerhead shrike (*Lanius ludovicianus mearnsi*)

Background

Status: USFWS Endangered

General Information: The San Clemente loggerhead shrike is an endemic subspecies of SCI and possibly the most endangered animal population in the continental United States (Lynn *et al.* 1999). Other populations of loggerhead shrikes occur on the mainland and nearby Santa Catalina Island, however, the SCI population is genetically and morphologically distinct from these populations (Ridgway 1903; Miller 1931; Mundy *et al.* 1996 *in* Lynn *et al.* 2000). San Clemente loggerhead shrikes are non-migratory, though individuals may disperse off-island. Shrikes from Santa Catalina Island or the mainland also occasionally appear on SCI during the winter. It is a medium-sized passerine with a white/gray/black/brown plumage. Loggerhead shrikes are often called "butcher birds" because of their habit of impaling and caching prey items on thorns or fences for later consumption.

Reproduction: Shrikes reach maturity after one year (Miller 1931) and adult shrikes have been known to live for up to 11 years (Bird Banding Laboratory n.d.), though the average is typically much lower. San Clemente loggerhead shrikes may begin breeding as early as late January and most clutches have been laid by May. Early clutches tend to be more successful than later ones (USFWS 2001).

Courtship feeding usually precedes copulation and also occurs while the female incubates the eggs. Most clutches contain 4-6 eggs. Incubation typically lasts 15-18 days and young typically fledge after another 16-20 days. Wing and tail feathers are not fully developed at fledging and consequently make the birds very vulnerable to predation. Parents may continue to feed fledglings for the next 20-30 days. Second nesting attempts are attempted after either failure or fledging of the first nest (Scott and Morrison 1990). Some pairs remain together for multiple years.

Nest-building takes approximately one week and is primarily completed by the female. Nests are approximately 8-13 cm in diameter and consist of an outer structure of twigs lined with grasses and forbs (Scott and Morrison 1990). On SCI, nests are located in lemonadeberry (*Rhus integrifolia*), Catalina cherry (*Prunus lyonii*), island oak (*Quercus tomentella*), toyon (*Heteromeles arbutifolia*), California sagebrush (*Artemisia californica*), California lilac (*Ceanothus* sp.), and cholla (*Opuntia* sp.)(Scott and Morrison 1990, Lynn 1999, USFWS 2001). Nests are most frequently placed in or near canyon bottoms, within canyon shrubland/woodland vegetation (Lynn 1999).

Average nest height in 1984-1986 was 2.3 m (n=47 nests) and nest locations are often reused in successive years (Scott and Morrison 1990). In 1998, all successful nests were placed in trees, and higher nests were more successful than lower nests. In 1999, the average height of successful nests was twice that of unsuccessful nests (USFWS 2001). Only during two years in the 1990s (in 1994 and 1998), nest success was at least 50% (USFWS 2001). However, the survivorship of young shrikes has increased (USFWS 2001).

Trophic level and Community Relationships:

Trophic level: The loggerhead shrike is a secondary consumer.

Predators: Island foxes, common ravens, and possibly introduced rats will prey on eggs and nestlings. Mice will also prey on eggs. Feral cats, red-tailed hawks, barn owls, and possibly American kestrels will prey upon adult or fledgling shrikes (Lynn *et al.* 2000).

Prey: During the summer, they rely primarily on beetles, bees, and wasps. During the winter ants, grasshoppers, crickets, and lizards (*Uta stansburiana* and *Xantusia riversiana*) may be more important. Small mammals (*Mus musculus* and *Peromyscus maniculatus clementis*), birds (e.g., rock wrens, house wrens, and orange-crowned warblers), and additional insect species (butterflies, moths, earwigs, and true bugs) are also taken (Lynn *et al.* 2000, USFWS 2001). Vertebrates account for a much larger portion of biomass consumed (84.2%) than invertebrates (15.3%)(Scott and Morrison 1995 in USFWS 2001). Lizards and large arthropods may be taken more frequently than would be expected from their abundance (Wakelee 1999).

Competitors: Other resident and migrant birds may feed on the same items but are not present in large numbers. Fox competition near nest sites for lizards and large arthropods may be significant.

Habitat Use and Behavior: On SCI, shrikes use the canyon shrubland/woodland and maritime desert scrub cholla phase communities for breeding territories in a higher proportion than their abundance on the island. They forage, throughout the year, from perches in canyons and in adjacent plateaus and shorelines. They seem to prefer areas of shrubs interspersed with open ground (USFWS 2001). The percent vegetative ground cover was > 50% surrounding the nest and perches (Lynn 1999). Recently introduced annual grasses have invaded much of this previously open ground. Roads, fires, and firebreaks can temporarily create new foraging habitat for shrikes. However, frequent fires that can kill shrub and tree species are detrimental to shrike nesting (USFWS 2001).

They use trees, coastal cholla (*Opuntia prolifera*), rocks, tall forbs, snags, and artificial substrates for perches. They use perches > 2 m tall in significantly higher proportion than their availability (Lynn 1999). When supplemental foraging perches were provided in occupied territories the foraging success rate increased and foraging ranges expanded. On SCI, shrikes defend territories year-round and are often observed on nesting territories the entire year. Territory size can vary greatly depending on rainfall and have been reported to range from 12.2 ha (1997 nesting territories) to 37 ha (1999 nesting territories) (USFWS 2001).

Abundance, Distribution, and Trends: At the beginning of the twentieth century, the loggerhead shrike was reported as “tolerably common” (Grinnell 1897) and “distributed over most of the island” (Howell 1917). Estimates of the historical population size typically range from 500 to 700 individuals post-breeding time (USFWS 2001). From 1979 to 1982 only two pairs were observed and the population was estimated as 18-30 birds, and between 1985 and 1998 the population ranged from six (1988) to 16 pairs (1994)(USFWS 2001). The population did not reach 16 pairs (observed in 1994) again until 2001 when 21 of 24 pairs successfully nested in the wild (K. Brock, pers. comm. 2001).

The breeding range of this species has greatly contracted since 1985 when most major canyons in the southwestern portion of SCI were used for nesting (Scott and Morrison 1990). In 1998, one canyon (China Canyon) contained 62.5% of all nests (Mader and Warnock 1999 in Lynn *et al.* 2000). In the 1990s, China Canyon, Cave Canyon, and the eastern escarpment between Twin Dams Canyon and Boulder South Canyon were the only areas used for nesting (USFWS 2001). In 1999, successful reintroductions occurred in Norton and Box Canyons. In 2001, 73% of nesting pairs established territories north and east of the SHOBA Impact Areas. Recent and historical nest locations are shown in Map 16.

Factors Influencing Population Numbers: The introduction of feral predators (cats and rats), feral grazers (goats, pigs, deer, cattle, and sheep), and exotic plant species, increased fire frequency, weather events (El Nino and drought), and demographic events have probably all been factors in the decline of this species on SCI (Lynn *et al.* 2000). Feral grazers and an increased fire frequency caused by military activity have significantly altered the vegetation of the Island by decreasing tree and shrub species and increasing non-native grasslands. This may have an effect on prey and nest site availability. Prey availability may also fluctuate greatly between years, depending on such things as weather, and impact reproductive success. Demographic events are magnified in small populations so increased predation, decreased pair formation, and low genetic diversity can significantly influence population size. Overwinter survival has a profound effect on the population. This rate has been improving in the last few years, possibly in response to predator control efforts and perch supplementation. Starvation and prey availability, especially during drought years, could also affect the population (USFWS 2001).

Summary of Knowledge and Special Considerations Related to Management:

- Native vegetation communities on SCI have shown to be recovering since the removal of feral grazers. However, non-native plants, especially grasses, pose a threat to continued recovery of native bunch grass communities used by shrikes for foraging.
- The re-introduction and enhancement of tree species, especially within canyons, will provide increased nesting locations and foraging perches for shrikes.
- Supplemental perches appear to improve foraging success.
- Roads, fires, and firebreaks can temporarily create new foraging habitat for shrikes. However, frequent fires that can kill shrub and tree species are detrimental to shrike nesting (USFWS 2001).
- Increasing the breeding range of the shrike should be a high priority to minimize the chances of a fire impacting a large portion of the population.
- Overwinter survival has a profound effect on the population. This rate has been improving in the last few years, possibly in response to predator control efforts and perch supplementation.
- Fluctuations in population size may be cyclic and natural.
- Annual variations in territory size can make estimates of projected carrying capacity of SCI difficult to determine.
- Low genetic diversity is unavoidable, but diversity should be maximized in management activities.
- An increase in fox populations will may require additional management to prevent shrike nest predation.
- Introduced feral cats will continue to predate shrikes until eradicated from the Island.

Management

Current Management Environment: The San Clemente loggerhead shrike is an intensively managed species. The current recovery program 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 which deters them from entering the area near a nest. Nest locations are enhanced through supplemental feeding and rodent deterence. Military training activities must be preceded by shrike surveys and fire preparation. In addition, research projects are underway to study various aspects of shrike ecology and captive rearing techniques.

Under current Biological opinions of the USFWS, the Navy is required to:

- Continue to implement the recovery program to protect and augment the population of shrikes through: 1) captive propagation and rearing, 2) monitoring of the wild shrike population, 3) predator control, 4) genetics research, and 5) habitat evaluation.

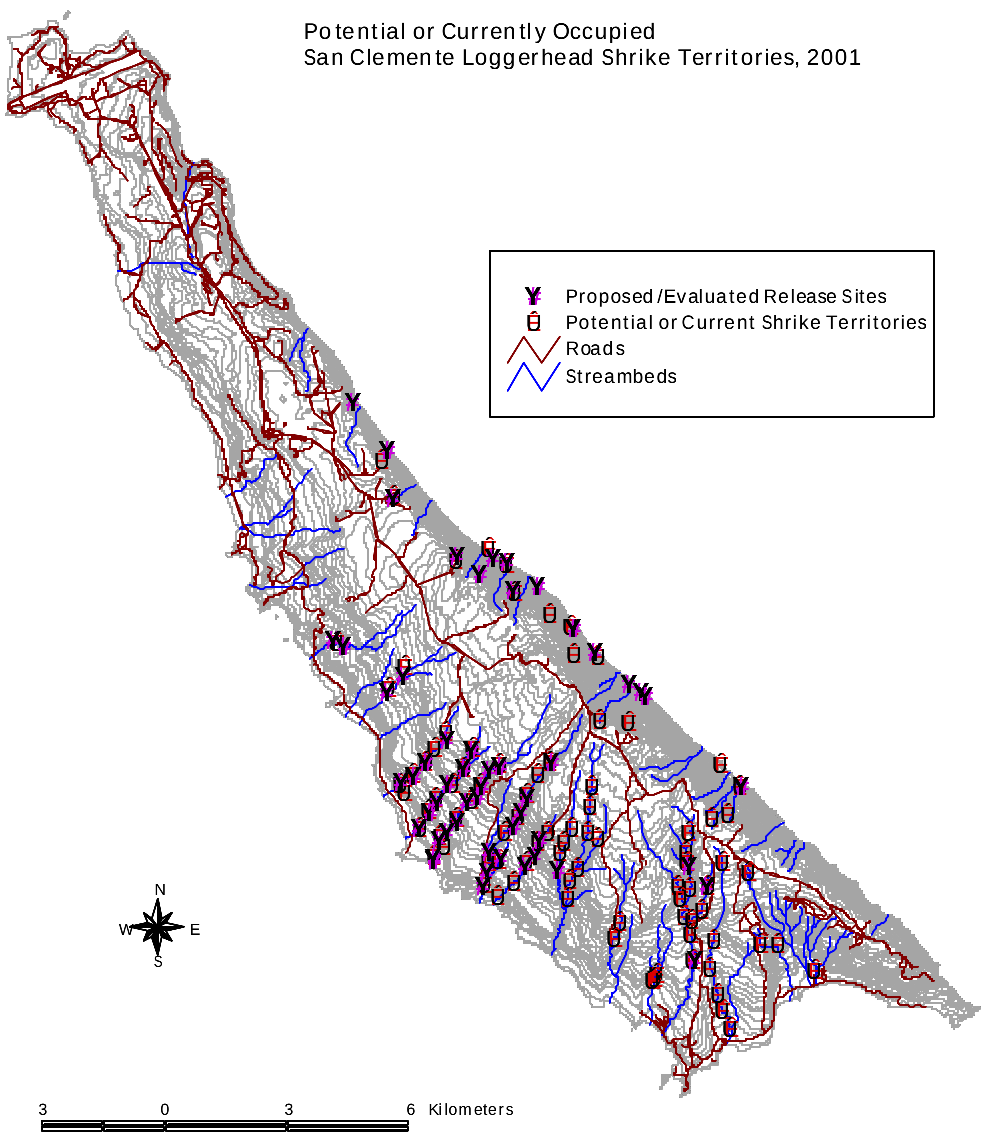
- As part of this program the island fox is to be monitored and removed from shrike nesting sites. Additional research on fox demographics is also performed.
- Establish a preset flight pattern that avoids shrike breeding areas for helicopters involved in range maintenance and clean-up.
- Assure that a qualified biological monitor observes shrikes during all phases of the installation of firebreaks to assure that shrikes are not impacted by installation activities.
- 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.
- 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.

Island-wide Desired Future Conditions:

- The eventual delisting of the San Clemente loggerhead shrike (probably after being downlisted to threatened status). Tentative criteria (still being developed) for downlisting to a threatened status will probably include (Brock, pers. comm. 2001):
  1. A breeding population that does not fall below 50 nesting pairs within one El Nino-La Nina weather cycle (8-10 years).
  2. The implementation of an island-wide management plan for restoring historical vegetation conditions by:
     - *a.* increasing the density and distribution of perches and trees used for foraging and nesting,
     - *b.* removing non-native plants especially annual grasses, and
     - *c.* rehabilitating the native bunch grass habitats.
- Tentative criteria for delisting will probably include (Brock, pers. comm. 2001):
  3. a self-sustaining population that does not fall below 75 pairs for three consecutive El Nino-La Nina cycles (24-30 years),
  4. habitat improvements which present at least 150 usable nesting territories and 550 winter territories,
  5. a permanent monitoring program,
  6. a long-term program to protect and increase the quantity and quality of shrike habitat throughout the island, and
  7. the implementation of an INRMP that addresses the restoration of biodiversity and ecosystem functions on SCI.
- Self-sustaining populations of both foxes and loggerhead shrikes that would eliminate the need for trapping of foxes in shrike breeding territories.
- Removal of all feral cats.

Applicable INRMP Management Units: Units immediately important as nesting locations or future release sites are units numbered 9-18: Lemon Tank, Seal Cove, Mt. Thirst, Lost Point, Cave Canyon, Eagle Canyon, Upper China Canyon, China Cove, Pyramid Cove, and Mosquito Cove.

Current Military Values of the INRMP Management Units: Highest: China Cove (16) and Pyramid Cove (17), High: Seal Cove (10), Medium: Cave Canyon (13) and Mt. Thirst (11), Low: Lemon Tank (9), Lowest: Lost Point (12), Mosquito Cove (18), Eagle Canyon (14), and Upper China Canyon (15).



MapD-16. Recent and historical nest locations of the San Clemente loggerhead shrike. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.2.4 Orange-crowned Warbler (*Vermivora celata sordida*)

Background

Formal Status: none.

General information: The race of orange-crowned warbler that breeds on SCI (*Vermivora celata sordida*) is endemic to the Channel Islands and two mainland locations, Point Loma and Palos Verdes Peninsula. Migration to the mainland occurs during the winter. Orange-crowned warblers are medium-sized warblers, ranging in length from 11-14cm. Their upper parts are a plain, dim olive-green color, with a yellow upper tail and rump. Their hindneck and crown is grayer with a brown-orange patch on the crown that is usually concealed. The underparts are a faintly streaked greenish-yellow. The bill is narrowly wedge-shaped, very acute at the tip, and horn-colored (as are the feet). There is little distinction between the sexes, although females tend to be duller in color with a semi-absent or absent crown-patch. *V.c. sordida* is darker and greener than the other subspecies (Sogge *et al*. 1994).

Reproduction: V.c. sordida begins singing as early as December, some pairs are formed in January. Captured males have been in breeding condition from mid-February into June, with the peak in March and April (Sogge *et al*. 1994). On SCI, the nest is placed low in a shrub or on the ground, and building is initiated in March. Shrubs and trees utilized include toyon, oaks, and ironwood. Orange-crowned warblers typically produce only one brood per season unless the first is destroyed. Mean clutch size for *V.c. sordida* is 3.3 (n=3; Sogge *et al*. 1994) and hatching occurs after approximately 13 days. Both parents feed nestlings and fledging occurs after another 12 days. Brown-headed cowbirds have been known to parasitize orange-crowned warbler nests, though this has not been observed for *V.c. sordida* (Sogge *et al*. 1994).

Trophic level and Community Relationships:

Trophic level: The orange-crowned warbler is a primary and secondary consumer.

Predators: Feral cats, raptors, island foxes, and loggerhead shrikes. Nest predators also include mice and rats.

Prey: Orange-crowned warblers are diurnal foragers who mainly eat invertabrates. The species flutters through vegetation, bough tips, and leaves searching for perches in which to eat flying insects. In San Diego, warblers use their bills to pierce flower bases and are known to eat berries and fruits. Large insects are crushed with mandibles or battered against a perch (Sogge *et al.* 1994).

Competitors: Competitors may include other bird species which forage in shrubs, especially during the winter.

Habitat Use and Behavior: The orange-crowned warbler prefers shrublands, riparian woodlands, and areas of chaparral and low vegetation which provide cover for nests. *V.c. sordida* make use of cliffs, hill slopes, canyons, gullies, torrey pine forests, and coastal bluffs where communities of coastal sage scrub occur (Sogge *et al.* 1994). On SCI, this primarily includes Canyon Woodland and Maritime Sage Scrub habitats (see sections 3.5.1 and 3.5.6 respectively for descriptions of these habitats). They favor shaded areas and humidity. Similar habitats are used for breeding and wintering. Flight is usually direct and with rapid wing beats. This species will hover briefly when gleaning insects from vegetation or hawking, and will flutter during song flight and when pairs are courting (Sogge *et al*. 1994).

Abundance, Distribution, and Trends: There are no density estimates for SCI. There is a tendency for population densities to be higher for given habitat types on islands than on adjacent mainland in Southern California (Yeaton 1974, Sogge *et al.* 1994). Gaines (1988) found that local numbers of a separate race of orange-crowned warblers varied dramatically from year to year. *V.c. sordida* disperses widely throughout mainland southern California and into central California during the winter. Other races of orange-crowned warbler arrive or pass through during migration and winter.

Factors Influencing Population Numbers: Availability of breeding habitat may limit the species (Sogge *et al*. 1994). Since they nest low in shrubs or on the ground, feral predators such as cats and rats could influence populations on SCI.

Summary of Knowledge and Special Considerations Related to Management:

- Primary habitat on SCI probably includes Canyon Woodland and Maritime Sage Scrub.
- Shrubs and trees utilized for nest sites include toyon, oaks, and ironwood.
- Brown-headed cowbirds have been known to parasitize orange-crowned warbler nests, though this has not been observed for *V.c. sordida*.
- Since they nest low in shrubs or on the ground, feral predators such as cats and rats could influence populations on SCI.

Management

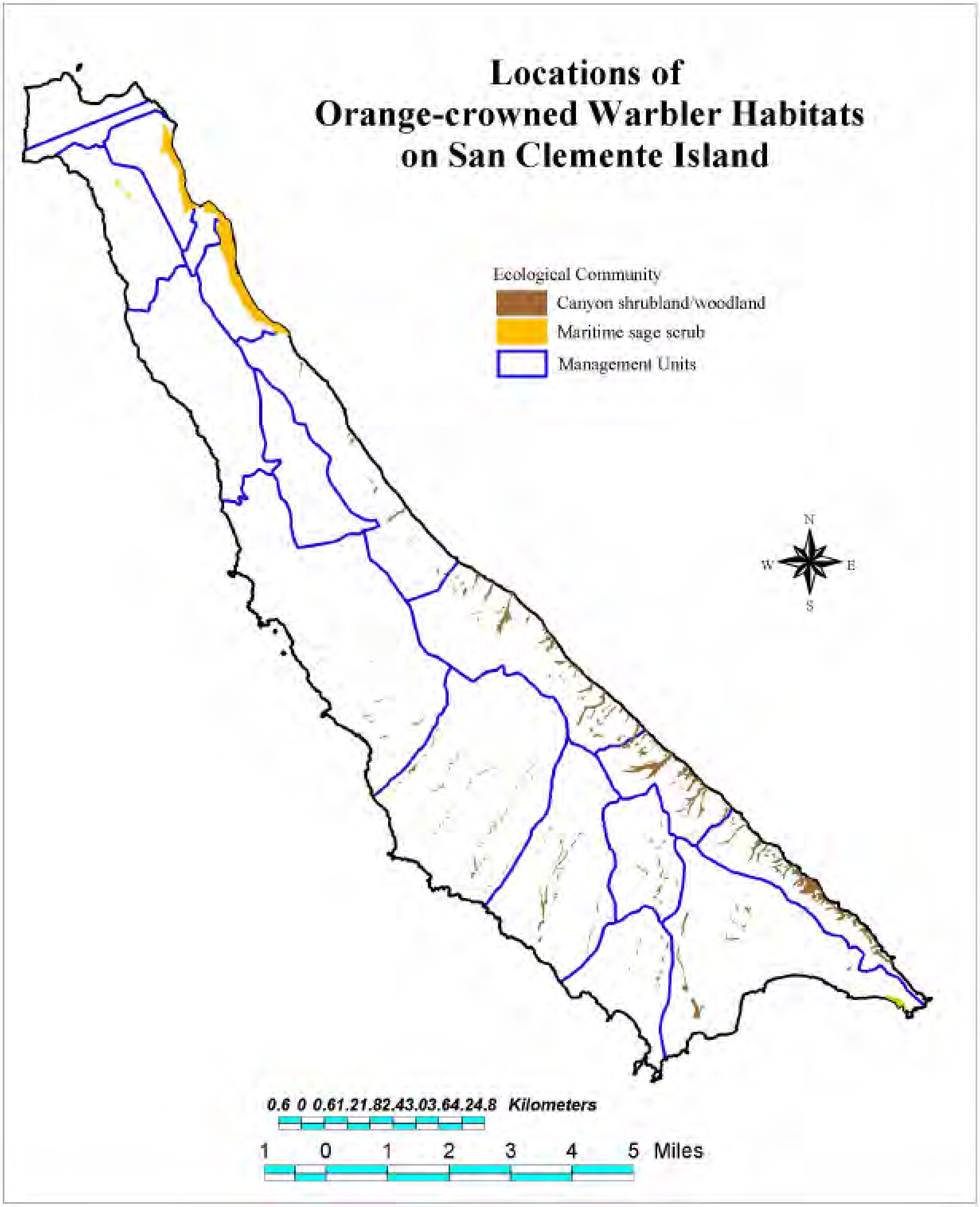
Current Management Environment: There is no management directed specifically toward this species. The removal of feral grazers and programs to control cats and rats have probably improved conditions for this species.

Island-wide Desired Future Conditions:

- Removal of all cats and non-native rodents.
- Recovery and expansion of trees and shrubs in canyon woodland habitat.
- Fire management that provides for natural dynamics and reduces the risk of catastrophic wildland fires that could dramatically alter large swaths of habitat.

Applicable INRMP Management Units: Dolphin Bay (3), West Cove (4), Wilson Cove (5), NOTS Pier (6), Lemon Tank (9), Seal Cove (10), Mt. Thirst (11), Lost Point (12), Cave Canyon (13), Eagle Canyon (14), Upper China Canyon (15), China Cove (16), Pyramid Cove (17), Mosquito Cove (18).

Current Military Values of the INRMP Management Units: Highest: China Cove, Pyramid Cove; High: NOTS Pier, Seal Cove, Wilson Cove; Medium: West Cove, Cave Canyon, Mt. Thirst; Low: Dolphin Bay, Lemon Tank; Lowest: Lost Point, Mosquito Cove, Eagle Canyon, Upper China Canyon.



MapD-17. Habitats used by the orange-crowned warbler on SCI. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.2.5 San Clemente Sage Sparrow (*Amphispiza belli clementae*)

Background

Formal Status: USFWS Federally Threatened subspecies.

Photo courtesy of Nicole Munkwitz.

General information: The San Clemente sage sparrow is a subspecies endemic to SCI. It is a small songbird (6 inches from beak tip to tail tip) with a brownish-gray back and distinctive white and black stripes on its face. It is distinguished from the southern California mainland subspecies (*Amphispiza belli belli*) by having a larger bill and a lighter juvenile plumage (Martin and Carlson 1998). It inhabits the boxthorn (*Lycium californicum*) phase of the maritime desert scrub community on the western edge of SCI (Hyde 1985). However, sage sparrows can be inconspicuous even in preferred habitat because they often run between shrubs instead of flying (Martin and Carlson 1998). On SCI, sage sparrows are non-migratory.

Reproduction: Breeding activity may start as early as late-January but usually not until February; earliest nests in 2001 were initiated approximately February 14 (Munkwitz 2001). Breeding activity usually peaks in March and April and lasts through late-June. Sage sparrows primarily nest in low, dense boxthorn (82.5% of nests in 2000), many of which are at least partially covered by lichen. Other nesting substrates include: island tarweed (Hemizonia clementina), island butterweed (*Senecio lyonii*), cactus, sagebrush (*Artemesia* sp.), saltbush (*Atriplex* sp.), grass, wishbone bush (*Mirabilis californica*), Island sunflower (E*ncelia californica*), Island morning glory (*Calystegia macrostegia*), and trefoil (*Lotus argophyllus*) (2001). The nest cup is made of grass, small twigs, and forb stems and lined with soft grasses, feathers, flower heads, or fur. Nests are typically placed approximately 20 cm above the ground with at least an additional 20 cm of canopy above the nest. These dense shrubs provide cover from both prevailing winds, which are often very strong on the westward side of SCI, and from predators (Willey 1997).

Sage Sparrows are able to reproduce successfully during their first year (Hyde 1985). Clutch size is usually 3-4 eggs and in most years 1-3 clutches are produced (Hyde 1985). Incubation typically lasts 11-14 days and fledging occurs

10-14 days after hatching. The female performs the incubation chores but both parents share feeding duties. Some years the reproductive success rate has been remarkably high (90% in 1986, 97% in 1999; Munkwitz *et al.* 2000), though rainfall amounts may greatly affect this rate (Hyde 1985).

Trophic level and Community Relationships:

Trophic level: The sage sparrow is a primary and secondary consumer.

Predators: Feral cats, raptors, island foxes, and loggerhead shrikes. Nest predators also include mice and rats.

Prey: Opportunistic ground forager and shrub gleaner of various insects, spiders, fruit, succulent vegetation, and seeds. Hyde (1985) found cactus fruit, boxthorn berries, and saltbush fruit to be especially important at different times of the year. Nestlings were primarily fed arthropods.

Competitors: Competitors include other ground foraging bird species, especially during the winter when white-crowned sparrows are present in large numbers. Vesper and golden-crowned sparrows may also compete for resources during the winter months.

Habitat Use and Behavior: Sage sparrows spend most of their time within boxthorn habitat, nesting close to shore with juvenile birds dispersing to upland areas during the non-breeding season. Adults show high site tenacity and can be observed within their breeding territories as late as October. Juveniles are much more mobile and often begin forming large flocks and dispersing to higher terraces during the early summer. The territory size of breeding sage sparrows ranged from 0.83 to 3.55 hectares in high density habitat and 1.43-3.97 in low or medium density habitat in 1999 (using the minimum convex polygon method of calculation). In 2000, territory size approximately doubled from 1999 in high density areas (Munkwitz *et al.* 2001).

The boxthorn community, which dominates the lower terraces on the western edge of SCI, used by sage sparrows is dominated by *Lycium californicum*. Other prevalent species include coast weed (*Amblypappus pusillus*), snake cactus (*Bergerocactus emoryi*), island tarweed (*Hemizonia clementina*), saltbush (*Atriplex* sp.), and in disturbed areas, little ice plant (*Mesembryanthemum nodiflorum*). The proportion of boxthorn within an area and the elevation coincide with the densities of sage sparrows found on SCI (Table D-5.). Munkwitz *et al.* (2000) found that high density habitat had a higher percent cover of snake cactus, grasses, and forbs and less bare ground than medium or low density habitat. Boxthorn shrubs have to be a minimum of 20 cm in height before they are used regularly by nesting sage sparrows. There was also significantly more lichen cover and a lesser slope in high density habitat than low density habitat. Willey (1997) found that the cover of vegetation at nest sites was greater and more evenly distributed than in surrounding habitat.

TableD-5. Criteria used by KEA Environmental (1997) for determining habitat quality categories (adapted from Munkwitz et al. 2000).

	High Quality	**Medium Quality**	**Low Quality**
Vegetation	Dominated by boxthorn component.	Moderate to high boxthorn component	Low boxthorn component
Elevation	0-30 meters above mean sea level.	30-90 meters above mean sea level	90-150 meters above mean sea level.
Sage Sparrow Densities observed	High densities	Moderate densities	Limited densities

Abundance, Distribution, and Trends: Subspecies endemic to SCI. In 2000, the estimated population of adult sage sparrows on SCI was 452 individuals, (Table D-6; Munkwitz 2001) and 206 nestlings were also banded.

TableD-6. 2000 density and population estimates of San Clemente sage sparrows in varying quality of habitats (adapted from Munkwitz et al. 2001). See Table D-5. for descriptions of habitat quality categories.

Habitat quality	Habitat available (acres)	Density estimate (males/acre)	Number of adults
High	923	0.110	202
Medium	1,648	0.054	178
Low	2,914	0.014	72

The 2000 population estimate is a decrease from an estimated 578 adults in 1999 (Table D-7). Between 1980 and 1985 population estimates ranged from 38 (1984) to 360 (1981). However, the differences in estimates may be due to survey and estimation methods, especially between 1997 and 1999. In addition, the difference between years, such as between 1999 and 2000, may represent normal annual variation in population size. Reproductive success rates for San Clemente sage sparrows are substantially higher than those for mainland populations (Munkwitz *et al.* 2001). In 2001, 140 nests were found, but population estimates were not yet available for this document.

TableD-7. Population estimates of San Clemente sage sparrows during years in which surveys were completed.

Year	Population Estimate (adults)[1]	Year	Population Estimate (adults)[1]
1980	176	1985	91
1981	360	1997	294
1982	205	1999	578
1983	198	2000	460
1984	38		

[1] 1980-1985 surveys were post-breeding counts that include both adult and juvenile birds. 1997, 1999, and 2000 surveys were pre-breeding counts that are estimations of adult birds only.

Factors Influencing Population Numbers: The decline of the San Clemente sage sparrow is attributed to vegetation reduction caused by overgrazing by goats, sheep, pigs, and cattle. However, Byers (1976) noted that the largest number of goats were concentrated in the southern end of the Island, away from the primary sage sparrow habitat, and consequently grazing may not have been as detrimental as originally thought. Introduced predators, especially feral cats, may also have contributed. An increase in fire frequency caused by training activities and cyclic weather patterns may also contribute to fluctuating abundance levels.

The previous year's productivity will have an obvious effect on the number of adults available to breed in a given year. Productivity is a factor of both the number of fledglings per nest, and the number of nesting attempts. In 1999, breeding success was high (97%) but most pairs only managed two nesting attempts. In 2000, most pairs attempted three nests, and though success was lower, productivity was almost equal. Winter survivorship also has a direct effect on the number of adults available to breed the following spring and summer. In relatively dry climates such as that on SCI, winter and spring rainfall directly affects the productivity and winter survivorship of bird populations. Increased vegetative growth and seed production in higher rainfall years will provide greater resources for breeding sage sparrows.

Summary of Knowledge and Special Considerations Related to Management:

- Habitat use during the breeding season has been reasonably well-defined for San Clemente sage sparrows. However, additional information on habitat used by dispersing juveniles and for all birds during the winter is still needed.
- Information on the rate of vegetation recovery post-disturbance, especially for boxthorn, and its relation to sage sparrow population estimates is still needed. Since fire negatively affects boxthorn cover (Kellogg and Kellogg 1994), frequent fires may be detrimental to sage sparrow populations.
- Fluctuations in weather patterns can have a large impact on annual variation of population estimates.
- What was defined by KEA (1997) as high, medium, and low quality habitats was based upon sage sparrow density estimates and may not accurately reflect actual habitat quality. Reproductive success in medium and low quality habitat is equal to that in high quality habitat and suggests that secondary habitat makes an important contribution to overall productivity.
- The low terraces dominated by boxthorn habitat are currently the most productive habitat overall for breeding sage sparrows on SCI. Boxthorn habitat with additional shrubs, grasses, and forbs, and little bare ground are particularly productive.

Management

Current Management Environment: The San Clemente sage sparrow was listed as Threatened under the ESA by the USFWS in 1977. Because of this status all activities with potential to affect sage sparrows or their habitat must be reviewed and approved by the USFWS. No specific management guidelines for sage sparrows or their habitat have been established at this time.

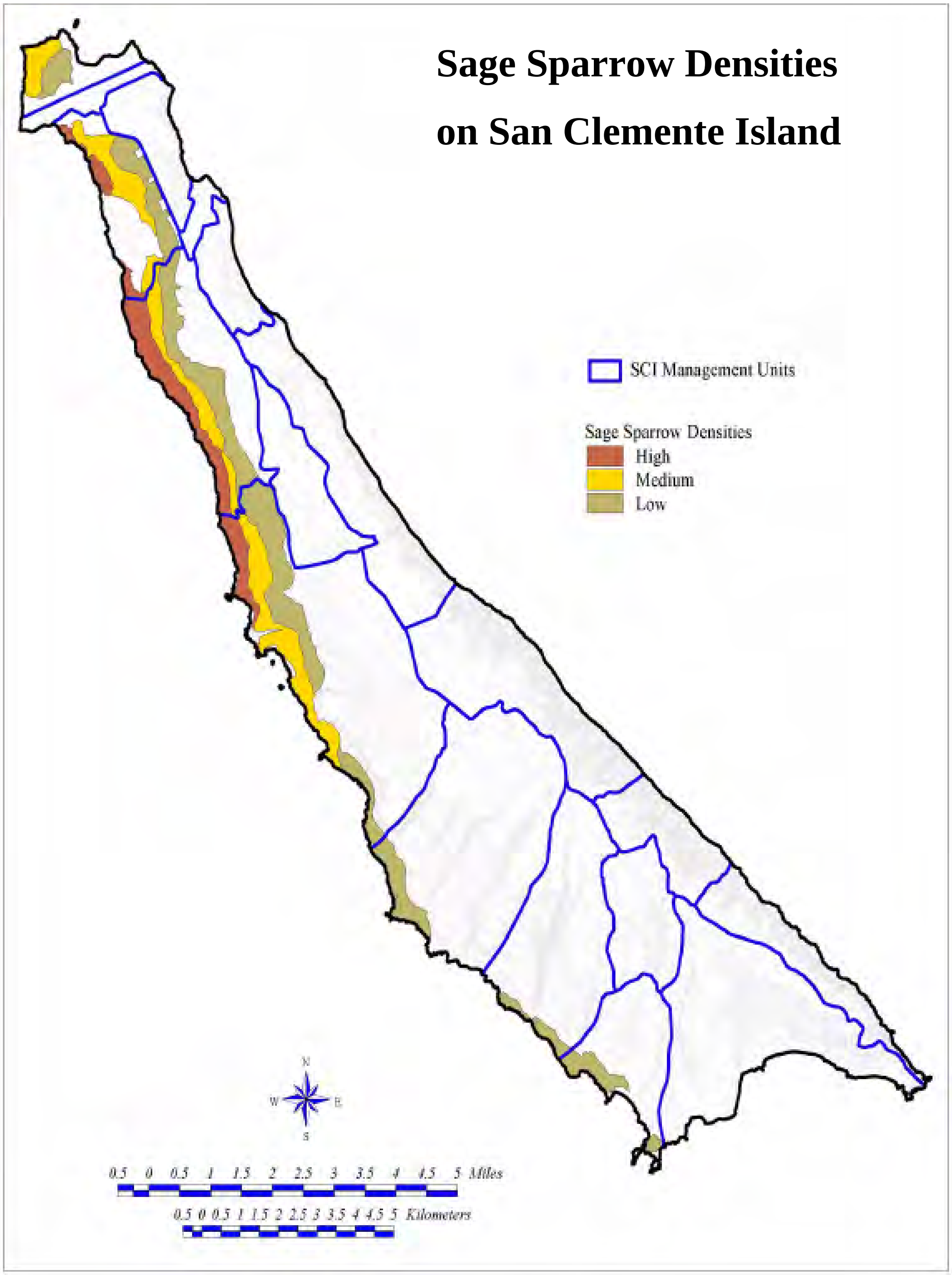
However, some current management practices have probably benefitted sage sparrows on SCI. All feral grazers were removed from the Island by 1993. Feral cat management efforts are ongoing on SCI, however, since 1999 control efforts have been limited to areas south of the primary sage sparrow breeding habitat. Intensive population monitoring studies are being performed annually.

Island-wide Desired Future Conditions:

- The recovery and maintenance of pre-grazing levels of high quality boxthorn habitat that ensures sage sparrow persistence on SCI with a self-sustaining population.
- Fire management that provides for natural dynamics and reduces the risk of catastrophic wildland fires that could dramatically alter large swaths of sage sparrow habitat.
- Removal of all feral cats.

Applicable INRMP Management Units: Northwest Harbor (1), West Cove (4), Terrace Canyon (7), Seal Cove (10), Lost Point (12), Cave Canyon (13), and China Cove (16).

Current Military Values of the INRMP Management Units: Highest: China Cove, Northwest Harbor, High: Seal Cove, Medium: West Cove, Terrace Canyon, Cave Canyon, Lowest: Lost Point.



MapD-18. Densities of San Clemente sage sparrows (provided by N. Munkwitz). (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.2.6 California Brown Pelican (*Pelicanus occidentalis californicus*)

Background

Formal Status: USFWS Endangered, CDFG Endangered

General information: The California brown pelican occurs along the Pacific coast from British Columbia south to Mexico (USDON, SWDIV 1998). It frequents estuaries, marine subtidal, and pelagic waters. The California brown pelican has seven-foot wingspan, a long, pouched bill, gray-brown body, and white head (adults). Its size and flight pattern (a few flaps and a sail), and habit of plunging head first into the water make pelicans easily recognizable.

Reproduction: California brown pelicans breed primarily on Anacapa Island in the Channel Islands, on the Los Coronados Islands off of Baja California, and as far south as Isabel Island and the Tres Marias Islands off the coast of Nayarit, Mexico (USFWS 2000). Small colonies have been reported from Santa Barbara, San Miguel, and Santa Cruz Islands, and Bird Island off of Monterrey (Grinnell and Miller 1944). The nesting season lasts from March through early August. Nests are built from small mounds of sticks or debris on rocky or low, brushy slopes of undisturbed islands, usually on the ground (USDON, SWDIV 1998). Eggs are laid from March to April. The clutch size averages three eggs, which are incubated for four weeks. Young are tended by both parents and first fledge 71-88 days after hatching (USDON, SWDIV 1998;USFWS 2000).

Trophic level and Community Relationships:

Trophic level: The pelican is a secondary consumer.

Predators: Gulls and vultures are common nest predators (USDON, SWDIV 1998).

Prey: Pelicans feed almost entirely on fish, but will also feed on crustaceans, carrion, and even young of their own species (USDON, SWDIV 1998).

Competitors: Gulls, especially the Heermann's, frequently steal fish from pouches of brown pelicans immediately after a dive.

Habitat Use and Behavior: Pelicans forage diurnally by diving head first into the water, mainly when the tide is rising (USDON, SWDIV 1998;USFWS 2000). They require terrestrial roost sites on which to dry their feathers after foraging. Roost sites are also important for escape from severe weather and wind, protection from predators, and social interaction. They will rest on the open water or on rocks offshore or on the mainland (USDON, SWDIV 1998). They will also use mud flats, sandy beaches, wharves, and jetties (USDON, SWDIV 1998). Pelicans typically roost, feed, and nest in flocks (Stokes and Stokes 1996).

Abundance, Distribution, and Trends:

Once considered abundant all along the California coast (USFWS 2000), the population had declined sharply by the time it was listed in 1970, with little or no successful breeding from 1969-71 (CDFG 2000). Since then, although numbers have increased substantially, the species has not yet recovered (USFWS 2000). On Anacapa Island, the only breeding colony in California, in 1971 although 552 pairs nested that year, only one chick was hatched due to DDT contamination (Schoenherr 1992). After DDT was banned, the number of chicks hatched and fledged on Anacapa increased to about 6500 by 1985 (Schoenherr 1992). From 1993 to 1997, the total breeding population in California increased from about 4,200 pairs to 6,380 pairs (CDFG 2000).

On San Clemente Island, brown pelicans are known to roost at Castle Rock and Bird Rock off the north end of the Island (USFWS 2000). In 1992-93, aerial surveys documented the presence of 92 and 358 roosting individuals (USFWS 2000).

Factors Influencing Population Numbers:

Contamination of the pelican's food supply with DDT and other chlorinated hydrocarbons or pesticides was directly responsible for the severe decline in the California brown pelican population(USDON, SWDIV 1998;USFWS 2000). The contamination resulted in thinning of pelican eggshells, which caused a significant decline in breeding success (Zeiner *et al.* 1990). The California brown pelican is still in the process of recovery and is still vulnerable to contamination by DDT and other pesticides (USFWS 2000). Low prey abundance resulting from El Niño effects and/or overfishing may also be slowing the recovery of the species (USFWS 2000).

Summary of Knowledge and Special Considerations Related to Management:

- Currently no brown pelicans breed on SCI.
- They rely on prey species commonly found in the waters adjacent to the Island.
- Pelicans may be vulnerable to oil spills.

Management

Current Management Environment: The California brown pelican was listed as Endangered under the ESA by the USFWS in 1970. Because of this status all activities with potential to affect pelicans or their habitat must be reviewed and approved by the USFWS. No specific management guidelines for pelicans or their habitat have been established at this time.

Island-wide Desired Future Conditions:

- Monitoring of roosting activity.

Applicable INRMP Management Units: Northwest Harbor (1)

Current Military Values of the INRMP Management Units: Highest: Northwest Harbor.

D.2.7 Rodents

Species and Status: Deer Mouse (*Peromyscus maniculatus clementis;* CDFG Species of Concern), Black Rat (*Rattus rattus*), House Mouse (*Mus musculus*), Harvest Mouse (*Reithrodontomys megalotis*), California vole (*Microtus californicus*). while the deer mouse is endemic and the only Island native, all rodents found on the island are discussed here because of their importance as a prey base.

General Information: The deer mouse (*Peromyscus maniculatus*) is very abundant throughout all of California and is found in nearly all habitats. On the Channel Islands, it is represented by eight different endemic subspecies, one for each different island. On SCI, *Peromyscus maniculatus clementis* is the only native rodent species. Little is known about the biology or abundance of this endemic subspecies, so information presented here is mainly derived from data about the mainland species, *P. maniculatus*, as well as from the little information about the other*Peromyscus* island endemics. The deer mouse shares SCI with four species of introduced rodents: the black rat, house mouse, California vole, and harvest mouse. They are thought to have been imported in loads of hay during San Clemente Island's ranching period in the early 1900s.

Reproduction: The deer mouse breeds year-round, most likely peaking beweeen March and August. They produce two to four litters per year. Litter sizes range from 1 to 9, with an average of about 3.5 young. They are solitary nesters who are maternally raised until 22-37 days, and reach sexual maturity at approximately 50 days. The four species of introduced rodents show similar reproductive cycles. They all breed at around 21 days, produce an average of 2-6 young, and continue breeding all year. The five species have slightly different population peaks, but they all occur between late spring and early fall (CDFG 1999).

Deer mice will construct their nests in nearly any sort of closed cover. They utilize slash and forest litter, rock piles, abandoned burrows and logs to form confined areas lined with soft materials such as root fibers, mosses, hair and grass. The California vole and the house mouse will build their own underground burrows in soft soils lined with soft materials. The harvest mouse forms nests of woven vegetation at the base of shrubs, thick grass or litter. Rats will nest in a variety of places including man-made structures (CDFG 1999).

Predators: All the island rodents are prey items to larger mammals, including the island fox, and to birds of prey. The island night lizard and the island fox are two sensitive species who make up their predator complex. Cohen (1977) noted that the red-tailed hawk and the northern harrier were frequent visitors to the island and fed exclusively on deer mice. The house mouse is also preyed upon by voles, rats, and the harvest mouse.

Prey and Other Food Items: The deer mouse is a generalist feeder, foraging on insects (especially at the larval and pupal stages), fungi, leaves, fruits and seeds and animal flesh. They primarily forage on the ground, but at times will climb up into shrubs to search for food. They store large caches of food for winter consumption. They are thought to play an important ecosystem role by feeding on larvae and pupae of insects who prey upon plant life (CDFG 1999).

The diet of the California vole consists mainly of plant matter; consuming grasses, sedges and herbs, foraging on the ground, leaving trails behind them leading to their nests. The other three introduced rodents are omnivorous, consuming seeds, fruits, invertebrates and when possible, human garbage (CDFG 1999).

Competitors: The deer mouse, harvest mouse, black rat and California vole are likely competitors against each other for burrowing spaces and food resources to some extent. The harvest mouse has been observed using the trails made by meadow voles in foraging; no tendency to avoid the voles has been noted.

Habitat Use and Behavior: The deer mouse, harvest mouse, black rat, and house mouse are all nocturnal creatures who are active year round and defend their nests. The black rat is highly social and forms colonies of several family units, living with or near human establishments when possible. The house mouse forms looser colonies comprised of a highly aggressive male with several females. The California vole is also active year round, but displays weak territorial behavior (CDFG 1999).

Abundance, Distribution and Trends: There is no recent information about the distribution or abundance of the SCI deer mouse. A twelve month capture survey of deer mice performed in 1976 on SCI (Cohen 1977) recorded peak numbers of captures during May through August, while no mice were captured from September through December. Eight different sites were sampled throughout several different habitats spanning the entire island. No trend in habitat preference was detected in this study. The three subspecies which occur on Anacapa, San Miguel and Santa Barbara islands were monitored between 1992 and 2000 for density and population numbers. Estimates of density between all the islands sampled ranged between 10 mice per hectare to upwards of 900 mice per hectare (Schwemm and Coonan 2001). Another capture study was performed in the summer of 1986 on Santa Catalina Island. Deer mice were found in all habitats sampled except for the coastal sage scrub, and were caught most often in the maritime scrub community. They were also caught in relatively high abundance in the chaparral and oak woodland sites, and less often in the riparian woodland and the coastal grassland traps. Overall the data showed deer mice to be fairly widespread, and it was noted that deer mice had been recorded in the coastal sage scrub community by Collins and Martin in 1985 (Perlmutter, from Hochberg 1993). A study focusing on the prey base of the loggerhead shrike reports that mice (all mice found on SCI) were found in highest abundance in maritime desert scrub-prickly pear/cholla vegetation and were least abundant in canyon shrub/woodland vegetation. They concluded that mouse densities increased with decreasing vegetation height and increasing vegetation densities (Lynn, S. and D.K. Garcelon 2001).

The four introduced species occur in low numbers with very localized distributions. The house mouse is found throughout the island, but occurs in highest abundance around abandoned structures. On the mainland it prefers areas inhabited by humans and nearby riparian areas. The harvest mouse and the California vole are very localized in distribution, inhabiting the salt-marsh communities near Pyramid Cove and Horse Beach (Cohen 1976). The harvest mouse is known on the mainland to be abundant primarily in grasslands, shrublands and forests in early stages. The black rat is known on the mainland to inhabit urban places, preferring buildings, attics, rafters, walls and enclosed spaces. Water is a requirement, and they inhabit riparian habitats near settlements as well. In the absence of human habitation, dense vegetation is thought to provide suitable habitat as well.

Factors Influencing Population Numbers: On San Miguel Island, populations of the deer mouse rose sharply as the island fox was eliminated as a primary predator there (Schwemm and Coonan, 2001). Presumably the San Clemente Island fox has the same inverse relationship to the deer mouse. Schwemm and

Coonan also determined that "spring densities were positively correlated with precipitation occurring during the winter two years previous, and negatively correlated with current-year winter rainfall".

Summary of Knowledge and Special Considerations Related to Management:

- The deer mouse is a key food item for higher level predators such as the island night lizard and the island fox. It is also thought to be important as a control for plant pests.
- Little is known about the distribution or abundance of the deer mouse on SCI, as the last capture survey was done in 1976, well before the extirpation of the feral grazers took place and native vegetation began to recover.
- The interactions between the deer mouse and introduced rodents are not well described, yet are an important consideration from a management standpoint.
- From the small amount of survey work done across the Channel Islands, there doesn't seem to be a clear preference for a specific habitat by the deer mouse. It was caught in relatively high abundance in the maritime desert scrub community, but it also appears that they occur at least in low numbers in all habitats.

Management

Current Management Information: There is currently no management program for the deer mouse on SCI. Black rats and house mice are being removed as part of the shrike recovery program.

Island-wide Desired Future Conditions:

- Removal of all non-native rodents.
- Surveys and monitoring of SCI deer mouse populations.

Applicable INRMP Management Units: All.

Current Military Values of the INRMP Management Units: See Table 4-5.

D.2.8 San Clemente Island Fox (*Urocyon littoralis clementae*)

Background

Status: CDFG Threatened, Federal Species of Concern

General information: The San Clemente island fox is believed to have first been introduced to SCI approximately 3,400 years ago by Native Americans. The closest relative of the island fox is the larger gray fox (*Urocyon cinereoargenteus*) that is found on the mainland. The coats of island foxes are a mixture of white, gray, black, and rufous colored. Adult males (avg. total length = 73 cm) average slightly larger than females (avg. total length = 69 cm) (Moore and Collins 1995). They will use burrows, dense shrubs, and rocky areas for cover (CDFG 1999) and are usually most active in the morning and early evening.

Reproduction: Pair formation and courtship in island foxes typically occurs January through March. Breeding occurs in late-February and March with pups being born in May. Gestation lasts approximately 50 days. Litter size may be as high as 5, but averages 2-3 pups. Only one litter per year is produced. The young emerge after 3-4 weeks and begin foraging with their parents by midsummer. They are eventually forced to be independent by their parents in early-fall (CDFG 1999). Island foxes can breed at the end of their first year and average lifespan is 4-6 years. Burrows, hollow logs or stumps, and rock crevices may be used as dens. They typically do not excavate their own den. Some dens may be used in successive years.

Trophic level and Community Relationships:

Trophic level: The island fox is a primary and secondary consumer.

Predators: Raptors may take young foxes. On three other Channel Islands, predation by golden eagles has severely impacted fox populations (Garcelon 1999).

Prey: Opportunistic forager of mice, birds, insects, fruit, carrion, crabs, and eggs. The fruits of *Arctostaphylus*, *Heteromeles*, *Opuntia*, *Prunus*, and *Mesembryanthemum* are particularly favored. Mice may be particularly important for feeding pups (Garcelon 1999).

Competitors: Probably compete with raptors and feral cats for some prey items such as mice and birds.

Habitat Use and Behavior: The island fox uses most habitats on SCI. It seeks cover in areas with burrows, dense brush, and rocky areas. It prefers areas with more complex, layered vegetation that includes woody, perennial, fruiting shrubs (CDFG 1999). Densities on Santa Catalina and Santa Cruz islands were highest in woodland habitats (Moore and Collins 1995).

Island foxes communicate using auditory, visual, and olfactory signals. They will bark and growl and have a series of submissive gestures. They mark their territories using urine and feces.

Abundance, Distribution, and Trends: Island foxes are found on the six largest Channel Islands, and the subspecies is endemic to SCI. Island fox densities tend to be higher than densities of mainland foxes. Densities within trapping areas on SCI in 1988-1997 ranged from 4.0 to 9.0 foxes/km^2. Of the three trapping populations surveyed during those years, one was relatively stable and two decreased approximately 25% from the first five years to the second five years. During 1995-1997, the SCI population estimate averaged 650 individuals (Garcelon 1999). However, populations of island foxes may fluctuate greatly in relatively short periods of time (Moore and Collins 1995). Average home range was 75.3 ha (n=16 foxes) with some overlap of ranges within canyon habitat. In China Canyon, an average of 5.8 fox home ranges overlapped each shrike territory (Garcelon 1999). When a fox is removed from an area, ranges of adjacent foxes expand into the unoccupied area or juvenile foxes may move in (Garcelon 1999).

Island fox populations tend to have a higher proportion of older individuals than mainland populations, which may suggest lower mortality rates on islands. Survival was higher for individuals in grasslands than in coastal sage or cactus, which could be a result of differing prey availability among habitats. Juveniles and adults had relatively high survival while pups showed the lowest survival (Garcelon 1999). Trapping results showed a sex ratio of 1:1 (Wilson 1976, Garcelon 1999).

Factors Influencing Population Numbers: Degradation of the island from goats has probably contributed to their decline. Sources of mortality include collisions with vehicles, disease, predation, and parasites. From 1991-1995, 26 dead foxes were opportunistically recovered along roadsides (Garcelon 1999). Declines in some trapping grids may be due to manipulation of the population to benefit the loggerhead shrike (D. Garcelon, *pers. com*.). Because of their small size and lack of immigration, island fox populations have low genetic variability compared to mainland fox populations. However, negative effects due to inbreeding do not appear to be present (George and Wayne 1991). Reproduction rates are influenced by 1) the number of females of reproductive age, 2) availability of mates and territories, and 3) the condition of the female, which is influenced by availability of prey (Garcelon 1999). Fertility rates may be low on SCI compared to other islands. The number of pups produced among age classes does not differ (Garcelon 1999). The introduction and invasion of grasslands by non-native, annual grasses may be affecting abundance of insects and small mammals, and may be affecting the fox’s ability to hunt in these more dense habitats (Garcelon 1999).

Summary of Knowledge and Special Considerations Related to Management:

- Because of low genetic variability the introduction of diseases such as canine distemper can be detrimental to the population.
- Island foxes prefer habitats with dense, woody vegetation, but use all habitats.

- Populations may fluctuate greatly over relatively short periods of time, perhaps in response to prey availability.
- Declines in some parts of SCI may be due to manipulation of the population to benefit the loggerhead shrike.
- Mice may be particularly important for feeding pups.
- The introduction and invasion of grasslands by non-native, annual grasses may be affecting abundance of insects and small mammals, and may be affecting the fox's ability to hunt in these more dense habitats.
- When a fox is removed from an area, ranges of adjacent foxes expand into the unoccupied area or juvenile foxes may move in.
- The introduction of a virus such as canine distemper, through exposure to domestic dogs, could have a catastrophic effect on the fox.
- Only one observation of a golden eagle has been made on SCI, and probably do not visit the Island on a regular basis.
- Death due to vehicle collisions may be significant in some parts of the Island.
- Fire may improve the short-term availability of prey for foxes.
- Because of severe declines of island foxes on other islands, monitoring of foxes on SCI should be continued.

Management

Current Management Environment: The island fox was listed as threatened by the CDFG in 1971 because of its limited distribution and increasing threats from habitat degradation. Because of declining populations, the USFWS has been petitioned to list subspecies of island foxes on four of the Channel Islands, but not SCI, as endangered under the ESA. Foxes on SCI have been trapped and removed from loggerhead shrike nesting areas. The Institute for Wildlife Studies is currently conducting research on the SCI fox, including radio telemetry studies. The Navy prohibits domestic dogs on SCI. The Navy is currently discussing potential changes to fox management policies on SCI with USFWS.

Island-wide Desired Future Conditions:

- Recovery of island shrub species to pre-grazing levels to provide adequate fruit preferred by foxes.
- Self-sustaining populations of both foxes and loggerhead shrikes that would eliminate the need for trapping of foxes in shrike breeding territories.
- Removal of all feral cats.

Applicable INRMP Management Units: All.

Current Military Values of the INRMP Management Units: See Table 4-5.

D.2.9 Abalone (*Haliotis* sp.)

Background

Status: White abalone = Federally Endangered; CDFG harvesting moratorium on all abalone in southern California.

Photo courtesy of Gary Davis.

General Information: Abalone are marine snails with a single flattened shell that cling to rocks from the intertidal zone to depths of up to 70 meters. Seven of the eight species of abalone in California are present in the waters surrounding SCI: white (*Haliotis sorenseni*), pink (*H. corrugata*), black (*H. cracherodii*), green (*H. fulgens*), red (*H. rufescens*), threaded (*H. assimilis*), and flat abalone (*H. walallensis*). The first four species are the most important economically. *Hybrids occasionally occur between species, including white abalone*, though they can be especially prevalent in red abalone populations.

Life Cycle: The reproductive strategy of abalone requires densely aggregated adults for success. Males release high densities of sperm into the sea in the hopes that a nearby female has done the same with her eggs. The older, and larger, an individual is, the more gametes it can produce. The presence of eggs or sperm in the water may stimulate other individuals to spawn and increase the chance of fertilization. *White abalone spawning is highly synchronized and breeding occurs from February to April.*

Larvae are free-floating for only a few days before attaching to a substrate. White abalone have the longest larval period (5-14 days) which may facilitate more movement between island and mainland populations. It takes three to seven years (*4-6 years for white abalone*) in a highly competitive ecosystem for an abalone to mature (Davis 1998). Mortality of immature abalone probably exceeds 99% (CDFG 2001). However, they are long lived; white abalone may live 35-40 years.

Community Relationships:

Predators: Natural predators of eggs and larvae are any filter-feeding organisms, and juveniles are preyed upon by crabs, lobsters, octopuses, starfish, and fish. Larger abalone may be preyed upon by some species of fish, bat rays, and sea otters.

Prey: Abalone feed on anchored or drifting pieces of algae. Adults prefer the larger brown algae, including giant kelp, and juveniles rely more on rock-encrusting algae species and diatoms.

Competitors: Algal grazers including: sea urchins (*Strongylocentrotus* sp.), brown sea hare (*Aplysia californica*), sea cucumbers (*Cucamaria* sp.), and other abalone species.

Habitat Use and Behavior: Different species are found at differing depths and probably prefer a certain range of temperatures. *White abalone are typically most abundant at depths between 25-30 meters, but can occur as deep as 60 meters* (See Figure 0-1 for depths of other species).

White abalone are commonly seen in open and exposed areas where they prefer areas of boulders surrounded by sand. White abalone may be restricted to depths and areas where attached brown algae occur. All ages, though especially juveniles, rely on rock crevices for cover. When abalone become larger (typically 75-100 mm in white abalone) they emerge into more open habitats. As they become older, abalone lead increasingly sedentary lives.

Abundance, Distribution, and Trends: Five of the eight eastern Pacific abalone species supported multi-million dollar fisheries for most of the twentieth century. However, a flawed management strategy and over-exploitation has resulted in the collapse of abalone populations in southern California.

White abalone densities in the early 1970s averaged 10,000 per hectare. Ten years later densities averaged 10 per hectare, and by the early 1990s had fallen to 1 per hectare. Within the last 30 years, white abalone abundance declined from approximately 2-4 million individuals to 1,600-2,500 individuals (Davis 1998). Separate surveys performed by CDFG and the National Park Service (NPS) show very scattered individuals of white abalone around SCI. NPS surveys, which concentrated in areas of their historical greatest abundance, revealed a density of 0.96 white abalone per hectare at SCI and 2.7 throughout its range (Haaker *et al.* 1999). General locations of white abalone found during CDFG surveys around SCI during 1999 are shown in Map 19.

In southern California, black abalone remain at population sizes of about 1% of their previous size. Pink, green, and red abalone have also declined dramatically in the last three decades (Davis 1998). Results of recent (1999) surveys at SCI for pink and green abalone are shown in Map 20 and Map 21, respectively. Prior to the moratorium, and as recently as 1995, 10,000 pounds of abalone were still being harvested annually at SCI.

Special Management Considerations:

Threats:

- CDFG (2001) listed 6 major reasons for the decline of abalone in California (no particular order): 1) over-harvesting which could not be sustained by the slow growth and low reproductive success of abalone (probably single biggest reason for decline according to USFWS), 2) illegal harvesting spurred by high prices, 3) death of sublegal abalone due to harvesting techniques to get legal size abalone (abalone have no blood clotting ability), 4) increased competition from sea urchins which have increased in numbers, 5) increased predation by sea otters, 6) loss of habitat to coastal development and pollution.
- Withering foot disease has contributed to the decline of populations of black abalone, and has also been found in red, pink, and green abalone.
- In tidal pools, Sargasso weed (*Sargassum muticum*), an introduced brown alga, may shade out native species of kelp fed on by abalone.

General Considerations:

- Increases in water temperature associated with El Nino events can contribute to long- and short-term population changes and could lead to recruitment failure.
- The reproductive strategy of abalone requires densely aggregated adults for success. In one Australian species, recruitment failure occurred when mean nearest-neighbor distances were over 1-2 meters.
- Active animal husbandry techniques will probably need to be employed to attempt to restore these slow-growing species to sustainable levels.
- Monitoring can be expensive but not necessarily difficult.
- There is high public interest in abalone management because of its commercial value.

Considerations Specific to White Abalone:

- Spawning is highly synchronized and breeding occurs from February to April.
- Larval stage is longer (5-14 days) than other species and probably allows for more dispersal between mainland and islands.
- Larval survival in white abalone may be reduced at lower temperatures and the species may be restricted to depths and areas where attached brown algae occur.
- Feed more on attached brown algae than drifting algae.
- It is estimated that 80% of the California landings of white abalone were taken from SCI. Because harvest records show SCI historically contained one of the larger populations of white abalone and because of its relative inaccessability from the mainland, the Island could be considered for active restoration efforts for the species.
- NMFS found that habitat destruction was not an immediate threat to white abalone populations.

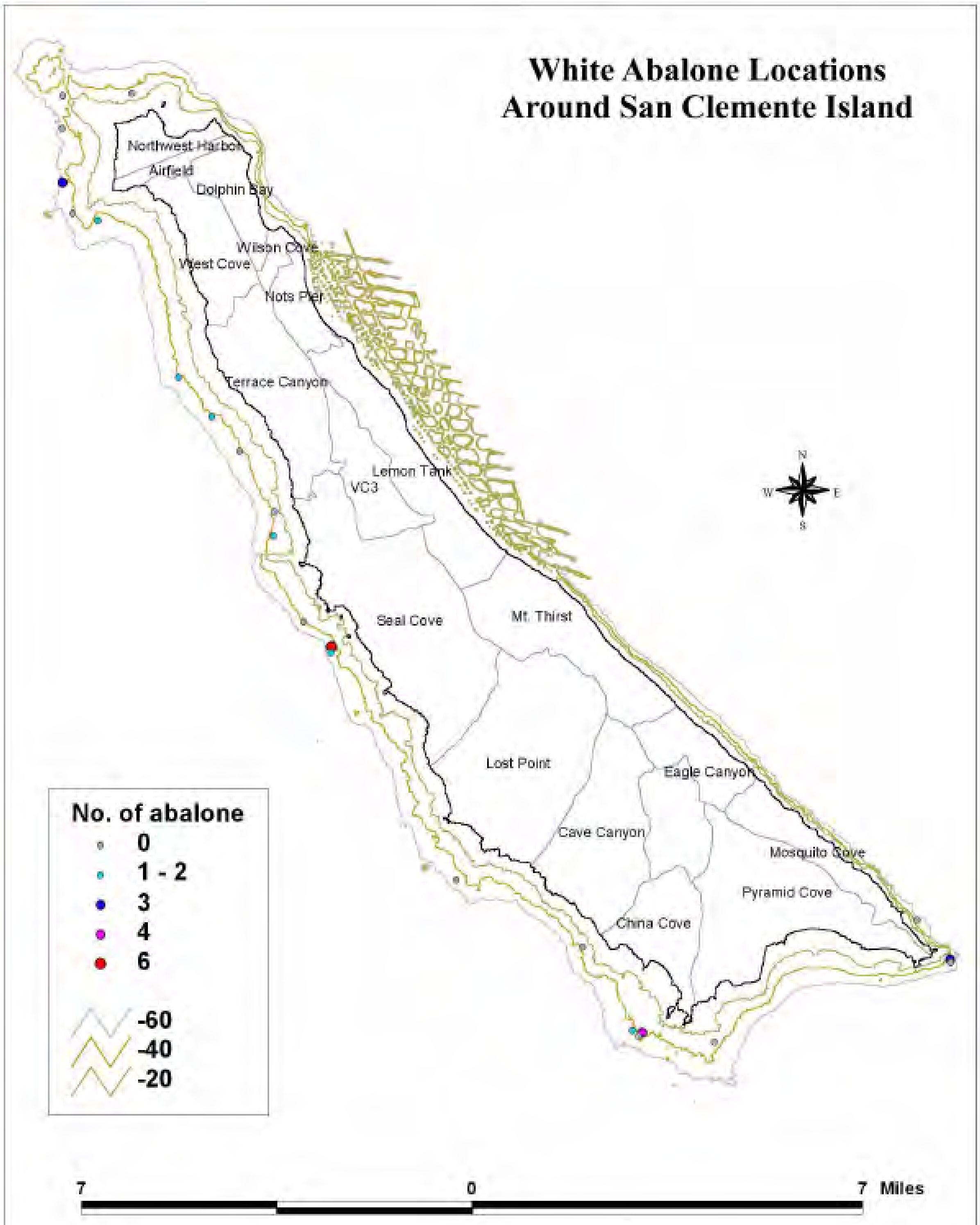
Management

Current Management Environment: White abalone became the first marine invertebrate listed as Federally Endangered on June 28, 2001. Critical habitat was not designated because of the potential threat of increased poaching in designated areas. A moratorium on all abalone harvesting south of San Francisco was instituted in 1996 by CDFG. The White Abalone Restoration Consortium was established to develop and execute a restoration plan.

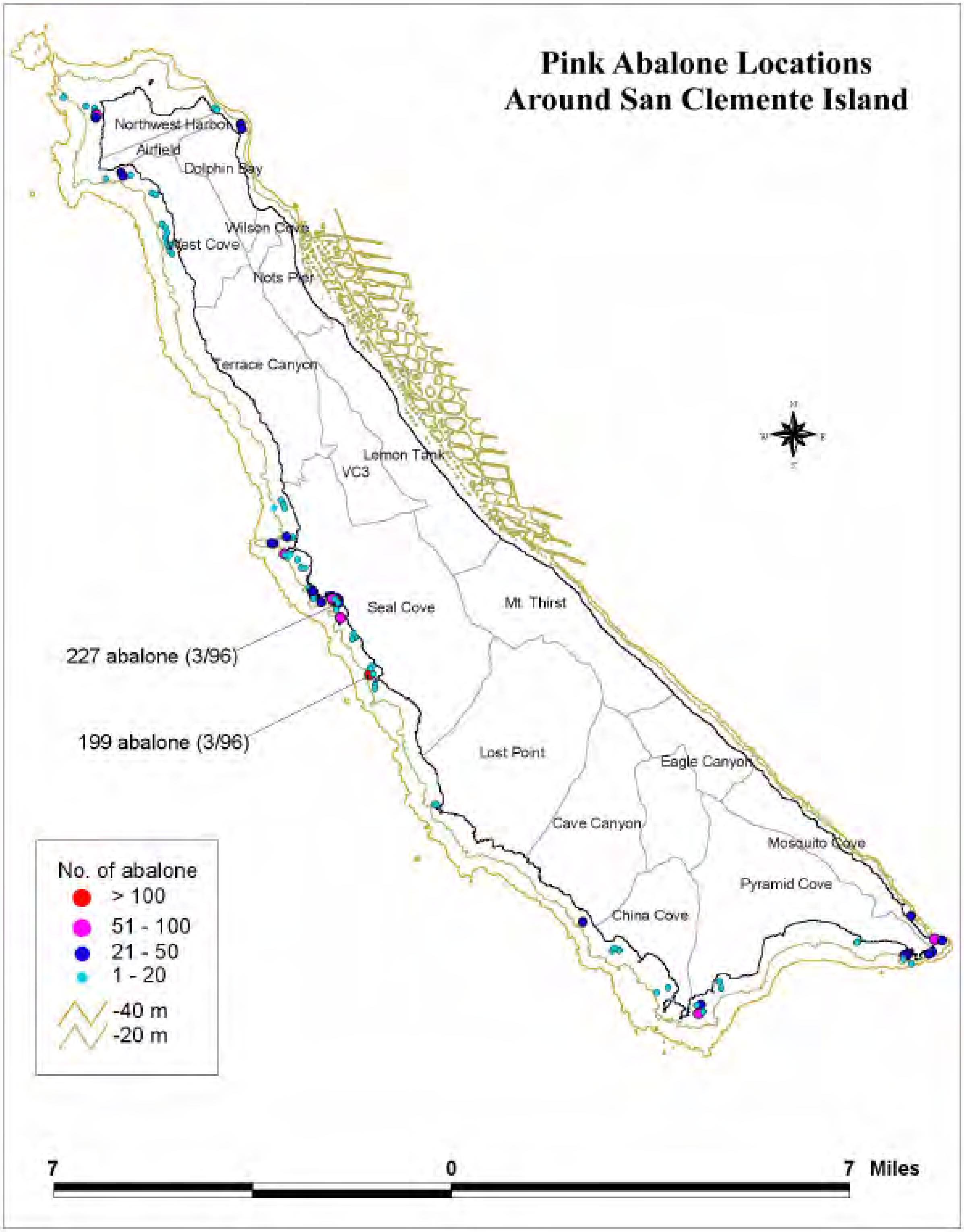
Island-wide Desired Future Conditions: Self-sustaining populations of all abalone species that historically occurred around SCI, which allow for some regulated harvesting.

Applicable Management Units: Areas were chosen for surveys in 1999 based upon input from former abalone fishermen. These locations were historically known for larger populations and consequently should contain appropriate habitat for abalone. Locations near Seal Cove (10), China Cove (16), and Pyramid Cove (17) may hold promise for management efforts. However, abalone were probably historically present around most of the island, and other areas may be recognized for initial management activities.

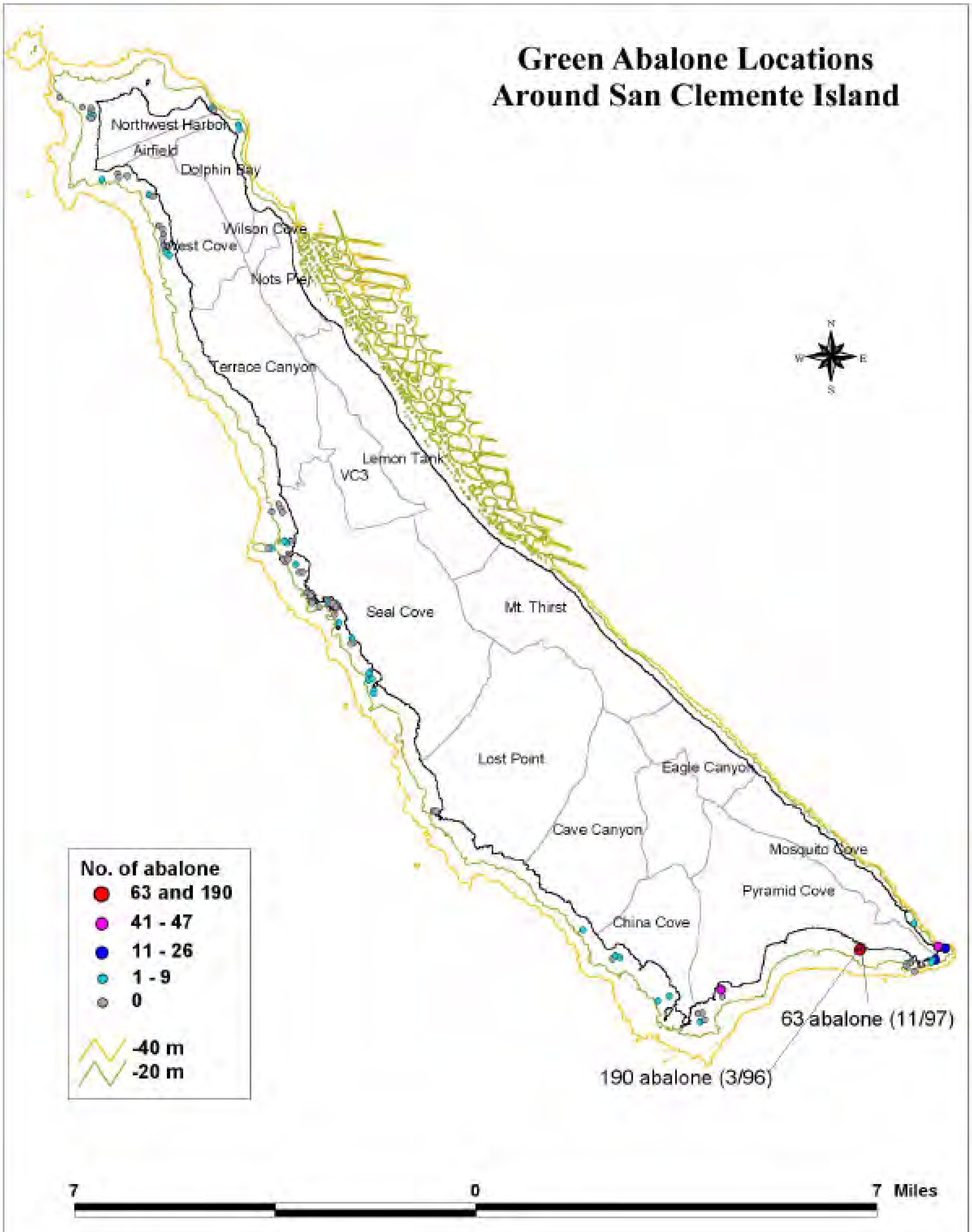
Current Military Values of the INRMP Management Units: Highest: China Cove, Pyramid Cove, High: Seal Cove.



MapD-19. Approximate locations of white abalone located during 1999 surveys (Haaker et al. 1999) around SCI. Observations are placed at transect locations and consequently only represent a general location. Depths of observations on map are the median depth recorded along entire transect. Surveys were concentrated in areas of past historical abundance. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).



MapD-20. Approximate locations of pink abalone located during surveys from 1996-1999 (Haaker and Tanaguchi 1996-999) around SCI. Observations are placed at transect locations and consequently only represent a general location. Depths of observations on map are the median depth recorded along entire transect. Surveys were concentrated in areas of past historical abundance. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).



MapD-21. Approximate locations of green abalone located during surveys from 1996-1999 (Haaker and Tanaguchi 1996-1999) around SCI. Observations are placed at transect locations and consequently only represent a general location. Depths of observations on map are the median depth recorded along entire transect. Surveys were concentrated in areas of past historical abundance. (Do not reproduce or distribute without Navy permission [see Document Disclaimer]).

D.2.9 Pinnipeds

Background

Species and Status: Three species of pinnipeds regularly use San Clemente Island: the California sea lion (*Zalophus californianus*), the northern elephant seal (*Mirounga angustirostris*), and the Pacific harbor seal (*Phoca vitulina*). The Guadalupe fur seal (*Arctocephalus townsendi*; USFWS and CDFG Threatened, fully protected) has also been spotted on at least two occasions in 1975 and 1997 (Carretta *et al.* 2000).

General Information: The most abundant pinniped in California waters is the California sea lion (*Zalophus californianus*) which is present year-round on SCI. The northern elephant seal (*Mirounga angustirostris*) is present on San Clemente Island during the winter and spring months. From April to November the animals are feeding at sea or haul out to molt at rookeries. The Pacific harbor seal (*Phoca vitulina*) is a fairly common, non-migrating pinniped often found on San Clemente Island. Although harbor seals are non-migratory, local movements of various distances have been recorded in relation to food resources and breeding activities (CDFG 1999). Seals and sea lions play a vital role in the kelp forest ecosystem by enhancing diversity of organisms and overall production of the kelp forests. The waters surrounding large pinniped rookeries are enriched by the accumulation of nitrogen compounds promoting algal growth, which in turn provides additional food for intertidal fishes and seabirds (CDFG 1999).

Reproduction: The California sea lion breeds only on islands from May to August and are most numerous at SCI during this time. Males migrate northward following the breeding season (CDFG 1999). SCI is one of only four islands in southern California where sea lions breed, San Miguel and San Nicolas islands harbor the largest rookeries. The northern elephant seal breeds from mid-December into March. The Pacific harbor seal breeds from March to June, with peak pupping occurring in April and May.

Community Relationships:

Predators: All seals and sea lions are significant prey items for sharks and whales. In addition, seal placentas and decomposing carcasses provide food for many other marine organisms.

Prey: Sea lions feed on a variety of fish and marine invertebrates including: anchovy, rockfish, whiting, mackerel, squid, and octopus. Northern elephant seals will also feed on sharks, rays, lamprey, crustaceans, and tunicates.

Competitors: Competitors for food include large fish.

Habitat Use and Behavior: The northern elephant seal prefers isolated or protected beaches safeguarded from high surf and severe winter storms. Annual summer and winter migration occurs northward. The Pacific harbor seal and california sea lions primarily hauls-out on rock ledges and small inlets with a gravel substrate (Cohen 1980).

Abundance, Distribution, and Trends: Pinnipeds predominantly use the area in the vicinity of Mail Point, but other haulouts and rookeries include Castle Rock, China Point, South Point (Carretta *et al.* 2000). The California sea lion rests and breeds on haul-out sites and rookeries on the western (winward) shore of the Island. Historically, populations were much larger than today prior to their near extinction due to overhunting in the late 1800s. The population has since increased dramatically, especially since the 1970s (CDFG 1999). During surveys in April 1999, surveyors counted 3,900 sea lions ashore with an additional 2,100 animals estimated in the waters surrounding SCI (Carretta *et al.* 2000). The primary breeding areas are located at North and South Creek, and Mail Point. Major haul-out grounds tend to be located at Bird Rock, Seal Cove, and Middle Ranch. Solitary animals can be found anywhere along the coast (Cohen 1980).

The northern elephant seal was also brought close to extinction following intensive commercial exploitation in the mid 1700s to late 1800s. The population has increased dramatically in the region since the 1930s (CDFG 1999). Fewer than 100 elephant seals are observed at any one time at SCI, however as many as 400 have been estimated in the waters around SCI (Carretta *et al.* 2000).

The greatest number of harbor seals located during recent surveys at SCI was 175 individuals, with the animals concentrated at: the mouth of Waymuck Canyon, NW Harbor Islet (Bird Rock?), Pyramid Head, and Pyramid Cove.

Factors Influencing Population Numbers and Special Considerations Related to Management:

- Prey abundance can greatly affect both breeding success during the spring and summer and resident numbers during the fall and winter.
- Seals and sea lions play a vital role in the kelp forest ecosystem by enhancing diversity of organisms and overall production of the kelp forests. The waters surrounding large pinniped rookeries are enriched by the accumulation of nitrogen compounds promoting algal growth, which in turn provides additional food for intertidal fishes and seabirds (CDFG 1999).
- Pinnipeds predominantly use the area in the vicinity of Mail Point, but other haulouts and rookeries include Castle Rock, China Point, South Point (Carretta *et al.* 2000).
- The California Sea Lion breeds only on islands from May to August and are most numerous at SCI during this time.

Management

Current Management Environment: Currently, there are no specific management protocols for pinnipeds at SCI. During tests that could potentially impact pinnipeds, monitoring is performed.

Island-wide Desired Future Conditions:

- Implementation of protocol for avoiding breeding haulouts during military exercises.
- Restrictions on personnel approaching or disturbing haulout sites from land.

- Restrictions on commercial fisherman coming within a close distance of haulout sites.
- Control of erosion which could impact nearshore feeding areas.
- Continued monitoring of all pinniped species.

Applicable INRMP Management Units: Northwest Harbor (1), Seal Cove (10), Lost Point (12), China Cove (16), and Pyramid Cove (17).

Current Military Values of the INRMP Management Units: Highest: China Cove, Pyramid Cove, Northwest Harbor, High: Seal Cove, Lowest: Lost Point.

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Appendix E: Marine Species from SCI of Interest for use as Ecological Indicators

TableE-1. Marine species known from San Clemente Island and of interest for use as ecological indicators or for Essential Fish Habitat analysis. Bolded entries are species covered under Essential Fish Habitat requirements of the Magnuson-Stevens Conservation Act.

Species (and Fishery Management Plan (FMP) if applicable)	Common Name	Life stage@SCI	Habitat	Biological Interactions
INVERTEBRATES				
Loligo opalescens (Coastal Pelagics FMP)	market squid	Occasional occurrence	Eggs are found at depths of 3-180 m. Juveniles and adults are neritic, ranging from the surface to 200 m, and to 460 m, respectively. All life stages occur in euhaline waters.	Juveniles and adults are prey for sharks, fishes, sea-birds, and marine mammals. Adults and juveniles are found with pelagic schooling fishes.
Haliotis corrugata	pink abalone	Abundant year-round	Found on rocks in kelp beds form the lower intertidal zone to 60 m, most commonly at 6-24 m, in both turbulent and quiet waters.	
Haliotis cracherodii	black abalone	Common year-round	Common in rocky, surf-swept areas.	Is an important intertidal grazer. Is replaced subtidally by red abalone in central California, and by green further south.
Haliotis fulgens	green abalone	Abundant year-round	Found in shallow, low intertidal zone to 24 m depth. It lives in areas of strong wave action, in crevices, and under rocks.	Is associate with dense algal cover and surfgrass, and is an important grazer there. Is replaced by black abalone intertidally; by pink in deeper, less turbulent water; and by red north of Point Conception.
Haliotis kamtschatkana	pinto abalone	Common year-round	Occurs from the lower intertidal zone to 100 m, mostly in 10-30 m in California. Prefers kelp beds on dark rocks protected from heavy waves.	
Haliotis rufescens	red abalone	Rare year-round	Occurs from the lower intertidal zone to 180 m, but mostly at 3-6 m in northern California, at 6-17 m in central California, and deeper than 15 m in southern California.	Replaces black abalone subtidally north of Point Conception and is replaced by pink, green, and white in southern California.
Haliotis sorensoni	white abalone	Abundant year-round	Is one of the deepest-occurring abalones, found on rocks from 4-65 m, most abundant at 24-30 m. Is probably not tolerant of wave surge.	Is associated with deep-living algae such as elk kelp and is replaced in shallower water by red and pink abalones. Adults feed on drift or attached algae.
Haliotis walallensis	flat abalone	Rare year-round	Found in relatively cool waters from the lower intertidal zone to 27 m.	Adults graze on diatoms and coralline algae from rocks.
Sicyonia ingentis	ridgeback prawn	Occasional occurrence	All stages are neritic. Juveniles and adults are found on various soft substrates at depths of 5-305 m. Juveniles are most common at 25-50 m, adults at 45-180 m.	It is eaten by flatfishes and probably other demersal fishes.
Pandalus platyceros	spot shrimp	Occasional occurrence	Juveniles are found from shore to depths of 55 m during their first year and then move deeper to adult grounds, they also occur in midwater. Adults are found from the intertidal zone to 530 m, but generally occur at depths greater than 50 m during the day and in shallow areas only at night.	Eaten by octopuses and yelloweye rockfish. Competitors probably include crabs.

TableE-1. Marine species known from San Clemente Island and of interest for use as ecological indicators or for Essential Fish Habitat analysis. Bolded entries are species covered under Essential Fish Habitat requirements of the Magnuson-Stevens Conservation Act. (Continued)

Species (and Fishery Management Plan (FMP) if applicable)	Common Name	Life stage@SCI	Habitat	Biological Interactions
Panulirus interruptus	California spiny lobster	Adult area (shallow) year-round, mostly April-August; Adult area (deeper) year-round, mostly September-March	Juveniles, through their second year, are found from the intertidal zone to 5 m, older juveniles deeper. Subadults and adults are found from the intertidal zone to 80 m, mostly less than 30 m.	Major predators are cebazon, kelp bass, and California sheephead; also eaten by several other fishes and octopuses. Cancrid crabs replace California spiny lobster in offshore areas in march when the lobsters move inshore. Typically found on reefs and near kelp, coralline algae, and sea grasses.
FISHES				
Trachurus symmetricus (Coastal Pelagics FMP)	jack mackerel	Major adult area year-round; Major spawning area January-November; Major juvenile area year-round	Eggs and larvae are epipelagic from the surface to 140 m, mostly above 50 m. Juveniles are epipelagic, occurring at depths of 9-55 m. adults occur from the surface to 403 m, but are primarily epipelagic from 9-73 m. Juveniles occur around natural and man-made objects such as kelp beds, reefs, piers, drilling platforms, and flotsam.	Major prey for sharks and other larger fishes (especially billifishes), sea basses, swordfishes, pelicans, pinnipeds, and porpoises. They school as a defense against predation. Competes for food with chub mackerel. Larvae commonly occur with Mexican lampfish larvae. Very small juveniles seek shelter under large jellyfish. Large juveniles associate with drifting giant kelp; larger juveniles and adults school with other pelagic species.
Scomber japonicus (Coastal Pelagics FMP)	chub mackerel	Major adult area May-November; Adult area year-round	Found predominantly nearshore (coasts or islands) and over shallow banks. Adults are coastal pelagic (primarily neritic, also epi-mesopelagic), occurring from surface to 300 m.	Eaten by larger fish, pelicans, and marine mammals, They school as a defense against predation. May compete for food with other pelagic species. Adults found in mixed schools with Pacific sardines, jack mackerel, Pacific bonito, and small bluefin tuna.
Sardinops sagax (Coastal Pelagics FMP)	Pacific sardine	Major adult concentrations year-round; Juvenile area year-round	Eggs, larvae, and adults are epipelagic-neritic and occur in the upper mixed layer, eggs usually in upper 20 m, and larvae in upper 80 m. These life stages are usually within 160 km of coast, occasionally to 640 km; adults occur mostly within 16 km of coast. Juveniles are primarily neritic and found close to shore.	Juveniles and adults are eaten by numerous fishes, marine birds, and marine mammals. It schools for defense against predation. May compete for food with all life stages of northern anchovy and with juvenile jack and chub mackerels. It commonly occurs with anchovies, thread herring, hakes, jack and chub mackerel, and Pacific bonito.
Engraulis mordax (Coastal Pelagics FMP)	northern anchovy	Major adult concentrations year-round; Major spawning area February-April; Major juvenile area year-round	Eggs and larvae are epipelagic-neritic. Eggs occur form surface to 50 m, mostly in upper 20 m, and larvae are found from surface to 75 m, mostly in upper 50 m; both occur to 480 km offshore. Juveniles are epipelagic, usually very near shore and estuarine. Adults are neritic to oceanic, from the surf zone to about 160 km offshore, and from near surface to 300 m.	Eggs and larvae are eaten by adult anchovies, pontellid copepods, and other predators of plankton. Juveniles and adults are prey for numerous squids, fishes, seabirds, and marine mammals. Adults are often found offshore with Pacific sardine, Pacific hake, chub mackerel, and Pacific bonito; occur inshore with market squid, Pacific herring, topsmelt, grunion, queenfish, white croaker, and white seaperch. Open water. Spawns winter and early spring.

TableE-1. Marine species known from San Clemente Island and of interest for use as ecological indicators or for Essential Fish Habitat analysis. Bolded entries are species covered under Essential Fish Habitat requirements of the Magnuson-Stevens Conservation Act. (Continued)

Species (and Fishery Management Plan (FMP) if applicable)	Common Name	Life stage@SCI	Habitat	Biological Interactions
Thunnus alalunga (Pelagic FMP)	albacore	Subadult area year-round, mostly April-October	All life stages are oceanic, although larger juveniles and adults can venture into neritic waters. Subadults and adults occur to 600 m, but are generally found at 20-200 m.	Eaten by sharks, larger scombrid fishes, dolphins, and killer whales. Competes for food with lancefish and other tunas. Forms mixed schools with other tunas and often associates with drifting kelp and sargassum.
Thunnus thynnus (Pelagic FMP)	bluefin tuna	Subadult area mostly April-October; Major subadult area July-September	Juveniles and adults are epipelagic and neritic, occurring from the surface to 200 m, and usually below surface waters at 25-180 m during winter.	Competes with albacore, yellowfin tuna, and other pelagic fishes. Bluefin tuna occur closer to shore than albacore, and are commonly found further north than skipjack or yellowfin tunas. Schools with other scombrids; schools are often associated with sharks, common dolphin, whales, floating kelp, and flotsam communities.
Xiphias gladius (Pelagic FMP)	Swordfish	Adult June-Sept		Large, solitary predator eats squid, sardine, anchovy, hake, mackerel, rockfishes.
Thunnus albacares (Pelagic FMP)	Yellowfin	Adult June-Sept	subtropical migratory more common during El Nino	
family Alopiidae (Pelagic FMP)	Thresher sharks			Probably eaten by elephant seals. They hunt sardines, anchovies, herring, squid, small tuna, pacific hake, etc.
Anoplopoma fimbria (Pacific Groundfish FMP)	sablefish	Juvenile area year-round; Adult area (general distribution) year-round	Larvae and young juveniles are found from surface to 100 m and from coastal waters to 370 km offshore, often near drifting kelp. After one year, juveniles descend to 100-200m. Subadults and adults are found at 150-2,740 m, occurring mostly at depths less than 1,000 m.	Larger fishes, sea birds, and pinnipeds eat juveniles, while hagfishes, sharks, larger bony fishes, sea lions, and sperm whales prey on adults. Competes for food with many co-occurring fishes. Spiny dogfish and Pacific cod are probably their main competitors. Adults commonly occur with with grenadiers, deep-living rockfishes, and flatfishes such as arrowtooth flounder and Dover sole.
Sebastes entomelas (Pacific Groundfish FMP)	widow rockfish	Adult area (general distribution) year-round	In water column, over hard bottoms along continental shelf. Adults are sublittoral to bathyal over depths of 20-366 m, mostly 100-300 m.	Yellow rockfish and Pacific hake are species most commonly caught with widow rockfish. Widow rockfish forms dense schools at night.
Ophiodon elongatus (Pacific Groundfish FMP)	lingcod	Occasional occurrence	Adults are sublittoral-bathyal, ranging from tidepools down to 475 m, mostly at depths less than 300 m, females tend to be deeper than males, which are rarely found below 185 m.	Eggs are eaten by gastropods, crabs, echinoderms, spiny dogfish, cabezon, and pile perch. Juveniles and adults are eaten by sharks, larger lingcod and pinnipeds.

TableE-1. Marine species known from San Clemente Island and of interest for use as ecological indicators or for Essential Fish Habitat analysis. Bolded entries are species covered under Essential Fish Habitat requirements of the Magnuson-Stevens Conservation Act. (Continued)

Species (and Fishery Management Plan (FMP) if applicable)	Common Name	Life stage@SCI	Habitat	Biological Interactions
Eopsetta jordani (Pacific Groundfish FMP)	petrale sole	Occasional Occurrence	Young juveniles occur at 18-82 m, while older juveniles are found at 25-145 m. Adults range from the surf line to 550 m, but are most abundant at depths less than 300 m; depth distribution changes seasonally.	Juveniles are eaten by adult petrale sole and other large fishes. Adults are prey for sharks and demersally feeding marine mammals. Compete with other large sympatric flatfishes. Uses the same summer feeding grounds as English, rex, and Dover soles, and lingcod.
Glyptocephalus zachirus (Pacific Groundfish FMP)	rex sole	Occasional Occurrence	Silty clays of shelf areas, outer banks. More common near mainland.	Distribution is probably tied to preferred invertebrate prey. May compete for food with Dover sole and other flatfishes. Prey primarily on sedentary polychaetes.
Merluccius productus (Pacific Groundfish FMP)	Pacific hake (also called Pacific whiting)	Adult area November-June; Major winter spawning area January-June	Eggs and larvae are neritic, concentrated in and below the thermocline. Juveniles to one year are neritic and move offshore as they mature. Adults are neritic form the surface to 920 m, mostly at 0-500 m, and occur from coastal waters to 400 km offshore. Large, mobile fish of the deep reef.	All life stages are important to prey. Eggs and larvae are eaten by planktivorous fishes and invertebrates. Juveniles and adults are eaten by larger fishes such as sharks, tunas, rockfishes, and many marine mammals, including pinnipeds and dolphins. Adults are cannabalistic. Competes with many pelagic fishes, including other schooling species such as shortbelly and widow rockfishes, and other pelagic feeding rockfishes. Year-old juveniles occur in mixed schools with northern anchovy.
Squalus acanthias (Pacific Groundfish FMP)	spiny dogfish	Occasional occurrence	In the water column, often near bottom; also found near the surface over oceanic depths. Small juveniles are neritic. Subadults and adults are mostly sublittoral-bathyal, occurring from the surface to depths greater than 900 m, mostly less than 350 m. Associated with deep reefs.	Spiny dogfish has few natural enemies. It may compete with sablefish, Pacific cod, soupfin shark, and sea lions. Is closely associated with white croaker in southern California.
Microstomus pacificus (Pacific Groundfish FMP)	Dover sole	Occasional occurrence	Silty clays of shelf areas. Eggs are neritic, occurring in the upper 50 m of the water column after rising from much deeper spawning depths. Larvae are found to 600 m, mostly in the upper 50 m, usually present over the continental shelf and slope, but also to 840 km offshore. Juveniles are sublittoral-bathyal and occur at depths of 10-700 m, mostly at less than 200 m. Adults are mostly bathyal, occurring from 9-1,450 m, usually deeper than 200-300 m.	Species is eaten by sharks and possibly sablefish. Larvae are eaten by albacore. May compete for food with certain eelpouts, rex sole, English sole, and other flatfishes. Off southern California, it is often found with stripetail rockfish and sablefish. Prey is primarily sedentary polychaetes.
Triakis semifasciata (Pacific Groundfish FMP)	leopard shark		demersal; over sand and mud in shallow bays and inshore waters to depths of 90 m. Considered an indicator species for bays and estuaries.	Probably has no predators except larger sharks and humans. Subject to fishing impact due to slow growth, long time to maturity, and low fecundity.

TableE-1. Marine species known from San Clemente Island and of interest for use as ecological indicators or for Essential Fish Habitat analysis. Bolded entries are species covered under Essential Fish Habitat requirements of the Magnuson-Stevens Conservation Act. (Continued)

Species (and Fishery Management Plan (FMP) if applicable)	Common Name	Life stage@SCI	Habitat	Biological Interactions
Galeorhinus zyopterus (Pacific Groundfish FMP)	soupfin shark		Open water	Feed on fish and some squid. May compete with spiny dogfish.
Sebastes mystinus (Pacific Groundfish FMP)	Blue rockfish		Rocky reef and kelp at bottom of the bed. Cold water species	Planktivore, kelp browser
Sebastes paucispinis (Pacific Groundfish FMP)	Pacific snapper (also called Bocaccio)		Rock or gravel substrate, kelp	NMFS lists as a candidate species as of January 1, 2001. Status is currently under review by NMFS. Eats fishes, crab, squid.
Sebastes rastrelliger (Pacific Groundfish FMP)	Grass rockfish		Shelter-seeking rockfish abundant in high-relief reefs.	
Sebastes atrovirens (Pacific Groundfish FMP)	Kelp rockfish		Kelp canopy.	Abundance directly correlated with kelp density.
Sebastes serranoides (Pacific Groundfish FMP)	Olive rockfish	Reproduction peaks winter to spring	Rocky reef and kelp canopy.	Planktivorous as a juvenile, then a kelp browser. Rarely moves between reefs, so is subject to over-fishing
Scorpaenichthys marmoratus (Pacific Groundfish FMP)	Cabezon		Shelter-seeking fish of rocky coastal or bottom of kelp beds less than 30 m deep. Larvae and early juveniles are coastal pelagic.	Juveniles eat many crustaceans and small fish. Adults eat crabs, mollusks, and small fish.
Oncorhynchus gorbuscha (Pacific Salmon FMP)	pink salmon	Occasional occurrence	Species is anadromous, usually in short coastal streams. Eggs, alevins, and fry are riverine upstream from intertidal zone; initial two life stages are buried in small to moderate sized gravel. Fry occur near surface in rivers and generally within the upper meter in estuaries and nearshore areas. Outmigrating juveniles are neritic, and immature and maturing fish are oceanic, occurring from surface to about 36 m, mostly in upper 10 m. Adults are riverine-estuarine, occur near surface coastally and throughout water column in rivers to about 950 km upstream, but usually within 65 km of ocean.	At sea, eaten by sharks, other large fishes, and marine mammals. Maturing fish returning to spawn and adults are eaten by birds, marine mammals, and bears. Competes with chum salmon.

TableE-1. Marine species known from San Clemente Island and of interest for use as ecological indicators or for Essential Fish Habitat analysis. Bolded entries are species covered under Essential Fish Habitat requirements of the Magnuson-Stevens Conservation Act. (Continued)

Species (and Fishery Management Plan (FMP) if applicable)	Common Name	Life stage@SCI	Habitat	Biological Interactions
Oncorhynchus tshawytscha (Pacific Salmon FMP)	chinook (king) salmon	Occasional occurrence, juveniles and maturing fish (2-5 years old)	San Diego area is the southernmost portin of range. Species is anadromous, usually in large coastal streams from Sacramento River north. Is pelagic in ocean, usually at 12 to 80 m deep.	At sea, eaten by sharks, other large fishes, and marine mammals. Maturing fish returning to spawn and adults are eaten by birds, marine mammals, and bears. At sea, is a carnivorous, opportunistic feeder. Winter run is protected under Endangered Species Act.
Paralabrax clathratus	kelp bass	Major adult area year-round	Adults occur seaward form the surf zone, from surface to 57 m, mostly at 2-21 m and preferring the holdfast zone of kelp beds. Can occur wherever there is physical relief, such as submarine canyons and cliffs, vegetation, rocks and debris.	Cannabalistic. Competes for food with barred sand bass where their habitats overlap. Commonly occurs with numerous other fishes including blue and olive rockfishes, opaleye, halfmoon, blacksmith, kelp perch, rainbow seaperch, rubberlip seaperch, California sheephead, and senorita. Abundance directly correlated with kelp density.
Sarda chiliensis	Pacific bonito	Adult area year-round. Migratory pelagic species.	All life stages are epipelagic-neritic, from the surface to depths of at least 88 m.	Eaten by large fishes and sea lions. Competes for food with yellowtail and Pacific baracuda, but can pursue faster prey than these species. Adults occur with jack and chub mackerels.
Paralichthys californicus	California halibut	Adult area (general distribution) year-round	Subadults and adults are neritic along the coast, occurring from the surf zone to at least 185 m, but rarely deeper then 60 m, mostly on sandy bottom.	Eaten by sharks, electric rays, larger halibuts, sea lions, and dolphins. Compete for food with lizardfish and several other flatfishes. Commonly occurs with guitarfish, midshipman, kelp pipefish, white croaker, queenfish, white seaperch, and bay goby.
Seriola lalandei	yellowtail	Adult area mostly March-October; Major juvenile area	All life stages are epipelagic in neritic waters. Adults are found from near surface to about 70 m, mostly coastal, but ranging from the surf zone to 2,100 km offshore. Juveniles and adults often occur with drifting kelp. Adults are often found near kelp beds along rocky inshore areas near points, and over offshore pinnacles and banks.	Eaten by giant sea bass and sea lions, and relies on strong swimming to escape predators. Sometimes school with Pacific barracuda.
Sphyraena argentea	Pacific barracuda	Adult area (general distribution) March-October	Adults are neritic and occur from near surface to about 20 m.	Prey for pinnipeds, porpoises, and large fishes, such as giant sea bass.
Stereolepis gigas	giant (black) sea bass	all	Aggregate in shallow water traditional spawning grounds in June-September. The largest bony fish of the kelp bed, adults are associated with rocky bottoms along the deep, outside edge of the kelp. Juveniles occur over sandy substrate.	Prey on many fishes and crustaceans including squid and bonito. Illegal to possess this species.
Clupea pallasi	Pacific herring	Occasional occurrence	Eggs occur from the high tide line to deeper than 20 m, mostly shallower than 2 m. Larvae and juveniles are neritic; adults are neritic to oceanic.	Predators include squids, other fishes, marine birds, pinnipeds, whales, and on smaller stages, medusae, amphipods, and arrow worms.
MAMMALS				

TableE-1. Marine species known from San Clemente Island and of interest for use as ecological indicators or for Essential Fish Habitat analysis. Bolded entries are species covered under Essential Fish Habitat requirements of the Magnuson-Stevens Conservation Act. (Continued)

Species (and Fishery Management Plan (FMP) if applicable)	Common Name	Life stage@SCI	Habitat	Biological Interactions
Mirounga angustirostris	northern elephant seal	Adult area February-December	Marine feeding habitat is characteristically on the continental shelf, along the slope, and over deeper oceanic waters within the coastal boundary currents. Rookeries are on beaches, primarily on remote islands.	Eaten by great white sharks and killer whales. Prey species include Pacific hake, walleye pollock, rockfishes, skates, sharks, squid, and octopus.
Phoca vitulina	harbor seal	Adult area year-round	Haulouts and pupping sites are on coastal rocky reefs and nearshore islands, sand and cobble mainland beaches, and estuarine sandy islands and spits, some of which may be accessible only at low tides. Ice floes from glaciers may also be used for pupping. Feeding occurs from shoreline to outer shelf neritic waters.	Eaten by white sharks and killer whales. Important predator in coastal areas.
Orcinus orca	killer whale	Major adult area year-round	Primarily coastal shelf waters and intracoastal waterways.	No natural predators. As schooling large predators, they are probably actively avoided.
Delphinus delphis	common dolphin	Major adult/juvenile area year-round	Shelf and slope waters, especially over areas of high topographic relief; occasionally in oceanic waters.	Killer whales and large sharks are likely predators. They occasionally school with yellowfin tuna, suggesting similar feeding habits. They often associate with Pacific white-sided dolphins in the study area and will accompany other dolphin species. Eat anchovy and squid in fall and winter.
Lissodelphis borealis	northern right whale dolphin	Adult area year-round	Primarily oceanic, occasionally occurring in outer and middle shelf waters.	Frequently associate with other dolphins and whales, especially Pacific white-sided dolphin.
Tursiops truncatus	bottlenose dolphin	Adult area (subtropical oceanic stock) year-round	Neritic, from coastal waters, including lagoons and bays, to the continental slope and beyond.	Have been taken by large sharks.
Lagenorhynchus obliquidens	Pacific white-sided dolphin	Adult area year-round	Neritic to oceanic, preferring outer continental shelf waters but occasionally entering inside waters such as Puget Sound and the Inside Passage off British Columbia.	Feeds on small schooling fishes and squid, especially northern anchovy and Pacific hake.
Globicephala macrorhynchus	short-finned pilot whale	Major adult area December-April	Oceanic and neritic waters.	Killer whales only known predator. Schools associate with bottlenose and Pacific white-sided dolphins.
Physeter macrocephalus	sperm whale	Occasional occurrence	Oceanic and marginally neritic, especially around seamounts and canyons.	Calves occasionally taken by killer whales and large sharks. Competes for food with larger species of beaked whales.
Ziphius cavirostris	Cuvier's beaked whale	Adult area year-round	Found in all oceans outside polar seas.	Often occurs in schools of 3-10 animals.
Eschrichtius robustus	gray whale	Major adult area (migration and wintering) December-May	Coastal and shelf waters, including bays and lagoons, where most calving occurs.	Killer whales are the only predators.
Balaena glacialis	right whale	Adult area April-September	Oceanic and shelf waters.	Killer whales are likely predators. May compete with sei whale, which has similar diet and feeding behavior.

TableE-1. Marine species known from San Clemente Island and of interest for use as ecological indicators or for Essential Fish Habitat analysis. Bolded entries are species covered under Essential Fish Habitat requirements of the Magnuson-Stevens Conservation Act. (Continued)

Species (and Fishery Management Plan (FMP) if applicable)	Common Name	Life stage@SCI	Habitat	Biological Interactions
Megaptera novaeangliae	humpback whale	Adult area (wintering) September-April	Neritic; shallow shelf and oceanic island waters, except during migration.	Calves and adults attacked by killer whales, but only rarely. Occasionally seen with small dolphins. Eats krill, small schooling fishes.
Balaenoptera acutorostrata	minke whale	Major adult area October-March	Open ocean, inside passages, and deeper fjords.	Killer whales have been observed preying on minke whales. Eats krill, other small schooling fishes.
Balaenoptera edeni	Bryde's whale	Occasional occurrence	Oceanic and slope waters.	Killer whales are occasional predators. Possible competition for food with right whales in southern hemisphere. Has been seen feeding on schools of Pacific sardine, northern anchovy, and pelagic red crab.
Balaenoptera musculus	blue whale	Adult area seasonal; Major adult area May-December	Oceanic to continental slope and outer shelf waters, often close to coast.	Killer whales occasionally take young. Feeds almost exclusively on euphausiids in large schools, but has been observed taking pelagic red crab off Baja California.
Grampus griseus	Risso's dolphin	Adult area year-round	Oceanic found throughout the world in temperate and tropical offshore waters.	Main prey is oceanic squid.
Pseudorca crassidens	false killer whale	Occasional occurrence	Wide-ranging, offshore species found in all tropical and temperate seas. Appears in coastal waters only in warm-water years.	Feeds on tuna and other large pelagic fishes, occasionally taking squid. Has been reported attacking other dolphins and young whales.

Appendix F: Legislation and Executive Orders

Legislation

Bald Eagle Protection Act (16 U.S.C. 668)

The Bald Eagle Protection Act (Bald and Golden Eagles Act) provides for protection of the bald eagle and the golden eagle by prohibiting taking, possession, and commerce in the birds.

Coastal Barrier Resources Act of 1982 (16 U.S.C. 3505)

Regulates the expenditure of federal funds to discourage development within boundaries of undeveloped, unprotected coastal barriers of the Coastal Barrier Resources System established by the Act, unless the expenditures are for military activities essential to national security.

Coastal Zone Management Act (CZMA) (16 U.S.C. 1451)

Establishes goals and a mechanism for states to control use and development of their coastal zone. Authorizes states to administer approved coastal nonpoint source pollution programs.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601)

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 establishes programs for the cleanup of hazardous waste disposal and spill sites to ensure protection of human health and the environment. Designates the President as trustee for federally protected or managed natural resources.

Conservation Programs on Military Reservations (Sikes Act) (16 U.S.C. 670)

The Sikes Act identifies requirements and provides the framework for management of natural resources on military lands. The Sikes Act also authorized the use of Cooperative Agreements with State agencies, local governments, universities, and non-governmental organizations to implement natural resources projects.

Clean Water Act

See "Federal Water Pollution Control Act"

Defense Appropriations Act of 1991 Legacy Program (P.L. 101-511)

The Defense Appropriations Act established a program for the stewardship of biological, geophysical, cultural and historic resources on DoD lands.

Endangered Species Act of 1973 (ESA) (16 U.S.C. 35)

The Endangered Species Act (ESA) of 1973 requires that all federal agencies undertake programs for the conservation of endangered and threatened species. These agencies are prohibited from authorizing, funding, or carrying out any action that would jeopardize a listed species or destroy or modify its "critical habitat" (Section 7). Critical habitat is usually designated concurrently with a listing. Section 9 prohibits the "taking" of endangered fish or wildlife, including direct killing, harming, harassing, or destruction of habitat that may be important to the species' survival or recovery. Prohibitions against *threatened* species are discretionary on the part of the Secretary of the Interior, but can be as restrictive as those protecting endangered species. Lists are maintained by the Secretary of the Interior. Monitoring of candidate species (Category 1 and Category 2) is required, with adoption of emergency listing when there is significant risk (Section 4).

For plants, collection or removal of seed material or whole plants of a threatened or endangered species, even for revegetation or monitoring purposes, requires a USFWS collection permit. There is no general taking prohibition for plants that compares to that which applies to animals (See Bean et al. 1991).

If an area is designated "critical habitat," physical and biological features of the environment must be protected for the purposes of conserving the listed species. "Incidental takes" are permissible only if an "incidental take statement" is issued by the Secretary of the Interior / USFWS with a biological opinion after agency consultation. Management options will likely be limited as a requirement for minimizing the taking.

Coordination regarding threatened and endangered species is addressed in Section 7 of this Act. In particular, Section 7(a) requires a federal agency to consult with USFWS on any proposed action if the agency has reason to believe that an endangered or threatened species could be directly or indirectly affected by the action. Species under review and those of "special concern" are also included. A Biological Assessment (B.A.) by the lead agency is required under Section 7(c) if listed species or critical habitat may be affected by a major construction activity. The purpose of a B.A. is to evaluate potential effects of the action on listed species and/or critical habitat, and to assist USFWS in rendering a Biological Opinion.

A consultation consists of one or more of these steps: 1) Informal; 2) Formal; or 3) Further Discussion. An informal consultation is an optional process that includes all discussions and correspondence between the USFWS and the federal agency to determine whether a formal consultation or conference is required. A formal consultation is a process between the USFWS and the federal agency that commences with federal agency's written request for consultation and concludes with the USFWS's issuance of a Biological Opinion.

A Biological Opinion must include: 1) a summary of the information on which the opinion was based (the information is to be provided by the federal agency), 2) a detailed discussion of the effects of the action on listed species or critical habitat, and 3) the USFWS opinion on whether the action is likely to jeopardize the continued existence of a listed species or adversely modify critical habitat. The biological opinion may include an incidental take statement that specifies: 1) the amount of "take" that is allowed, 2) reasonable and prudent measures that the USFWS considers necessary or appropriate to minimize such a "take", and 3) the terms and conditions that must be complied with to implement the reasonable and prudent measures.

The Navy must take measures to assure that no irreversible or irretrievable commitment of resources is authorized, funded or carried out by them that will likely jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify designated critical habitat, until the Consultation process is complete. The Navy is to provide leadership in identifying and protecting habitat that is critical for any threatened or endangered species.

Navy installations are required to carry out the following:

1. Maintain liaison with local governmental agencies and organizations having an interest in endangered and threatened species protection;
2. Delineate boundaries of the habitat areas of endangered and threatened species on maps;
3. Initiate consultation with the USFWS or NMFS per cooperative agreement procedures when a proposed action or program has been identified that may affect listed species or their habitat;
4. Perform a B.A. for any action that may adversely affect the continued existence of endangered and threatened species or result in the destruction or adverse modification of habitat of such species (The EA should contain the final biological opinion of the USFWS or NMFS following the consultation process);
5. Cooperate with the USFWS or NMFS during development and implementation of a recovery plan for listed species occurring on the installation.

The California State Legislature has expressed its intent to protect, preserve and enhance endangered or rare species as issued in the Fish and Game Code (Div. 2, Chpt. 10 Native Plant Protection and Div. 3, Chpt. 1.5 Endangered Species). California Endangered Species Act (CESA) violations can result in a fine of up to $5,000 and / or one year in prison. While this law does not apply to federal actions, it does apply to state agencies and private landowners. In the spirit of the law and as a service to state agencies and private landowners, federal agencies operate under these guidelines.

Penalties: Civil penalty of up to $25,000 per violation or criminal penalty of up to $50,000 and / or one year in prison, knowing violation for a take or damage / destruction of critical habitat of an endangered animal.

Endangered Species Act 1973 Amendments	The Endangered Species Act of 1973 (1978 Amendments), (PL 95-632; 16 USC §§ 1531 et seq.) provides for the conservation and protection of endangered and threatened species of fish, wildlife, and plants and expands the consultation process.
Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136)	Governs the use and application of pesticides in natural resource management programs.
Federal Noxious Weed Act of 1974 (7 U.S.C. 2801)	Establishes control and eradication of noxious weeds and regulates them in interstate and foreign commerce.
Federal Water Pollution Control Act as amended by the Clean Water Act of 1977 (CWA) (33 U.S.C. 1251)	Regulates dredging and filling of wetlands and establishes procedures for identifying and regulating nonpoint sources of polluted discharge into waterways.
Fish and Wildlife Coordination Act (16 U.S.C. 661)	The Fish and Wildlife Coordination Act is a law which mandates that wildlife conservation receive equal consideration and be coordinated with other features of water resource development. The intent is to prevent loss or damage of wildlife and provide for development and improvement of wildlife in conjunction with water development projects. Federal agencies proposing to impound, divert or control surface waters are required to consult with the USFWS and CDFG, to include and give full consideration to the recommendations of these agencies, and to provide justifiable means and measures for benefiting wildlife in project plans. ACOE must coordinate permit applications with USFWS and CDFG. Like NEPA, implementation of this Act is essentially procedural in that no particular outcome is mandated.The Act authorizes project modification, land acquisition, and other measures necessary to protect wildlife.
Forest Resources Conservation and Shortage Relief Act (16 U.S.C. 620)	Regulates the export of unprocessed timber originating from Federal lands in western States.
Government Performance and Results Act of 1993	The purposes of this Act are to:

1. Improve the confidence of the American people in the capability of the Federal Government, by systematically holding Federal agencies accountable for achieving program results;
2. Initiate program performance reform with a series of pilot projects in setting program goals, measuring performance against those goals, and reporting publicly on their progress;
3. Improve Federal program effectiveness and public accountability by promoting a new focus on results, service quality, and customer satisfaction;
4. Help Federal managers improve service delivery, by requiring that they plan for meeting program objectives and by providing them with information about program results and service quality;
5. Improve congressional decisionmaking by providing more objective information on achiebing statutouy objectives, and ont he relative effectiveness and efficieney of Federal programs an spending; and
6. Improve internal management of the Federal Government.

Each agency shall submit to the Director of the Office of Management and Budget and to the Congress a strategic plan for program activities. Such plan shall contain:

1. A comprehensive mission statement covering the major functions and operations of the agency;
2. General goals and objectives, including outcome-related goals and objectives, for the major functions and operations of the agency;
3. A description of how the goals and objectivves are to be achieved, including a description of the operational processes, skills and technology, and the human, capital, information, and other resources required to meet those goals and objectives; and other requirements.

Magnuson-Stevens Fishery Conservation Mangement Act (16 U.S.C. 1801)	Expanded requirements for the habitat sections of all Fishery Management Plans.
Marine Mammal Protection Act (16 U.S.C. 1361)	Protects marine mammals and establishes a marine mammal commission.
Marine Protection, Research, and Sanctuaries Act of 1972 (16 U.S.C. 1431)	Establishes regulations relating to dumping specific material into open waters and establishes a program for designation and regulation of national marine sanctuaries.
Migratory Bird Treaty Act (16 U.S.C. 703)	The Migratory Bird Treaty Act protects most birds, whether or not they migrate. Birds, their nests, eggs, parts or products may not be killed or possessed. Game birds are listed and protected except where specific seasons, bag limits, and other features govern their hunting. Exceptions are also made for some agricultural pests, which require a USFWS permit (yellow-headed, red-winged, bi-colored red-winged, tri-colored red-winged, Rusty and Brewer's blackbirds, cowbirds, all grackles, crows and magpies). Some other birds that injure crops in California may be taken under the authority of the County Agricultural Commissioner (meadowlarks, horned larks, golden-crowned sparrows, white- and other crowned sparrows, goldfinches, house finches, acorn woodpeckers, Lewis woodpeckers, and flickers). Permits may be granted for various non-commercial activities involving migratory birds and some commercial activities involving captive-bred migratory birds.

Penalties: Violations of this act can cost an individual or organization up to $5,000 and $10,000, respectively, and up to six months imprisonment for a misdemeanor. Felony violations may result in fines of up to $250,000 for individuals, $500,000 for organizations, and up to two years' imprisonment.

Recent court decisions and DoD policy now interpret this law as not applicable to federal agencies. However, DoD does support the spirit of the law as guideline for management practices on its properties.

Military Construction Authorization Act-Leases; Non-excess property (10 U.S.C. 2667)	Provides for the out-leasing of public lands.
Military Construction Authorization Act-Military Reservations and Facilities-Hunting, Fishing, Trapping (10 U.S.C. 2671)	Establishes requirements for regulating hunting, fishing, and trapping on military lands.
Military Construction Authorization Act-Sale of Certain Interests in Lands; Logs (10 U.S.C. 2665)	Provides for the production and sale of forest products.
National Defense Authorization Act of 1989-Volunteer and Partnership Cost-Share Programs (P.L. 101-189)	Expands existing authority to use volunteers to include acceptance of voluntary services for natural resources programs at military installations.
National Environmental Policy Act (NEPA)1969 (42 U.S.C. 4321)	The National Environmental Policy Act of 1969 (NEPA) evolved over 10 years from the desire of Congress to have a cohesive statement of the national environmental policy. Agencies must assess, in detail, the potential environmental impact of any proposal for legislation or other major federal action that has the potential for significantly affecting the quality of the human environment. The Act is intended to help public officials and citizens make decisions that are based on understanding of environmental consequences and take action that protects, restores and enhances the environment. NEPA mandates that agencies use a "systematic, interdisciplinary approach" that integrates the natural and social sciences and environmental design. The courts have interpreted this mandate to be essentially "procedural;" that is, environmental impacts must be considered, but proposals with environmentally damaging consequences need not necessarily be rejected. The law requires a detailed statement of "significant" environmental impacts of "major"federal actions. An action may be significant in terms of geographical extent, long-term impact, potential risk, or because of its effect on heritage resources or endangered species. The process identifies reasonable alternatives to proposed actions to that might have less or no environmental effect. Individual and cumulative impacts must be considered. A three-tiered approach is used to evaluate impacts: 1) The Environmental Assessment (EA) is the analysis to be completed when the govern-

ment is uncertain as to whether an action will significantly affect the environment or the action is controversial. The result of an EA is either a Finding of No Significant Impact (FONSI) or a requirement to complete an Environmental Impact Statement (EIS); 2) The EIS is a full-disclosure document that presents a full and unbiased discussion of significant impacts, informing the public and decision makers of reasonable alternatives to the proposed action; and 3) A Categorical Exclusion is used for actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by the Department of Navy in implementation of federal regulations and for which, therefore, neither an EA nor and EIS is required.

(PL 91-190; 42 USC 4321-4347, January 1, 1970, as amended by PL 94-52; July 3, 1975, PL 94-83, August 9, 1975, and PL 97-258, Section 4(b), Sept. 13, 1982)

National Invasive Species Act of 1996 (16 U.S.C. 4701)	Mandates a ballast water management program for armed forces vessels to demonstrate technologies and practices to prevent introduction of aquatic nonindigenous species into waters of the United States.
Oil Pollution Act of 1990 (OPA 90) (33 U.S.C. 2701)	Redefines the requirements of the National Contingency Plan (NCP) to include planning for, rescue of, minimization of injury to, and assessment of damages for injury to, fish and wildlife resources.
Outdoor Recreation–Federal/State Programs Act (16 U.S.C. 460 P-3)	Defines a program for managing lands for outdoor recreation.
Sikes Act Improvement Act (SAIA) 18 November 1997	The Sikes Act Improvement Amendments (16 USC § 670a et seq.) require military installations to prepare and implement integrated natural resource management plans (INRMPs) to provide for conservation and rehabilitation of natural resources, sustainable multipurpose uses of resources, and public access for use of natural resources, subject to safety and military security considerations.
Soil Conservation Act (16 U.S.C 3B)	The Soil Conservation Act provides for application of soil conservation practices on federal lands. Requires federal agencies to control and prevent soil erosion and preserve natural resources in managing federal lands.

Executive Orders

EO 13112 Invasive Species 3 February 1999	Requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems. Establishes federal agency responsibilities for the identification and management of Invasive Species. Establishes a National Invasive Species Council, and requires a National Management Plan with performance-oriented goals and objectives and specific measures of success.
EO 11988 Floodplain Management 24 May 1977	Provides direction regarding actions of federal agencies in floodplains.
EO 11644, as amended by EO 11989, Use of Off-road Vehicles on Public Lands 24 May 1977	Establishes policies and provides for procedures to control use of off-road vehicles on public lands.

EO 11990 Protection of Wetlands 24 May 1977	Directs the preservation and enhancement of wetlands.
EO 12962 Recreational Fisheries 7 June 1995	Directs federal agencies to cooperate in conservation of aquatic resources and enhancement of opportunities for recreational fishing.
EO 13089 Coral Reef Protection 11 June 1998	Requires federal agencies to protect and enhance coral reefs and coral reef systems.
EO 13186 Migratory Birds 10 January 2001	Directs executive departments and agencies to take certain actions to further implement the Migratory Bird Treaty Act.
EO 13123 Greening the Government Through Efficient Energy Management 3 June 1999	The Executive Order "Greening the Government Through Efficient Energy Management" directs federal government to significantly improve its energy management in order to save taxpayer dollars and reduce emissions that contribute to air pollution and global climate change. It promotes energy efficiency through energy efficient building design, construction, and operation; water conservation; use of renewable technologies; and fostering markets for emerging technologies.

Appendix G: Executive Order, Instructions, Agreement, MOU, Policies, Natural Resources Management Letter, and Biological Opinions

Executive Order

Executive Order 6897, dated November 7, 1934 transferring to the Control and Jurisdiction of the Secretary of the Navy Certain Lands off the Southern Coast of California

Instructions

NAS North Island 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

NAS North Island 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 MOU

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

Policies

Southern California Eelgrass Mitigation Policy (Adopted July 31, 1991)

Policy letter preventing feral cat and dog populations on Navy property

Letter Regarding Designation of Natural Resources Management per 5090.1B CH-2 sec 22-6.7c.

Letter to Mr. Jan Larson from Donald J. Boland, Captain, US Navy, ACOS for Environmental/Safety

Biological Opinions

Biological Opinion between US Department of the Interior and USFWS for the West Cove Beach Cable Replacement Project, San Clemente Island, Los Angeles County, California (1-6-95-F-29)

Biological Opinion between US Department of the Interior and USFWS on Strategic Environmental Research and Development Program Windfarm (1-6-97-F-18)

An Amendment to the Biological Opinion 1-6-97-F-18 between US Department of the Interior and USFWS

Biological Opinion between US Department of the Interior and USFWS on Utility Pole Installation, San Clemente Island (1-6-97-F-42)

Biological Opinion between US Department of the Interior and USFWS for Impacts to Island Night Lizard Caused by Existing and Proposed Naval Activities on San Clemente Island (1-6-97-F-58)

Biological Opinion/Conference between US Department of the Interior and USFWS on Training Activities on San Clemente Island, San Diego County, California (1-6-97-F-21)

Biological Opinion between US Department of the Interior and USFWS on Training Area Ranges on San Clemente Island, Los Angeles County, California (refer to 1-6-00-F-19)

Summary of current management under BOs (1-6-97-F-58),(1-6-00-F-19), and (1-6-97-F-21):

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

The INLMA and TARS BOs require the following:

- 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 (MDSLY) 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 MDSLY 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 buffaloes, 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.
- 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.

Management of Brown Pelicans

TARS BO for Castle Rock and B Rock requires the following:

- 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.

Western Snowy Plover Management

The TARS BO requires the following:

- 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

Existing BOs require the following:

- 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, fuel-break 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

Existing BOs require the following:

- 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

Existing BOs require the following:

- 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 radio-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

Existing BOs require the following:

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

Fire Management

Existing BOs require the following:

- 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 USFWS ample opportunity for review and comment on the draft and final SCI Fire Management Plan.

Construction and Maintenance

Existing BOs require the following:

- 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

Existing BOs require the following:

- 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.

Appendix H: Public Comments

Distribution List
Comment Letters
Comment Matrices

NBC INRMP Nov 01 Distribution List

Organization/Individual	Address	Hard Copies	CD
San Diego Library	San Diego Central Library Science Section Government Documents ATTN: Mr. Gary Klockenga 820 E Street, San Diego, CA 92101 (619) 236-5800	1	0
Coronado Library	Coronado Public Library ATTN: Ms. Ann Clifford 640 Orange Avenue Coronado, CA 92118	1	0
Imperial Beach Library	Imperial Beach Branch Library ATTN Branch Library Director 810 Imperial Beach Blvd Imperial Beach, CA 91932	1	0
Mayor Rose - Imperial Beach	The Honorable Diane Rose Mayor of Imperial Beach 825 Imperial Beach Boulevard Imperial Beach, CA 91932	0	1
Mayor Smisek - Coronado	The Honorable Tom Smisek Mayor of Coronado 1825 Strand Way Coronado, CA 92118	0	1
CCC - San Francisco	California Coastal Commission Attn: Mr. Marc Delaplaine 45 Fremont Street Suite 2000 San Francisco, CA 94105-2219	0	1
CCC - San Diego	California Coastal Commission San Diego Coast Office Attn: Ms. Keri Akers 7575 Metropolitan Drive, Suite 103 San Diego, CA 92108-4402	0	1
USFWS	Ms. Nancy Gilbert Carlsbad Field Office U.S. Fish and Wildlife Service 2730 Loker Ave West Carlsbad, CA 92008	2	1
CDFG - Tippets	Mr. William Tippets California Department of Fish and Game Environmental Services Division, NCCP 4949 Viewridge Drive San Diego, CA 92123	1	1
CDFG - Osborne	Ms. Meredith Osborne California Department of Fish and Game 4949 Viewridge Drive San Diego, CA 92123	1	0
USFWS Refuges - Buck	Mr. Slader Buck South San Diego Sub-Complex San Diego NWR Complex 2722-D Loker Avenue W Carlsbad, CA 92008	1	0
USFWS Refuges - Collins	Mr. Brian Collins Sweetwater Marsh NWR 1080 Gunpowder Point Drive Chula Vista, CA 91910	1	0
NMFS - Hoffman	National Marine Fisheries Service ATTN Mr. Robert Hoffman 501 W. Ocean Blvd. Suite 4213 Long Beach, CA 90802-4213	1	0
ACOE	U.S. Army Corps of Engineers San Diego Field Office Attn: Mr. Rob Lawrence 16885 West Bernardo Drive, Suite 300A San Diego, CA 92127	1	0
Port of San Diego	Ms. Eileen Maher Port of San Diego Environmental Services 3165 Pacific Highway San Diego, CA 92101	1	0
Audubon	Mr. Jim Peugh San Diego Audubon Society 2321 Morena Boulevard, Suite D San Diego, CA 92110	1	0
YMCA Camp Surf	MARK THOMPSON YMCA – CAMP SURF 106 CARNATION AVENUE IMPERIAL BEACH, CA 91932	0	1
BRI - Lisa Heffernan	Bitterroot Restoration Inc. Attn: Ms. Lisa Heffernan 3790 Via De La Valle, Ste 117E Del Mar, CA 92014	1	0
USDA	Mr. John Turman U.S. Department of Agriculture Wildlife Services 9830 Bond Avenue, Suite A El Cajon, CA 92021	1	0
Liz Copper	Ms. Elizabeth Copper 227 F Avenue Coronado, CA 92118	1	0
Brian Foster	Ms. Brian Foster 129 1/2 D Avenue Coronado, CA 92118	1	0
State Parks	Ms. Ronilee Clark Resource Ecologist California State Parks Southern Service Center 8885 Rio San Diego Drive, Suite 270 San Diego, CA 92108	1	0
USFS	Ms. Kirstin Collins U.S. Forest Service Cleveland National Forest 10845 Rancho Bernardo Road #200 San Diego, CA 92127	1	0
EXECUTIVE OFFICER, NBC	NASNI - Bldg 678, Second Floor	1	
PUBLIC WORKS OFFICER, NBC (LCDR RIOS)	NASNI - Bldg 3, Second Floor	1	1
AIR OPERATIONS OFFICER, NBC (CDR LILLEY)	NASNI - Old Air Terminal	0	2
PUBLIC AFFAIRS OFFICER, NBC (K. MITCHELL)	NASNI - Bldg 678, Second Floor	0	1

NBC INRMP Nov 01 Distribution List

SECURITY OFFICER, NBC (LT REYES) (1 CD)	NASNI - Near Front Gate 545-6133	0	1
PROJECT LEAD NAB CORONADO EIS, CNRSW (C. DOWNEY)	NASNI - Bldg 678	1	0
CSCWP (NASNI) (LCDR O'CONNOR)	NASNI - Bldg G - MWR Second Floor (Near Middle) - 545-1834/2584	0	1
EXECUTIVE OFFICER, NARSD (NASNI) (CDR VISQUERA)	NASNI - Bldg 251 (Near Bldg 11)	0	1
OPERATIONS OFFICER, H5 (LCDR KLETTER)	NASNI - Bldg G - Second Floor - Rm 230 545-1858	0	1
LEGAL DEPARTMENT, THIRD FLEET (LCDR D. LEECH)	LCDR LEECH C3F CODE J00J FPOAP SAN DIEGO CA 96601-6601	1	0
AFLOAT ENVIRONMENTAL OFFICER, COMMNAVSURFPAC (LT KIM) (1 CD)	COMNAVSURFPAC ATTN LT JONG KIM (N41ENA) 2841 RENDOVA RD SAN DIEGO CA 92155 - NAB BLDG 11 RM 312	0	1
ENVIRONMENTAL, COMNAVSURFPAC (S. WHETSTINE) (1 CD)	COMNAVSURFPAC 2841 RENDOVA RD SAN DIEGO CA 92155 - NAB BLDG 11 RM 312	0	1
AOPS, COMSPECBOATRON ONE (CDR DOWNEY) (1 CD)	AOPS, COMSPECBOATRON ONE CDR DOWNEY NAB CORONADO 3400 TARAWA ROAD SAN DIEGO CA 92155 - NAB CORONADO BLDG 209 or 227 437-2559	0	1
SCHEDULER, NAVAL SPECIAL WARFARE CENTER (H. ISBELL) (1 HARD COPY)	NAB CORONADO BLDG 624 - MAIL WITH PENWELL	0	1
NAVAL SPECIAL WARFARE CENTER (LT FITCH) (1 CD)	NAB CORONADO 2446 TRIDENT WAY SAN DIEGO CA 92155 437-5118	0	1
EXECUTIVE OFFICER (LCDR ZINKE)/PAO (LT McCABE) - NSWC BUDS	EXECUTIVE OFFICER NAVAL SPECIAL WARFARE CENTER C/O: CDR ZINKE 2446 TRIDENT WAY SAN DIEGO CA 92155-5494	1	1
STAFF CIVIL ENGINEER, CNSWG-1 (LT CAVNAR) (1 CD)	SCE, CNSWG -1 LT J CAVNAR NAB CORONADO 3632 GUADALCANAL RD SAN DIEGO CA 92155 - NAB CORONADO - BLDG 156 First Floor	0	1
RANGE ENGINEER, CNSWG-1 (LT LOESCHKE)	RANGE ENGINEER CNSWG -1 LT LOESCHKE NAB CORONADO 3632 GUADALCANAL RD SAN DIEGO CA 92155 - NAB CORONADO - BLDG 156 First Floor	1	0
ENVIRONMENTAL ENGINEER, CNSWG (R. TORRECARION)	SCE, CNSWG -1 R TORRECARION NAB CORONADO 3632 GUADALCANAL RD SAN DIEGO CA 92155 - NAB CORONADO - BLDG 156 First Floor	0	1
RANGE COORDINATOR, NSWC (C. CHALDEKAS/S. PENWELL)	MR SCOTT PENWELL COMNAVSPECWARCOM CODE N412 2000 TRIDENT WAY BLDG 624 SAN DIEGO CA 92155 - NAB CORONADO BLDG 624	1	1
CSBR-1 (BM1 GARY YOUNG)	?	0	1
OPERATIONS DEPARTMENT, ACU ONE (LTJG LUMPKIN)	LTJG HILARY LUMPKIN NAB CORONADO 3226 TARAWA ROAD SAN DIEGO CA 92155-5084 - NAB CORONADO BLDG 209 or 227	0	1
NABCOMNAVBEACHGRU ONE (LCDR FOSTER)	LCDR FOSTER NAB CORONADO COMNAVBEACHGRU ONE 3600 TARAWA RD BLDG 149 SAN DIEGO CA 92155-5592	1	0
USMC TRAINING DEPT, EWTGPAC (MAJ CAVAZOS)	MAJOR CAVAZOS NAB CORONADO EWTGPAC 3423 GUADALCANAL ROAD SAN DIEGO CA 92155-5099 - NAB CORONADO BLDG 15 - First Floor - West Wing 437-2236	0	1
ACB ONE (LT NIELSEN/LT HAWN)	NAB CORONADO 2524 ENIWETOK ROAD SAN DIEGO CA 92155 - 437-2532	0	1
OPERATIONS CHIEF (S3C), ACB ONE (BUCS (SCW) HAMLIN)	BUCS(SCW) T. J. HAMLIN OPERATIONS CHIEF (S3C) ACB ONE 2524 ENIWETOK ROAD SAN DIEGO CA 92155	0	1
LOGISITCS, COMEODGRU ONE (MMCS JORGONSON)	LOGISITCS, COMEODGRU ONE MMCS JORGONSON NAB CORONADO BLDG 156 2424 RENDOVA ROAD SAN DIEGO CA 92155	0	1
EODMU3 (LTJG AGLE)	LTJG DAVE AGLE NAB CORONADO EODMU3 2930 TAWARA RD BLDG 715 SAN DIEGO CA 92155-5297	0	1

NBC INRMP Nov 01 Distribution List

OPERATIONS LCPO, NPMOC-SD (A. KESTERBAUM)	NO RESONSE FROM PREVIOUS DOCUMENTS	0	0
CHSLWP (N3 - CDR HAMMOND)	?	0	1
TAC GROUP ONE (OPS-O N3- CDR SEBASTIAN)	TAC GROUP ONE OPS-O N3- CDR SEBASTIAN NAB CORONADO 3605 TARAWA ROAD #150 SAN DIEGO CA 92155 437-3773	0	1
G 3, I MEF (MAJ NEMETH)	COMMANDING GENERAL I MEF ATTN G3 MAJOR TOM NEMETH BOX 555300 CAMP PENDLETON CA 92055	0	1
FASOGRUTRUPAC SERE CAMP (1 CD)		0	1
MWR - N92C, CNRSW (D. SCHOUTEN)	NASNI GOLF COURSE	0	1
SOUTHBAY AFT, SWDIV (J. BOYD)	JENNY L. BOYD SWDIV NAVFACENGCOM 2585 CALLAGAN HIGHWAY SAN DIEGO CA 92136	1	1
REGIONAL PLANNING TEAM, SWDIV (G. BORDNAVE) (1 CD)	SWDIV, NAVFACENGCOM NATURAL RESOURCES 1220 PACIFIC HIGHWAY CODE 5GPN SAN DIEGO CA 92132-5190	0	1
NATURAL RESOURCES, SWDIV (M. PERDUE/J. DINNEL)	SWDIV, NAVFACENGCOM NATURAL RESOURCES 1220 PACIFIC HIGHWAY CODE 5GPN SAN DIEGO CA 92132-5190	1	1
ENVIRONMENT AND SAFETY ACOS, CNRSW (CAPT BOLAND)	ENVIRONMENT AND SAFETY ACOS, CAPT DJ BOLAND NAVAL BASE POINT LOMA 140 SYLVESTER SAN DIEGO CA 92106-3521	0	1
NEPA, CNRSW (B. CROUSE)	BROADWAY COMPLEX BLDG 1 First Floor	0	1
LEGAL DEPARTMENT, CNRSW (S. HIPFEL)	BROADWAY COMPLEX BLDG 1 First Floor	0	1
ENVIRONMENTAL DEPARTMENT, CNRSW (B. GORDON)	ASW BLDG 50	0	1
NBC COMPLIANCE, CNRSW (A. ORDONIO)	NASNI BLDG 3, SECOND FLOOR	0	1
NRO, CNRSW (N45RN)	ASW BLDG 50	2	2
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United States Department of the Interior
Fish and Wildlife Service
Ecological Services
Carlsbad Fish and Wildlife Office
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In Reply Refer To: FWS-LA-2483

DEC 0 5 2001

Captain D.R. Landon
Department of the Navy
Naval Air Station North Island
P.O. Box 357033
San Diego, California 92135-7033

Attn: Ms. Tammy Conkle

Re: Comments on Final Draft San Clemente Island Integrated Natural Resources Management Plan 5090 Ser NC02 / 335

Dear Ms. Conkle:

Thank you for the opportunity to provide comments on the draft final San Clemente Island Integrated Natural Resources Management Plan (INRMP). Overall, we find the draft final INRMP comprehensive, and appreciate the effort to utilize an ecosystem approach and integrate existing and suggested natural resource management to training activities on the island. We offer the following comments, some of which re-iterate our comments on previous drafts.

We remain concerned and do not concur with the current treatment of fire management in some portions of the draft INRMP, most notably in sections pertaining to Maritime Desert Scrub: Boxthorn, but in other plant communities as well. Unless information is available on a biologically correct fire interval and patch size for a particular plant community, the goal should remain to prevent and suppress wildfires. For plant communities for which sufficient information is available to ascertain a fire regime that accomplishes the stated goals, we concur with inclusion of specifics regarding fire intervals and patch sizes. For plant communities where such information is not available, we recommend development of a study program (which is already suggested in the INRMP) to determine the appropriate parameters for fire. The fire management ideas presented for Maritime Desert Scrub: Boxthorn appear premature. The goal presented is to maintain the current distribution of this plant community, however we do not know the fire interval that will accomplish this goal. It should be noted that the areas that retain high density sage sparrow populations are those that do not have recorded incidents of fire. Reference to maintenance of only 80 percent of high density sage sparrow habitat (page 4-6) implies that 20 percent losses are acceptable, which is not an appropriate goal for this document.

Additional comments regarding this issue can be found in the specific comments on Chapter 4 and Chapter 5 below.

Our current understanding of the text is that the INRMP is defining the percentage of particular plant communities that will be maintained in a reference condition. The percentages provided are very specific, however, the fate of the community that is *not* retained in the reference condition, and the potential location of modified portions of plant communities are not identified. If a plant community supports a listed species, losses or modification of this habitat could adversely affect the species.

Appendix G, which was not included in the October, 2001 draft, should include the list of all natural resource management operations required under existing Biological Opinions (Opinions). We recommend that this list be developed from the existing Opinions and include the natural resource management activities that were part of the proposed action, and the items found in the "terms and conditions" section. An additional list should be included as an appendix, of existing natural resource management activities other than those required in Opinions. It is still rather unclear in the INRMP what activities comprise the current natural resource management on the island.

Several avian species should be included on wildlife resources lists within the management units. Five species: Pacific slope flycatcher (a Channel Island endemic, *ssp. insulicula*); Allen's hummingbird (a Channel Island endemic, ssp. *sedentarius*); orange-crowned warbler (an SCI endemic, ssp. *sordida*); burrowing owl; and grasshopper sparrow should be added to the list. Burrowing owls may be significant in terms of their winter use of the island. Because they are declining on the mainland and are a species of concern there, their use of SCI is important. Orange-crowned warblers on SCI are an endemic subspecies. They are ground nesters in maritime sage scrub and shrubby habitat on canyon slopes. They would be sensitive to elevated predation levels that may be posed by cats and rats. Pacific slope flycatchers on SCI are a Channel Islands endemic subspecies. They use canyon areas and nest on depressions on rock faces. They too could be subject to predation pressures from cats and rats, due to their nesting habits. Allen's hummingbird is a Channel Islands endemic that nests in lemonade berry where it hangs over the edge of steep slopes. It feeds on a variety of nectar sources, but may be important to the pollination of *Castilleja grisea*, as it is often seen visiting this listed plant. Grasshopper sparrows utilize grasslands on the island and have been observed exhibiting nesting behavior during the breeding season. Xantus murrelet families with downy young have been observed (and photographed) at several locations on the island from northern areas near Wilson Cove, Eel Point, and China Pt. This is significant, since previous evidence of nesting was shell fragments. Xantus murrelet should be included on the wildlife resources list of units that support features important to this species, including offshore rocks and sea stacks, as well as rocky crevices that are over the water.

The San Clemente Island deer mouse should be included on the wildlife resources list of units that support maritime desert scrub and oak woodland. Although studies have not been conducted on SCI to assess the distribution of deer mice and habitat associations, such a study was conducted on Catalina Island by Gary B. Perlmutter from Humbolt State University. This study suugested a habitat association on Catalina, where deer mice were found most frequently in Maritime Desert Scrub and next in oak woodland.

Chapter 1
Page 1-2, P 3, bullet 3. The plan cannot ensure ecosystem resilience to testing and training impacts. The plan can provide guidelines to monitor ecosystem health and impacts associated with training, and provide training guidelines intended to lessen ecosystem impacts.

Page 1-2, P 5. Several acronyms are not defined. Acronyms should be spelled out before the first use of the acronym.

Page 1-7, F 1-4. Where does San Clemente Island fit into the organizational chart? It is not listed on the chart. Naval Base Coronado is also not on the chart. This needs to be clarified.

Page 1-7, P 3. This paragraph appears to be a typographical error and repeats the paragraph above it in the document.

Page 1-10, P 1. The table and the Map 1-1 do not correspond well to each other. Map 1-1 does not accurately depict the land use areas on SCI, just the canyon names, airstrip location, MIR location, INLMA, and Fire Support Areas. The "extent of land use areas" is a much broader term. Please revise the text to reflect this. Mining training ranges, Kingfisher, and Underwater Range are not on the map, nor are many of the land use areas.

Page 1-13, Bullet 2. We recommend that this section be revised as follows: "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".

Page 1-13, last P. This paragraph should also mention the 1984 Channel Island Recovery Plan.

Page 1-14, sentence 2. Delete "after recovery".

Page 1-14, P 2. We suggest moving the reference to Biological Opinions to section 2, where the explanation of the Endangered Species Act is found. In the current place in the text, the reader doesn't know what a biological opinion is. The reader is then referred to Appendix G, which is empty in the draft received by the Fish and Wildlife Service. The Opinions need to be added. The Natural Resource Office has not initiated consultation on the Fire Management Plan. Please add text indicating that the Navy will consult on aspects of the Integrated Natural Resource Management Plan that may affect listed species, including fire management, prior to implementation. The appropriate place for this part seems to be in section 2 under the discussion about the ESA 2.3.2.1.

Chapter 2
A description of the electrical system- including maps depicting the location of electrical wires, transformers, generators, etc. should be included in this document. The electrical system has apparently been the ignition source for several wildfires on SCI. Appropriate maintenance of this system is one important step in the reduction of wildfire ignitions on the island.

Page 2-18, section 2.1.4 Please provide a map of known contaminant sites on San Clemente Island. The issue of possible effects to natural resources from environmental contaminants should be specifically addressed in the INRMP. The INRMP should contain a historical description of the past use of contaminants, including pesticides, solvents, electrical equipment, fuel storage, munitions storage, dumps, etc. Any known releases should be documented, contaminant pathways discussed, and possible resources impacted should be identified. If this has been accomplished in a document about the Installation Restoration Program, please include this document as an appendix or provide a citation to the document. If the Navy is unable to include this document as an appendix, please provide a text description of each of the 16 sites identified on page 2-18 in section 2.1.4. Is Nanny Canyon identified on this list under another name?

Page 2-20, section 2.1.6 We recommend offering a formal conservation education program in addition to the other college-level course work currently available on SCI. A course could be put into place through one of the existing universities that service the base, in collaboration with all of the natural resources personnel who work on the island.

Page 2-35 There is no mention of the California Endangered Species Act. The California Endangered Species Act, and applicability to the island should be described.

Page 2-36, P 2. This is an appropriate place to describe the past Biological Opinions and how section 7 requirements will be dealt with for this INRMP, the Operations Management Plan, and the Fire Management Plan.

Chapter 3
Page 3-22, p 2. This section is titled "Current Management- Erosion Control, Road Design and Maintenance", however erosion control measures, or guidelines to minimize erosion are not adequately described. This area of natural resource management needs more attention on the island and we recommend that it receive high priority.

Page 3-22, bullet 3. This sentence refers to the Site Approval Process, but does not give a reference page within the document. Please include a reference page to allow the reader to understand the Site Approval Process.

Page 3-25, section 3.3.6 is titled "Historic Disturbance Regimes", and is contained within section 3.3, which is titled "What Shapes the Island Today". We recommend changing the title of section 3.3.6 to "Historical and Current Disturbance Regimes", since several of these disturbance regimes are current. Wildland fire is a historical and current disturbance regime, as are introduced plants and non-native animals. It would be appropriate to include the wildfire maps generated by the NRO that show the recent fire history of the island. This information is provided on a unit-by-unit basis in Chapter 5, but would be valuable to include in a more comprehensive fashion (i.e. fire map of the entire island) here as well. Under sections that describe current disturbance regimes, current management of the disturbance should be described. The current fire management, weed control program, and predator management program could be placed here.

Page 3-35, following table 3-4, it would be useful to provide reference to the pages that list the endemic plants, birds, reptiles, etc.

Page 3-27, sec. 3.3.6.2 This chapter describes the status and current management of natural resources on SCI. Please describe the current management of exotic plant species in this section.

Page 3-87, sec. 3.6.6 This section should be titled "Native Terrestrial Mammals", since there is a separate section on terrestrial mammals that are not native to the island.

Page 3-88. The Service did not include the island fox on the Candidate Notice of Review or on the proposed final rule.

Page 3-88. We suggest separating the management of native terrestrial mammals from that of non-natives.

Page 3-106, sec. 3.7.1 The list of invasive plant species identified on the island (currently in the document on page 4-57) should be referenced in this section.

Page 3-109 This section refers to rodent poisoning around shrike nesting areas. It should mention that the primary target of these efforts is roof rats (*Rattus rattus*), although mice may also be affected in some areas. Quintox bait stations are elevated when set a specified distance from shrike nests, to reduce the impact on native mouse populations. This should be confirmed with the predator management staff.

Chapter 4

Page 4-3, para I.C. This bullet refers to section 3.4.1, but no mention of the 1992-1993 baseline of 61% of total vegetative cover is found in section 3.4.1. Does the 61% total vegetative cover refer to island-wide vegetative cover, or the cover found on transects within the canyon shrubland/woodland? Does this goal represent increasing island-wide the amount of canyon shrubland/woodland, or increasing the plant density in the existing woodlands?

Page 4-4, p 2. Several sentences refer to the NPS scale, but it is not described in this section. The NPS scale should be described somewhere in the document, and referenced here.

Page 4-6, paragraph I. We recommend that this paragraph be modified to read " Within delineated high-density sage sparrow areas, maintain the first terrace boxthorn community in the reference condition...., and improve, where possible, the condition of this plant community by reducing the distribution and abundance of non-native species.

Page 4-7, para A. We still have significant concerns about the use or allowance of fire in this plant community, and especially within delineated high-density sage sparrow areas. The patch-sizes suggested in the following paragraphs are unclear in terms of their significance, and result in numerous questions. What is "fire patch size target"? What is the "standard" that is referred to in paragraphs C and D. How were appropriate patch sizes determined? Is this referring to controlled burns or planning patch sizes for wildfires? If this is information that is to be used by fire management personnel when budgeting and planning fire-suppression resources, we suggest that the information be removed from this document and retained in the fire management plan (bullets A,B,C,D,E). To avoid incidental take of sage sparrows, the appropriate fire management guidelines for this community is to "minimize the incidence of wildfire in the boxthorn community by appropriate planning and designation of fire prevention and suppression resources", until we better understand any role of fire in maintaining this plant community. We suggest an objective of "maintain at a minimum, the existing cover and distribution of boxthorn on the first and second terraces north of Seal Cove, and within this area monitor the plant community to assure that non-native species do not exceed the percent cover documented in the reference plot".

Page 4-7, para F. Because of the lack of information regarding the appropriate fire return interval for this plant community, we suggest that the fire return interval proposed in this section (5 years) be deleted so the sentence reads "...to prevent a repeat burn".

Page 4-7, 4-8. Para H and para IV are redundant.

Page 4-31, figure 4-2. Not all of the Management Units are identified on the histogram.

Page 4-38. This section, which refers to the Island Night Lizard Management Area, needs to be consistent with the Biological Opinion 1-6-97-F-58. In that opinion, a threshold that triggers re-initiation of consultation was identified. Restoration activities also supposed to take place in the INLMA on spur roads and portions of the existing road that are no longer in use. On page 4-39, we recommend that the sentence under IIA be deleted.

Page 4-42. 3.e. The potential for eradication of black rats and cats from SCI should be included. 6. Restoration of woodland and shrub-land plant communities, and reduction of annual grasslands on the island are important shrike habitat augmentation needs that should be considered in all fire management decisions. Fire management should be used on the island to reduce grasslands and encourage shrub and tree re-establishment.

Page 4-42. A map of shrike habitat necessary for recovery has been developed in draft form and would be a valuable addition to either this section or the section in chapter 3 that pertains to shrikes. A map of the known release areas/historical and current territories should also be included.

Page 4-43, para B.1. We recommend that this paragraph be deleted. The goal should be to improve the condition of the habitat and retain native species in equivalent or increasing abundance and distribution, while reducing the cover of non-native plant species.

Page 4-65, sec 4.8. Please add information pertaining to aerial suppression resources to this section. The existing fire management should be described in Chapter 3, "Status and Management". Chapter 3 contains a sub-heading titled "Wildland Fire" (3.3.6.1). It should include the aerial suppression resource capability that the Navy has committed to and implemented over the course of the past four years. With the current situation in mind, specific concerns should be added to section 4.8 that reflect the safety concerns expressed by HC-85 during the fire management plan meetings, and issues surrounding the use of salt water, suppressant, and retardant on native plant communities.

Page 4-73, para A. The Navy has requested re-initiation of formal consultation regarding ordnance restrictions during the fire season. We recommend that paragraph A be deleted, as the Navy and Service have not yet completed consultation on this proposed action.

Page 4-72, unnumbered figure. Under Extreme Conditions, the use of pyrotechnics and incendiary devices should be prohibited in SHOBA, where use of these tools is most likely to occur, as well as to the rest of the island.

Page 4-74- 4-77. This section delineates "Fire Management Success Targets". There should be a biological basis for these targets.

Chapter 5
Within each "special management emphases" box, please include special management that pertains to the natural resource value as well as the military value. For example, the special management emphasis in unit 10, where military value is high and natural resource value is highest, should be different than the special management emphasis in China Cove (unit 16) where military value is highest and natural resource value is medium or at the Airfield (unit 2) where the military value is highest and the natural resource value is lowest.

Thank you for your coordination on this INRMP. We have found this process to be a valuable tool in the development of this plan. We are committed to work with you expeditiously to resolve any outstanding issues that may affect listed species through informal or formal consultation.

Please contact Sandy Vissman of my office at (760) 431-9440 if you have questions regarding these comments.

Sincerely,

Nancy Gilbert

Nancy Gilbert
Assistant Field Supervisor

STATE OF CALIFORNIA-THE RESOURCES AGENCY GRAY DAVIS, *Governor*

DEPARTMENT OF FISH AND GAME
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February 19, 2002

Flex your Power

Ms. Tamara Conkle
Navy Region Southwest
Natural Resources Office
NAS North Island, Building 3
San Diego, California 92135-7088

Dear Ms. Conkle:

Comments on the Final Draft Integrated Natural Resources Management Plan (INRMP) for Naval Base San Clemente Island

The Department of Fish and Game (Department) has reviewed the final draft INRMP for Naval Base San Clemente Island. The Department, as the State wildlife agency, has participated in the review and preparation of the INRMP pursuant to the Sikes Act Improvement Act (SAIA) of 1997. Our involvement has included meetings with the INRMP consultants and stakeholders, discussions with the U.S. Fish and Wildlife Service, and submittal of oral and written comments to the INRMP preparers.

In accordance with the SAIA, this INRMP will provide a framework to manage natural resources on San Clemente Island for the next five years, while still preserving the military mission of the installation. By this letter, the Department concurs that the INRMP meets with the requirements of the SAIA. As noted in the comments below, the Department has identified some issues that should be worked on as part of the first five-year performance period.

Many uncertainties still exist regarding the appropriate fire management methods needed to maintain or enhance the natural resource values of the Island's varied ecological units. We will work with the Navy and the USFWS to refine fire management goals for each community and to ascertain fire intervals and patch sizes that maximize species diversity while reducing exotics. The Department will also review the Island's Wildland Fire Management Plan and provide comment in the near future.

The Department recognizes that a complete prioritization of natural resource management objectives and actions is not possible prior to finalization of this version of the INRMP. We will continue to work with the Island's Natural Resources' personnel and the Navy to refine priorities and management goals over the course of the next five years.

The Department requests that data from biological surveys regarding the distribution of sensitive plants, animals, and natural communities be submitted to the California Natural Diversity Database (NDDB). The NDDB is continually updated in an effort to provide the most current location and condition data for California's rarest species and communities. Field survey forms and instructions may be obtained from the Department's Wildlife and Habitat Data Analysis Branch web site at http://www.dfg.ca.gov/whdab/index.html under the "Biological Info" menu.

The Department appreciates the opportunity you have given us to provide input and comment throughout the development of this INRMP. We recognize that much time and thought has been applied to this comprehensive and well-organized document. We will continue to consult with the Navy in the future regarding natural resource planning for San Clemente Island and look forward to working collaboratively to implement the INRMP. If there are any questions regarding these comments, please contact Meredith Osborne at (858) 636-3163 with any questions.

Sincerely,

C F Raysbrook

C. F. Raysbrook
Regional Manager

Attachment

cc: Bill Tippets, DFG
Meredith Osborne, DFG
Elizabeth Kellogg, Tierra Data Systems
Sandra Vissman, USFWS

MO:mo/sl
File:CFR-Chron
file:mosborne\NB San Clemente Island INRMP concurltr.wpd

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November 21, 2001

Ms. Tamara Conkle
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San Diego, CA 92135-7088

Comments on the Final Draft Integrated Natural Resources Management Plan (INRMP) for San Clemente Island

Dear Ms. Conkle:

The Department of Fish and Game (Department) has reviewed the final draft INRMP for San Clemente Island. Department comments on earlier drafts of this document were provided to you informally at meetings or by email. Most of our earlier recommendations have been incorporated into the final draft. Overall, this is a very well organized and comprehensive INRMP. Our comments on the final draft focus on Chapter 3 (Status and Current Management of Natural Resources), Chapter 4 (Natural Resource Management) and Chapter 5 (Strategies by Management Unit).

Comments:

Chapter 3. Status and Current Management of Natural Resources

3.5, Ecological Units. The introduction to this section refers to a description of the vegetation condition monitoring program (presumably Land Condition Trend Analysis) in Section 3.7.1.1. This section reference is incorrect; it should be 3.8.1.2. Section references should be checked and corrected throughout the document. The standard LCTA sampling methodology (Tazik et al.) should be referenced in Chapter 8.

3.5.1 - 3.5.9, descriptions of Ecological Units. There should be an explanation, at the beginning of this chapter or in Section 3.8.1.2, of how the percent cover values contained in the tables were calculated (for example, whether they were based on the percent of the total number of transect points on which each species was intercepted, or the percent of total intercepts with all species, or some other calculation).

Chapter 4. Natural Resource Management

Chapter 4 provides a vegetation community-by-vegetation community listing of the key resource concerns/sensitivities, management objectives, and specific actions that will be considered for implementation. There are multiple objectives for most of the vegetation communities, and it is not consistently specified which of the identified actions are a priority. It may not be necessary or possible to provide a complete prioritization of the actions at this juncture, but an indication of the general prioritization of the potential actions/remedial measures would be useful to those who will be implementing the INRMP. For example, Section 4.1.1 (Canyon Shrub/Woodland) includes several woody communities and makes recommendations to prevent erosion, initiate certain studies, reduce non-native vegetation, maintain specified bare ground conditions, foster recruitment of woody species, and attain certain wildfire management conditions.

The INRMP could take one of several approaches to prioritizing actions, but it seems important to identify those actions within each vegetation community that are required to comply with existing Section 7 biological opinions for listed species. Based on the information available to date, the INRMP could also identify the highest priority geographic locations in which those identified actions should occur (e.g., oak recruitment in specified management units or erosion control in specified management units is a priority). It would also be useful to establish a timeline in which a refinement of the prioritization will be accomplished, while continuing those required actions pursuant to the biological opinions.

Throughout Chapter 4 there are references to other sections of the document. In a large document such as this, this is very helpful to the reader. However, some of the references are incorrect; this may have resulted from section number changes that have occurred from earlier drafts. Section references should be checked in Chapter 4 and throughout the INRMP and updated if necessary.

4.1.1, Canyon Shrubland/Woodland, I.C, I.E, IV.B. In three different instances there is reference to Section 3.4.1 for an explanation of how the baseline conditions were defined using 1992-1993 vegetation data. The reference should be changed to Section 3.8.1.2 (see comment on Section 3.5 above) or to the introduction to Section 3.5.

Section 4.1.1 I.F.4 defines a specific maximum acreage (70 acres) and interval period (10 years) for fires of moderate or higher intensity in the island woodland community. It is not clear if this only applies to wildfire events or if prescribed fires also are included; some moderate intensity prescribed fires may be determined to be beneficial to reduce non-natives plants in woodlands, and this condition may preclude using this management technique (which is included as a management tool in item I.F.3).

4.1.1, IV.A, needs explanation of how oak seedling establishment will be accomplished after every reproductive event. Human intervention (i.e., irrigation or caging) may be required to ensure that seedlings survive and are recruited into the sapling size class. IV D: There may have been multiple reproductive events during the years that comprise the age difference between the oldest and youngest tree.

Section 4.1.2 I., Maritime Desert Scrub: Boxthorn, states that within delineated high-density sage sparrow areas, 80% of the first terrace boxthorn community should be maintained in the reference condition, and that this condition should be measured over a 7-year El Nino cycle. We concur that limited incursions into these sensitive areas could be tolerated, it is not clear how the 20% encroachment/damage limit would be monitored or if uses would be directed toward specified portions of the area. We recommend that military operations in these (limited) areas develop or review their operation plans in coordination with the island's natural resource managers to document how military activities will adhere to that encroachment level (the matrix tables in Chapter 5 identify potential military/sensitive natural resource conflicts). A similar approach could be developed for other vegetation communities that have a specified percentage of intact habitat to be maintained.

The boxthorn reference condition of 28% cover does not match the percent cover value of 21.8% contained in the table in Section 3.5.2, page 3-54. If the reference condition is based on data not derived from the 1992-1993 vegetation surveys, this should be explained. How will the determination be made that 80% of the first- and second-terrace boxthorn communities are meeting the management goals? Will this be based on 80 percent of the vegetation transects conforming to these standards? This should be explained in Section 3.8.1.2 (see comments on Section 3.5 above), which would also aid in understanding the similar management goals for the following subsections.

Section 4.1.2. II. discusses fire relationships to the boxthorn community. The "acceptable" specific return intervals, acreage, and fire intensities are based on very preliminary information. We recommend that studies of fire effects on boxthorn and sage sparrows (and other sensitive species) be a priority action. Until more is learned about fire and boxthorn/sage sparrow response, we suggest that the interval, acreage and intensity specifications be considered very preliminary and only used to generally guide the wildfire response (this comment applies to fire effects for all vegetation communities).

4.1.4, Maritime Desert Scrub: Terrace Complex, Proposed Management Strategy, I.A. Section 3.4.4 is referred to regarding the 1992-1993 baseline. This reference should be to Section 3.5.4.2. References to other sections should be checked throughout the text of the INRMP, as the multiple drafts of the document may have resulted in Section number changes.

Section 4.1.6, Maritime Sage Scrub. It is not clear how the fire intervals and acreage values were derived. Is the priority action in this vegetation community the prevention of frequent, large wildfires?

Sections 4.1.7 and 4.1.8. Similar concern to that expressed for Section 4.1.6.

Section 4.1.12, Coastal Salt Marsh. Goals for exotic plant removal from salt marshes should be established. Perhaps reducing upstream sedimentation and restoring the hydrology of the marshes to pre-grazing area conditions would result in the reduction of at least some of the non-native species that are intolerant of frequent inundation.

Section 4.2.3. Please rephrase the first sentence to delete "dangerous" and insert the phrase "somewhat subjective" or similar phrase/wording.

Section 4.2.3.1 Natural Resources Scoring Factors. List of resources used in the analysis: Lettering should start with "A". References to Table 4-6 should be changed to Table 4-4 (Items H through O). Item G. Explain why sage sparrow density points were weighted.

Section 4.4.1, Proposed Management Strategy I. The Sawyer Keeler-Wolf Reference should be included in Section 8.0 References.

Section 4.4.3. Subsection "I" states that the INLMA plan will be finalized and implemented. Are all of the actions under subsection "I" required actions? Is the statement that INL surveys will be conducted every 3 years within the INLMA an unchangeable requirement, or can the survey protocol be revised so that annual monitoring, but of fewer, selected sites can be instituted?

Section 4.4.4. We concur with the community-level management guidelines and recommend that certain actions be made priorities: I.D (restrict access to nesting/breeding grounds to comply with MBTA), I.G (appropriate use of pesticides), I.H (address birds in all project planning), I.I.1 (establish MAPS stations or similar surveys). We suggest an additional objective: restore missing components of the native avifauna (e.g. San Clemente spotted towhee) to San Clemente island.

Section 4.4.4. I. E. 1. Regarding the use of artificial nest boxes for landbirds, we suggest careful consideration of this proposal prior to implementation. There are viable populations of European starlings and house sparrows present on San Clemente Island. Both species readily use nest boxes for breeding purposes and would be the most likely occupants in an area close to human habitation. Enhancement of the populations of these two pest species is highly undesirable. Further, it is not clear which native landbird species would benefit from such a program.

Section 4.4.4. I. F. The brown-headed cowbird is a native species and thus does not make a good example to support this action item.

Section 4.4.4. I. I. Suggested additional item 4: Be aware of and cooperate with the conservation efforts proposed through the DFG's

Species of Special Concern program.

Section 4.4.4. II A.3.d. (SCI Loggerhead Shrike). When nests of certain shrike predators are removed, what happens to the contents? Are all eggs and nestlings routinely destroyed or are they incubated and/or held in captivity? If held, when and where are they released?

Section 4.4.4.II.B (San Clemente sage sparrow). We agree that maintaining at least 80% of the first terrace boxthorn community appears to be necessary for the sage sparrow. The specific human-managing items in this sub-section are a good first-step to delineating how that 80% will be assured. As previously discussed in our response, close coordination between the biologists who monitor the sparrow population and military operations planners is essential to ensure that the most important core areas of boxthorn/sparrows are managed consistent with the 80% objective.

Section 4.4.4 II. Suggested additional item C. San Clemente Spotted Towhee. The San Clemente Spotted Towhee is included on the DFG's draft Bird Species of Special Concern list as a first priority species. Although extirpated from San Clemente Island in the 1970s, this taxon is doing well on Santa Catalina Island where the population is estimated to number about 2000-5000 pairs. In order to remove this taxon from the Department's SSC list, another viable population must be reestablished within the historic range. Therefore, we recommend as part of a multi-species landbird conservation program, the San Clemente Spotted Towhee be reintroduced to San Clemente island. The reintroduction should take place only when there are no impacts to the recovery of the San Clemente sage sparrow and SCI loggerhead shrike.

Section 4.4.5 (Shorebirds). Under "Specific Concerns" the first bulleted item should be corrected as follows: "San Clemente provides wintering habitat and breeding habitat for the federally-listed Western snowy plover."

Section 4.4.5 II. A. 1. We recommend monthly monitoring of the snowy plover population on SCI.

Section 4.4.5 II. A. Suggested additional item 5. All snowy plover nests found will be protected with exclosures and/or symbolic fencing with interpretive signs (see USFWS draft Recovery Plan appendix F).

Section 4.4.5 II. A. Suggested additional item 6. 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.

Section 4.4.5 II. A. Suggested additional item 7. Human disturbance should be minimized at West Cove from 15 march - 31 July for at least two consecutive years to allow plovers to successfully breed.

Section 4.4.5 II. A. Suggested additional item 8. Removal of feral cats should continue at all beach sites.

Section 4.4.5 II. A. Suggested additional item 9. Removal of ravens should target the beach areas, especially around Horse Beach and be conducted from 1 March through 31 July.

Section 4.4.6 (Seabirds) General Comments: We understand Seal Cove is sometimes used as an anchorage and that Castle Rock is used as a Navy target for shooting practice. All human disturbance should be eliminated from the seabird nesting colonies during the breeding season to help avoid nest failures. There is so little breeding habitat available for seabirds at San Clemente Island that protection of every site is sorely needed.

Identification and protection of essential roosting habitat is listed as one of the primary objectives for the federal recovery plan for the California Brown pelican. Basic requirements for communal night roosts are inflexible and include the following: 1) they must be within energetically efficient distances from foraging areas, 2) they must be buffered from mammalian predators and human disturbances, and 3) they must provide shelter from strong winds and surf spray (USFWS 1983). As the species is highly sensitive to human disturbances, protection of pelican night roosts should be a high priority.

Brandt's cormorant, while not listed as threatened or endangered by the State or federal government or considered a species of special concern by the DFG is one of the most sensitive of seabird species to disturbance. Numbers of breeding birds at San Clemente Island are fairly small (about 125 pairs) but have grown over the last decade. The most important nest site (about 100 pairs) is at Bird Rock (in NW Harbor). This location is amidst a very busy Naval operations area. The Navy needs to keep people from landing on the rock during the breeding season (approximately January through August); such an event could lead to total loss for the year's breeding effort. The other regularly used Brandt's Cormorant nest site (about 20 pairs) is on the SW side of the island, on some cliffs about some two miles southeast of Lost Point (in a colony named "Lost Point South"). Smaller numbers (<10 pairs) nest occasionally on some rocks in Seal Cove (about mid-way down the west side of the island) and on Castle Rock (off the north tip of the island) (G. McChesney pers. com.).

In the last few years, Double-crested Cormorants(currently a BSSC, DFG 1992) started nesting on some cliffs above a narrow cove just north of Seal Cove (G. McChesney pers. com.).

Ashy Storm-petrel breeds in very small numbers at San Clemente Island (10 individuals) (Carter et al. 1992). It is a second priority species of special concern. A comprehensive survey for this species is warranted. Additionally, this species will use nest boxes; a breeding enhancement program using nest boxes could be undertaken to increase nesting opportunities for this species.

Section 4.4.6 I. B. (Xantus' Murrelet) breeding at San Clemente Island had long been suspected (Jehl and Bond 1975) and was confirmed in 1994 by H. Carter when eggshell fragments were seen on an offshore rock near Seal Cove (Drost and Lewis 1995). 125 individuals were found during the breeding season on San Clemente Island by Carter et al. 1992 indicating a small core breeding population. Crevice nesting seabirds such as Xantus' Murrelet and Ashy Storm-petrel are nocturnal, largely to escape predation pressure from diurnal predators such as Western gulls. Nocturnal predators such as the barn owl are known predators of Xantus' murrelets. Military operations conducted at night with aid of high intensity artificial light may provide barn owls with additional opportunities to prey upon Xantus' murrelets. Such lighting should not be within Xantus' murrelet breeding territory.

Section 4.4.7 III. (San Clemente Island Fox). General comment: The population is apparently in decline on the island but the decline does not appear to be an island-wide effect. It is most pronounced in the area where the foxes have been manipulated to benefit the San Clemente Island Loggerhead Shrike (D. Garcelon pers. com.).

Section 4.4.7 III. B. The statement should be modified as follows "continue to remove foxes from breeding shrike territories using non-lethal means." We recommend that foxes not be held in captivity during the pair bonding and pupping season. Spend a short, intense amount of time engaged in fox manipulations early in the season (February) and then cease fox manipulations for the next 5 months, when at all possible. Cat box traps are catching too many foxes and too few cats. Therefore, we recommend not using them. Rather, spot-lighting and shooting seems to be an effective target-specific means of removing cats. Leg-hold traps may be used but there has been some injury to foxes reported.

Section 4.4.7 III D. We concur with the proposal to mow the sides of the roads so it is easier to see foxes and reduce road kills and to establish an education program to sensitize residents to the problem. We understand the educational program implemented at San Nicholas Island has been very successful in reducing island fox mortality from road kills and could serve as a model for San Clemente Island.

Section 4.4.7 III. Suggested additional item F. 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.

Section 4.8 (Wildfire Management). We agree with the proposed strategy/objectives and recommendations for increasing the fire fighting capability of SCI staff. The Fire Danger Rating system appears to be reasonable and implementable. As stated previously in our comments, the targets for fire interval (recurrence), acreage burned, and intensity in the vegetation communities are very preliminary and should only be used as guidelines. One of the priorities for the island's biology should be to evaluate the effects of fires (wildfire and prescribed) on key biological resources, and abiotic features such as erosion rates, where relevant.

Chapter 5. Strategies by Management Unit

The format of this section is very helpful to identify potential training, infrastructure and other human-related use conflicts with natural resources. The human activity-resource effects matrix tables are especially useful as a quick and fairly comprehensive assessment of the potential conflicts. These tables will need to be routinely updated as more is learned from activities on the island.

As the distributions of non-listed plants are not mapped separately from one another in the natural resources map for each management unit, a reference to Appendix C would be helpful to the reader.

Table 5-1 does not indicate any potential effects from "Battalion Landings" - is this because these operations are prohibited/not applicable in this area (if so, note not applicable or prohibited on the table)? If these activities are allowed, it appears that potential impacts could occur to the sage sparrow and wintering western plovers from the larger foot landings (low for the 1-10, medium for 10+).

Unit 3 (Dolphin Bay), text on page 5-16. Under Management, there is some repetition of goals and information among the first, third, and fourth bulleted items in the list; they could be combined into one or two items.

Table 5-16 identifies only one "low" potential effect from "Battalion Landings" for animal species. It appears form the resources map that there is at least a "low" to "medium" potential effect from battalion landing on sage sparrows, shrikes, western snowy plovers and marine mammals.

Appendix B: Comprehensive Species List

General comment: We strongly recommend the species list be arranged taxonomically in its entirety rather than in its present format. It is very difficult to find taxa quickly. The following corrections to the species list are referenced by page number.

B-20

Change title "Herptiles" to "Reptiles".

Regarding *Pipilo maculatus clementae* San Clemente spotted towhee. This taxon is **not** extinct. It has been extirpated from San Clemente island since 1970s. However, it is still common on Santa Catalina island. It is included as a first priority species on the draft BSSC list (L. Comrack pers. com. 2001).

Regarding *Xantusia riversiana*, *Amphispiza belli clementae* and *Lanius ludovicianus mearnsi*, add status designation SSC for consistency. All federally-listed terrestrial vertebrates not state-listed are automatically considered Species of Special Concern by the DFG.

B-21

Under Non-residents, Gaviiformes, change the scientific name *Gavia arctic* to *Gavia pacifica* and the common name Arctic loon to Pacific loon. This taxon was split some years ago into two separate species. Pacific loon winters commonly in the state; Arctic loon is accidental in the state (one record only that we know of at Abbott's lagoon, Marin County).

B-22

Under Falconiformes, add status designation "Fully Protected" to *Elanus leucurus* White-tailed Kite. (See Fish and Game Code Section 3511)

B-23

Under Charadriiformes, *Sterna maxima* Royal Tern add status designation SSC. It is included as a third priority species on the draft BSSC list (L. Comrack pers. com. 2001).

Under Columbiformes, remove *Columba livia* (rock dove) from the non-residents list. Add to the Introduced List instead.

B-24

Under Passeriformes, add status designation SSC for the following taxa: *Ammodramus savannarum* Grasshopper Sparrow, *Catharus ustulatus* Swainson's Thrush and *Contopus cooperi* Olive-sided Flycatcher. All are considered second priority species on the draft BSSC list (L. Comrack pers. com. 2001)

B-26

Under Passeriformes, add status designation SSC for *Toxostoma bendirei* Bendire's Thrasher (DFG 1992).

Under Mammals, Native, change common name of *Plecotus townsendii* from Townsend's long-eared bat to Townsend's big-eared bat.
B-31

Under Mollusca, SCI Endemics, change scientific name of land snail *Micrarionta redimita* to *Xerarionta redimita*. (NDDB 2001)

The Department appreciates the opportunity you have given us to provide input and comment throughout the development of this INRMP. We will continue to assist the Navy in the future with natural resource planning for San Clemente Island. If there are any questions regarding these comments, please contact Lyann Comrack at (838) 467-4208 or Meredith Osborne at (858) 636-3163 with any questions.

Sincerely,

William E. Tippets
Environmental Program Manager
CA Department of Fish and Game

cc: Elizabeth Kellogg, Tierra Data Systems
Sandra Vissman, USFWS

Comment Matrix
San Clemente Island Integrated Natural Resources Management Plan
Public Draft October 22, 2001

#	Page	Section	Reviewer	Comment	Response
1.			Aaron O. Allen, Army Corps of Engineers	Although the document contains detailed climate and weather information, the discussion of surface water hydrology could be augmented to discuss general runoff patterns, a description of the number/size/orientation of the basins/sub-basins on the island, typical stream channel morphology and channel substrate. The above information will also be critical in determining the extent of waters of the United States and wetlands on the Island.	Stream channel morphology is generally simple on SCI with many small basins, resulting from the Island's youthful geomorphology. It will be described in more detail as the ongoing wetland delineation is expanded from vernal pools to the drainages.
2.			Aaron O. Allen	The Corps recognizes that a delineation of waters of the United States, including wetlands, is ongoing and was not able to be included with the report. As a result, it is difficult for the Corps to provide definitive comments on the Management Plan without knowing the location and extent of our jurisdiction in the project area. The Corps would recommend that, once you complete a draft delineation for waters of the United States for the Island, you forward the document for our review and approval prior to finalizing the delineation. At that time, the Corps should be able to provide more definitive comments on which jurisdictional areas exhibit the highest physical and biological functions. Once the higher value jurisdictional areas have been identified, every effort should be made to avoid and minimize future impacts in these areas. Furthermore, any activities in the Pacific Ocean (including any tidal areas) would be subject to Section 10 of the Rivers and Harbors Act and any discharges of dredged or fill material in waters of the United States would be subject to Section 404 of the Clean Water Act.	Comment acknowledged and jurisdictional statement added to document.

Comment Matrix

San Clemente Island Integrated Natural Resources Management Plan

Public Draft October 22, 2001

#	Page	Section	Reviewer	Comment	Response
1.		General	S. Vissman, United States Fish and Wildlife Service	We remain concerned and do not concur with the current treatment of fire management in some portions of the draft INRMP, most notably in sections pertaining to Maritime Desert Scrub: Boxthorn, but in other plant communities as well. Unless information is available on a biologically correct fire interval and patch size for a particular plant community, the goal should remain to prevent and suppress wildfires. For plant communities for which sufficient information is available to ascertain a fire regime that accomplishes the stated goals, we concur with inclusion of specifics regarding fire intervals and patch sizes. For plant communities where such information is not available, we recommend development of a study program (which is already suggested in the INRMP) to determine the appropriate parameters for fire. The fire management ideas presented for Maritime Desert Scrub: Boxthorn appear premature. The goal presented is to maintain the current distribution of this plant community, however we do not know the fire interval that will accomplish this goal. It should be noted that the areas that retain high density sage sparrow populations are those that do not have recorded incidents of fire. Reference to maintenance of only 80 percent of high density sage sparrow habitat (page 4-6) implies that 20 percent losses are acceptable, which is not an appropriate goal for this document. Additional comments regarding this issue can be found in the specific comments on Chapter 4 and Chapter 5 below.	These items will be consulted on with USFWS. Additional text was added to explain the approach further. Our position is that we will not be able to determine a biologically "correct" fire regime, only one that meets our INRMP goal of community and species protection and reduction of exotics. Even after decades of study on the mainland, such regimes continue to be widely debated. The regimes targeted parallel or are more conservative than those adopted by land management agencies on the mainland for shrublands. We consider the targets to be preliminary and not "premature." The Plan recommends a monitoring regime to evaluate their success or need for adjustment. In the boxthorn community, there are large areas that have no recorded incidence of fire and also do not have sage sparrows, so occupation by sage sparrows is more complicated than one factor. It is not prudent to plan for the absence of fire in this community, and it may also be detrimental if the community is locally or broadly degraded by exotics. Fire planning using prevention and suppression alone is not cost-effective nor consistent with federal fire policy. These community targets are necessary to guide the Fire Department's response. While in most cases the Fire Department response is "all available resources," the targets help define what pre-suppression resources should be employed, what resources should be available at various fire weather conditions, and what may be summoned from the mainland. They also guide the Incident Commander during a fire when, for example, there may be multiple fires burning on the Island and the mainland (thus affecting the Commander 's ability to justify enhance suppression assets against requests of other incident commanders).
2.		General	S. Vissman	Our current understanding of the text is that the INRMP is defining the percentage of particular plant communities that will be maintained in a reference condition. The percentages provided are very specific, however, the fate of the community that is not retained in the reference condition, and the potential location of modified portions of plant communities are not identified. If a plant community supports a listed species, losses or modification of this habitat could adversely affect the species.	The targets for habitat condition will also be consulted on for their effect on federally listed species. It may be that the Island currently does not sustain these conditions, and this means that an immediate adjustment in management is warranted. The areas that do not meet the target condition are not non-habitat, only degraded below this condition. This is clarified in the text and a monitoring regime proposed to support it.
3.		Appendix G,	S. Vissman	Appendix G, which was not included in the October, 2001 draft, should include the list of all natural resource management operations required under existing B.O.s. We recommend that this list be developed from the existing B.O.s and include the natural resource management activities that were	Included a section before the stack of BOs that describes natural resource management currently taking place under them.

#	Page	Section	Reviewer	Comment	Response
				part of the proposed action, and the items found in the "terms and conditions" section of the B.O. An additional list should be included as an appendix, of existing natural resource management activities other than those required in B.O.s. It is still rather unclear in the INRMP what activities comprise the current natural resource management on the island.	
4.			S. Vissman	Several avian species should be included as key species and on wildlife resources lists within the management units. Five species: Pacific slope flycatcher (a Channel Island endemic, *ssp. insulicula*); Allen's hummingbird (a Channel Island endemic, ssp. *sedentarius*); orange-crowned warbler (an SCI endemic, ssp. *sordida*); burrowing owl; and grasshopper sparrow should be added to the list. Burrowing owls may be significant in terms of their winter use of the island. Because they are declining on the mainland and are a species of concern there, their use of SCI is important. One question that would be valuable to answer is: where do the owls that winter on SCI breed? Orange-crowned warblers on SCI are an endemic subspecies. They are ground nesters in maritime sage scrub and shrubby habitat on canyon slopes. They would be sensitive to elevated predation levels that may be posed by cats and rats. Pacific slope flycatchers on SCI are a Channel Islands endemic subspecies. They use canyon areas and nest on depressions on rock faces. They too could be subject to predation pressures from cats and rats, due to their nesting. Allen's hummingbird is a Channel Islands endemic that nests in lemonade berry where it hangs over the edge of steep slopes. It feeds on a variety of nectar sources, but may be important to the pollination of *Castilleja grisea*, as it is often seen visiting this listed plant. Grasshopper sparrows utilize grasslands on the island and have been observed exhibiting nesting behavior during the breeding season. *Xantus murrelet* families with downy young have been observed (and photographed) at several locations on the island from northern areas near Wilson Cove, to Eel Point, to China Pt. This is significant, since previous evidence of nesting was shell fragments (see Channel Islands symposia). Xantus murrelet should be included on the wildlife resources list of units that support features important to this species, including offshore rocks and sea stacks, as well as rocky crevices that are over the water.	The Orange-crowned warbler was added in all management units that contain Maritime Sage Scrub. We also included a focus species profile on this bird. As little is known about the historical habitat use of the Grasshopper sparrow on SCI, we feel more information is needed before we can recommend management for it. It is recommended for study in chapter 4 under land birds. Xantus' murrelet has been included, along with a focus species profile. We felt that the Pacific slope flycatcher, Allen's hummingbird and the burrowing owl were already protected by management action taken for other species.
5.			S. Vissman	The San Clemente Island deer mouse should be included on the wildlife resources list of units that support maritime desert scrub and oak woodland. Although studies have not been conducted on SCI to assess the distribution of deer mice and habitat associations, such a study was conducted on Catalina Island by Gary B. Perlmutter from Humbolt State University. This study suugested a habitat association on Catalina, where deer mice were found most frequently in M.D.S. (13 of 33) and next in oak woodland (8 of 33).	More information is needed on habitat use and ecology of the deer mouse on San Clemente Island before a management recommendation can be made. We recommend this subspecies for further study in Ch. 4 (4.4.7).
6.	Page 1-2,	P 3, bullet 3.	S. Vissman	The plan cannot ensure ecosystem resilience to testing and training impacts. The plan can provide guidelines to monitor ecosystem health and impacts associated with training, and provide training guidelines intended to lessen ecosystem impacts.	Changed to state "Provide guidelines to monitor ecosystem health and impacts associated with training, and provide training guidelines intended to lessen ecosystem impacts."
7.	Page 1-2.	P 5.	S. Vissman	Several acronyms are not defined. Acronyms should be spelled out before the first use of the acronym	Corrected.
8.	Page 1-7.	F 1-4.		Where does San Clemente Island fit into the organizational chart. It is not on the chart- neither is Naval Base Coronado. This needs to be clarified.	The caption now reads: "CNRSW environmental organizational chart. Most natural resource functions on San Clemente Island occur under Environmental Operations."
9.	Page 1-7	P 3.	S. Vissman	This paragraph is the same as the one above- needs to be deleted.	Deleted.
10.	Page 1-10	P 1.	S. Vissman	The table and the Map 1-1 do not really go together. Map 1-1 does not accurately depict the land use areas on SCI, just the canyon names, airstrip location, MIR location, INLMA, and Fire Support Areas. The "extent of land use areas" is a much broader term. The text should be revised to reflect this. Mining training ranges, Kingfisher, and Underwater Range are not on the map. Nor are many	Now reads: "Table 1-2 and Map 1-1 give locations and land-use areas on the island"

#	Page	Section	Reviewer	Comment	Response
				of the land use areas.	
11.	Page 1-13	Bullet 2.	S. Vissman	This is erroneous. Accuracy of this statement should be improved, or perhaps it should be eliminated. The issue could be appropriately stated as: "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." Recommend modifying the language to something like the italicized statement above.	Modified to reflect your language: 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.
12.	Page 1-13		S. Vissman	Suggest added bullet. Resolution is needed to issues surrounding project-specific impacts and the need to minimize those impacts vs. ongoing stewardship responsibilities of the Navy.	Added: Resolution is needed to issues surrounding project-specific impacts and the need to minimize those impacts vs. ongoing stewardship responsibilities of the Navy.
13.	Page 1-13	last P.	S. Vissman	Should also mention the 1984 Channel Island Recovery Plan.	Added: *1984 Channel Island Recovery Plan*. A Northern Channel Island Recovery Plan for plants has been developed by USFWS and a Southern Channel Island Recovery Plan for plants is in progress.
14.	Page 1-14	sentence 2.	S. Vissman	Delete "after recovery". Redundant	Ddeleted
15.	Page 1-14,	P 2.	S. Vissman	We suggest moving the reference to Biological Opinions to section 2, where the explanation of the ESA is found. In the current place in the text, the reader doesn't know what a biological opinion is. The reader is then referred to Appendix G, which is empty in my draft. The Opinions need to be added. The NRO has not initiated consultation on the Fire Management Plan. Maybe the text should state that the Navy will consult on aspects of the plan that may affect listed species, including fire management, prior to implementation. The appropriate place for this part seems to be in section 2 under the discussion about the ESA 2.3.2.1.	Moved to section 2.3.2.1
16.		*Chapter 2*	S. Vissman	A description of the electrical system- including maps depicting the location of electrical wires, transformers, generators, etc. should be included in this document. The electrical system has apparently been the ignition source for several wildfires on SCI. Appropriate maintenance of this system is one important step in the reduction of wildfire ignitions on the island.	2.1.3 (2-16) POWER DISTRIBUTION: The system consists of approximately 925 poles spanning a distance of 45 miles. Several island sites were recently (1997) connected to the power grid, which significantly increases the efficiency of power production.
17.	Page 2-18	sec. 2.1.4	S. Vissman	Please provide a map of the IR sites on San Clemente Island. The issue of possible effects to natural resources from environmental contaminants should be specifically addressed in the INRMP. The INRMP should contain a historical description of the past use of contaminants, including pesticides, solvents, electrical equipment, fuel storage, munitions storage, dumps, etc. Any known releases should be documented, contaminant pathways discussed, and possible resources impacted should be identified. If this has been accomplished in a document about the Installation Restoration Program, this could be included as an appendix. Alternatively, each of the 16 sites identified on page 2-18 could be described in the text of section 2.1.4. Is Nanny Canyon identified on this list under another name?	Addressed at USFWS/Navy meeting on 12/4/01. A map and summary table are provided.
18.	Page 2-20	section 2.1.6	S. Vissman	We recommend offering a formal conservation education program in addition to the other college-	Language added on page 6-19 "Support the offering

Comments -

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				level course work currently available on SCI. A course could be put into place through one of the existing universities that service the base, in collaboration with all of the natural resources personnel who work on the island.	of a formal conservation education program by one of the universities that services the base, in collaboration with all of the natural resource personnel that work on the island if such a course could be offered at no extra cost to the Navy and did not interfere with its training mission."
19.	Page 2-35		S. Vissman	There is no mention of the California Endangered Species Act. The California Endangered Species Act, and applicability to the island should be described.	Added in section 2.3.2.11 under "State Laws"
20.	Page 2-36,	P 2	S. Vissman	This might be an appropriate place to describe the past B.O. s and how section 7 requirements will be dealt with for this INRMP, the Operations Management Plan, and the Fire Management Plan.	Past BOs are described and the link between the Fire Plan and INRMP is addressed, but how Section 7 consultation for the Operations Plan will proceed is left to that planning process.
21.		*Chapter 3*	S. Vissman	Chapter 3 presents information on the current management on the island. In some areas, little information on current management is provided.	We have included all current management of which we have been made aware.
20	Page 3-22	P 2.	S. Vissman	This section is titles "Current Management- Erosion Control, Road Design and Maintenance", however erosion control measures, or guidelines to minimize erosion are not adequately described. This may be an area of natural resource management that needs more attention on the island.	Added more current management: • 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. • 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.
21	Page 3-22	bullet 3	S. Vissman	This sentence refers to the Site Approval Process, but does not give a reference page within the document. Is the Site Approval Process described in the document somewhere?	Reference added to Site Approval checklist and the checklist is provided in Chapter 6.
22	Page 3-25	section 3.3.6	S. Vissman	is titled "Historic Disturbance Regimes", and is contained within section 3.3, which is titled "What Shapes the Island Today". We recommend changing the title of section 3.3.6 to "Historical and Current Disturbance Regimes", since several of these disturbance regimes are current. Wildland fire is a historical and current disturbance regime, as are introduced plants and non-native animals. It would be appropriate to include the wildfire maps generated by the NRO that show the recent fire history of the island. This information is provided on a unit-by-unit basis in Chapter 5, but would be valuable to include in a more comprehensive fashion (i.e. fire map of the entire island) here as well. Under sections that describe current disturbance regimes, current management of the disturbance should be described. The current fire management, weed control program, and predator management program could be placed here.	Title changed. Map 3-4 included. A current management section on native predators is now included under "Competition and Predation". There already exists a section on current management of introduced animals in section 3.7.3. We have included a section on current fire management here, and current management of weeds can be found in section 3.7.1.
23	Page 3-35	following table 3-4	S. Vissman	It would be useful to provide reference to the pages that list the endemic plants, birds, reptiles, etc.	Pertinent sections are now referenced.
24	Page 3-27	sec. 3.3.6.2	S. Vissman	This chapter describes the status and current management of natural resources on SCI. What is the current management of exotic plant species? This section should describe the current management.	Added: See section 3.7.1 for current management.
25	Page 3-87	sec. 3.6.6	S. Vissman	This section should be titled "Native Terrestrial Mammals", since there is a separate section on	Title has been changed to Native Terrestrial

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				terrestrial mammals that are not native to the island.	Mammals.
26	Page 3-88		S. Vissman	The Service did not include the island fox on the Candidate Notice of Review or on the proposed final rule.	This statement has been changed to reflect this decision.
27	Page 3-88		S. Vissman	We suggest separating the management of native terrestrial mammals from that of non-natives.	Separated
28	Page 3-106	sec. 3.7.1	S. Vissman	The list of invasive plant species identified on the island (currently in the document on page 4-57) should be referenced in this section.	Referenced
29	Page 3-109		S. Vissman	This section refers to rodent poisoning around shrike nesting areas. It should mention that the primary target of these efforts is roof rats (*Rattus rattus*), although mice may also be affected in some areas. Quintox bait stations are elevated when set a specified distance from shrike nests, to reduce the impact on native mouse populations. This should be confirmed with the predator management staff.	Confirmed with Dr. Kelly Brock and added.
30	Page 4-3	para I.C.	S. Vissman	This bullet refers to section 3.4.1, but no mention of the 1992-1993 baseline of 61% of total vegetative cover is found in section 3.4.1. Does the 61% total vegetative cover refer to island-wide vegetative cover, or the cover found on transects within the canyon shrubland/woodland? Does this goal represent increasing island-wide the amount of canyon shrubland/woodland, or increasing the plant density in the existing woodlands?	An introductory paragraph to the habitat section was added to define "baseline" and "reference" condition.
31	Page 4-4	P 2.	S. Vissman	Several sentences refer to the NPS scale, but it is not described in this section. The NPS scale should be described somewhere in the document, and referenced here.	The National Park Service(1992) fire severity index is described in a table in the Fire Management section of Chapter 4.
32	Page 4-6	paragraph I.	S. Vissman	We recommend that this paragraph be modified to read " Within delineated high-density sage sparrow areas, maintain the first terrace boxthorn community in the reference condition...., and improve, where possible, the condition of this plant community by reducing the distribution and abundance of non-native species.	The need for a more specific target is addressed in the response to Comments 1 and 2, above.
33	Page 4-7	para A.	S. Vissman	We still have significant concerns about the use or allowance of fire in this plant community, and especially within delineated high-density sage sparrow areas. The patch-sizes suggested in the following paragraphs are unclear in terms of their significance, and result in numerous questions. What is "fire patch size target"? What is the "standard" that is referred to in paragraphs C and D. How were appropriate patch sizes determined? Is this referring to controlled burns or planning patch sizes for wildfires? If this is information that is to be used by fire management personnel when budgeting and planning fire-suppression resources, we suggest that the information be removed from this document and retained in the fire management plan (bullets A,B,C,D,E). The appropriate fire management guidelines for this plan in this community would be to "minimize the incidence of wildfire in the boxthorn community by appropriate planning and designation of fire prevention and suppression resources", until we better understand any role of fire in maintaining this plant community. We suggest an objective of "maintain at a minimum, the existing cover and distribution of boxthorn on the first and second terraces north of Seal Cove, and within this area monitor the plant community to assure that non-native species do not exceed the percent cover documented in the reference plot".	See response to Comments 1 and 2, above. Patch size targets will be consulted on with USFWS. Some language has been modified for clarity. The patch sizes involve both wildfire and prescribed fire. Patch size targets are to control detrimental fire size, which can result in too homogeneous a plant community with a parallel reduction in wildlife diversity. Large patch sizes can slow re-occupation by wildlife, and slow plant recovery if propagules need to move long distances to reoccupy (if the fire was also severe and these propagules were killed). In an ecosystem with many rare species, patch sizes need also be controlled so that whole species are not affected at any one time.
34	Page 4-7	para F	S. Vissman	Because of the lack of information regarding the appropriate fire return interval for this plant community, we suggest that the fire return interval proposed in this section (5 years) be deleted so the sentence reads "...to prevent a repeat burn".	See response to Comments 1 and 2, above.
35	Page 4-7, 4-8		S. Vissman	para H and para IV are redundant.	Corrected.
36	Page 4-31	figure 4-2	S. Vissman	Not all of the Management Units are identified on the histogram	Corrected.
37	Page 4-38		S. Vissman	This section, which refers to the Island Night Lizard Management Area, needs to be consistent with the Biological Opinion 1-6-97-F-58. In that opinion, a threshold that triggers re-initiation of consultation was identified. Restoration activities also supposed to take place in the INLMA on	Section modified. Divergences from the BO will be consulted on. The INRMP recommends revisiting this BO. Sentence deleted.

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				spur roads and portions of the existing road that are no longer in use. On page 4-39, we recommend that the sentence under IIA be deleted.	
38	Page 4-42	3.e.	S. Vissman	The potential for eradication of black rats and cats from SCI should be included. Restoration of woodland and shrub-land plant communities, and reduction of annual grasslands on the island are important shrike habitat augmentation needs that should be considered in all fire management decisions. Fire management should be used on the island to reduce grasslands and encourage shrub and tree re-establishment.	Language added. We concur with these statements.
39	Page 4-42		S. Vissman	A map of shrike habitat necessary for recovery has been developed in draft form and would be a valuable addition to either this section or the section in chapter 3 that pertains to shrikes. A map of the known release areas/historical and current territories should also be included.	The maps agreed upon by the Navy are in the Appendix containing Species Profiles. The Navy does not concur with certain shrike maps depicting habitat necessary for recovery.
40	Page 4-43	para B.1	S. Vissman	We recommend that this paragraph be deleted. Rather than having the condition degrade, and that be the goal, why not have the goal be to improve the condition of the habitat? Cannot the goal be to retain native species in equivalent or increasing abundance and distribution while reducing the cover of non-native plant species?	See response to Comments 1 and 2, above.
41	Page 4-65	Sec 4.8.	S. Vissman	This does not appear to accurately reflect the existing fire management on San Clemente Island. Bullet one indicates that current firefighting resources on SCI are one fire engine and four fire fighters. During the fire season, SCI also has aerial suppression capabilities on the island. These should be described. The existing fire management should be described in Chapter 3, "Status and Management". Chapter 3 contains a sub-heading titled "Wildland Fire" (3.3.6.1). It should include the aerial suppression resource capability that the Navy has committed to and implemented over the course of the past four years. With the current situation in mind, specific concerns should be added to section 4.8 that reflect the safety concerns expressed by HC-85 during the fire management plan meetings, the issues surrounding the use of salt water on plant communities,	Additional current fire management information is added as requested.
42	Page 4-73	para A.	S. Vissman	The Navy has requested re-initiation of formal consultation regarding ordnance restrictions during the fire season. We recommend that paragraph A be deleted, as this has not yet undergone consultation, and appears to trigger consultation in this planning document.	Deleted.
43	Page 4-72	Figure	S. Vissman	Under Extreme Conditions, the use of pyrotechnics and incendiary devices should be prohibited in SHOBA, where use of these tools is most likely to occur, as well as to the rest of the island.	They are prohibited during the day when conditions are EXTREME, but allowed at night when weather conditions fall into a lower fire danger category.
44	Page 4-74-4-77		S. Vissman	This section delineates "Fire Management Success Targets". There should be a biological basis for these targets.	See response to Comments 1 and 2, above.
45		*Chapter 5*	S. Vissman	Within each "special management emphases" box, include special management that pertains to the natural resource value as well as the military value. For example, the special management emphasis in unit 10, where military value is high and natural resource value is highest, should be different than the special management emphasis in China Cove (unit 16) where military value is highest and natural resource value is medium or at the Airfield (unit 2) where the military value is highest and the natural resource value is lowest.	Included

Comment Matrix
San Clemente Island Integrated Natural Resources Management Plan
January 2002

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1.		3.5	W. Tippets	Ecological Units. The introduction to this section refers to a description of the vegetation condition monitoring program (presumably Land Condition Trend Analysis) in Section 3.7.1.1. This section reference is incorrect; it should be 3.8.1.2. Section references should be checked and corrected throughout the document. The standard LCTA sampling methodology (Tazik et al.) should be referenced in Chapter 8.	Section reference updated, Tazik et. al. was added as a reference in Chapter 8.
2.		3.5.1 - 3.5.9	W. Tippets	Descriptions of Ecological Units. There should be an explanation, at the beginning of this chapter or in Section 3.8.1.2, of how the percent cover values contained in the tables were calculated (for example, whether they were based on the percent of the total number of transect points on which each species was intercepted, or the percent of total intercepts with all species, or some other calculation).	3.8.1.2 changed to read: *Cover data*-recorded at each meter by lowering a 1/4 inch rod and recording what plant species, persistent litter, non-persistent litter (generally woody, a dead plant that is still rooted, or litter more than two inches deep), lichen, moss, bare ground and rock came in contact with it. The percentage cover is represented by the number of "hits" out of 100, and so represents the absolute cover of the species or ground cover type.
3.		Ch.4 General	W. Tippets	Chapter 4 provides a vegetation community-by-vegetation community listing of the key resource concerns/sensitivities, management objectives, and specific actions that will be considered for implementation. There are multiple objectives for most of the vegetation communities, and it is not consistently specified which of the identified actions are a priority. It may not be necessary or possible to provide a complete prioritization of the actions at this juncture, but an indication of the general prioritization of the potential actions/remedial measures would be useful to those who will be implementing the INRMP. For example, Section 4.1.1 (Canyon Shrub/Woodland) includes several woody communities and makes recommendations to prevent erosion, initiate certain studies, reduce non-native vegetation, maintain specified bare ground conditions, foster recruitment of woody species, and attain certain wildfire management conditions. The INRMP could take one of several approaches to prioritizing actions, but it seems important to identify those actions within each vegetation community that are required to comply with existing Section 7 biological opinions for listed species. Based on the information available to date, the INRMP could also identify the highest priority geographic locations in which those identified	Prioritization of actions is the responsibility of the Island's Natural Resources Personnel and is largely based upon funding and compliance with Biological Opinions under the Endangered Species Act. When an action is required under an existing BO we tried to list it as such in the text of Chapter 4. Special Management Emphasis Areas are identified in the individual units in Chapter 5, such as for oak recruitment. The drivers for proposed projects are shown in the Chapter 7 implementation table. A recommendation to refine the priorities for the Plan was added to Chapter 7.

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				actions should occur (e.g., oak recruitment in specified management units or erosion control in specified management units is a priority). It would also be useful to establish a timeline in which a refinement of the prioritization will be accomplished, while continuing those required actions pursuant to the biological opinions.	
4.		Ch. 4, General	W. Tippets	Throughout Chapter 4 there are references to other sections of the document. In a large document such as this, this is very helpful to the reader. However, some of the references are incorrect; this may have resulted from section number changes that have occurred from earlier drafts. Section references should be checked in Chapter 4 and throughout the INRMP and updated if necessary.	Cross-referencing was conducted prior to printing the final document.
5.		4.1.1, I.C, I.E, IV.B.	W. Tippets	Canyon Shrubland/Woodland. In three different instances there is reference to Section 3.4.1 for an explanation of how the baseline conditions were defined using 1992-1993 vegetation data. The reference should be changed to Section 3.8.1.2 (see comment on Section 3.5 above) or to the introduction to Section 3.5.	References were changed to 3.8.1.2 and cross-referenced for automatic updating.
6.		4.1.1 I.F.4	W. Tippets	This section defines a specific maximum acreage (70 acres) and interval period (10 years) for fires of moderate or higher intensity in the island woodland community. It is not clear if this only applies to wildfire events or if prescribed fires also are included; some moderate intensity prescribed fires may be determined to be beneficial to reduce non-natives plants in woodlands, and this condition may preclude using this management technique (which is included as a management tool in item I.F.3).	This section was clarified to include both prescribed fires and wildland fires, and a statement was added about the possible beneficial effects to woodlands of moderate-intensity fires that do not become crown fires.
7.		4.1.1, IV.A	W. Tippets	An explanation is needed of how oak seedling establishment will be accomplished after every reproductive event. Human intervention (i.e., irrigation or caging) may be required to ensure that seedlings survive and are recruited into the sapling size class.	Changed to: Achieve seedling establishment and survival after every reproductive event, by human intervention if necessary which may include irrigation, nursery planting, moving to safe sites, or other means.
8.		4.1.1, IV.D	W. Tippets	There may have been multiple reproductive events during the years that comprise the age difference between the oldest and youngest tree.	Changed to: Determine what is the oldest and what is the youngest tree in order to calculate the maximum length of time between reproductive events, recognizing that there may have been multiple reproductive events between the years that comprise these extremes.
9.		4.1.2 I.	W. Tippets	This section, Maritime Desert Scrub: Boxthorn, states that within delineated high-density sage sparrow areas, 80% of the first terrace boxthorn community should be maintained in the reference condition, and that this condition should be measured over a 7-year El Nino cycle. We concur that limited incursions into these sensitive areas could be tolerated, it is not clear how the 20% encroachment/damage limit would be monitored or if uses would be directed toward specified portions of the area. We recommend that military operations	The introduction of section 4.1 was expanded to include information about how reference conditions were determined and how these conditions will be monitored. A recommendation on coordination between military operators and natural resource managers was added

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				in these (limited) areas develop or review their operation plans in coordination with the island's natural resource managers to document how military activities will adhere to that encroachment level (the matrix tables in Chapter 5 identify potential military/sensitive natural resource conflicts). A similar approach could be developed for other vegetation communities that have a specified percentage of intact habitat to be maintained.	to Chapter 4. A proposal to add long-term monitoring transects in boxthorn and aerial photo monitoring was added.
10.		4.1.2 I	W. Tippets	The boxthorn reference condition of 28% cover does not match the percent cover value of 21.8% contained in the table in Section 3.5.2, page 3-54. If the reference condition is based on data not derived from the 1992-1993 vegetation surveys, this should be explained. How will the determination be made that 80% of the first- and second-terrace boxthorn communities are meeting the management goals? Will this be based on 80 percent of the vegetation transects conforming to these standards? This should be explained in Section 3.8.1.2 (see comments on Section 3.5 above), which would also aid in understanding the similar management goals for the following subsections.	The introduction of section 4.1 was expanded to include information about how reference conditions were determined and how these conditions will be monitored. Reference condition refers to data from plots located in good examples of a particular plant community. Baseline condition is the average condition of the community in 1992-1993 based on stratified-randomly placed plots.
11.		4.1.2. II	W. Tippets	This section discusses fire relationships to the boxthorn community. The "acceptable" specific return intervals, acreage, and fire intensities are based on very preliminary information. We recommend that studies of fire effects on boxthorn and sage sparrows (and other sensitive species) be a priority action. Until more is learned about fire and boxthorn/sage sparrow response, we suggest that the interval, acreage and intensity specifications be considered very preliminary and only used to generally guide the wildfire response (this comment applies to fire effects for all vegetation communities).	Text was added to explain the rationale for assessing community resilience to various fire patterns, which is based on an assessment of risk of extremes…lack of fire as well as very frequent fire, large fires, or intense (hot) fires carry unacceptable risks to ecosystem health. Fire interval estimates are based on ranges known from the mainland and the physiology of dominant plants.
12.		4.1.4, I.A	W. Tippets	Maritime Desert Scrub: Terrace Complex, Proposed Management Strategy. Section 3.4.4 is referred to regarding the 1992-1993 baseline. This reference should be to Section 3.5.4.2. References to other sections should be checked throughout the text of the INRMP, as the multiple drafts of the document may have resulted in Section number changes.	Reference was changed to 3.5.4.2.
13.		4.1.6	W. Tippets	Maritime Sage Scrub. It is not clear how the fire intervals and acreage values were derived. Is the priority action in this vegetation community the prevention of frequent, large wildfires?	See response to no. 11.
14.		4.1.7 and 4.1.8	W. Tippets	Similar concern to that expressed for Section 4.1.6.	See response to no. 11.
15.		4.1.12	W. Tippets	Coastal Salt Marsh. Goals for exotic plant removal from salt marshes should be established. Perhaps reducing upstream sedimentation and restoring the hydrology of the marshes to pre-grazing area conditions would result in the reduction of at least some of the non-native species that are intolerant of frequent inundation.	Recommendation was added: Salt marshes should be periodically monitored for exotic plant species. Non-native species should be removed before they become established.

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16.		4.2.3	W. Tippets	Please rephrase the first sentence to delete “dangerous” and insert the phrase “somewhat subjective” or similar phrase/wording.	Changed “dangerous” to “somewhat subjective”.
17.		4.2.3.1	W. Tippets	Natural Resources Scoring Factors. List of resources used in the analysis: Lettering should start with “A”. References to Table 4-6 should be changed to Table 4-4 (Items H through O). Item G. Explain why sage sparrow density points were weighted.	Lettering now starts with “A”. References to Table 4-6 were changed to Table 4-4.
18.		4.4.1	W. Tippets	Proposed Management Strategy I. The Sawyer Keeler-Wolf Reference should be included in Section 8.0 References.	Reference was added to Chapter 8.
19.		4.4.3	W. Tippets	Subsection “I” states that the INLMA plan will be finalized and implemented. Are all of the actions under subsection “I” required actions? Is the statement that INL surveys will be conducted every 3 years within the INLMA an unchangeable requirement, or can the survey protocol be revised so that annual monitoring, but of fewer, selected sites can be instituted?	Those actions required under the terms and conditions of the BO are identified as such. The survey recommendation was changed to read: “Conduct INL surveys in the INLMA every five years, consistent with the BO on training and the INL. However, seek a change in this requirement to annual monitoring of fewer, selected sites.”
20		4.4.4	W. Tippets	We concur with the community-level management guidelines and recommend that certain actions be made priorities: I.D (restrict access to nesting/breeding grounds to comply with MBTA), I.G (appropriate use of pesticides), I.H (address birds in all project planning), I.I.1 (establish MAPS stations or similar surveys). We suggest an additional objective: restore missing components of the native avifauna (e.g. San Clemente spotted towhee) to San Clemente island.	Prioritization of actions is the responsibility of the Island’s Natural Resources Personnel and is largely based upon funding and compliance. The drivers for proposed projects are shown in the Chapter 7 implementation table. An additional objective was added as requested, but qualified such that the Navy would require an agreement that its mission would not be constrained, and funding would have to come from elsewhere.
21		4.4.4. I. E. 1	W. Tippets	Regarding the use of artificial nest boxes for landbirds, we suggest careful consideration of this proposal prior to implementation. There are viable populations of European starlings and house sparrows present on San Clemente Island. Both species readily use nest boxes for breeding purposes and would be the most likely occupants in an area close to human habitation. Enhancement of the populations of these two pest species is highly undesirable. Further, it is not clear which native landbird species would benefit from such a program.	Recommendation regarding nest boxes was removed.
22		4.4.4. I. F	W. Tippets	The brown-headed cowbird is a native species and thus does not make a good example to support this action item.	Changed to read: If it is determined that a non-native species or a native brood parasite is having a direct effect on a sensitive native species (e.g. Brown-headed cowbirds parasitizing San Clemente sage sparrows), then take

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					appropriate removal actions for pest species.
23		4.4.4. I. I	W. Tippets	Suggested additional item 4: Be aware of and cooperate with the conservation efforts proposed through the DFG's Species of Special Concern program.	Added as requested.
24		4.4.4. II A.3.d	W. Tippets	SCI Loggerhead Shrike. When nests of certain shrike predators are removed, what happens to the contents? Are all eggs and nestlings routinely destroyed or are they incubated and/or held in captivity? If held, when and where are they released?	At this point, no eggs have been removed as the goal is to discourage the presence of these species before they nest. The hope is that this will continue to be the case (K. Brock, pers. comm.). Changed to read: Monitor ravens and raptors and discourage them from nesting within the vicinity of shrike nests.
25		4.4.4.II.B	W. Tippets	San Clemente sage sparrow. We agree that maintaining at least 80% of the first terrace boxthorn community appears to be necessary for the sage sparrow. The specific human-managing items in this sub-section are a good first-step to delineating how that 80% will be assured. As previously discussed in our response, close coordination between the biologists who monitor the sparrow population and military operations planners is essential to ensure that the most important core areas of boxthorn/sparrows are managed consistent with the 80% objective.	Same response as to no. 9.
26		4.4.4 II	W. Tippets	Suggested additional item C. San Clemente Spotted Towhee. The San Clemente Spotted Towhee is included on the DFG's draft Bird Species of Special Concern list as a first priority species. Although extirpated from San Clemente Island in the 1970s, this taxon is doing well on Santa Catalina Island where the population is estimated to number about 2000-5000 pairs. In order to remove this taxon from the Department's SSC list, another viable population must be reestablished within the historic range. Therefore, we recommend as part of a multi-species landbird conservation program, the San Clemente Spotted Towhee be reintroduced to San Clemente island. The reintroduction should take place only when there are no impacts to the recovery of the San Clemente sage sparrow and SCI loggerhead shrike.	Additional section addressing San Clemente Spotted Towhee was added. The management strategy recommends determining the efficacy of re-introducing this species on SCI.
27		4.4.5	W. Tippets	Shorebirds. Under "Specific Concerns" the first bulleted item should be corrected as follows: "San Clemente provides wintering habitat and breeding habitat for the federally-listed Western snowy plover."	Changed as requested.
28		4.4.5 II. A. 1	W. Tippets	We recommend monthly monitoring of the snowy plover population on SCI.	Changed to monthly monitoring.
29		4.4.5 II. A	W. Tippets	Suggested additional item 5. All snowy plover nests found will be protected with exclosures and/or symbolic fencing with interpretive signs (see USFWS draft Recovery Plan appendix F).	Added as requested.
30		4.4.5 II. A	W. Tippets	Suggested additional item 6. 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.	This suggestion cannot be added because it constrains training.
31		4.4.5 II. A	W. Tippets	Suggested additional item 7. Human disturbance should be minimized at West	The Navy anticipates a conflict by way of

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				Cove from 15 March - 31 July for at least two consecutive years to allow plovers to successfully breed.	predation of any plover young by feral cats and by the island fox, another sensitive species. For this reason, conversion of the wintering plover population to a nesting population will not be actively encouraged.
32		4.4.5 II. A	W. Tippets	Suggested additional item 8. Removal of feral cats should continue at all beach sites.	Added as requested.
33		4.4.5 II. A	W. Tippets	Suggested additional item 9. Removal of ravens should target the beach areas, especially around Horse Beach and be conducted from 1 March through 31 July.	Added as requested.
34		4.4.6	W. Tippets	Seabirds. General Comments: We understand Seal Cove is sometimes used as an anchorage and that Castle Rock is used as a Navy target for shooting practice. All human disturbance should be eliminated from the seabird nesting colonies during the breeding season to help avoid nest failures. There is so little breeding habitat available for seabirds at San Clemente Island that protection of every site is sorely needed.	Added new recommendations: -Identify and limit disturbance to sea stacks and rocky shores potentially used by sea birds. -Known seabird colony locations include cliffs south of Lost Point, Seal Cove, China Cove, Mosquito Cove, and Castle Rock. -Do not use sea stacks, or known colony locations, as military targets.
35		4.4.6	W. Tippets	Identification and protection of essential roosting habitat is listed as one of the primary objectives for the federal recovery plan for the California Brown pelican. Basic requirements for communal night roosts are inflexible and include the following: 1) they must be within energetically efficient distances from foraging areas, 2) they must be buffered from mammalian predators and human disturbances, and 3) they must provide shelter from strong winds and surf spray (USFWS 1983). As the species is highly sensitive to human disturbances, protection of pelican night roosts should be a high priority.	Roost requirements were added to section 3.6.4 and following recommendation was added to Chapter 4: Identify and protect essential roosting habitat of the California brown pelican on SCI.
36		4.4.6	W. Tippets	Brandt's cormorant, while not listed as threatened or endangered by the State or federal government or considered a species of special concern by the DFG is one of the most sensitive of seabird species to disturbance. Numbers of breeding birds at San Clemente Island are fairly small (about 125 pairs) but have grown over the last decade. The most important nest site (about 100 pairs) is at Bird Rock (in NW Harbor). This location is amidst a very busy Naval operations area. The Navy needs to keep people from landing on the rock during the breeding season (approximately January through August); such an event could lead to total loss for the year's breeding effort. The other regularly used Brandt's Cormorant nest site (about 20 pairs) is on the SW side of the island, on some cliffs about some two miles southeast of Lost Point (in a colony named "Lost Point South"). Smaller numbers (<10 pairs) nest occasionally on some rocks in Seal Cove (about mid-way down the west side of the island) and	Added as requested (see response to comment #34).

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				on Castle Rock (off the north tip of the island) (G. McChesney pers. com.).	
37		4.4.6	W. Tippets	In the last few years, Double-crested Cormorants(currently a BSSC, DFG 1992) started nesting on some cliffs above a narrow cove just north of Seal Cove (G. McChesney pers. com.).	Added as requested (see response to comment #34).
38		4.4.6	W. Tippets	Ashy Storm-petrel breeds in very small numbers at San Clemente Island (10 individuals) (Carter et al. 1992). It is a second priority species of special concern. A comprehensive survey for this species is warranted. Additionally, this species will use nest boxes; a breeding enhancement program using nest boxes could be undertaken to increase nesting opportunities for this species.	Added as requested (see response to comment #34).
39		4.4.6 I. B	W. Tippets	Xantus' Murrelet. Breeding at San Clemente Island had long been suspected (Jehl and Bond 1975) and was confirmed in 1994 by H. Carter when eggshell fragments were seen on an offshore rock near Seal Cove (Drost and Lewis 1995). 125 individuals were found during the breeding season on San Clemente Island by Carter et al. 1992 indicating a small core breeding population. Crevice nesting seabirds such as Xantus' Murrelet and Ashy Storm-petrel are nocturnal, largely to escape predation pressure from diurnal predators such as Western gulls. Nocturnal predators such as the barn owl are known predators of Xantus' murrelets. Military operations conducted at night with aid of high intensity artificial light may provide barn owls with additional opportunities to prey upon Xantus' murrelets. Such lighting should not be within Xantus' murrelet breeding territory.	Added as requested (see response to comment #34). Following recommendation was also added to address light issue: Avoid high-intensity artificial light near Xantus' murrelets breeding sites, which may allow increased predation by barn owls.
40		4.4.7 III	W. Tippets	San Clemente Island Fox. General comment: The population is apparently in decline on the island but the decline does not appear to be an island-wide effect. It is most pronounced in the area where the foxes have been manipulated to benefit the San Clemente Island Loggerhead Shrike (D. Garcelon pers. comm.).	This information was added to the species profile in Appendix D.
41		4.4.7 III. B	W. Tippets	The statement should be modified as follows "continue to remove foxes from breeding shrike territories using non-lethal means." We recommend that foxes not be held in captivity during the pair bonding and pupping season. Spend a short, intense amount of time engaged in fox manipulations early in the season (February) and then cease fox manipulations for the next 5 months, when at all possible. Cat box traps are catching too many foxes and too few cats. Therefore, we recommend not using them. Rather, spot-lighting and shooting seems to be an effective target-specific means of removing cats. Leg-hold traps may be used but there has been some injury to foxes reported.	The Navy is no longer removing foxes from shrike territories because the fox is also considered a sensitive species and it was found to be too disruptive to their behavior. A Cooperative Conservation Agreement is currently in development with USFWS. Also recommend focusing work on better understanding effects of trapping program on foxes.
42		4.4.7 III D	W. Tippets	We concur with the proposal to mow the sides of the roads so it is easier to see foxes and reduce road kills and to establish an education program to sensitize residents to the problem. We understand the educational program implemented at San Nicholas Island has been very successful in reducing island fox mortality from road kills and could serve as a model for San Clemente Island.	Added following sentence: A similar education program implemented at San Nicolas Island, that has been very successful, could be used as a model.
43		4.4.7 III	W. Tippets	Suggested additional item F. 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	Added as requested.

#	Page	Section	Reviewer	Comment	Response
				which reduce standing crop biomass.	
44		4.8	W. Tippets	Wildfire Management. We agree with the proposed strategy/objectives and recommendations for increasing the fire fighting capability of SCI staff. The Fire Danger Rating system appears to be reasonable and implementable. As stated previously in our comments, the targets for fire interval (recurrence), acreage burned, and intensity in the vegetation communities are very preliminary and should only be used as guidelines. One of the priorities for the island's biology should be to evaluate the effects of fires (wildfire and prescribed) on key biological resources, and abiotic features such as erosion rates, where relevant.	The recommended study was added as a high-priority research and monitoring item.
45		Ch. 5, General	W. Tippets	As the distributions of non-listed plants are not mapped separately from one another in the natural resources map for each management unit, a reference to Appendix C would be helpful to the reader.	Added in introduction to Chapter 5.
46		Table 5-1	W. Tippets	Table does not indicate any potential effects from "Battalion Landings" - is this because these operations are prohibited/not applicable in this area (if so, note not applicable or prohibited on the table)? If these activities are allowed, it appears that potential impacts could occur to the sage sparrow and wintering western plovers from the larger foot landings (low for the 1-10, medium for 10+).	Battalion landings do not occur within Unit 1. Tables were changed to reflect whether specific training activities do not occur within that unit by adding "Not Applicable".
47	5-16		W. Tippets	Unit 3 (Dolphin Bay). Under Management, there is some repetition of goals and information among the first, third, and fourth bulleted items in the list; they could be combined into one or two items.	Edited as requested.
48		Table 5-16	W. Tippets	Table identifies only one "low" potential effect from "Battalion Landings" for animal species. It appears from the resources map that there is at least a "low" to "medium" potential effect from battalion landing on sage sparrows, shrikes, western snowy plovers and marine mammals.	The infantry operations (battalion landings) in this unit are restricted to a very small area on the northeastern boundary of the unit. Potential effects were added for the loggerhead shrike.
49		Appendix B, General	W. Tippets	General comment: We strongly recommend the species list be arranged taxonomically in its entirety rather than in its present format. It is very difficult to find taxa quickly. The following corrections to the species list are referenced by page number.	The list was arranged taxonomically in its entirety.
50	B-20	Appendix B	W. Tippets	Change title "Herptiles" to "Reptiles".	Changed as requested.
51	B-20	Appendix B	W. Tippets	Regarding Pipilo maculatus clementae San Clemente spotted towhee. This taxon is not extinct. It has been extirpated from San Clemente island since 1970s. However, it is still common on Santa Catalina island. It is included as a first priority species on the draft BSSC list (L. Comrack pers. comm. 2001).	Changed to extirpated.
52	B-20	Appendix B	W. Tippets	Regarding Xantusia riversiana, Amphispiza belli clementae and Lanius ludovicianus mearnsi, add status designation SSC for consistency. All federally-listed terrestrial vertebrates not state-listed are automatically considered Species of Special Concern by the DFG.	Added "CSC", California Species of Concern. This is consistent with the rest of the document.
53	B-21	Appendix B	W. Tippets	Under Non-residents, Gaviiformes, change the scientific name Gavia arctic to Gavia pacifica and the common name Arctic loon to Pacific loon. This taxon	Changed as requested.

#	Page	Section	Reviewer	Comment	Response
				was split some years ago into two separate species. Pacific loon winters commonly in the state; Arctic loon is accidental in the state (one record only that we know of at Abbott's lagoon, Marin County).	
54	B-22	Appendix B	W. Tippets	Under Falconiformes, add status designation "Fully Protected" to Elanus leucurus White-tailed Kite. (See Fish and Game Code Section 3511)	Added as requested.
55	B-23	Appendix B	W. Tippets	Under Charadriiformes, Sterna maxima Royal Tern add status designation SSC. It is included as a third priority species on the draft BSSC list (L. Comrack pers. com. 2001).	Added as requested.
56	B-23	Appendix B	W. Tippets	Under Columbiformes, remove Columba livia (rock dove) from the non-residents list. Add to the Introduced List instead.	Added as requested.
57	B-24	Appendix B	W. Tippets	Under Passeriformes, add status designation SSC for the following taxa: Ammodramus savannarum Grasshopper Sparrow, Catharus ustulatus Swainson's Thrush and Contopus cooperi Olive-sided Flycatcher. All are considered second priority species on the draft BSSC list (L. Comrack pers. com. 2001)	Added as requested.
58	B-26	Appendix B	W. Tippets	Under Passeriformes, add status designation SSC for Toxostoma bendirei Bendire's Thrasher (DFG 1992).	Added as requested.
59	B-26	Appendix B	W. Tippets	Under Mammals, Native, change common name of Plecotus townsendii from Townsend's long-eared bat to Townsend's big-eared bat.	Changed as requested.
60	B-31	Appendix B	W. Tippets	Under Mollusca, SCI Endemics, change scientific name of land snail Micrarionta redimita to Xerarionta redimita. (NDDB 2001)	Changed as requested.

Comments -

#	Page	Section	Reviewer	Comment	Response
1.		General	Bertram J. Serden	None of the working group represents the sport-fishing public which uses the seas surrounding San Clemente Island for recreational purposes. Aren't we important?	The footprint of this INRMP extends only 300 yards into the water, and the subject matter is largely terrestrial. In addition, the sport-fishing public will be invited to participate in the public process dictated by the Environmental Impact Statement on the SCI Operations Management Plan.
2.		General	Jim Kiech	Speaking as a sport fisherman, I feel that the Navy has found a new way, with the backing of the environmentalist, to restrict those pesky fishermen in their small boats from getting in the way of military maneuvers at San Clemente. So quite frankly, I'm wasting my time here because the decision has already been made, the Navy and the environmentalists have the POWER. Speaking as an X-Marine who gave 4 years of his youth to you and 1 year in Viet Nam, I feel screwed by the military again, as if you give a s----.	The Navy does not intend to exclude sport fisherman from surrounding waters except in matters of safety, security, and incompatibility with sensitive natural resources.
3.		General	Walt Arrington, Long Beach Neptunes Freediving Spear-fishing Club	I am the representing member of the Long Beach Neptunes Freediving Spearfishing Club, and I received Capt. Landon's letter dated October 21, 2001. I apologize for my tardiness in getting you my comments on behalf of our Club. I first would like to explain our sport. We snorkel (without the use of Scuba) in kelp beds and there fringes as well significant drop offs to spear migrating pelagic fish. We obey all fish and game sport-fishing regulations. As divers we have the ability to identify the species and its size before attempting to spear the fish. Because we are swimmers and generally in small boats we will anchor in shallower reef depths of 30-40 feet (in sand) before swimming out to drop offs at 100 foot depths. In the Kelp Bed areas we are swimming sometimes in shallower depths. The diving in Kelp Beds is for the pelagic White Sea Bass. The diving on the deeper blue water is for Yellowtail, Bluefin Tuna, and Yellowfin Tuna. It is also important that anchorages are maintained (not be off limits) so that we can use the island for necessary shelter and stopping point for fishing location outside the island as well as fishing nearby. The fishing just off the island serves as alternative should the weather or seas be too harsh for our boats or our sport. Because we snorkel San Clemente Island, especially during the summer months, weekends	These helpful comments and observations are acknowledged for providing sufficient detail about the freedivers' sporting requirements that consideration in the context of this Plan is facilitated.

#	Page	Section	Reviewer	Comment	Response
				provide for safety on the surface as compared with closer in locations such Santa Catalina Island, which has significant boat and recreational traffic. Finally we are the eyes underwater we have seen tremendous surge in life and growth of many plants and animals around the San Clemente Island. Black Sea Bass which we would never see 10 years ago now are plentiful in sizes over 200 pounds. They can be found mating just under our anchored boats. White Sea Bass hunted by net fishing have come back very strong in recent years as a result of the ban on gill netting our club helped support. The total number of spear fishermen accessing the island during a typical summer is probably 200. The total number of active free-diving spear fisherman in the State of California is less than 1000. Our club is only 80 divers. We are involved in conservation efforts as our take represents less than 1% of the total fish taken in the world. We do not want to be confused with a scuba diver who might take fish off a reef that are territorial and therefore upset the ecosystem of and Island reef area, but we will need access thru these areas to get to the blue water or hunt in the kelp for pelagics passing through the area during their annual migrations.	

Appendix I: San Clemente Island Integrated Natural Resources Management Plan Environmental Assessment

DEPARTMENT OF THE NAVY
COMMANDER IN CHIEF
UNITED STATES PACIFIC FLEET
250 MAKALAPA DRIVE
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:
5090
Ser N46523/0492
26 Mar 02

From: Commander in Chief, U.S. Pacific Fleet
To: Commander, Navy Region Southwest (N45)

Subj: FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR PROPOSED IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP), NAVAL BASE CORONADO, SAN DIEGO COUNTY, CALIFORNIA

Ref: (a) COMNAVREG SW ltr 5090 Ser N45R2/020 of 25 Feb 02
(b) OPNAVINST 5090.1B

Encl: (1) Finding of No Significant Impact (FONSI)
(2) Notice of Availability (NOA)

1. An Integrated Natural Resource Management Plan (INRMP) and accompanying Environmental Assessment (EA) for Naval Base Coronado, San Diego County, California were forwarded by reference (a) for review in accordance with reference (b). It has been determined that preparation of an Environmental Impact Statement (EIS) is not required and that neither the proposed action nor management measures would generate significant impacts. Accordingly, it is considered that, with implementation of the following paragraph and any mitigation measures described in enclosure (1), compliance with the National Environmental Policy Act and the Sike's Act Improvement Act of 1997 has been effected, and the proposed management measures described in the above plan may be initiated.

2. The Council on Environmental Quality regulations require public notification of the availability of the EA and of the decision not to prepare an EIS. If appropriate, publication in a foreign-language newspaper should also occur.

Subj: FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR PROPOSED IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP), SAN CLEMENTE ISLAND, NAVAL BASE CORONADO, CALIFORNIA

Please provide verification of local publication to CINCPACFLT (N465) upon implementation. The INRMP and accompanying EA should be retained in project files for possible future use.

3. Point of contact is Ms. Karen A. Verkennes, N46523, at COMM/DSN (808) 474-0745 or E-mail VerkenKA@cpf.navy.mil.

Date 26 March 2002

D L Crisp
D.L. CRISP
Deputy Chief of Staff, for
Shore Installation Management

Copy to:
NAVAL BASE CORONADO (CO)
SOUTHWESTNAVFACENGCOM (Code 5GENP, 5GPN.TC)
CNO WASHINGTON DC (N456)
CHINFO WASHINGTON DC

DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY

FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR ENVIRONMENTAL ASSESSMENT (EA) FOR THE PROPOSED IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP) FOR SAN CLEMENTE ISLAND, SAN DIEGO, CALIFORNIA

Pursuant to Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] §§ 1500-1508) implementing procedural provisions of the National Environmental Policy Act (NEPA), the Department of the Navy gives notice that an EA has been prepared and an Environmental Impact Statement (EIS) is not required for the implementation of an INRMP for San Clemente Island, San Diego, California.

In January 2002, the INRMP was prepared in accordance with the Sikes Act Improvement Act (SAIA) which requires the Secretary of Defense to carry out a program for the conservation of natural resources on military installations. To facilitate this program, the SAIA states that all Navy facilities with natural resources will prepare and implement an INRMP. The goal of the INRMP is to implement an ecosystem-based program that provides for conservation and rehabilitation of natural resources in a manner that is consistent with military mission; integrates and coordinates all natural resources management activities; provides for sustainable multipurpose uses of natural resources; and provides limited public access for use of natural resources subject to safety and military security considerations. The INRMP objectives would integrate fish and wildlife management, land management, and management for outdoor recreational opportunities as practicable and consistent with the military mission and established land uses.

The proposed action would implement the overall goals and actions described in the INRMP. Any requirement for the obligation of funds for projects in this INRMP, evaluated in this EA, 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 USC § 1341 *et seq*.

The EA addresses the preferred alternative and the no-action alternative. The preferred alternative comprises the proposed action, described above. The no-action alternative comprises continued implementation of existing natural resources management programs at San Clemente Island, implementing those actions that are legally required. On-going practices used for management of natural resources at San Clemente Island would continue and there would be no change to the objectives of current natural resources management programs.

Direct, indirect, and cumulative impacts of the proposed action and the no-action alternative were analyzed for the following resources: geology/seismicity; soils; hydrology and water quality; air quality; vegetation communities; biological resources including sensitive plant and wildlife populations; land use; traffic and circulation; noise; aesthetics; cultural resources; public facilities/ access/recreation; safety and environmental health; utilities; and socio-economics. The Department of the Navy determined that all potential environmental impacts from the proposed action would not be significant. The following paragraphs summarize potential impacts on environmental resources.

The proposed INRMP management effects on soils, hydrology and water quality, vegetation communities, biological resources including sensitive plant and wildlife populations, land use, aesthetics, cultural resources, and public facilities/access/recreation would have a beneficial impact, including cumulative impacts. The proposed INRMP management effects on air quality, traffic and circulation, noise, safety and environmental health, utilities, and socio-economics would have no effect.

A Record of Non-Applicability (RONA) for Clean Air Act Conformity was approved and signed in February 2002. Based on information gathered during preparation of the EA, the Department of the Navy finds that the proposed implementation of the INRMP will not significantly impact the environment.

The EA addressing this action may be obtained from: Commander, Southwest Division, Naval Facilities Engineering Command, 2585 Callagan Highway, Building 99, San Diego, CA 92136-5198. Attn: Christine Tuttle, Code 5SPR.CT, telephone (619) 556-8706.

After careful review of the EA prepared in accordance with the requirements of NEPA, CEQ regulations, and Department of Navy Procedures for implementing NEPA, I have determined that implementation of the proposed action would not have significant impacts on the natural and human environment; therefore, an EIS does not need to be prepared.

26 March 2002
DATE

D L Crisp
D. L. CRISP
Rear Admiral (sel), U.S. Navy
Deputy Chief of Staff
Shore Installation Management
U.S. Pacific Fleet

DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY

NOTICE OF AVAILABILITY OF THE FINDING OF NO SIGNIFICANT IMPACT (FONSI) AND ENVIRONMENTAL ASSESSMENT (EA) FOR PROPOSED IMPLEMENTATION OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP) SAN CLEMENTE ISLAND, NAVAL BASE CORONADO, SAN DIEGO, CALIFORNIA

Pursuant to Council on Environmental Quality regulations (40 CFR Parts 1500-1508) implementing procedural provisions of the National Environmental Policy Act (NEPA), the Department of the Navy gives notice that an EA has been prepared and an Environmental Impact Statement (EIS) is not required for the proposed implementation of an INRMP for San Clemente Island, Naval Base Coronado, California.

The proposed action would implement the overall goals and actions described in the INRMP, as well as implement the specific Department of the Navy projects. The execution of any of the INRMP projects will be dependent on the availability of appropriate funding sources.

The goal of the INRMP is to implement an ecosystem-based conservation program that provides for conservation and rehabilitation of natural resources in a manner that is consistent with the military mission; integrates and coordinates all natural resources management activities; provides for sustainable multipurpose uses of natural resources; and provides for limited public access for use of natural resources subject to safety and military security considerations. The INRMP management objectives are to integrate fish and wildlife management, land management, and management for outdoor recreational opportunities, as practicable and consistent with the military mission and established land uses.

Direct, indirect, and cumulative impacts of the proposed action and the no action alternative were analyzed for the following resources: geology/seismicity; soils; hydrology and water quality; air quality; vegetation communities; biological resources including sensitive plant and wildlife populations; land use; traffic and circulation; noise; aesthetics; cultural resources; public facilities/access/recreation; safety and environmental health; utilities; and socio-economics. The Department of the Navy has determined that all potential environmental impacts from the proposed action will not be significant.

Based on information gathered during preparation of the EA, the Department of the Navy finds that implementation of the Proposed Action will not significantly impact the environment. The EA and FONSI prepared by the Navy addressing this action is on file and interested parties may obtain a copy from: Commanding Officer, Southwest Division, Naval Facilities Engineering Command, 2585 Callagan Highway, Building 99, San Diego, California, 92136-5198, Attn: Christine Tuttle, telephone (619) 556-8706.

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

February 2002

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

San Clemente Island, California

February 2002

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.

For further information, contact:
Mr. Jan Larson, Director, Natural Resources
U.S. Department of the Navy
Commander Navy Region Southwest
937 No. Harbor Dr.
San Diego, CA 92132-0058

Prepared for: Commander, Navy Region Southwest, Natural Resources Office. Prepared under contract to: Southwest Division, Naval Facilities Engineering Command, 1220 Pacific Hwy, San Diego, California, Contract #N68711-99-D-6619/0021. Points of Contact: Tamara Conkle, Commander Navy Region Southwest; Danielle Flynn or Kimberly O'Connor (Natural Resources) and Christine Tuttle (Planning), Southwest Division Naval Facilities Engineering Command.

Prepared by: Tierra Data Inc., 10110 W. Lilac Road, Escondido, CA 92026
Points of Contact: Elizabeth M. Kellogg and Cory Davis.

TABLE OF CONTENTS

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.

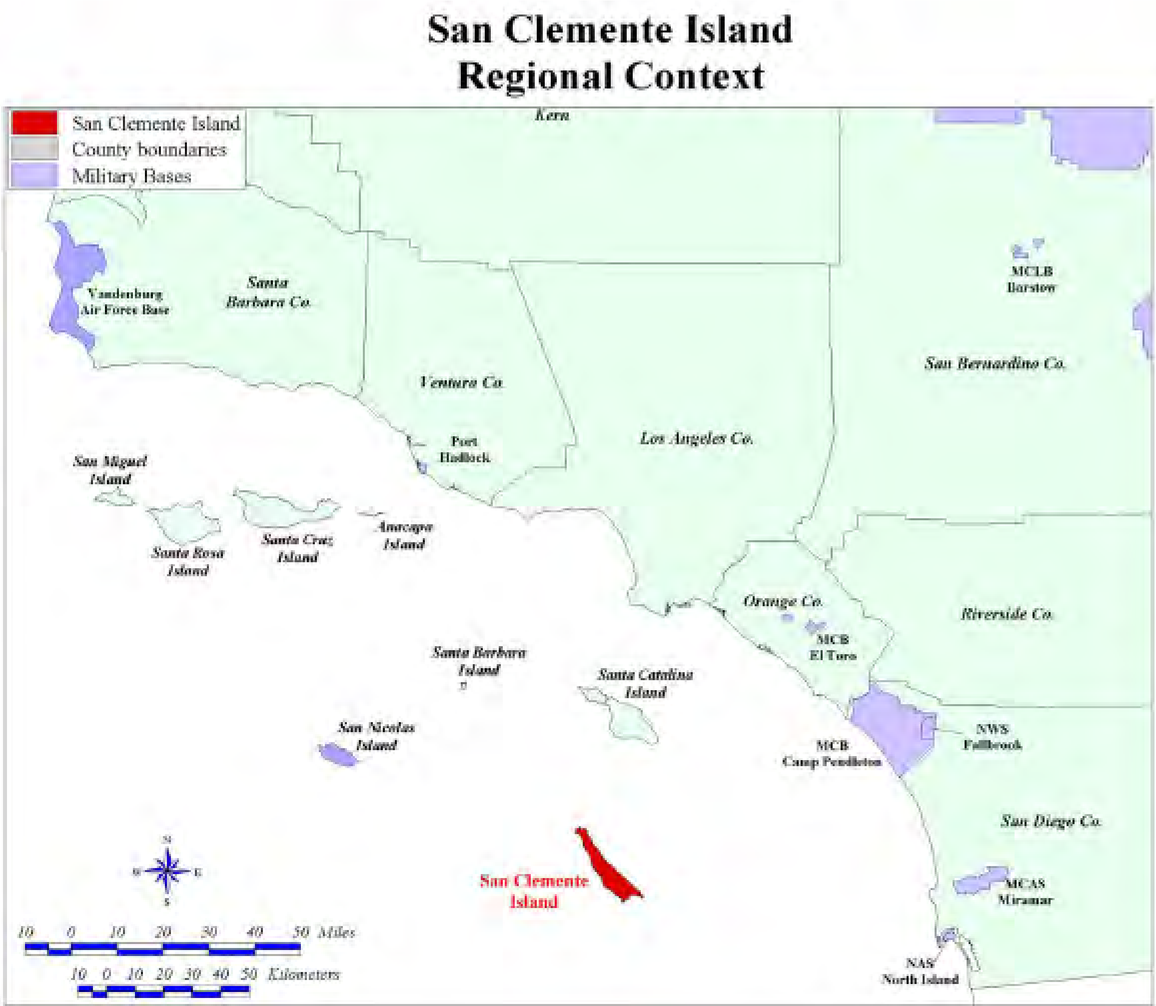
1.1 Military Mission

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).



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 filfolia),* 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, ecosytem-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 ffect=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 nd 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*.

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

- o 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
- o Memorandum of Understanding by the National Park Service on Outdoor Recreation
- o 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

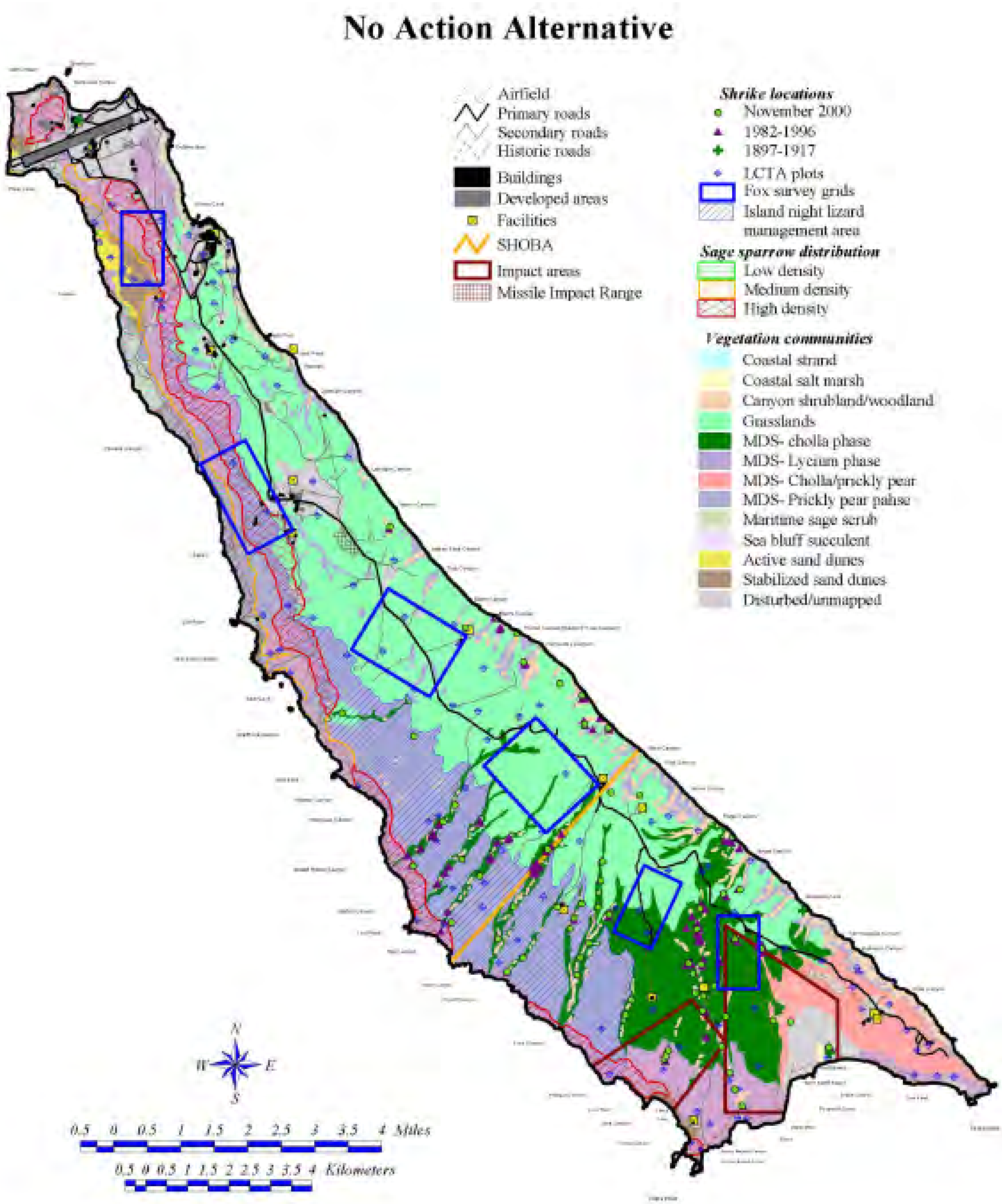
A summary of the terms and conditions of the various USFWS BOs is in Appendix C of the INRMP. The No-Action Alternative reacts to BO conditions rather than managing as an ecosystem.

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 compatability
- 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.



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, Forminifera, 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 droughtiest 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 8-hour	40 mg/m^3(35 ppm) 10 mg/m^3(9 ppm)	40 mg/m^3 (35 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 8-hour	235 μg/m^3 (0.12 ppm) (0.08 ppm)[c]	235 μg/m^3 (0.12 ppm)
Particulate Matter (PM_{10})	24-hour Annual	150 μg/m^3 50 μg/m^3	150 μg/m^3 50 μg/m^3
Sulfur Dioxide (SO_X)	3-hour 24-hour Annual	-- 365 μg/m^3 (0.14 ppm) 80 μg/m^3 (0.03 ppm)	1,300 μg/m^3 (0.5 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 3-2) 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.

	Ozone Federal standard=.12 ppm[1] State standard=.09 ppm[1]		**Nitrogen Dioxide** Federal standard=.05 ppm[2] State standard=.25 ppm[1]	
Month	**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 an 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 the 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

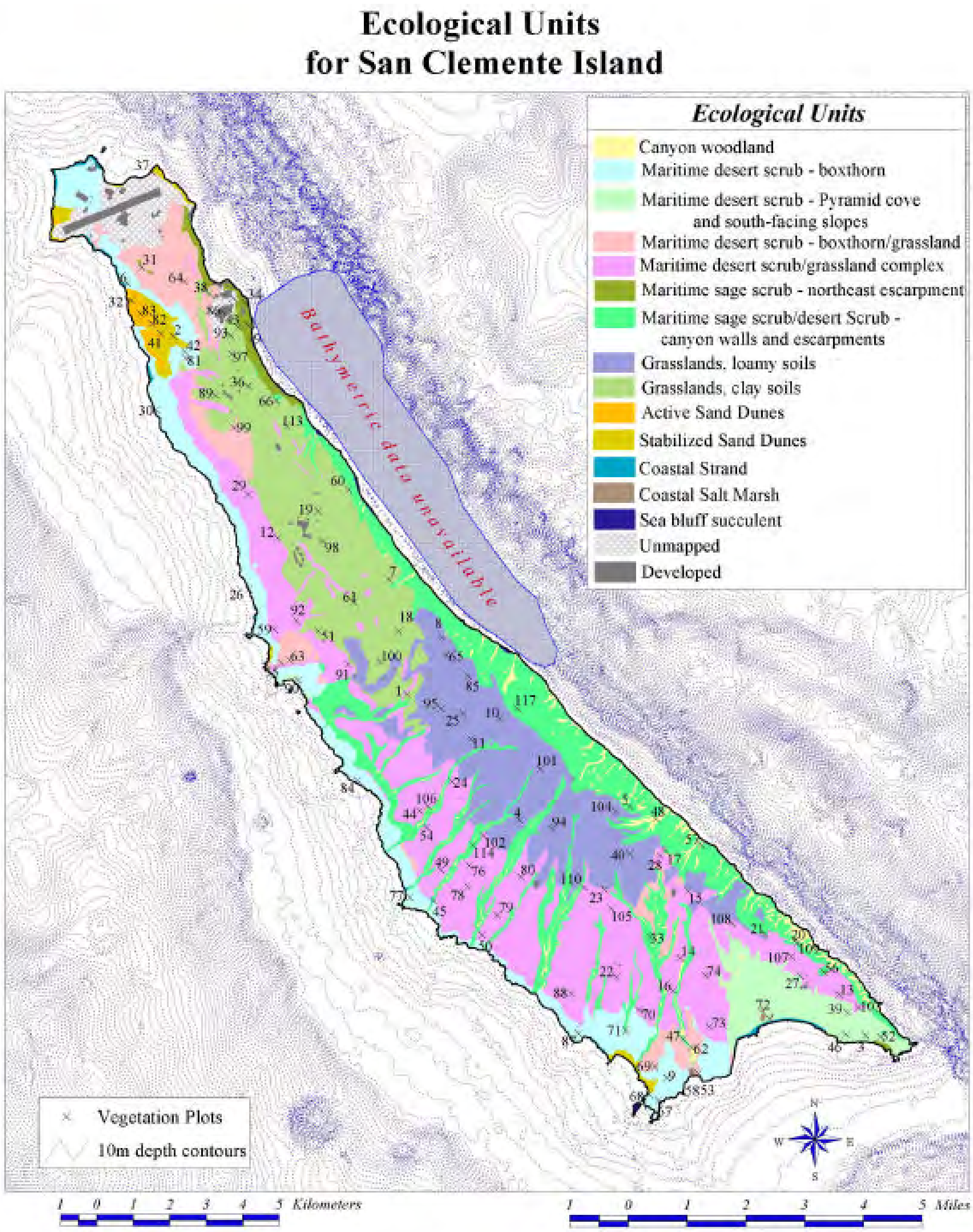
3.1.4.1 Vegetation Communities

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	Acres	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



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 cryptograms, 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	*Delphinium variegatum* ssp. *kinkiense*	FE, SE	1B	G4T1, S1.1
Thorne's royal larkspur	*Delphinium variegatum* ssp. *thornei*	FC2	1B	G4T1, S1.1
San Clemente Island buckwheat	*Eriogonum giganteum* var. *formosum*	FC2	1B	G2T2, S2.2
San Clemente Island bush mallow	*Malacothamnus clementinus*	FE, SE	1B	G1, S1.1
San Clemente Island woodland star	*Lithophragma maximum*	FE, SE	1B	G1, S1.1
San Clemente Island broom	*Lotus dendroides* var. *traskiae*	FE, SE	1B	G4T2, S2.1
San Clemente Island silver hosackia	*Lotus argophyllus* var. *adsurgens*	FC2, SE	1B	G5T1, S1.1
San Clemente Island milkvetch	*Astragalus nevinii*	FC2	1B	G2, S2.2
San Clemente Island evening primrose	*Camissonia guadalupensis* ssp. *clementina*	FC2	1B	G2T1, S1.2
San Clemente Island Indian paintbrush	*Castilleja grisea*	FE, SE	1B	G2, S2.2

Common Name	Scientific Name	USFWS, CDFG Status	CNPS Status	Global, State CNDDB Rank
San Clemente Island bedstraw	*Galium catalinense* ssp. *acrispum*	FC2, SE	1B	G4T2, S2.2
Blair's Stephanomeria	*Stephanomeria blairii*	FC2	1B	G2, S2.2
San Clemente Island brodiaea	*Brodiaea kinkiense*	FC2	1B	G2, S2.2
San Clemente Island triteleia	*Triteleia clementina*	FC2	1B	G1, S1.2
Channel Island Endemics				
Channel Island tree poppy	*Dendromecon harfordii* var. *rhamnoides*	FC2, Presumed extirpated from SCI	1B	G4T1, S1.1
island poppy	*Eschscholzia ramosa*		4	G3, S3.3
island oak	*Quercus tomentella*		4	G3, S3.2
Santa Catalina Island buckwheat	*Eriogonum grande* var. *grande*		4	G2T2, S2.2
southern island tree mallow (malva rose)	*Lavatera assurgentiflora* ssp. *glabra*	FC2	1B	G2T2, S2.1
Santa Cruz Island rock cress	*Sibara filifolia*	FE	1B	G1, S1.1
island green dudleya	*Dudleya virens* ssp. *virens*	FC2	1B	G2T2, S2.2
island jepsonia	*Jepsonia malvifolia*	FC2	4	G4, S3.3
Santa Cruz ironwood	*Lyonothamnus floribundus* ssp. *asplenifolius*	FC2	1B	G2T2, S2.2
Christmas berry or toyon	*Heteromeles arbutifolia* var. *macrocarpa*	No official status but of local concern.		
San Miguel milkvetch	*Astragalus miguelensis*		4	G3, S3.3?
Guadalupe Island lupine	*Lupinus guadalupensis*	FC2	1B	G2, S2.2
Palmer's clover	*Trifolium gracilentum* var. *palmeri*		4	G5T3, S3.2
island big-pod ceanothus	*Ceanothus megacarpus* var. *insularis*		4	G5T3, S3.3
island redberry	*Rhamnus pirifolia*		4	G3, S3.2
San Nicolas Island lomatium	*Lomatium insulare*	FC2	1B	G2, S2.1
island morning-glory	*Calystegia macrostegia* ssp. *amplissima*	FC2	4	G4G5T3, S3.3
Nevin's gilia	*Gilia nevinii*		4	G3, S3.2
pygmy linanthus	*Linanthus pygmaeus* ssp. *pygmaeus*		1B	G4T2, S1.2
San Clemente Island phacelia	*Phacelia floribunda*	FC2	1B	G2, S1.1
seaside fiddleneck	*Amsinckia spectabilis* var. *nicolai*	No official status but of local concern. This subspecies is no longer recognized.		
Trask's cryptantha	*Cryptantha traskiae*	FC2	1B	G2, S2.2
island snapdragon	*Galvezia speciosa*	FC2	1B	G2, S2.2
Santa Catalina figwort	*Scrophularia villosa*	FC2	1B	G2, S2.2
island sagebrush	*Artemisia nesiotica*		4	G3, S3.3
San Clemente Island hazardia	*Hazardia cana*	FC2	1B	G2, S2.2
leafy malacothrix	*Malacothrix foliosa* ssp. *foliosa*		4	G4T3, S3.2
island tarplant	*Hemizonia clementina*		4	G3, S3.3
Nevin's eriophyllum	*Eriophyllum nevinii*	FC2	1B	G2, S2.3
California dissanthelium	*Dissanthelium californicum*	Presumed Extinct	1A	GH, SH
Other Natives				
aphanisma	*Aphanisma blitoides*		1B	G2, S1.1
Robinson's pepper-grass	*Lepidium virginicum* var. *robinsonii*		1B	G5T2?, S?
island apple-blossom	*Crossosoma californicum*		1B	G3, S3.2
Santa Catalina Island desert thorn	*Lycium brevipes* var. *hassei*	Presumed Extirpated from SCI	1B	G4T1, S1.1
small-flowered microseris	*Microseris douglasii* ssp. *platycarpha*		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 CNDDB Rank
MARINE INVERTEBRATES			
Haliotis sorensi	white abalone	FE	
TERRESTRIAL INVERTEBRATES			
Micrarionta gabbi	Gabb's snail	FSC	
Coelus pacificus	Channel Islands dune beetle	FSC	G?, S?
Coenonycha clementina	SCI Coenonycha beetle	FSC	G1?, S1?
AMPHIBIANS AND REPTILES			
Xantusia riversiana	Island night lizard	FT	G1, S1
BIRDS			
Gavia immer	common loon	CSC	G5, S1
Oceanodroma homochroa	ashy storm-petrel	FSC, CSC, PIF	G2, S2
Oceanodroma melania	black storm-petrel	CSC, PIF	G3, S1
Pelecanus occidentalis	brown pelican	FE, SE, FP	G4T3, S1S2
Phalacrocorax auritus	double-crested cormorant	CSC	G5, S3
Circus cyaneus	northern harrier	CSC	G5, S3
Accipiter striatus	sharp-shinned hawk	CSC	G4, S3
Accipiter cooperii	Cooper's hawk	CSC	G4, S3
Falco columbarius	merlin	CSC	G5, S3
Falco peregrinus anatum	peregrine falcon	SE	G3, S2T2
Charadrius alexandrinus nivosus	western snowy plover	FT, CSC, PIF	G4T2, S2
Charadrius montanus	mountain plover	FPT, CSC	G3, S2?
Numenius americanus	long-billed curlew	CSC, PIF	G5, S2
Haematopus bachmani	black oystercatcher	PIF	G5, S2
Larus californicus	California gull	CSC	G5, S2
Sterna elegans	elegant tern	FSC, CSC	G5, S1
Synthliboramphus hypoleucus	Xantus' murrelet	FSC, CSC, PIF	G4?, S3
Cerorhinca monocerata	rhinoceros auklet	CSC	G5, S3
Athene cunicularia hypugea	burrowing owl	FSC, CSC	G4, S2
Asio flammeus	short-eared owl	CSC	G5, S3
Asio otus	long-eared owl	CSC	G5, S3
Selasphorus rufus	rufous hummingbird	PIF	G5, S1S2
Chaetura vauxi	Vaux's swift	CSC	G5, S3
Empidonax trailii	willow flycatcher	SE	G5, S1S2
Lanius ludovicianus mearnsi	San Clemente loggerhead shrike	FE	G4T1, S1

Scientific Name	Common Name	USFWS, CDFG, PIF Status	Global, State CNDDB Rank
Riparia riparia	bank swallow	ST	G5, S2S3
Toxostoma bendirei	Bendire's thrasher	CSC, PIF	G5, S3
Dendroica occidentalis	hermit warbler	PIF	G4G5, S3?
Icteria virens	yellow-breasted chat	CSC	G5, S3
Piranga rubra	summer tanager	CSC	G5, S2
Spizella breweri	Brewer's sparrow	PIF	G5, S3
Spizella atrogularis	black-chinned sparrow	PIF	G5, S3
Amphispiza belli clementae	San Clemente sage sparrow	FT, PIF	G5T1, S1
Carduelis lawrencei	Lawrence's goldfinch	PIF	G3, S3
MARINE MAMMALS			
Enhydra lutris	sea otter	FT	
Balaenoptera borealis	sea whale	FE	
Balaenoptera musculus	blue whale	FE	
Balaenoptera physalus	finback whale	FE	
Megaptera novaengiliae	humpback whale	FE	
TERRESTRIAL MAMMALS			
Urocyon littoralis clementae	San Clemente island fox	FSC, ST	G1, S1

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;
PIF = Partners in Flight Watch List
Global and State CNDDB 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—20 EOs 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.

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 *et al*. 1992
	Cryptic Fish	10,456	360	Allen *et al*. 1992
	All Fish	13,227	360	Allen *et al*. 1992
San Onofre	All Fish	2,506	407	Larson and DeMartini 1984
Pounds				
Santa Catalina	All Fish	46	360	Allen *et al*. 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 m^2). 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.

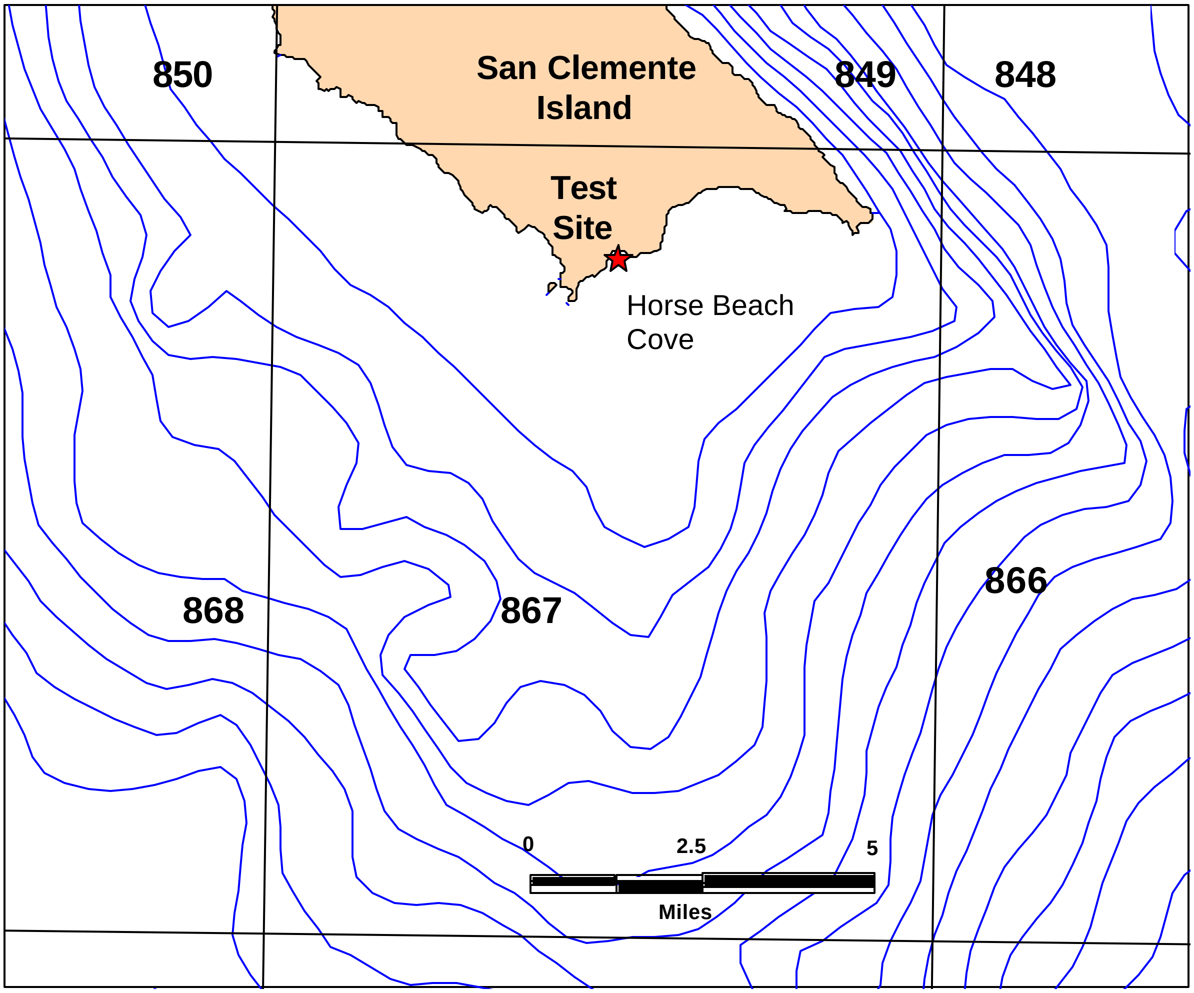
Rocky Habitats

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 nm^2 or 280 km^2) 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 Clement 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 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; Teransihi *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* May-Oct	Nov-Apr	California Stock Size (CV)**	Seasonality	Habitat Preference
Odontocetes					
Risso's dolphin (Grampus griseus)	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 (Tursiops truncatus) (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 (Delphinus delphis)	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 (Balaenoptera physalus)	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 (Balaenoptera musculus)	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

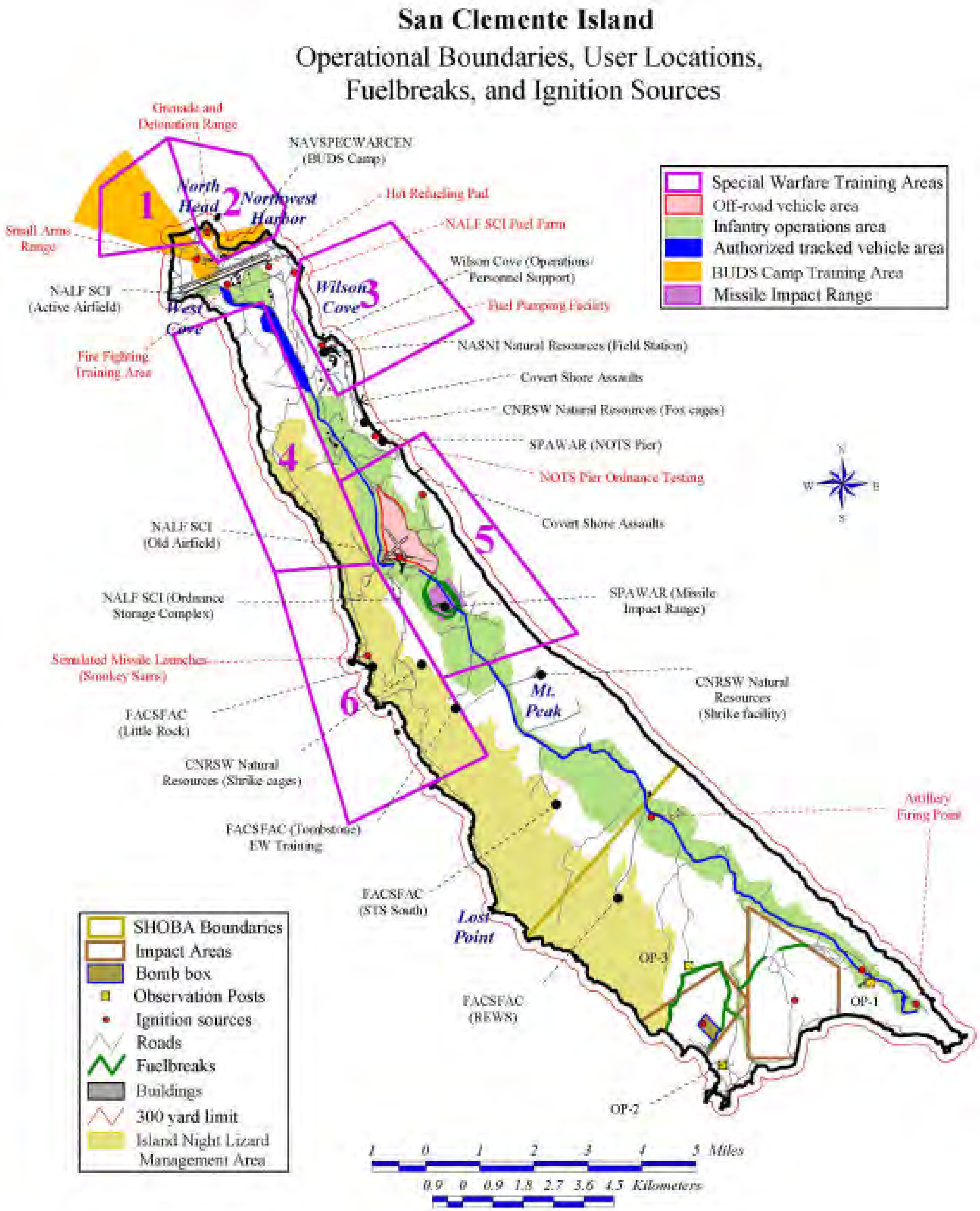
NALF SCI is located at the northern end of the Island. Users of the airfield are the U.S Navy and U.S. Marine Corps, other military organizations, civilian contract air carriers, and non-military general aviation. The airfield is restricted to military aircraft and authorized contract flights, though 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

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, disproportionably 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 logically 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 PM_{10}, 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**
De minimis		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
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.		

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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8.0 Reviewers and Persons Consulted

8.1 Reviewers

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8.2 Agencies and Persons Interviewed

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Richard Montague, Fire Consultant

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 *Lycium* 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 Date
San Clemente Island, CA

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 (MDSLY) 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 MDSLY 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 Conditons:**
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 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 *s.filifolia* 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 monitory activity within 3 months of firebreak installation.
98.			3.4 Prohibit use of incendiary devices during the proposed action unless sufficient on-site **aeria**l 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 *S.filifolia* 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 *M. clementinus* and *C. grisea* 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 *Cryptantha traskiae* 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 *Lotus dendroideum* var.*traskiae, delphinium variegatum* ssp. *Kinkiense* 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 *Lotus dendroideus* populations with TARs, report to FWS.
182.			7. Study fire effects on *Lotus dendroideus, delphinium variegatum* 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 accres 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 sort-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 intesity 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 to100-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 on 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 immmediately 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 edangered 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.