# San Clemente Island
# *Environmental Assessment*

Wildland Fire Management Plan

***Final May 2009***

*__Prepared for:__*

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# Environmental Assessment

for

the San Clemente Island
Wildland Fire Management Plan
Naval Base Coronado, California

*May 2009*

*Executive Summary*

This Environmental Assessment (EA) is to determine if an Environmental Impact Statement (EIS) or Finding of No Significant Impact (FONSI) should be prepared on the strategies proposed in the final draft of the San Clemente Island Wildland Fire Management Plan (WFMP) on Naval Base Coronado, California. The WFMP for this federal property addresses a requirement for year round, tactical, live-fire training to fulfill military mission objectives for unit-level and joint training in a wildland environment that contains many sensitive and federally listed resources, and for which fires may affect their long-term viability. The WFMP will: protect personnel, facilities, and natural and cultural resources from the impacts of wildland fire; ensure perpetuation of native terrestrial habitat, fire adapted plant communities, and rare species; and, minimize the total cost of fire pre-suppression and suppression practices on lands owned by the U.S. Navy on San Clemente Island.

The WFMP is designed to comply with the Federal Wildland Fire Management Policy. The Department of the Interior signed the most recent Federal Fire Policy of 2001. It was adopted by the Department of Defense (DOD) Wildland Fire Policy Working Group in 1996, and made DOD fire policy through DOD Instruction 6055.06 (Fire and Emergency Services Program October 10, 2000).

The Proposed Action most fully addresses management objectives and issues of concern, and so it is also the environmentally preferred alternative. The Proposed Action applies a full range of fire management tools that allow for controlling fire ignitions, spread, and its potential to damage natural resources. The Ridge Road fuelbreak and other pre-established containment lines will allow better control of fire spread into eastern canyons and other sensitive habitats. The communications network improvement, the maintained roads that facilitate access to fires in a timely manner, purchase of a quick-attack fire suppression vehicle, and other appropriate staging of suppression support assets (both labor and equipment) allow timely response to control fire spread. An emphasis on containing fires within the Land Management Unit boundaries will prevent large proportions populations of any threatened or endangered species from being affected by a single fire. The small area used for fuelbreak maintenance is compensated by long-term control of fire size and fire interval over 90% of the most sensitive habitats (canyon woodland for shrike nesting and high-density sage sparrow habitats).

The long-term, adverse, but minor and localized effects on vegetation resulting from treating vegetation fuels as described in the Proposed Action (such as along Ridge Road) are far outweighed by the enhanced protection of human life and the investment in infrastructure and

long-term protection against catastropic fire where all the vegetation and habitat is lost in a single event. Minor, short term impacts are offset by controls on fire size and fire interval in the most sensitive wildlife habitats (boxthorn and canyon woodlands), to maximize the self-sustaining populations of San Clemente sage sparrow and loggerhead shrike. Negative impacts are avoided or minimized through best management practices, or are compensated for by substituting a temporary, short-term adverse impact for a long-term net benefit.

There are many beneficial effects of the WFMP. This is because implementation of the WFMP is expected to result in improved habitat condition from:

- Reduced fire size;
- Longer fire return intervals which will improve the age structure of shrublands and woodlands;
- Less damaging fires based on clarified suppression priorities;
- Sensitive species protection practices and sustainability planning associated with all phases of the fire management program; and
- Practices such as prescribed fire which benefit conditions for certain species.

The Proposed Action adopts best management practices for managing the effects of fuels management, fire and smoke on public health, stormwater runoff and erosion, and complying fully with Clean Air Act requirements along with other applicable laws and policies.

Under the Sikes Act Improvement Act, Department of Defense landowners may not conduct activities that result in a net loss to the capability of the installation to achieve its military mission. Naval Base Coronado managers have examined the Proposed Action and determined that the combination of actions provided for in this EA will not result in the impairment of any military mission values.

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# 1.0 Purpose and Need

The Commanding Officer, Naval Base Coronado (NBC) proposes to implement a Wildland Fire Management Plan (WFMP) for San Clemente Island (SCI) (U.S. Navy Draft 2005), located in Los Angeles County, California. The Navy proposes to implement the WFMP to offset the anticipated increase in ignition sources as a result of expanded training activities, as described in its Southern California Range Complex Final Environmental Impact Statement/Overseas Environmental Impact Statement (SOCAL EIS) (U.S. Navy 2008). This Environmental Assessment (EA) has been prepared to assess the potential environmental impacts of implementing fire management strategies identified in the WFMP. The analysis presented in this EA will be used by decision makers to determine if a Finding of No Significant Impact (FONSI) is appropriate or whether to prepare an Environmental Impact Statement (EIS) to implement the WFMP. A Biological Assessment (December 2005) has been prepared separately to support the WFMP in consultation with the U.S. Fish and Wildlife Service (USFWS). A Biological Opinion (BO) was issued by the USFWS in November 2008 (see Appendix B).

This EA studies three alternatives, two that examine differing levels of implementation of the WFMP, and one that uses current management levels and approaches as a baseline. There has been no previously-adopted fire management plan on this federal property.

## 1.1 Purpose of Proposed Action

The Commanding Officer of NBC intends to immediately implement the WFMP on SCI upon conclusion of the NEPA process. This WFMP provides fire management guidelines and decision criteria that integrate the U.S. Navy's mission, fire protection for human life and infrastructure, and natural and cultural resources protection. The Proposed Action addresses a military requirement for year round, tactical, live-fire training to fulfill military mission objectives for unit-level and joint training in a wildland environment that contains many sensitive and federally listed resources, and for which fires may affect their long-term viability.

SCI is a U.S. Navy-owned asset used to support of live-fire, unit level and major range events for the Navy and Marine Corps, as well as joint training. A consequence of this training and other activities on the Island is incidental fire starts in a wildland environment. These fires threaten human life and infrastructure; and, these fires threaten federally protected plants and animals that are listed under the Endangered Species Act (ESA of 1973 [16 U.S.C. §§ 1531-1544], as amended), and other sensitive natural and cultural resources. The protection of federally listed species from fire impacts can and has conflicted with military mission requirements to train according to the prescribed standards, intensity, and schedule. This WFMP is intended to reduce the fire threat, and to provide the means to achieve requirements of the military training mission while providing for natural and cultural resource sustainability and compliance.

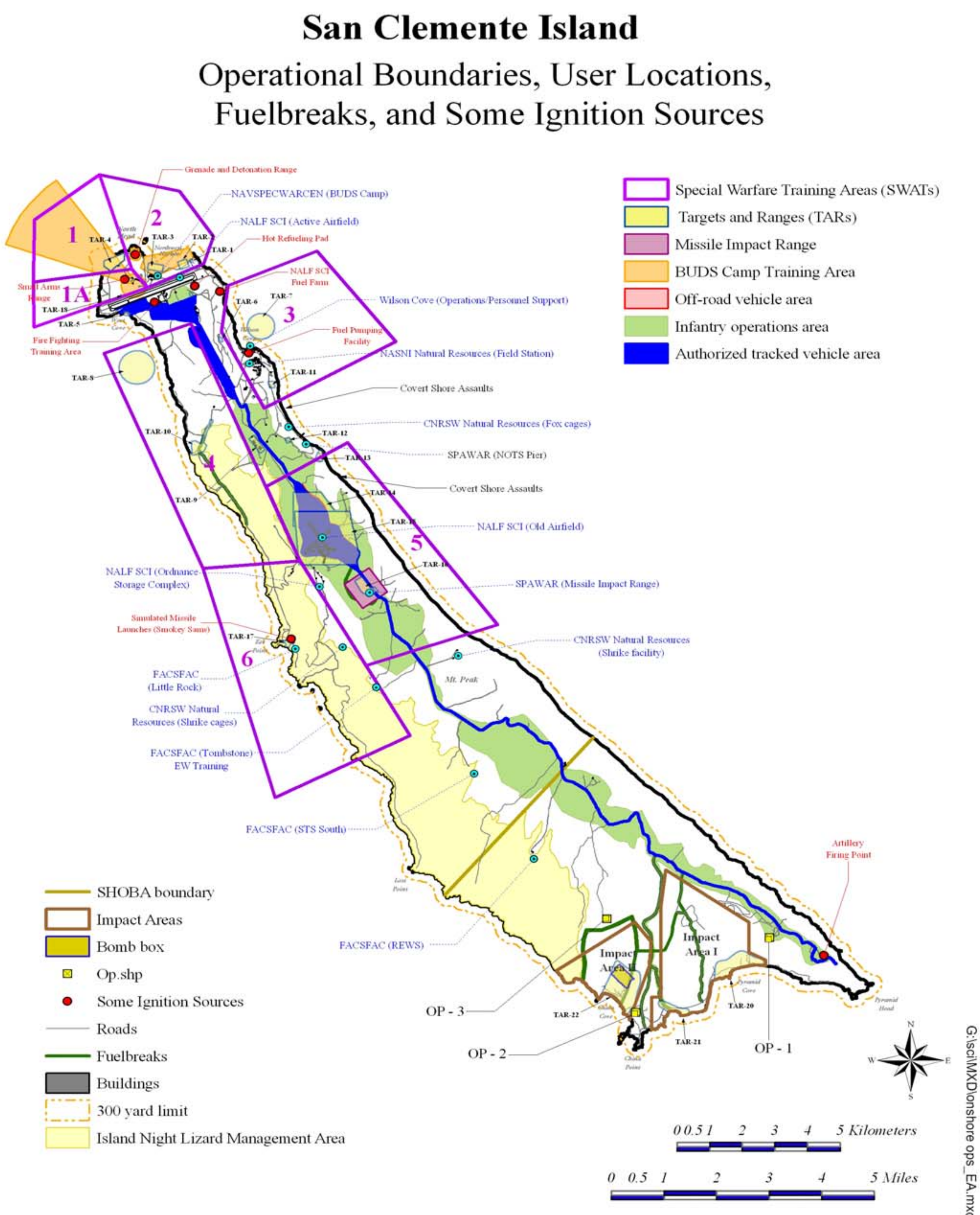
SCI is the cornerstone of tactical, live-fire training within the Southern California Operations Area, and serves the largest concentration of Naval forces in the world. For the Island, the military mission is:

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

Onshore and nearshore training areas are depicted in Map 1-1.

Use of incendiary ordnance in military training, left unmanaged, could result in damage to legally protected natural resources and degradation in ecological values on the Island. Managed inappropriately, this fundamental aspect of military training can constrain training to the extent that it inadequately prepares military units for deployment. Suppression assets from the mainland are not realistically available to SCI. Firefighting in the Ship-to-Shore Bombardment Area (SHOBA) can potentially be dangerous and options available to Federal Fire Department (FFD) to suppress fires are limited. The 2008 BO requires certain fire management activities to accommodate the plan for expanded range use by NSWC units and for other increases in training footprint and tempo as discussed in the SOCAL EIS.

Most fires on the Island today are ignited by live ordnance training of various types. Approximately half of fires occurring on the Island in recent years have been in the ship-to-shore bombardment area (SHOBA) on the south half of the Island, where fire is usually allowed to burn itself out, sometimes after several days. Fires in the northern portion of SCI are suppressed before they spread very far. SHOBA fires total about 85% of total acreage burned from 1996-2004 because of this disparity in suppression tactics. Until helicopter resources became available, most fires on SCI were allowed to burn out because of concerns about risks to personnel of unexploded ordnance which could be set off during a fire.




*Map 1-1. Onshore and nearshore training ranges for San Clemente Island.*

## 1.2 Need for Proposed Action

The WFMP is needed to protect life, property, and maximize military training opportunities, while protecting natural ecosystem functions and diversity, and minimizing total cost. By preventing and containing uncontrolled fires, the loss of human life, facilities, natural and cultural resources, and military readiness values due to wildfire may be prevented.

The primary drivers that create a need for a WFMP are the Sikes Act Improvement Act (SAIA) of 1997 (16 USC Section 670a), which is implemented through Chief of Naval Operations (OPNAV Instruction) 5090.1C. In this case, the WFMP supports the objectives of protecting and conserving natural resources as described in the SCI Integrated Natural Resources Management Plan (INRMP) (U.S. Navy 2002). An INRMP is the principal natural resources planning document for DOD lands as required under the SAIA. It is an ecosystem-based plan intended 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. This WFMP is consistent with and supports the goals and objectives of the SCI INRMP. In keeping with the principal mission of DOD installations to ensure the preparedness of the U.S. Armed Forces, Navy policy mandates that natural resource management actions shall permit no net loss of the capability of the installation's lands to support the military mission while providing for conservation and rehabilitation of natural resources.

Through the INRMP, many environmental laws are addressed that also drive the need for the Proposed Action. The primary laws include the Endangered Species Act, due to the presence of a number of species on the island that are listed as threatened or endangered, and the Clean Water Act, due to the potential for sedimentation of waters as a result of wildland fire impacts.

The WFMP is also designed to comply with the Federal Wildland Fire Management Policy. The Department of the Interior signed the most recent Federal Fire Policy of 2001. It was adopted by the Department of Defense (DOD) Wildland Fire Policy Working Group in 1996, and made DOD fire policy through DOD Instruction 6055.6 (Fire and Emergency Services Program October 10, 2000).

An EA is a procedural requirement under the National Environmental Policy Act (NEPA) intended to ensure that federal agencies evaluate the potential for significant impacts prior to making decisions. This EA complies with the:

- National Environmental Policy Act of 1969 (42 U.S.C. § 4321, et seq, as amended);
- Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] parts 1500-1508) July 1, 1986;
- 32 CFR 775, Department of Navy (DON) Procedures for Implementing NEPA; and
- Department of the Navy Procedures for Implementing NEPA (32 C.F.R. § 775), as described in OPNAV Instruction 5090.1.C.

## 1.3 Goal and Objectives of the WFMP

Responding to the direction provided by the documents mentioned above and scoping by the interdisciplinary team, the fire program has a primary goal and several objectives:

*Goal 1: Protect life, property, and maximize training opportunities, while protecting natural ecosystem functions and diversity, and minimizing total cost.*

The WFMP objectives are:

- Implement the Guiding Principles of the Federal Wildland Fire Management Policy and DOD INST 6055.6 into SCI wildland fire management;
- Prevent and contain loss of human life, facilities, natural and cultural resources, and military readiness values due to wildfire.
- Support Fire Management Success Thresholds (design criteria) for achieving the INRMP's goal and objectives for each Land Management Unit and ecological community, such that each habitat is resilient and self-sustaining, all native species are self-sustaining, and exotic species are minimized, while ensuring maximum flexibility in high-value military areas for military use. The INRMP is required under the SAIA (Public Law 105-85, Div. B Title XXIX, Nov. 18, 1997), which requires the Secretaries of the military departments to prepare and implement an INRMP for each military installation with significant natural resources in the United States.
- As a first priority, use prevention and other pre-suppression measures to control fire.
- Align fire ignition risk with fuel hazard conditions to reduce wildfire occurrence using an effective Fire Danger Rating System (FDRS).
- Control fuel loads to keep fires small in high conflict areas with special status resources.
- Enhance biological diversity and habitat for sensitive species through the appropriate use of fire and fuel treatment measures.
- Control, confine, and contain fires to protect life, property, natural ecosystem, and cultural resource by providing appropriate fire suppression response while minimizing total cost.
- Promote rehabilitation of habitats affected by wildland fire management practices so that there is no net loss of natural resources values.
- Maintain effective firefighting infrastructure and communication systems for fire response, control, and incident command.
- Improve the organizational capacity, cost-effectiveness and efficiency of wildland firefighting.
- Build fire suppression, fuel treatment, and in-house fire weather prediction capability to achieve objectives of this WFMP.
- Improve capability and the cost-effectiveness of fire suppression, while opening opportunities for prescribed fire as a management tool for habitat restoration and protection of endangered species by enhanced resource sharing and coordination.

- Set up effective monitoring and information management to validate and adapt decisions.
- To achieve full and complete implementation of critical aspects of this WFMP, formalize mandates, protocols, procedures, and other priorities so that guidelines become standard operating procedure and are fully enforced.
- Assign responsibility for key elements of the Plan for effective and cost-efficient implementation, and so that funding can be obtained in a timely manner.
- Implement this Plan strategically and cost-effectively to achieve its goal and objectives, based on adaptive management principles.
- Improve and refine wildland fire management to maximize flexibility for training and minimize wildfire losses, by adaptively adjusting success criteria and priorities based on past Fire Department accomplishments, new risks and hazards, new biological information, and changes in policy.

## 1.4 Interdisciplinary Planning Team

This EA was produced by an interdisciplinary planning team that shared responsibility for its content. A list of planning team members, their specialties, and consultants is included in Chapter 6.

The office of the Commander Navy Region Southwest (CNRSW) initiated this planning process. In a collaborative setting, the users, managers and agencies with responsibility for, or interest in SCI resources, partnered together in the form of a WFMP Working Group. Stakeholders came together regularly at meetings and in the field over the course of the year 2001 to identify and discuss issues, clarify current practices, jointly develop a sense of the desired fire management direction, and arrive at fire management and implementation strategies. The WFMP was then put on hold as discussions ensued about how to apportion the costs of implementing the Plan, as well as complete consultation on the Plan's approach with the U.S. Fish and Wildlife Service (USFWS) under the ESA. The planning process was reinitiated in 2003 with the addition of some new training ranges proposed by Naval Special Warfare Group One (NSWG-1).

This Working Group consisted of the Commanding Officer (CO) Naval Base Coronado (NBC) and representatives from CNRSW Natural Resources Office (NRO), CNRSW FFD, San Clemente Island Range Operations, USFWS, California Department of Fish and Game (CDFG), Southern California Offshore Range (SCORE), Naval Facilities Engineering Command, Southwest Division (NAVFAC SW), and tenant users of Island resources including NSWG-1, US Marine Corps Expeditionary Warfare Training Group Pacific (EWTGPAC), 1st Marine Expeditionary Force (I MEF), Space and Naval Warfare Systems Center (SPAWARSYSCEN), Commander THIRD Fleet (COMTHIRDFLT), and HC-85 Commander Helicopter Wing Reserve. The USFWS regularly attended these meetings and commented on document drafts.

## 1.5 Decision to Be Made

The decision to be made is which alternative to pick to implement the WFMP, based on the environmental knowledge gained by the content of this EA. A course of action will be selected which is consistent with the Biological Opinion issued by the USFWS on the Proposed Action, and best addresses the military need, effectiveness of the fire management practices, and environmental impact.

## 1.6 Key Issues Considered

"Key issues" were identified by the Working Group, defined as concerns that are important, not easily solved, and may have more than one solution in which trade-offs need to be evaluated. It is a concern that should be considered when designing and evaluating alternatives in an EA. SCI contains distinguished examples of a coastal Mediterranean ecosystem with components unique in the United States; SCI also has an ecosystem that with limited worldwide geographic distribution and high biological diversity. Wildland fire has long been recognized as a natural process operating within the southern California Mediterranean ecosystem with associated effects on individual components of the ecosystem, sometimes detrimental and sometimes beneficial. There is a need to manage wildland fire so that threats to life, property and Navy resources are reduced and fire's function as a natural process is maintained.

The Working Group identified the following key issues to be addressed using the framework described later in this chapter; they are listed in no particular order:

1. Uncontrolled wildland fires threaten personnel, facilities and natural resources. Wildland fire hazards are highest during extended dry periods. Fire danger may increase as SCI continues to recover from damage caused by feral goat grazing, which existed perhaps for centuries but became out of control when domestic sheep grazing was terminated by the Navy after taking control of the Island in 1934.
2. Recovery requirements for the endangered San Clemente loggerhead shrike (*Lanius ludovicianus mearnsi*) have dictated the current fire management strategy. This has curtailed training by restricting units' time on the range, target size, and the use of incendiary munitions including tracers and illumination rounds.
3. Complete access and flexibility in use of ordnance for training operations in SHOBA and other ranges is necessary to properly train military personnel to deployment standard. The Navy needs to use the entire area within firebreaks of designated Impact Areas (I and II) for training during fire season and breeding season for federally listed species.
4. Suppression response times can be too long, depending on where a fire occurs, because of inadequate communication systems and poor road conditions. When response time increases, fires may become larger than suppression resources can contain in a timely manner, and result in more expensive containment measures and additional ecological damage.
5. Fire suppression even from the air 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.
6. Control of invasive plant species must be improved to protect habitat values for endemic species. Both uncontrolled and prescribed fires can have both positive and negative roles in exotic species management and must be evaluated on a situational basis.

7. The removal of grazing feral animals has resulted in an increase in fuel loads in shrub and woodland areas. In the event of a fire, higher fuel loads may preclude achieving ecological objectives if the fires cannot be contained and controlled.
8. The current level of fire protection afforded natural habitats is not deemed adequate to remove any use restrictions on SCI ranges imposed by the USFWS BO; although, the suppression response time has been improved significantly by use of HC-85 and a private helicopter, instead of the U.S. Forest Service aerial assets required under BO 1-6-97-F-21. Improved practices should result in greater flexibility for operations as a positive consequence of proactive management undertaken. Costs, including annual budgeting for helicopter standby and firefighting costs, continue to rise with little appreciable return in operational flexibility.
9. The funding source of fire management should be clearly defined and funding secured. Conflicts arise because operational commands and the shore support facilities responsible for overall management and maintenance of SCI have different funding sources. This may result in a scarcity of funding resources, as well as friction over who is required to fund various aspects of numerous programs required to maintain the SOCAL Range.
10. Fire management responsibilities must be clarified and funded to facilitate use of the Island for training by operational forces in higher fire danger conditions. The level of partnership among Island managers that may be necessary to implement this WFMP is not currently operational.
11. It is paramount to have a balanced approach that does not over-emphasize suppression, which is the most expensive approach to fire management. Preventing fires is much more cost-effective than suppression and should receive more emphasis than it has in the past. A cost-effective balance of prevention, fuels management, and suppression strategies needs to be identified.
12. Uncontrolled fires can be detrimental to San Clemente loggerhead shrike recovery. However, fire management for shrike protection may conflict with objectives for other species. It also conflicts with operational requirements for using ordnance. There has been no assessment of whether operational restrictions actually benefit San Clemente loggerhead shrike recovery.
13. Fire suppression activities can cause more harm than the fire itself because of ground disturbance caused by the suppression vehicles and equipment. Fire control lines are necessary to fight fires at logical locations. Fire department personnel must be notified of habitat that is sensitive to off-road vehicles. This includes increased information in the form of up-to-date maps and charts clearly delineating natural resources values that require protection.
14. DOD guidance currently identifies a collateral mandate or mission for wildland fire suppression consistent with what is identified in recent Federal Fire Policy, but this mission is not currently adequately staffed, equipped, or funded. There is little institutional reward for fighting wildland fire within the FFD, and the organization is geared almost completely to structural fire protection and crash or other emergency response.

15. When training activity covers a large area with large quantities of potential fuel sources, the firefighting assets must be commensurate with the vegetation fuel hazard and risk of ignition.
16. There is an emerging fuel hazard on the central part of the Island with the spread of the native colonizing shrub, coyote brush (*Baccharis pilularis*), into grassland areas.
17. Use of illumination rounds and other incendiary devices is a required and critical training activity for Navy and Marine Corps personnel for deployment overseas. Because of the risk of fire ignition during breeding seasons, use of incendiary devices has been severely curtailed, resulting in reduced and suboptimal training. A recent BO has alleviated some but not all of the restrictions (FWS-CA-2808 23 July 2002, reinitiation of BO 1-6-97-21).
18. Under appropriate conditions, controlled burns could be used to support Explosive Ordnance Disposal (EOD) personnel so they have a clear view of the ground during ordnance sweeps, but currently there is no mechanism to conduct them.
19. Communication systems, including internet computer systems, require improvement in terms of connectivity, range, reliability and dependability. Communication systems are critical for safety and to minimize the dangers of fires spreading quickly. The Fire Chief requires immediate access to the internet as well as communication with his firefighters on the scene and aircrews providing support. All personnel in the field require reliable communication in the event of emergencies and to report fires. Spectrum management is becoming critical and requires even greater coordination among the 11 commands on SCI.
20. Fire planning cannot be segregated for different management organizations or types of resources on the Island. A plan encompassing all administrative areas and users on the Island is needed.
21. Fire season restrictions have not been consistently implemented and should be predictable. Military operators must know constraints well in advance to ensure adequate training and exercise planning occurs.
22. Areas of high military value and the need to conduct training with incendiary munitions warrant acceptance of a higher level of fire damage to the environment. The best way to minimize damage should be considered.
23. The use of all terrain vehicles (ATVs) for resource protection has resulted in increased fire risk due to potential ignitions from sparks in dry grass.
24. Mechanically-established fire and fuel breaks have environmental impacts, especially with regard to accelerated soil erosion and sedimentation due to improper drainage design. Alternatives need to be researched. Use of salt water for suppression on sensitive areas, such as water sources, may affect these resources.
25. Though there are better processes for collecting and managing fire data, documentation of fire patterns including number of fires, locations, and ignition sources has not been consistent and has been ineffective at guiding management effort. Similarly, the success of documenting fire management has been inconsistent.

## 1.7 Federal, State and Local Laws That Apply to the Proposed Action

A number of laws apply to the Proposed Action to implement the WFMP. Federal laws include:

- Sikes Act Improvement Act
- Endangered Species Act
- Clean Water Act
- Coastal Zone Management Act
- Fish and Wildlife Coordination Act
- Magnuson-Stevens Fisheries Conservation and Management Act
- Migratory Bird Treaty Act
- Soil and Water Conservation Act
- National Historic Preservation Act
- Archeological Resources Protection Act

While the State of California does not have jurisdiction over the deeded U.S. Department of Defense property of San Clemente Island, the State is responsible for implementing certain federal laws. Authority is delegated to the California Coastal Commission to implement the federal Coastal Zone Management Act (CZMA). 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 project site is located outside the coastal zone as designated by the California Coastal Act of 1976 (16 U.S.C., § 1456). As defined in Section 304 of the Act, the term "coastal zone" does not include "lands the use of which is by law subject solely to the discretion of or which is being held in trust by the Federal government." The project site is located on San Clemente Island, land which is owned and operated by the Department of the Navy, and is therefore excluded from the coastal zone. However, the Navy recognizes that actions outside the coastal zone may coastal uses or resources via "spill over" and, therefore, are subject to the provisions of CZMA. The Navy analyzed the impacts of the proposed project on the coastal zone by looking at reasonable foreseeable direct and indirect affects on the coastal use or resources sand has concluded there will be no affects to coastal uses or resources.

San Clemente Island is part of the county of Los Angeles; since the land and nearshore waters are completely owned by the federal government, no local laws are applicable to this WFMP.

# 2.0 Proposed Action and Alternatives

## 2.1 Introduction

The issues identified during the interdisciplinary scoping and planning process led to a set of alternatives structured around the fire management tools available to accomplish program goals and objectives. The tools were assembled and balanced to provide effective fire protection while protecting natural and cultural resource values.

## 2.2 Description of Alternatives

The three alternatives considered in the environmental analysis include a No Action/Baseline alternative (Alternative 3), and two additional alternatives. NEPA requires agencies to consider a "No Action" option that provides a baseline condition against which the other alternatives can be evaluated. The alternatives considered and the tools selected to manage fire ignitions constitute a balanced blend of the available fire management techniques that reduce ignition risk, manage vegetative fuel hazard, and are feasible and effective in the fire environment of San Clemente Island.

Other criteria used to evaluate the alternatives are:

- Consistency with installation INRMP management goals and objectives.
- Consistency with Federal Fire Policy, including human life as first priority and fire to be managed as part of a natural ecosystem process.
- Ecological soundness. Does not result in jeopardy to threatened and/or endangered species, avoids and minimizes possible impacts to these. Provides for the long-term sustainability of sensitive species populations. Avoids and minimizes the proliferation of non-native species. Avoids and minimizes erosion and sedimentation.
- Efficiencies to be gained and trade-offs that may be necessary.
- No net loss of land's capability to support the military mission (SAIA compliance).
- Maximizes training flexibility with respect to timing and location.

**(a) Alternative 1: Proposed Action/Preferred Alternative.** The proposed action comprises complete implementation of the WFMP. The Plan is an ecosystem based series of pre-suppression and suppression strategies and actions. This alternative combines fuelbreak infrastructure development, predefined suppression locations and ranking of values at risk, enhanced suppression capability, a FDRS to minimize ignitions during hazardous conditions, human and suppression resources staging as fire danger increases, best management practices for avoiding and minimizing effects on natural/cultural resources, and variable threshold maximum fire sizes ranging from 3-300 acres based on natural resource values at risk.

**(b) Alternative 2: Proposed Action without prescribed burning.** There would be no prescribed burning opportunities for patch-level fuels management or for meeting INRMP objectives for sustaining sensitive or at-risk natural resources.

**(c) Alternative 3: No Action/Baseline to include continuation of Current Management levels.** This Alternative, which would result in restricted use of ordnance during fire season, requires helicopter standby throughout season when training is taking place, and reduces the target area during fire season. No controls on fire interval are identified to protect natural resources. This Alternative has impeded the training schedule and does not allow flexibility to increase training tempo or footprint. It allows no means to use fire as a management tool to achieve natural resources sustainability objectives.

### 2.2.1 Alternative 1 Proposed Action/Preferred Alternative—Full Implementation the WFMP

The Proposed Action is to implement a strategy that brings together a full set of tools including preventative measures, enhancement of on-Island assets, and fuels management. The range of tools planned to manage fires include:

- Using fuelbreaks in high-risk areas
- Designating firefighting access roads and roads to be used for firefighting
- Implementing a FDRS in which ordnance use is managed along a gradient of hazardous fire weather, and suppression resources are staged based on the risk of fire ignitions
- Coordinating the access and progressive staging of fire suppression equipment with high hazard weather conditions and military training activity
- Managing fuels along firefighting roads, for defensible space around structures, to provide patch-level fuels management and benefit natural resources sustainability
- Upgrading firefighter qualifications
- Upgrading communication systems to shorten fire response times
- Reporting and monitoring fires and fire impacts to natural resources
- Coordinating fire management within the Navy

The core elements of the Proposed Action are detailed below.

**Core Strategy – Fire Danger Rating System (FDRS) and Prevention**

Since the use of a FDRS is primarily a means to prevent ignitions in conditions where suppression is difficult, this is described in Section 2.6 “Proposed Conservation Measures.”

Once the planned fuelbreaks in SHOBA Impact Areas are in place, existing restrictions on use of incendiary ordnance, as well as the fire season target area size, will be superseded by the FDRS.

At the start of fire season, fuelbreaks and drivable roads are expected to be in place, and water storage containers should be filled at VC-3, Mt. Thirst, and TAR 10. This is when the FDRS will be announced on a daily basis to manage fire risk and guide the staging and availability of necessary suppression assets. The start and end of fire season will be declared by OIC, through recommendations from the Wildland Fire Coordinator, when live fuel moisture reaches ~ 200%.

Education and training of Island users is another strategy for preventing ignitions that is assigned both to the FFD and NRO by the WFMP.

The FFD and Navy will continue annual training to maintain the highest standards of professional and technical expertise in planning and safely implementing an effective wildland fire management program.

A Department of Navy Wildland Fire Coordinating Group will convene annually to ensure that prudent and practicable measures are taken 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.

An Annual Preparedness/WFMP Update Meeting will be conducted to include: a brief for fire personnel on revisions to natural or cultural resource sensitive areas; evaluation of how the FDRS and fire weather data are working; evaluation of any suppression response tactic implemented that season to see if it met objectives of the WFMP and Minimum Impact Suppression Tactic (MIST) guidelines; and a review of written agreements.

**Core Strategy – Fuels Management Using a Range of Methods**

Managing fuel loads by establishing safety corridors or buffers where vegetation fuels are reduced, defensible space around structures and low-intensity landscape modification using prescribed fire that also meets ecological objectives are the initial lines of defense to reducing adverse ecological effects of wildland fire, and the associated cost of fire suppression.

The WFMP implements three types of fuels management. Two of these involve the use of prescribed fire, one for fire control (fuelbreaks, strip burns), and one for improving the ecological value of vegetation communities. The three types of fuels management are:

- High-intensity fuels management safety corridors or buffer zones using a combination of existing road maintenance, fire retardant, herbicide, and prescribed strip burns. The use of chemical foam retardant in pre-suppression works to protect sensitive resources, provides short-term (approximately one year or until one inch of rain falls) protection of sensitive resources, or other boundary protection, around actual or potential ignitions as needed.
- Defensible space around structures, such as hand pruning and thinning of shrubs next to occupied buildings.
- Low-intensity landscape modification with prescribed fire that meets fuels management, resource protection and habitat restoration objectives. A regular burn plan would be an integral part of a proactive fire and fuels management and long-term habitat conservation program.

Table 2-1 and Map 2-1 describe the project footprint of firebreaks, fuelbreaks, and fuels treatment under the WFMP. All treatments except road maintenance may need to occur during the breeding season of the San Clemente loggerhead shrike or San Clemente sage sparrow (*Amphispiza belli clementae*). The successful installation of fuelbreaks and prescribed burn treatments requires flexibility to be accomplished during the breeding season. There are a number of reasons for this requirement as a practical matter. First, fuelbreaks need to be prepared prior to the start of the fire season in order to do their job of stopping fires. The best time to burn for fuelbreaks is soon after the grasses have dried, which is during late spring and early summer when most migratory and resident birds are breeding. The grasses may dry in March, or they may dry in July depending on rainfall patterns. If prescribed burning is delayed until late summer or fall, then the fire danger conditions may be too extreme to allow for prescribed burns, and most of the benefit will have been lost since most of the fire season will have passed. Compounding the difficulty is that prescribed burns are much more likely to burn out of control or be cancelled when left to late summer or early fall. Early in the season, burns may be planned for just after fine fuels (grass) are dry enough to carry a fire but while woody fuel moisture is still high, enhancing the ability to control and, therefore, execute the burn. Late-season burns also carry a higher likelihood of cancellation due to other fires in the western U.S., drawing down firefighting resources sufficiently such that a prescribed burn would not be advisable. Finally, fire crews needed to perform prescribed burns are more likely to be available outside the peak of fire season.

*Table 2-1. Project footprint of firebreaks and fuels management under the WFMP. All treatments except road maintenance may need to occur during the breeding season of the federally protected wildlife species.*

| Firebreak or Fuel Treatment | Area or Length |
|---|---|
| Ridge Road to be maintained to function as a firebreak | 20.6 miles (no new unvegetated footprint) |
| Existing roads to be maintained in drivable condition | 32 miles (no new unvegetated footprint) |
| Strip burns | Up to 5 miles/year, rotated along roads or fuelbreaks over a 10-year period up to 20 miles (72.6 acres) |
| Prescribed burns in patches | Up to 300 acres/year for strategic fuels management and to achieve INRMP objectives for sensitive natural resources |
| Herbicide treatment as needed | Up to 5 miles once every 5 years (12.1 acres) |
| Fire retardant application | 7.1 miles (25.8 acres), could be up to 15 miles in future (54.5 acres) |

### *Core Strategy – Rapid Attack Suppression*

Due to the high cost of providing the manpower and equipment necessary for suppressing fires, it is important to manage the cost of fire suppression. Using both civilian and military resources, or seasonal rather than year-round assets, operational costs can be reduced. An annual risk analysis assists in managing cost, and helps tailor appropriate levels of future funding and suppression needs.

Rapid-attack suppression capability by air is through staging of a private or military helicopter at various levels of alert according to the Fire Danger Rating if live-fire training is being conducted. Enhanced ground suppression is achieved with acquisition of a quick-attack fire suppression apparatus (a wildland engine compliant with the interagency National Wildfire Coordinating Group standards with some adjustments as described in Section 4.4.1 of the WFMP).


*Map 2-1. Proposed Fire Management Areas on San Clemente Island.*

### *Core Strategy – Improved Human Resource Capacity*

The WFMP builds up human resource capacity for improved suppression response by assigning responsibilities to the Wildland Fire Coordinator (WFC), providing training to Fire Department and military operators and civilians, and improving access to a Rapid Fire Response Team. The WFC will organize a training program for FFD San Diego personnel assigned to SCI. The WFC will appoint, along with the Wildland Fire Coordination Group, military and civilian personnel to assist in support of suppression efforts during a wildland fire incident on SCI. Federal Fire Department San Diego will provide training for that support when needed, including the training of personnel to man the standby quick-attack suppression apparatus.

### *Core Strategy – Improved Firefighting Infrastructure*

Improved firefighting infrastructure is necessary to provide access and response to fire emergencies. The Plan recommends improved electronic communications capable of rapid notification of any fire or any life and safety incident. The road network on SCI has strategic functions for wildland fire control. Certain roads must remain passable for firefighting and also function as firebreaks (see “Core Strategy – Fuels Management”). Future use of an airfield at VC-3 would benefit both aerial delivery of fire retardant for fuelbreaks and fire suppression staging. Backup water supplies are recommended for staging at certain locations during fire season.

For TAR 10 in Land Management Unit (LMU) 7, the road immediately south of the dunes (i.e., West Shore Road) will remain passable for two-wheel drive vehicles. A staging area for a portable water tank and emergency vehicle will be located in the immediate vicinity of TAR 10. For TAR 17 in LMU 10, the existing unpaved road to Seal Cove along the LMU boundary (i.e., Lost Point Trail Road) will remain passable by two-wheel drive emergency vehicles to the canyon directly east of Eel Point.

### *Core Strategy – Implementation Mechanisms*

A new Island-wide Fire Management Instruction to augment the SCORE Range Users Manual is recommended. Also, a SCI Wildland Fire Coordinating Group and Department of Navy (DON) Wildland Fire Coordinating Group will allow for collaborative partnerships to improve planning, management, implementation, and cost efficiency. The DON Wildland Fire Coordinating Group will improve availability of suppression assets and cost-effectiveness of their use, as well as human resources available to implement the WFMP. The SCI Wildland Fire Coordination Group, led by the Officer in Charge, involves user command representatives including SCORE, as well as representatives from Federal Fire, Public Works, Explosive Ordnance Disposal (EOD), and CNRSW Natural and Cultural Resources.

### *Assignment of Responsibilities*

The following preliminary assignments are made (funding may not necessarily come from the entity assigned responsibility):

***NRSW Safety, Code N35.*** Communication system upgrade. Improve radio and telephone communication system so that reporting of a fire incident reaches FFD in three minutes or less from time of first knowledge. Improve access to high-speed Internet service for managing real-time fire information and weather data.

***Naval Facilities Southwest.*** Road design, construction, and maintenance to a standard that functions as a fuelbreak, and that supports a quick-attack fire engine asset for emergency response. Priority roads are along LMU boundaries that are expected to serve as part of an Island fuelbreak system.

***Federal Fire Department***

- Wildland Fire Support Crew based on 3-4 weeks of overtime pay for existing off-duty federal firefighters or contracted. Alternatively, the current DOD Instruction allows for the use of "call when needed" reserve units to fill this need.
- Quick attack, all-wheel drive fire apparatus on Island to specifications (see WFMP) for use of incendiaries north of SHOBA during certain fire danger conditions.
- Seasonal Rapid Fire Response Team Agreement.
- GS 10-11 Wildland Fire Coordinator promoted from within FFD.
- Train 2-3 support staff assigned to WFC; each will have 40 hours of wildland fire training. Alternatively, the current DOD Instruction allows for the use of "call when needed" reserve units to fill this need.
- DOD Wildland Fire Coordinating Group.
- Advise the Officer-in-Charge (OIC), in cooperation with the Environmental Program/NRO, when live fuel moisture in the wildland environment reaches ~ 200% to announce the start and end of fire season.
- Provide computer system upgrade for the Fire Chief on Island to achieve high-speed Internet access.
- Update Fire Instructions for consistency with DOD fire policy.
- For prescribed fire monitoring and post-fire reporting, access to a camera, global positioning system, and the best available ESRI GIS software for a geographic information system. Provide data to NRO for consolidation and long-term record keeping in a GIS database.
- May have some maintenance responsibilities for national interagency Remote Automated Weather Station (RAWS) weather stations.

***NRSW N45 (Natural Resources Office)***

- The Environmental Program/NRO will conduct an initial assessment after each fire incident to determine if any immediate corrective action is necessary that cannot wait until the Annual Review (section 4.5.4.1 of the WFMP) to stay within the parameters defined in this Plan.
- RAWS weather station upgrade, maintenance and monitoring (will be shared with SCORE or Federal Fire Department)
- Aerial suppression support: private helicopter
- Prescribed Fire Program, including coordinating priorities among operators, natural resources managers, and EOD. Estimated newly burned additions are up to one mile per year of fuelbreaks and 300 acres per year of additional strip or patch burns. Work with WFC to monitor prescribed burns that have more of an experimental component to burn objectives.

- Monitoring to include fire severity mapping, fire effects analysis on listed species. Monitor the boxthorn community on sites with different fire history in order to verify proper fire management. Upon approval of the SCI Wildland Fire Coordination Group, 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.
- Fire perimeter mapping stored in GIS-based database, and consolidating data (e.g. ignition source, weather) collected by other groups and entering them into the database.
- The Environmental Program/NRO will be responsible for maintaining the fire database and ensuring that all necessary fields are filled in.
- The Environmental Program/NRO will convene the WFMP Working Group to confer about whether a WFMP update is needed in five years (if it has not been done earlier). If found beneficial, this update will be done in tandem with the INRMP update.
- CNRSW staff will support the Wildland Fire Coordinator in charting live fuel moisture levels in key fuel species. The WFC will advise the OIC when to announce the start and end of fire season.
- Federal Fire Department personnel will receive a cultural resources protection briefing from the CNRSW cultural resources staff.
- Adaptive management annual review and update to include a discretionary major update in five years, and BA, EA.
- The NRO Director will ensure, in cooperation with OIC, that roads and fuelbreaks, which compose the firefighting network, are open before the start of fire season. This can be accomplished before or after the fire season between November and April, with good weather conditions and approval of the SCI Wildland Fire Coordinating Group.

***Naval Base Coronado/SCI Officer in Charge***

- Establish an SCI Wildland Fire Coordination Group.
- Announce the start and end of fire season.
- Determine the continued need for staffing of two to three seasonal firefighters after a three-year annual review of the effectiveness of other recommendations in the WFMP by the OIC and NRO.
- Sign prescribed burn plans and coordinate annual implementation of prescribed burns.
- Conduct an annual review jointly with NRO among parties with a stake in wildland fire management to reassess priorities and success criteria, and build on the past year’s experience.

***Southern California Offshore Range (SCORE)***

- Monitoring and documentation of ignition source, impacts of fire management on training. Install Fuelbreaks on SHOBA. (Other fuelbreaks are considered above under Prescribed Fire Program, estimated newly burned additions at about one mile per year of fuelbreaks and 300 acres per year of additional strip or patch burns).
- Remote Automated Weather Station’s weather station upgrade, maintenance and monitoring (certain stations will be maintained by the Environmental Program/NRO).
- Provide weather data to NRO for consolidation and long-term record keeping in a GIS database.

***NRSW N45 (Natural Resources Office):*** Education. Develop Island-wide Instruction on compliance with FDRS and other WFMP requirements.

***Individual Military Units, As Appropriate:*** Quick attack, all-wheel drive fire apparatus on Island to specifications (see WFMP) for use of incendiaries north of SHOBA during certain fire danger conditions.

The primary recommendations of the WFMP that resulted in a change from the No Action Alternative are listed below.

### 2.2.2 Alternative 2 – Proposed Action Without Prescribed Burning

As SCI recovers from historic overuse by goats, pigs, and other feral animals, vegetative cover has increased dramatically (Tierra Data 2005). Ground cover alone has increased from about 24 percent in 1992 to averaging about 60 percent in 2003. Shrub communities Island-wide have been filling in at the expense of cactus cover, and shrubland boundaries have been expanding. While the Navy's success in spurring this recovery is overall a significant benefit to the ecological health of the Island, it may pose a dilemma for achieving the specific needs of at-risk species, some of which are federally protected. Without prescribed burning opportunities for patch-level fuels management or for meeting INRMP objectives for sustaining sensitive or at-risk natural resources, the Navy would have fewer management options for achieving its natural resource sustainability objectives as identified in the INRMP.

By diversifying the fire regime under controlled conditions, managing for some younger age classes of vegetation that will benefit certain species, allowing for scientific study of unknown fire dependencies on the Island, broader opportunities for prescribed burning allows for an increased probability that all classes of natural resources are protected, consistent with the mission of NBC. Without prescribed fire in patches, there would be one less tool for achieving habitat condition success thresholds to manage the impacts on natural resources.

A regular burn plan would be an integral part of a proactive fire and fuels management and long-term habitat conservation program. The goal is to maintain the opportunity to burn up to 300 acres per year in patches to meet both fuels management and natural resources objectives.

### 2.2.3 Alternative 3 - No Action/Baseline

Currently, the use of incendiary ordnance is restricted during the period of overlap between the breeding season of the San Clemente loggerhead shrike and fire season, and the target area in SHOBA is reduced in size during fire season. Per the Biological Opinion (BO) FWS-CA-2808, the Navy may use incendiary illumination rounds, white phosphorus, and tracer rounds in Impact Areas 1 and 2 within maintained firebreaks for two hours prior to sunrise, year-round, except when wind speed exceeds 13 knots, using a real-time weather recording system. The training activities continue unless incidental takes exceeds 10% of the shrike population. A helicopter is placed on standby throughout the season. There are no natural resource objectives integrated into fire planning to help prioritize fire protection or avoid an unsustainable natural resource condition. An existing Mutual Aid Agreement with the Cleveland National Forest could be activated to bring in fire suppression bombers, but these airplanes are not cleared to fly over water and they have never actually been involved in suppressing a fire in the past. They require at least two hours notification before needed on a fire. In addition, San Clemente Island is a very low priority for use of these bombers during fire season because of the lack of human life and urban infrastructure at risk compared to mainland fires.

This Alternative has impeded the military training schedule and does not allow flexibility to increase training tempo or footprint. It allows no means to use fire as a management tool to achieve ecological objectives.

Table 2-2 summarizes existing parameters of three BOs, including the most recent 2008 BO, that have changed fire management on SCI for protection of the San Clemente loggerhead shrike and the Island night lizard (*Xantusia riversiana*). In addition to BOs, a Conservation Agreement between the Navy and the USFWS concerning the San Clemente Island fox (*Urocyon littoralis clementae*) dated 10 January 2003 contained some requirements related to fire management. Among other conservation measures, the Navy committed to take responsibility for promoting the recovery of native grassland and shrub communities and reducing the coverage of non-native annual grasses. The Navy established the ability to propagate native plants through the operation of a viable native plant nursery and to enhance habitats by out planting nursery grown plants in the field. This method of habitat augmentation will continue. Further, with implementation of the SCI INRMP, and with the adoption and implementation of the WFMP, prescribed fire can be used to foster a mosaic of grassland and shrubs with consequential restoration of native vegetation to improve grassland habitats.

*Table 2-2. Summary of three USFWS Biological Opinions pursuant to Endangered Species Act Consultations on training activities. These BO's are related to fire management (BO 1-6-97-F-21), to the establishment of an Island Night Lizard Management Area (BO 1-6-97-F-58), and FWS-CA-2808 (23 July 2002), which reinitiated BO 1-6-97-F-21.*

- **Measures Offered By the Navy**
- Adopt Fire Instruction.
- Develop fire training and education pamphlets for range users, and yearly briefings by NRO for regarding fire prevention.
- Conduct yearly NRO briefings to the Federal Fire Department concerning the Endangered Species Act and wildland fire issues.
- Restrict ordnance use during fire season.
- Reduce size of target areas and reduced number of targets.
- Restrict activities involving ordnance and artillery to fixed operating areas surrounded by firebreaks.
- No training activities in Shore Bombardment Area (SHOBA) involving incendiary and other pyrotechnic devices during the overlap breeding/fire seasons unless on-site suppression resources sufficient to extinguish all incidental fires are present. Onset of fire season to be determined by the NRO botanist and on-island Fire Chief.
- Fire Suppression Measures to include existing Memorandum of Understanding (MOU) between the USFS and the FFD to address the suppression of fires on the southern portion of the island and the steep areas of the eastern escarpment (aerial suppression zone).
  Prescribed Fire is identified as a component of the management strategy for SCI.
- Install firebreak to contain fires in Impact Area 2.
- All Standard Operating Areas to be surrounded by firebreaks, and coordinate annually with FFD and USFS in advance of fire season to develop and implement a firebreak addendum to the Wildland Fire Management Plan.
- Implement the fire management practices of the Fire Management Plan, once completed.

**Conservation Recommendations**

- Apply fire retardants surrounding the remaining population of Santa Cruz Island rock cress (*Sibara filifolia*).
- Survey for sensitive species prior to installation of any firebreak, or any controlled burn. Informally consult with the USFWS prior to firebreak installation.
- Mark individual SCI bushmallow plants prior to EOD removal, fuelbreak establishment, and training range backburning to enable personnel to avoid individual plants.
- Conduct research on fire effects on the recovery of listed plant and animal populations.
- Research the distribution of Island night lizard in postburn areas as part of scheduled Island night lizard surveys.
- Apply aerial herbicide within firebreak corridors when wind speeds are below 13 knots.
- Survey to assess the status of federally listed plant species within the fuelbreak boundaries and in and adjacent to Horse Beach Canyon.
- Collect seed from listed plants within impact areas. Propagate plants for future planting within and adjacent to the impact areas, prioritizing San Clemente Island bushmallow seed or cuttings from within Impact Area 2.
- Include detailed location information and impact avoidance recommendations for each listed plant species in the Fire Management Plan.
- Notify USFWS when conservation recommendations are implemented.

**Reasonable and Prudent Measures**

- Improve maintenance of the electrical system on SCI.
- Maintain "trim line" of 25 feet around buildings and generators.
- Conduct annual ignition source review.
- Limit incendiary ordnance to non-windy conditions during fire season.
- Reduce size of the impact area during fire season (this requirement later adjusted to an expanded zone by FWS-CA-2808). Maintain firebreaks at each target area.
- Train and educate personnel.
- Close SHOBA for ordnance training during the entire fire season whenever USFS aerial suppression units are unavailable because of fires on the mainland.
- No training in SHOBA involving incendiary devices during overlap of fire season and shrike breeding period. This requirement was later adjusted by FWS-CA-2808. The Navy now can use incendiary illumination rounds, white phosphorus, and tracer rounds in Impact Areas 1 and 2 within maintained firebreaks for two hours prior to sunrise, year-round, except when wind speed exceeds 13 knots, using a real-time weather recording system. Continue training activities as described unless incidental take exceeds 10% of the shrike population.
- All Standard Operating Areas surrounded by firebreaks.
- FFD and USFS develop and implement a firebreak addendum to the Wildland Fire Management Plan annually.
- Prescribed fires meeting natural resources objectives shall be allowed.
- Minimize adverse effects to shrikes and island night lizards during fuelbreak installation and maintenance, and reduce the potential for spread of wildfire outside of existing firebreaks
- Implement the loggerhead shrike recovery program (captive breeding, re-introduction, predator management, genetics research, population monitoring, and habitat restoration), monitoring/mapping of listed species (western snowy plover, island night lizard, sage sparrow, listed plant species), propagation and out-planting of Santa Cruz Island rockcress, propagation and out-planting of other listed plant species, and genetics research on listed plant species.
- Continue to monitor the level of take that may occur within fuelbreaks in impact areas, including loss of island night lizard habitat, and shrike habitat, individuals, and nests.

**Terms and Conditions**

- Maximize use of roads to position firefighters between sage sparrow habitat and approaching fires.
- Minimize use of backburning in sage sparrow habitat. Water will be the primary suppression agent in sage sparrow habitat.
- FFD shall relay aerial suppression availability to the Range Safety Officer (RSO) on a daily basis. RSO shall use an anemometer to determine wind speed when analyzing ignition potential.
- Personnel trained in the use of the on-site fire suppression equipment shall be present at each fixed range (except SHOBA) when exercises may cause fires.
- Fire history databank to include ignition source, fire size, weather conditions at time of ignition, time of initial report, time of response, method of suppression, duration, intensity, and proximity to sensitive resources.
- Site visit by NRO biologist within one week of fire.
- Aerial surveillance on any fires over 100 acres in size.
- Gas combustion engines to have spark arrestors.
- Prohibit incendiary use for entire fire season if wildfire due to incendiary use occurs outside of firebreaks. Informally consult. If take of an individual shrike, then cease activity and formally consult. (This later modified by FWS-CA-2808.)
- Quantify number, cause of fires in no-suppression zones.
- On-site fire suppression unit during control burns near shrike breeding areas.
- Prohibit use of incendiary devices unless on-site aerial resources are present.
- Notify USFWS of ignition source and maps of all fires.
- Share criteria defining the "fire season" with USFWS.
- Notify the USFWS in advance of any prescribed burn.
- Provide USFWS review and comment on draft and final San Clemente Island Fire Management Plan.
- Coordinate between shrike monitors and firebreak installation contractors prior to firebreak installation.
- Assure aerial fire suppression units are not staged in the vicinity of the Santa Cruz Island rock cress population, or on beaches within SHOBA.
- Establish preset flight pattern that avoids shrike breeding areas for helicopters involved in range maintenance and clean-up. Brief pilots.
- Qualified biological monitor observes shrikes during all phases of firebreak installation. Provide to USFWS a written annual report within three months of installation.
- Maintain effective and logistically practical fuelbreaks around Target Areas 1 and 2 prior to use of incendiary devices, illumination rounds, and tracers during each fire season. Fuelbreak alignment and installation shall protect the maximum possible number of shrikes, including crossing below the China 4 historical territory adjacent to Impact Area 2.
- Assess, in coordination with the Service and the Navy's Fire Management Plan team, the utility of firebreaks around Horse Beach Canyon in the vicinity of the SEAL Team training area.
- Continue to monitor the loggerhead shrike population within Impact Areas 1 and 2. Impact areas shall be monitored a minimum of three times each during the breeding and nonbreeding seasons. Coordinate with the Service prior to the onset of fire season and at the end of shrike breeding season to discuss the number of loggerhead shrikes detected within the impact areas and how this relates to the island-wide status of the shrike.
- Continue habitat restoration, predator management and monitoring, captive breeding, and re-introduction to benefit the San Clemente loggerhead shrike, in accordance with approved recovery plans.
- The Navy shall assure that operators using San Clemente Island comply with weather restrictions

## 2.3 Elements Common Among Alternatives

These elements are common to all alternatives because they are covered under existing Navy Instructions or a Biological Opinion, and are implemented regardless of the choice of alternative:

- On a regular basis, FFD inspects industrial operations, power lines, and occupied structures for defensible space standards.
- A firefighting helicopter is designated for fire suppression response in SHOBA during the San Clemente loggerhead shrike breeding season.

Alternative 1 and 2, as action alternatives, share common elements of the WFMP. These are listed below:

- Land management units are defined.
- A Wildland Fire Coordinator is appointed.
- Certain roads are designated to be drivable during fire season.
- Water storage containers pre-staged.
- Fuels management occurs for vegetation along key roads.
- Quick-attack suppression capability is recommended for TARs.
- Best management practices are identified for avoiding and minimizing effects on cultural resources.
- Fire Department personnel are recommended for enhanced wildland fire training.
- Electronic communications are upgraded.
- A fire reporting and monitoring program is outlined to support adaptive management.
- Collaborative partnerships are proposed for improved planning, management, implementation, and cost efficiency, such as the Department of Navy Wildland Fire Coordinating Group and SCI Wildland Fire Coordination Group.
- Implementation instruments are recommended such as range rules, instructions, or cooperative agreements to assure WFMP implementation.
- The FFD can train military operators and civilians for a Rapid Fire Response Team.

## 2.4 Alternative Considered But Not Carried Forward

One alternative was considered but rejected from further consideration as being inconsistent with the selection criteria regarding INRMP goals and objectives, ecological soundness, and efficiencies to be gained (see Section 2.2). This alternative was to:

*Adopt the mainland and national fire size standard for planning infrastructure and the staging of personnel and suppression assets of 10 acres in the wildland-urban interface and 40 acres in wildlands (unless a WFMP says differently).*

Wildland fire organizations often plan the availability and deployment of suppression assets around a ten-acre fire size as a rule of thumb. This standard is based on the presence of urban infrastructure and human life at risk within structures. This conventional threshold acreage is too large for exceptionally high natural resource values and too small for low-value resources. It was decided that it was not possible to meet the natural resource goals and objectives as identified in the INRMP with these mainland conventions.

A threshold fire size for planning purposes very much depends on the management objective and the balance of risk and harm that could occur in a particular environment. For example, a smaller fire size is acceptable as a planning criteria baseline in a wildland-urban interface with high ignition risk, fire spread potential, and human life at stake. The following will also be considered: actual fire history; potential fire behavior (new fire scenarios) due to new circumstances; the risk of exceeding a threshold for the temporary loss of territory for a management focus wildlife species, which would result in permanent harm to achieving objectives for that species, in a single incident; the risk of exceeding a threshold for the population and genetic viability of a target plant species; the scale of the patchiness that is acceptable as a management objective for a plant community or wildlife habitat; and alternative locations where wildlife and plant population objectives may be met.

## 2.5 Comparison of Alternatives with Proposed Action

The following matrix (Table 2-3) contrasts other options considered in this EA, summarizing the discussion in this chapter.

*Table 2-3. Comparison of elements of the WFMP that differ among the Alternatives considered in this EA.*

| WFMP Topic | Alternative 1 – Proposed Action/Preferred Alternative | Alternative 2 – Proposed Action Without Prescribed Burning | Alternative 3 – No-Action/Baseline (Current Management) |
|---|---|---|---|
| **OVERVIEW** | Full WFMP As Proposed With Implementation of Daily FDRS instead of fire season restriction on ordnance use. Variable Threshold Maximum Fire Sizes 3-300 acres based on resource values at risk. Additional management controls on fire return interval | This is the Preferred Alternative without a prescribed WFMP to maintain the opportunity to burn up to 300 acres per year in patches to meet both fuels management and natural resources objectives. | Restricted use of ordnance during fire season, helicopter standby throughout season when training taking place, reduced target area in fire season. No controls on fire interval or fire size. Has impeded the training schedule and does not allow flexibility to increase training tempo or footprint. |
| **Estimated Ignitions and Average Fire Size** | Low | Low | Medium |
| **Firebreak (miles)** | Medium - 20.6 miles | Same as Preferred Alternative | Varies around impact areas |
| **Road grading** | Medium - 32 miles | Same as Preferred Alternative | None except Ridge Road |
| **Suppression Assets** | Suppression asset staged on island while training going on higher fire danger days to meet minimum response times. | Same as Preferred Alternative | Existing Federal Fire Department resources and helicopter staged during training throughout fire season. |
| **Prescribed fire (fuels management) along corridors** | Medium - 18 acres/year or up to 5 miles/year | Same as Preferred Alternative | None |
| **Prescribed fire (fuels management) in habitat areas** | Some - 300 acres/year | None | None |

| | | | |
|---|---|---|---|
| **Training and Operational Flexibility** | Improved | Decreased because there would be less flexibility to address a higher risk of training shutdown due to fire escapes and of approaching endangered species take limits | Poor |
| **Environmental Soundness** | Balance of pre- suppression work and staging of assets appropriately based on risk of ignition and value of resource. | Improved due to added flexibility to reduce risk to sensitive species populations and achieve INRMP objectives. | Too restrictive of training and potentially damaging to natural resources |

## 2.6 Proposed Conservation Measures for Effects on Natural Resources

The WFMP fully integrates the objectives of the INRMP and incorporates many avoidance and minimization measures to protect resources.

***Assign and Rank Values for All Resources at Risk***

In order to prioritize fire planning and response, as well as achieve reasonable cost for fire management, federal wildland fire policy dictates that fires will be suppressed at minimum cost based on natural resources objectives and values to be protected. The goal is to minimize the total cost of fire management, "considering firefighter and public safety, benefits, and values to be protected, consistent with resource objectives." Fire management plans, programs, and activities "will be based on economic analyses that incorporate commodity, non-commodity and social values."

The resource valuation was performed with the understanding that much of the information about the Island's natural resources is incomplete. Consequently, this resource appraisal should be viewed with caution and only in conjunction with the objectives and strategies outlined throughout the INRMP and the WFMP. Re-appraisal of natural resources valuations will be conducted at least biennially. For a complete discussion of how the resource appraisal was completed, see Section 4.2.3 of the INRMP. Only those resources tied to specific locations could be analyzed by management unit. The resources that were eventually selected for the valuation were assigned a weighting factor determined by a panel of biologists, as follows:

- San Clemente loggerhead shrike nest locations
- San Clemente loggerhead shrike potential release sites;
- San Clemente sage sparrow density
- Island night lizard density
- Ecological units
- Federally listed plants
- Endemic plants
- Seabird colonies
- Pinniped rookeries
- Western snowy plover observations

- Existing natural resources management operations (NRO facilities in Wilson Cove, Stone Station and Burns cage complex, and Arizona Cage complex)

Results of the valuation of natural resources on SCI, by resource, are shown in Table 4-7 of the INRMP. **These relative values are not to be used for any other purpose than fire suppression strategy development.**

### *Natural Resources Values and Suppression by Land Management Unit*

The valuation of natural resources by land management unit was undertaken during the preparation of the INRMP to try to determine which parts of the Island have the potential for the most conflict between military use and natural resources management. This supported the WFMP by helping natural resources managers develop specific fire management prescriptions in each Land Management Unit (LMU). The maps developed for each LMU constitute Chapter 5 of the WFMP. In this chapter, individual land management units are looked at in detail as a practical way to organize fire response to assure compatibility with natural resources. Management priorities shift from unit to unit as both resource values and military values and use change. Here are the general fire suppression guidelines that apply across all LMUs, as summarized from Chapter 4 of the WFMP.

- Once human life and high-value structures are not at risk, the first wildland priority is to keep fires within fuelbreak or LMU boundaries. Additional priorities that apply to all LMUs are as follows:
  - Avoid fires from nearing active nests of the San Clemente loggerhead shrike.
  - When a fire occurs in the west shore boxthorn habitat on the first or second terraces outside Impact Area I or II, keep the fire as small as possible. Control with direct attack, including use of a helicopter. However, ground disturbance is likely to be more damaging in the long term than a fire, so aerial suppression or backburning is preferred over entry with equipment into habitat areas.
  - Avoid fire entry into canyon shrubland or woodland. Fires that enter canyon shrubland or woodland will be kept as small as possible. Control with direct attack, including use of a helicopter.
  - Keep as small as possible fires that threaten shrubland or woodland stands that are less than five years old (based on most recent fire in which shrubs were consumed) rather than contain at logical control lines. This applies to boxthorn on the first or second terrace of the west shore. This does not apply to coyote brush-grassland areas from Stone Station northward on the upper plateau.
  - When a fire crosses the Impact Area I or II fuelbreak in SHOBA, keep the fire out of canyons and contained within that land management unit. Fires will be contained to a control line such as a road, fuelbreak, base of terrace slope, land management unit boundary, ridge, or other logical terrain feature. Terrace slopes (as opposed to the flats) will be protected if possible.
  - For shrublands not in canyons, control, confine, and contain fires using logical terrain features such as roads, fuelbreaks, canyon rims, LMU boundaries.
  - Avoid dumping sea water on fresh water sources or in drainages during fire suppression practice. Roads are appropriate for dumping sea water for practice. Sea water dumps are permitted during suppression incidents. Also, avoid using both fresh

water and sea water in the same bucket during practice, to preclude adding salt water to fresh water areas.

- The Navy will provide the Federal Fire Department, and its cooperators through the use of the Incident Command System, information concerning sensitive resources, including maps of sensitive natural and cultural resources that are updated annually. This will assure that any collateral damage to natural and cultural resources are minimized and that resource protection is integrated into the strategic planning of all fire and fuels management activities.
- Suppression tactics are selected that cause the least collateral damage, and are commensurate with effective wildfire containment and control strategies, firefighter and public safety, and resource values to be protected. Minimum Impact Suppression Tactics (MIST) are employed, where feasible, to avoid sensitive natural and cultural resources. (see WFMP)
- Provide proper safeguards for cultural resources during fire management. Proper safeguards include use of MIST during suppression as described above. Sufficient location and value information will be provided on firefighting maps to identify and prioritize suppression or pre-suppression response. Resource Advisors, both for cultural and natural resources, will be present at prescribed burns. Federal Fire personnel will receive an annual cultural resource protection briefing from the cultural staff. Rehabilitation of sites affected by suppression will be conducted so that there is no permanent loss of cultural resource values.

***FDRS and Prevention***

Preventing unplanned ignitions by managing fire ignition risk as hazardous weather and fuel conditions increase is the first line of defense. Prevention strategies are based primarily on implementing a FDRS, which will align fire ignition risk with fuel hazard conditions (fuels, topography and weather) in the wildland environment. Suppression assets are staged at an increasing state of readiness as fire danger increases if training using incendiary ordnance is occurring. The use of incendiary ordnance is conditioned upon appropriately staged suppression response and advance fuel treatments (see WFMP).

Daily or Hourly FDRS can be announced via an internet-based system that relies on humidity (fine fuel moisture) and wind speed. The FDRS can also be forecasted weekly. The FDRS will be routinely announced on a daily basis when Fire Season begins. Fire Season is declared by the Commanding Officer, NBC and SCI OIC when live fuel moisture is at 200% as determined by FFD with support from CNRSW NRO. Methodology is described in the WFMP.

***Habitat Condition Success Thresholds***

Habitat condition success thresholds are proposed in order to manage the risks of fire. Thresholds are proposed to prevent large-scale, stand-replacing losses, which may be catastrophic to individual species.

Success thresholds are not mandatory, but are intended to guide both fire response and land management. They are intended to ensure each habitat is resilient and self-sustaining, all native species are self-sustaining (plants and wildlife), and exotic species are minimized, while ensuring maximum flexibility in high-value military areas for military use. A change in management is expected when it is clear success thresholds are not achieved. Possible adjustments might include using fire retardant at specific locations, adding fuelbreaks, pre-positioning a fire truck or helicopter, or prescribed burning.

The rationale for establishing fire size thresholds in different habitats is to support the planning of necessary suppression response as well as pre-fire season activities to protect values at risk. For example, wildland fire organizations may plan the availability and deployment of suppression assets around a ten-acre fire size as a rule of thumb. A threshold fire size for planning purposes very much depends on the management objective and the balance of risk and harm that could occur in a particular environment. For example, a smaller fire size is acceptable as a planning criteria baseline in a wildland-urban interface with high ignition risk, fire spread potential, and human life at stake. The following will also be considered: actual fire history; potential fire behavior (new fire scenarios) due to new circumstances; the risk of exceeding a threshold for the temporary loss of territory for a management focus wildlife species, which would result in permanent harm to achieving objectives for that species, in a single incident; the risk of exceeding a threshold for the population and genetic viability of a target plant species; the scale of the patchiness that is acceptable as a management objective for a plant community or wildlife habitat; and alternative locations where wildlife and plant population objectives may be met.

When evaluating whether success thresholds are met, the following applies:

- In all cases no matter what the military or natural resources value rating, fires that burn at Severity 5 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.
- Similarly, any fire that stays within the firebreak boundaries of Impact Areas I and II, or any other firing range, will 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 WFMP.

Habitat Condition Success Thresholds are shown in Table 2-4.

*Table 2-4. Summary of habitat or plant community thresholds for managing the impacts of wildland fire.*

| Habitat or Plant Community | Maximum Patch Size[1] | Maximum Acres [1, 2] (approximate % of Island habitat area) | Average Fire Return Interval for Habitat or Plant Community[3] | Fire Severity Considered as Impact[4] |
|---|---|---|---|---|
| Canyon Woodland | 3 acres | 30 (<5%) over 5 years | at least 40 years | starting at Moderate |
| High Density Sage Sparrow[5] | 5 acres | 45 (5%) over 5 years | at least 40 years | starting at Moderate |
| Moderate Density Sage Sparrow [5] | 20 acres | None specified | at least 40 years | starting at Moderate |
| Low-density Sage Sparrow and other boxthorn or Boxthorn/Grassland transition[5] | 40 acres | None specified | None specified | starting at Moderate |
| Maritime Desert Scrub of Terrace Complexes[6] | None | None specified | at least 5 years in grasslands, at least 10 years in shrublands | starting at Lightly Burned |
| Maritime Desert Scrub of Pyramid Cove | None[7] | None specified | None specified | starting at Moderate only in Horse Beach Canyon |
| Maritime Sage Scrub | 200 acres | None specified | at least 20 years | None specified |
| Loamy Grassland[8] | 300 acres | None specified | at least 5 years | None specified |
| Clay Grassland[9] | 300 acres | None specified | at least 5 years | None specified |

1 Calculations will be based on fires mapped using a minimum 1/2-acre mapping unit for boundaries (including unburned inclusions) and severity.

2 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 or one El Niño cycle (about 7–10 years).

3 These threshholds are planning guidelines only. The determination and tracking of fire return intervals over time will be addressed in the INRMP. Fire may return at about every X years on average. Some places will never burn and be very "old", while some will burn more frequently than once in X years. Determination of fire return interval on SCI is complicated by lack of sufficient fire history data to establish a baseline for habitats or plant communities of interest.

4 Moderate means Score 3 on severity scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts. Lightly Burned (Score 5) means litter and duff are blackened but not evenly converted to ash; grasses and herbs are burned to ash with some resprouting; shrubs are singed/stressed and many resprout/recover; there is no effect on mature trees but seedlings/saplings may be killed.

5 For areas with highest military value, the usual boxthorn objectives will not apply (e.g. Northwest Harbor, China Cove). The focus will be on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to avoid a repeat burn within five years. In addition to the above, threshold conditions for boxthorn from the INRMP are incorporated into the WFMP as follows: Within delineated high-density sage sparrow areas, maintain a threshold percentage of the first-terrace boxthorn community in the reference condition (Vegetation Trend 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. Maintain a threshold percentage of the second-terrace boxthorn in 14% cover boxthorn and less than 50% cover of exotics. Improve, where possible, the condition of this plant community by reducing the distribution and abundance of non-native species. Evaluate the condition of exotics over at least one seven-year El Niño cycle.

6 Threshold conditions from the INRMP are incorporated into the WFMP as follows: 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 seven-year El Niño cycle.

7 None specified except boxthorn outside Impact Areas is tallied with the 40-acre maximum for Low-density Sage Sparrow habitat. Threshold conditions for Pyramid Cove from the INRMP are incorporated into the WFMP as follows: Control invasive exotic grasses using appropriate wildland fire management protocols. Reduce exotics from the 1992–93 baseline condition of 40% by maintaining the current pace of shrub recovery.

8 In contrast to patch sizes for other communities, exceeding thresholds in grassland will not justify enhanced suppression resources to correct except when nesting by the San Clemente loggerhead shrike is occurring in the coyote brush that occupies this type. Guideline conditions from the INRMP are incorporated into the WFMP as follows: Improve the dominance of needlegrass and other native herbaceous species from the 1992–93 baseline of 29% by a favorable burning regime. Reduce exotics from the 1992–93 baseline of 58% by a favorable burning regime, as evaluated over at least one 7-year El Niño cycle.

9 Decrease exotic cover in clay grasslands by 10% in 10 years from the 1992–93 baseline of 70% of total cover, as measured over at least one El Niño cycle. Coyote brush (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 loggerhead shrike. So, until further understanding changes this approach, no situation is identified (except nesting by San Clemente loggerhead shrike) in which enhanced fire suppression would be justified due to exceeding threshold values.

### *Integrating Habitat and Species Objectives From the INRMP*

The WFMP integrates its own objectives with those of the INRMP by using the Success Thresholds described above. These INRMP objectives, which the WFMP is designed to support, are summarized in Table 2-5.

*Table 2-5. INRMP objectives (desired future conditions) supported by the SCI Fire Management Plan for habitats that support federally protected species.*

**Mapping Unit: Canyon woodland**

- 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.
- Initiate the recovery of ironwood trees and enhance their reproduction, abundance, and distribution of associated species.
- Accelerate the recovery of Island oaks.
- Expand shrub and woodland boundaries.
- Foster mixed woodlands with a native shrub layer and an understory of native grasses and herbs.
- Maintain natural processes and functions, and natural abundance and diversity of wildlife.
- 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.
- Ensure that recruitment exceeds mortality of all focus management species and all native trees.
- Improve the native woody cover condition by 10% from the 1992–93 baseline 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 of 45% of total cover in the next ten years.

**Maritime Desert Scrub (MDS) – Boxthorn**

- 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. 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.
- Within delineated high-density sage sparrow areas, maintain a threshold 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 threshold 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. Evaluate the condition of exotics over at least one seven-year El Niño cycle.
- Improve fire management strategy 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.

**MDS-Boxthorn/Grassland**

- Fire management thresholds are the same as low-density boxthorn habitat.
- Support the Objectives and Desired Future Conditions described in the INRMP:
- Increase the cover of native shrubs, subshrubs, and herbaceous forbs.
- Monitor to determine whether the increased cover of San Clemente tarweed will lead to further change in composition, structure and function.
- 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
- On the flats, establish or augment existing shrub islands. Increase the cover of woody shrubs by 25% from the 1992–93 baseline 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 and cholla thickets.
- 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 seven-year El Niño cycle.

**MDS - Pyramid Cove and south-facing slopes**

- Protect habitat conditions that support Sibara filifolia, Lotus argophyllus var. adsurgens, Euphorbia misera, Selaginalla bigelovii, and the full array of other plant and animal species, including the grass thought to be extinct on SCI, Dissanthelium californicum.
- Suppress prickly pear and cholla.
- Control invasive exotic grasses using appropriate wildland fire management protocols. Reduce exotics, mostly red brome, from the 1992–93 baseline condition of 40% by maintaining the current pace of shrub recovery.
- Increase cover of Euphorbia misera where it currently exists from its 1992–93 baseline of less than 1%.
- 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.
- Protect rare species while allowing light fire.
- Protect Horse Beach Canyon from moderate intensity (NPS intensity 3) or hotter fires by applying pre-suppression and suppression tools.
- Evaluate fire tolerance of Sibara filifolia seed. Compare habitat here with that where this species was recently rediscovered on Santa Catalina Island for insight into its habitat preferences and to help improve our ability to define a desired future condition for Sibara habitat.

**Maritime Sage Scrub (MSS) & MSS/Desert scrub - canyon walls**

- Foster the continued expansion of this community. Improve understanding of this community's natural boundaries and shifting dominance from north to south.
- Suppress prickly pear and cholla.
- 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.

**Grasslands, loamy soils**

- 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. Experiment with fire management to improve native dominance, protect sensitive plant populations, and achieve an open grassland condition.
- 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.
- Improve the dominance of needlegrass and other native herbaceous species from the 1992–93 baseline of 29% by a favorable burning regime. Reduce exotics from the 1992–93 baseline of 58% by a favorable burning regime, as evaluated over at least one 7-year El Niño cycle.
- Experiment with fire management to improve native dominance, protect sensitive plant populations, and achieve an open grassland condition. Consider low elevation grasslands at the northern end of the Island as a priority area for increasing needlegrass cover.

**Grasslands, clay soils**

- 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. Manage fire for native perennial herbs and grasses, to enhance transit and prey availability for the SCI fox, and prey availability for the shrike.

| | |
|---|---|
| the impacts of fire on rare shrub species.<br>• Experiment with the reintroduction of Lavatera assurgentiflora ssp. glabra in suspected historic locations<br>**MDS/Grassland complex (terrace faces and flats)**<br>• 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.<br>• Expand shrub and woodland boundaries.<br>• Suppress prickly pear and cholla.<br>• Accelerate the recovery of shrubs on the terrace faces and flats. | • Allow patches and stands of coyote brush (Baccharis pilularis) to fluctuate naturally (increase and decrease in the size and extent) within a larger mosaic of grasslands.<br>• Decrease exotic cover by 10% in 10 years from the 1992–93 baseline of 70% of total cover, as measured over at least one El Niño cycle.<br>• Conduct restoration experiments to shift dominance towards native species.<br>• Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species and native forbs.<br>• Coyote brush 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 loggerhead shrike. So, until further understanding changes this approach, no situation is identified (except nesting by San Clemente loggerhead shrike) in which enhanced fire suppression would be justified due to exceeding threshold values. |

### *Fire Retardant Application Best Management Practices (BMP's)*

The following BMP's apply to the use of fire retardant applied preemptively for fuelbreak purposes.

- Develop application protocols for the use and application of the fire retardant Phos-Chek D75-F that minimize the effects of application on plant and wildlife communities. Consider the following:

  The temporary fertilizing effect of retardants from 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 (Hamilton et al. 1998). The ecological effect of the foam or retardant application depends on which product is applied. Foams act as surfactants (like a soap), while retardants have a mild fertilizer effect due to the ammonia component of the chemical (Hamilton et al. 1998). If conditions are sufficiently moist after retardant application, biomass production will likely increase during the growing season when the chemical is applied, but the effect will not persist. Under dry conditions, no effect on biomass production is likely (Hamilton et al. 1998). Weedy grasses that can exploit the additional nitrogen could gain an advantage over native plants under moist conditions. Annual grassland in California doubled its biomass from approximately 6 tons/ha to 12 tons/ha following application of diammonium phosphate retardant (Larson and Duncan 1982, cited in Adams and Simmons 1999). Native legumes germinated, but failed to establish on retardant-treated areas. Similar decreases in native legumes the first growing season after application of ammonium-based retardant were shown in an Australian eucalyptus community (Bradstock et al. 1987). In laboratory studies with algae, aquatic invertebrates, and fish (Hamilton et al. 1998), short-term toxicity tests showed that both fire-retardant and foam-suppressant chemicals were very toxic to aquatic organisms including algae, invertebrates, and fish. Foam suppressants were more toxic than fire-retardant chemicals. Both foams and retardants have variable degradability but generally the persistence of effects depends on post-application weather patterns (Larson and Duncan 1982; Larson and Newton 1996; Hamilton et al. 1998). The material is expected to last until there is about one inch of rain, or repeated fog can have the same dissipating effect (M. Rogers and R. Montague, pers. comm.).

- Apply retardant after grasses have seeded out to avoid a fertilizing effect or rotate use 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 units may ensure ranges are safe for aerial application of fire retardant or prescribed fire in a non-wildfire situation.
- 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 will be applied adjacent to and outside of the previous year's retardant line. The previous year's retardant line will then be allowed to burn to reduce any increase in exotic species caused by the application of the retardant. Rotating the placement of burns, herbicides, or retardant as much as possible within a band is advisable, to minimize repeated impact and environmental consequences such as increasing invasive species or erosion.
- A controlled burn within the area of concern soon after retardant application will maximize the effectiveness of the retardant line.
- Application of retardant after the winter rains will reduce the risks of chemicals washing into water sources.
- 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.
- Application of retardants will be performed in conjunction with long-term monitoring of soil and vegetation responses to this activity. Direct, long-term impacts to plant and wildlife communities are thought to be insignificant at this time (Hamilton et al. 1998; Adams and Simmons 1999; Bradstock et al. 1987; Hamilton et al. 1998; Larson and Duncan 1982; Larson and Newton 1996).
- Survey for rare plants in advance of application so that populations will be avoided.
- 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.
- Areas around occupied nesting areas will be sprayed with adequate coordination between monitors and applicators.
- Fire retardants will only be used when deemed necessary to maintain the military mission and protect sensitive resources.

### *Prescribed Fire Best Management Practices*

Prescribed fire is likely to be the most environmentally compatible alternative to establishing fuelbreaks when compared to retardant use, disking, and herbicides. Burns will be accomplished in patches or strips that vary in width and placement due to aspect and other factors. The shrub component of the burned area as a whole will reach maturity only in patches under such a regime, but age classes will range from zero to 40 years or more in these patches. The design of the prescribed burn, including the fire intensity at which it is burned, depends on the fire management objective. Vegetated islands and buffer strips can be planned and placed to protect sensitive resources. The WFMP incorporates the following BMP's for prescribed fire.

- Confine all fires to designated zones and prevent fires from exceeding prescriptions.
- Submit deviations or additions to any Annual Burn Plan (see Burn Plan guidelines) to NRO staff for approval and NEPA review. Such changes must also be approved by the

FFD and the SCI Wildland Fire Coordinating Group. Proposed burns that affect habitat occupied by federally listed species or other sensitive species believed to be at risk from a burn will likely receive some reasonable delay in approval or possibly no approval at all.

- Consider in the design any opportunities for habitat or species protection and enhancement consistent with meeting the primary objective, when conducting prescribed burns primarily for safety reasons.
- Accomplish fuels management by using a burn plan in concert with firefighters and with natural resources staff, who can identify in planning stages potential biological conflicts to avoid during burning.
- Survey rare plants in advance of prescribed fire application so that populations will be avoided by location or timing, or prescribed fire will be planned to provide a resource benefit.

### *Firebreak and Fuelbreak Best Management Practices*

The use of herbicide, retardant, and prescribed burns are all options for fuelbreak establishment that are easier on the land and natural/cultural resources than disked or bladed firebreaks. They are also options when unexploded ordnance poses a danger to ground-disturbing equipment. However, at least a road interior to the fuelbreak or a significant topographic feature is still needed for staging of suppression assets during a fire or for aerial suppression units to work from. Whether to use prescribed fire, retardant, or herbicide alone or in combination depends on fuel condition, cost, logistics, risk of increasing invasive weeds, and the duration each is expected to last before reapplication is necessary. It is also advisable to rotate the placement of burns, herbicides, or retardant as much as possible within a band, to minimize repeated impact and environmental consequences such as increasing invasive species or erosion.

Fuelbreak location has been adjusted from year-to-year based on the location of shrike nests, change in target location, ongoing discussions with SCORE, and budget constraints. These adjustments are likely to continue. For example, herbicide application was effective initially, but it type-converted a fuelbreak strip to a dense stand of cholla (*Opuntia prolifera*), and subsequently prevented follow-up applications from becoming effective, possibly due to the cholla blocking herbicide from reaching the grasses, which persisted as a dense understory still capable of carrying a fire.

The proposed techniques for installing fuelbreaks in SHOBA are, to some degree, experimental. Monitoring will be used to evaluate alternative techniques and their effectiveness, and the need to repeat or augment them.

### *Reporting and Monitoring for Adaptive Management*

Sufficient reporting and monitoring is necessary to evaluate, adapt and improve fire management on SCI. The following are monitoring program highlights.

- Map the perimeter of each fire, document the ignition source, map fire severity, assess effects on listed species, and, to the degree possible, determine weather conditions at the time of ignition.
- Evaluate the status of the boxthorn community on sites with different fire history in order to verify proper fire management. Upon approval of the SCI Wildland Fire Coordination

Group, conduct experimental burns to clarify the response of this community to fire, in consultation with the USFWS. Alternatively, conduct an experiment on boxthorn recovery by using various clearing treatments on a small site.

- Initial prescribed burns that have more of an experimental component to burn objectives will be monitored by both the WFC and NRO. Consider the following:
  - Identify a reference site, on-site or off-site.
  - Using a 50-meter plot/transect layout, monitor the following attributes or variables: vegetative fuels, species cover, species composition/frequency, presence/absence of rare species or weeds, composite burn index.
  - Monitor fire intensity.
  - Document conditions before the burn (WFMP recommended list is from the U.S. Department of Interior "FIREMON" from the Fire Management Program Center, National Interagency Fire Center Monitoring Handbook).
- Continue to evaluate the use and application of fire retardant from roads (ground spraying) and by aerial spraying in inaccessible areas (or those with unexploded ordnance concerns) as a means to prevent damage to sensitive resources that can result from disked or bladed firebreaks.
- Estimate fuel load changes in conjunction with the Vegetation Trend Long-term Monitoring Program. Use visual (photos with markers) and standard fuel models. This is important as shrub recovery continues throughout the Island. It is important in boxthorn where no standard fuel model exists.
- Select focus species. Appendices D and E of the SCI INRMP discuss management focus species for SCI. For fire management, the selection of focus species should be stressor- or threat-based, meaning they should be selected to be those most at risk from an altered fire regime, especially in combination with drought and invasives, etc. Simple presence/absence from a checklist will be the start of this kind of analysis. The selection of species should also meet these criteria:
  - A clear link should be established between monitoring and management objectives and questions that relate to fire as an integral ecological process and a potential stressor on plant communities and species. This link should be described in explicit conceptual models of fire effects, and include other ambient (not species) indicators also identified in the context of these conceptual models.
  - The approach should be applicable across a range of budgets and spatial scales, including species, community, and landscape. It would be best to link the selection to other monitoring programs to improve its predictive power.

### *Natural Resources Sustainability Monitoring*

For each habitat, a set of measures is proposed to ensure that the habitat remains healthy and sustainable, and supports federally listed and other management focus species. The intent is to assess the sustainability of the Island ecosystem with respect to impacts of the fire regime based on criteria and indicators considered nationally for fire effects. These assessments are made in coordination with the wildlife, vegetation trend, and other Island-specific monitoring programs identified in the SCI INRMP, and reported on in the annual update and triennial report. The assessed factors include but are not limited to:

- annual productivity

- ecosystem and landscape fragmentation
- area and level of infestation by exotic weeds
- presence and status of species of concern
- presence and extent of representative species
- area of land with accelerated erosion
- change in extent of bare ground
- military readiness indicators
- economic cost of fire management (fiscal impact)

***Annual Review and Updates***

- The OIC and NRO will jointly conduct an annual meeting among parties with a stake in wildland fire management to reassess priorities and success criteria, and build on the past year's experience. The goal will be to provide the Fire Department with a revised annual prescribed fire implementation schedule, reach an agreement regarding fuelbreak acreages, and revise overall fire management thresholds for the Island and each habitat. The following information will be gathered and prepared for presentation at this meeting:
  - An annual summary of fire incidents and cause.
  - Maps of all fires, including burn size and burn severities across each fire.
  - An assessment of each fire's effects on natural resources.
  - New fire frequency, year-of-last-fire maps.
  - Number of fires and acres consumed in areas that had a previous fire within the past five years.
  - Prescribed fire acreages and photographs of results.
  - New biological survey results.
  - New fire risks or protection requirements such as new training tactics and locations, new weapons, or new facilities.
  - New BO's or other policy adoptions.
  - Pertinent conclusions of the long-term vegetation monitoring program, and an assessment of any new erosion post-fire.
  - New resources or equipment acquired by the Fire Department.
  - Prescribed burns for the upcoming year.
- The Environmental Program/NRO will convene and confer with the WFMP Working Group in five years to determine if an update is necessary.
  - The Fire Atlas pages (Chapter 5), which direct the Fire Department regarding location of firefighting assets, topography, and natural and cultural resource values at risk, will be completely updated every five years, with annual updates of sensitive species locations or as deemed necessary by NRO.
  - The update will include revised maps of sensitive areas, values at risk, firefighting infrastructure, and any new training scenarios.
- NRO will update the WFMP in five years if it has not been done earlier. If found beneficial, this update will be done in tandem with the SCI INRMP update.

***Other Best Management Practices***

- The potential impact due to the spread of weeds as a result of hazard fuel reduction projects along roads and around structures is minimized by evaluating these projects for effectiveness, eliminating invasive species and providing annual weed abatement.
- Identifying the locations of sensitive habitat and consulting with FFD before a wildfire occurs helps to avoid damage to sensitive species. Since it is expected that a fire will spread rapidly, the Navy will consult with FFD regarding the location and importance of natural and cultural resources to minimize impacts associated with suppression activities.
- To the extent feasible, he Navy will monitor any sensitive plant species that is affected by a wildfire to develop basic information on the effect of fire on that species. Fire response information should be incorporated into the sensitive species database as part of the Navy’s inventory and monitoring programs.
- Avoiding potential impacts to geology and soils by improved wildfire suppression; avoiding building fire lines during suppression; by conducting only small-sized prescribed fires; and using existing roads and trails for fuelbreaks. The WFMP provides post-burn rehabilitation guidelines to avoid soil erosion or exotic weed establishment after wildland fire.
- Preventing potential impacts to the health and safety of firefighters and others by improved fire suppression, a policy that that keeps firefighter safety as the first priority during incidents, providing adequate survivable space, developing and communicating evacuation plans, and improving coordination and education notification procedures.
- Implementation of MIST protocols will minimize damage to sensitive resources during suppression, including to jurisdictional wetlands or waters of the U.S.
- Implementation of MIST protocols and site-specific avoidance measures during prescribed burns for potential impacts due to stormwater runoff to jurisdictional waters, to be incorporated into the site-specific burn plan.

## 2.7 Conservation Terms and Conditions from Biological Opinion on the SCI Military Operations and Fire Management Plan

A Biological Opinion (BO) was issued on the San Clemente Island Military Operations and Fire Management Plan November 2008, addressing this WFMP in concert with military training activities, on November 17, 2008 (FWS-LA-09B0027-09F0040). The Terms and Conditions issued under this BO that pertain to the WFMP overlap substantially with the measures described by the Navy in the WFMP itself. The fire-related conservation measures are identified below. These measures are considered part of the Proposed Action in this document.

**Fire Management Plan Measures (FMP-M-l)**

**FMP-M-l.** The Navy will evaluate firelines and bladed areas disturbed by fire suppression activity and rehabilitate these areas as practicable and appropriate.

**FMP-M-2.** The Navy's Natural Resource Office will determine whether seeding is appropriate for post fire erosion control. Seeding would be overseen by the San Clemente Island Botany Program and would use native seed collected from San Clemente Island.

**FMP-M-3.** The Navy will evaluate the potential impacts of fire on Santa Cruz Island rock-cress, San Clemente Island bush mallow, and San Clemente Island larkspur.

**FMP-M-4.** When designing and implementing fuel breaks, the Navy will factor in the need to protect canyon shrubland/woodland occupied by shrikes. Coordination between Navy Natural Resource personnel and applicators will occur prior to fuel break installation in the proximity of occupied nesting areas.

**FMP-M-5.** The Navy will minimize impacts to listed species and occupied habitat associated with Phos-Chek application by considering the locations of federally-listed species in advance of fuel break installation. This will allow the Navy to avoid impacts to the extent practicable. The Navy will avoid application of Phos-Chek within 91.5 m (300 ft) of mapped Santa Cruz Island rock-cress locations and avoid application of Phos-Chek within 91.5 m (300 ft) of other mapped listed species to the extent consistent with fuelbreak installation.

**FMP-M-6.** The Navy will monitor soil and vegetation responses to retardants and herbicides and use this information to maximize the effectiveness of fuelbreak installation and minimize impacts to native vegetation.

**FMP-M-7.** The Navy will coordinate the development of burn plans with natural resources staff to identify potential biological issues.

**FMP-M-8.** The Navy will consider the locations of federally-listed plants in advance of prescribed fire application so that impacts can be avoided by location or timing where possible and plan prescribed fire to provide a resource benefit where appropriate.

**FMP-M-9.** The Navy will conduct experimental burns to evaluate the response of the boxthorn plant community to fire.

**FMP-M-10.** The Navy will conduct prescribed fire experiments to evaluate their effectiveness in controlling non-native annual plants.

**FMP-M-11.** The Navy will establish post-fire recovery plots to monitor recovery and identify new infestations of non-native invasive plants associated with both wildfire and prescribed fire.

**FMP-M-12.** The Navy will evaluate burn areas and prioritize them appropriate for inclusion in the weed eradication program, as appropriate.

**FMP-M-13.** The Navy will conduct pre-season briefings on minimal impact suppression tactics (MIST) for the fire fighting personnel. This would include guidelines on fire suppression materials and tactics, including limitations associated with Phos-Chek and salt water drops.

**FMP-M-14.** The Navy will conduct an annual review of fire management and fires that will allow adaptive management, if required, as outlined on page 4-56 of the draft Wildland Fire Management Plan (September 2005 draft). The Service will be included as an invited stakeholder to participate in this annual review.

**FMP-M-l5.** The Navy will staff and train a Wildland Fire Coordinator prior to modifying existing training restrictions or increasing distribution of ignition sources on San Clemente Island. The equipment and tools necessary for this staff person to accomplish the duties of this position will be in place prior to any increasing ignition sources on the island.

**FMP-M-16.** The Navy will submit a final San Clemente Island Fire Management Plan to the Service prior to increasing ignition sources on the island.

## 2.8 Key Issues

The key issues addressed by the Proposed Action/Preferred Alternative include:

- Uncontrolled fires can be detrimental to San Clemente loggerhead shrike recovery. The WFMP places controls on fire size, frequency, and location to address this issue.
- Fire management for shrike protection may conflict with objectives for other 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. The WFMP provides one means for balancing the trade-offs among competing natural resources objectives.
- Natural resources management conflicts at times with operational requirements for using ordnance. The WFMP opens up opportunity for using ordnance under all fire weather conditions with controls on ignitions and fire spread; thus, the WFMP can fulfill both natural resource management and operational requirements.
- Wildland fire patterns may affect the ability of special status species to be self-sustaining. The WFMP provides tools for natural resources managers to address this issue.
- Some fire regimes and fire infrastructure could result in erosion and sedimentation in environments with sensitive natural and cultural resources. The WFMP provides for monitoring erosion and sedimentation in order to address this issue.

## 2.9 Resource Topics Not Considered Relevant for Analysis

Outdoor recreation and scenic values are not considered in this analysis because San Clemente Island lands are not accessible to the public for recreation and are generally not visible to the public for scenic values.

The topic of education and outreach is also not analyzed because there is no target audience for such an effort covered in the WFMP. The WFMP requires training in wildland fire response for the Federal Fire Department and some military personnel, but this is not considered a topic under education or outreach.

Socioeconomic effects on local communities are also not analyzed. NEPA considers “impacts to the human environment” to include any effects of federal actions on the social and economic well-being of communities and individuals. The management actions proposed within the WFMP would not generate new jobs and income within the local community; however, some fire personnel may come from outside the area on a temporary basis to assist Federal Fire staff with a fire or fuels management. This impact would be negligible to communities surrounding the federal properties; therefore, it is eliminated from further analysis. There is no public access to San Clemente Island, so no non-military local community to analyze.

## 2.10 Conclusion

The preferred alternative reduces the potential loss of human life, and sustains ecological and military training values by assuring access to a firefighting helicopter and quick-attack apparatus, and providing enhanced pre-suppression planning for the Federal Fire Department and its cooperators. The FDRS allows for appropriate staging of suppression resources as fire danger increases. The Preferred Alternative also implements the use of fire retardant to establish fuelbreaks, and hazardous fuels reduction using prescribed fire and herbicide as needed. Short-term ecological damage may occur through some loss of native habitat by this hazardous fuels reduction. Prescribed fire, for reasons of natural resource sustainability, also reduces the long-term risk to ecological values by providing opportunities for protecting sensitive species and other natural resources by diversifying the fire regime under controlled conditions, managing for some younger age classes of vegetation that will benefit certain species, allowing for scientific study of unknown fire dependencies on the Island, and increasing the probability that all classes of natural resources are protected, consistent with the mission of NBC. The No Action/Baseline Alternative could risk the extirpation of some species from SCI.

The full range of tools selected for the Proposed Action/Preferred Alternative constitutes a balance blend of the available fire management techniques that reduce ignition risk, manage vegetative fuel hazard, and are feasible and effective in the fire environment of SCI.

# 3.0 Affected Environment

## 3.1 Land Use

San Clemente Island consists of 37,200 acres plus 54 acres of offshore rocks. It 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.

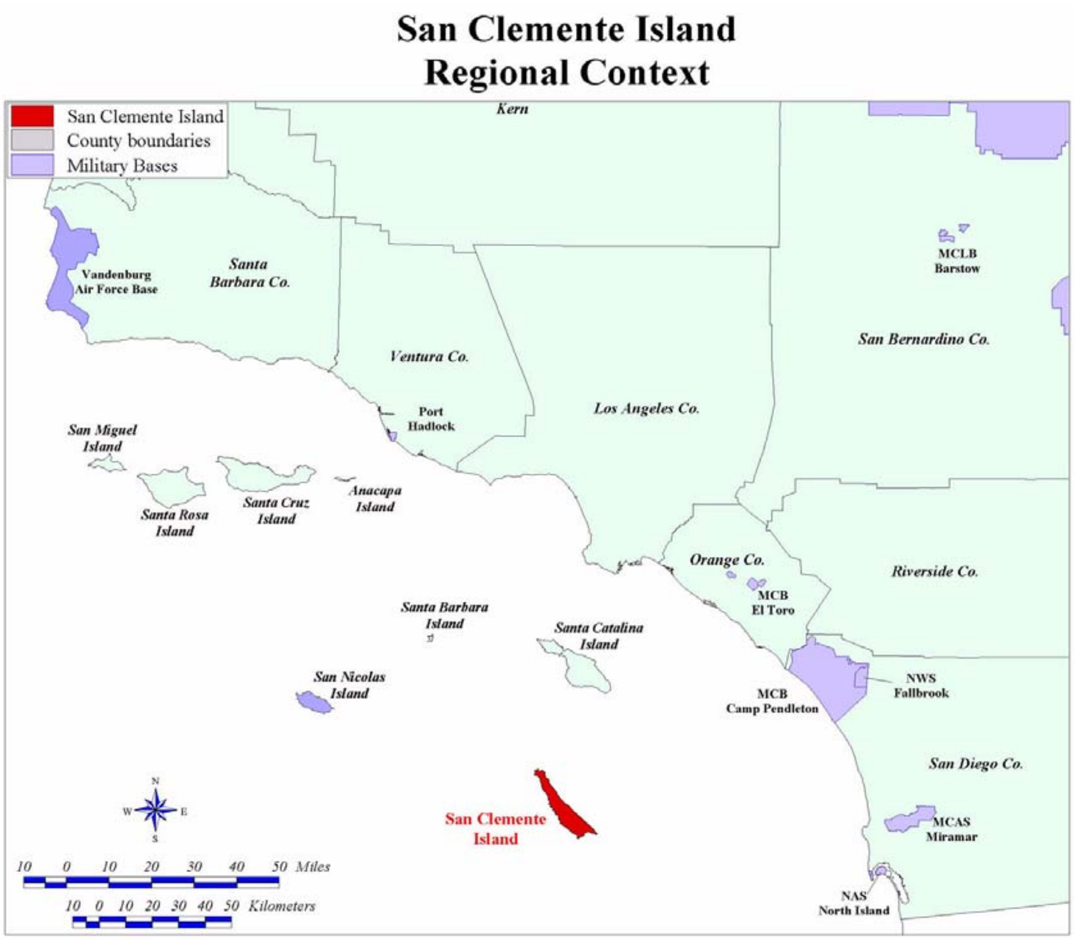



*Figure 3-1. San Clemente Island and other Channel Islands of the archipelago and proximate counties on the mainland of southern California.*

SCI is the cornerstone of tactical, live-fire training within the SOCAL Range. The SOCAL Range supports the training requirements of the largest concentration of naval forces in the world. Land, air, and sea ranges provide the U.S. Navy, U.S. Marine Corps (USMC), and other military services space and facilities, which they use to conduct readiness training and test and evaluation activities. Over twenty U.S. Navy and USMC 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, Research, Development Training and Education (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.

For SCI, the military mission is:

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

There are three main types of users at SCI: tenants, frequent users, and intermittent users. Tenants are users that maintain a permanent presence on the Island and occupy permanent facilities or operational areas. Tenants primarily consist of military training and research groups but also include a medical clinic and the Natural Resources Office (NRO). Frequent users conduct operations on and around the Island throughout the year, but do not have permanent assigned structures or a daily presence. Frequent users consist mainly of large Navy commands such as COMTHIRDFLT and Commander Strike Force Training Pacific (COMSTKFORTRAPAC). Infrequent users include a variety of military and civilian groups including U.S. Air Force Units, National Guard Units, and Boy Scouts of America.

Major range events, operations, and activities that make up military operations occur in onshore, nearshore and offshore environments. Types of operations and activities that are conducted at SCI can be broken down into seven broad types described in more detail in the SOCAL EIS (December 2008). They are:

1. Shore Bombardment Area (SHOBA) Operations
2. Amphibious Training
3. Naval Special Warfare Training
4. Airfield Operations
5. RDT& E Tests
6. Other Island Operations
7. Offshore Operations

The first six of these occur in the onshore/nearshore environment.

The table (Table 3-1) below gives location and land-use areas on the Island. Land and water use activities under the purview of this Plan are discussed in detail in the SoCal Range Complex EIS. 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.

*Table 3-1. Summary of land-use types. Total acreage of SCI is 37,200 plus 54 acres in off-shore rocks.*

| **Naval Base 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 |
| Other (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 Range | 28,458 |
| Kingfisher | 1,629 |
| Underwater Range | 21,022 |
| ***Acreage from GIS coverage revised 1/25/02** | |

## 3.2 Training, Utilities and Infrastructure

San Clemente Island 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, Naval Air Landing Field (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. 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.

Onshore operations include all operations and functions that take place physically on the Island including aviation over flight. Map 1-1 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 SOCAL Range.

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.

**Shore Bombardment Area**

SHOBA range is located at the southern end of SCI (Map 1-1). Operations conducted in SHOBA use both live and non-live fire. 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 aircraft carrier, a battleship if available, one or more cruisers, a unit of destroyers, and a logistic support ship). Combined Arms exercises involve all supporting arms of the Navy, Marine Corps, and Air Force, using such assets as NSFS, artillery, mortars, fixed-wing aircraft, and helicopters, and include exercising protocols for coordination of these assets. Combined Arms Evolutions are central to the military's Joint Warfare/Littoral Warfare strategy.

The Supporting Arms Coordination Exercise (SACEX) is one of the major SHOBA Combined Arms operations. 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. Amphibious landings operations are often associated with a SACEX or FSCEX. See Figure 3-2. 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 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. 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 currently takes place.

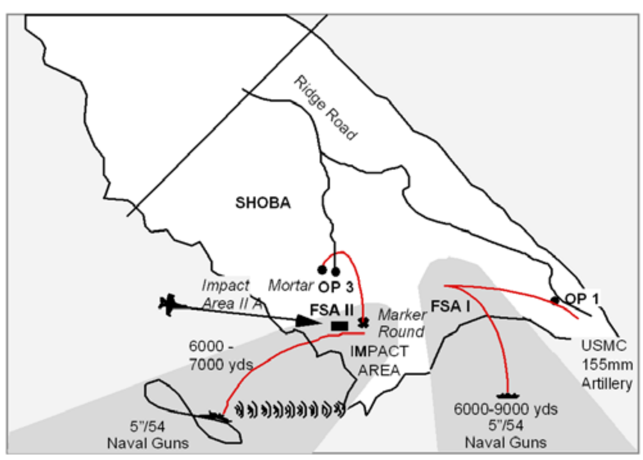



*Figure 3-2. Supporting Arms Coordination Exercise (SACEX). Integrates Naval Surface Fire, Artillery and Air Support (from San Clemente Island Operations Management Plan).*

### 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 include 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 LCAC’s air cushion ability allows it 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. 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 calendar year 2006, and will be used on SCI sometime after that.

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.

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.

### Airfield Operations

NALF SCI is located at the northern end of the Island (Map 1-1). 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.

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 Navy air facilities. It is also a way of mitigating the amount of nighttime operations at NAS North Island that can disturb residents nearby.

**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 Exercices (COMPTUEX/ITA);
- Barge Operations;
- Combat Search and Rescue;
- Airfield and Weather Support;

- LCU Operations;
- Oil Spill Response Practice;
- Surface/Subsurface Surveillance.

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.

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. See Figure 3-3. It provides progressive and realistic pre-deployment training for Carrier Battle groups, Amphibious Ready Groups, and Marine Expeditionary Units and other deployers in a joint environment. 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. Similarly, a COMPTUEX is 18 days long plus three days of Final Battle Problem solving.

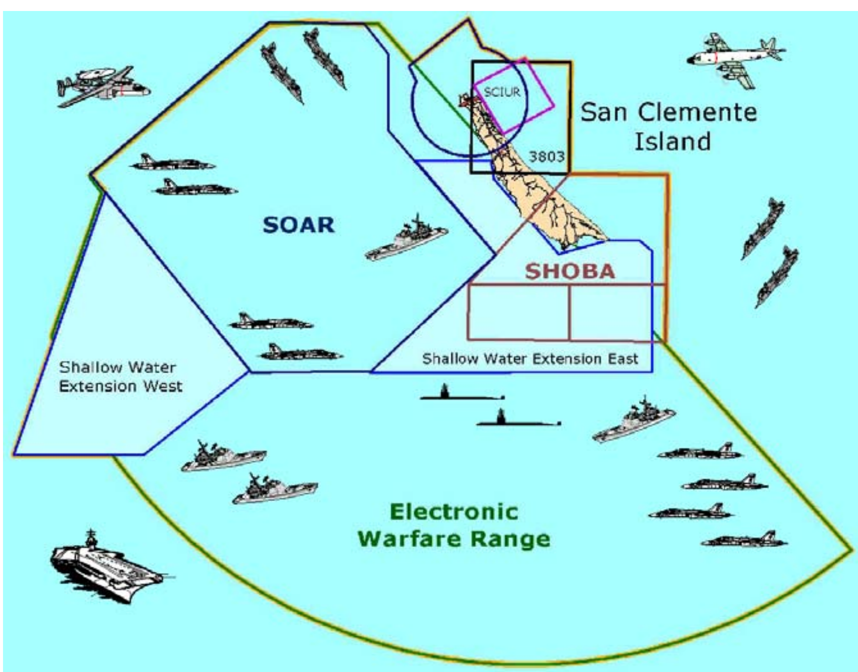



*Figure 3-3. JTFEX scenario from San Clemente Island Operations Management Plan (Draft 2000).*

The SOCAL Range 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.

## 3.3 Recreational and Scenic Values

For military and on-Island personnel, outdoor recreation 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. Permanent military and civilian personnel also have the opportunity to whale watch, fish, swim, surf, or snorkel from certain areas of the shore. 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).

**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.

Given the highly productive waters surrounding SCI, it is a popular spot for recreational fishermen. 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.

## 3.4 Public Health and Safety

The health and safety of the public and fire personnel are the first concern in any fire management plan. Current wildland fire management capability and responsibility on San Clemente Island lies with the Federal Fire Department. The FFD falls under the Assistant Chief of Staff for Security and Force Protection for CNRSW, based in San Diego. FFD has crash/rescue responsibilities at the airfield, and as well would be the Incident Commander in the event of a wildfire emergency. A separate medical crew on Island is available to respond to medical emergencies.

The National Wildfire Coordinating Group (NWCG) is a national operational group designed to coordinate programs of the participating wildfire management agencies. It is made up of the USDA Forest Service; four USDI agencies including the NPS; and State forestry agencies through the National Association of State Foresters. Based on NWCG guidelines, a minimum of four wildland-trained firefighters are required on each engine that responds to a wildland fire. The current staffing at the FFD does not meet standards of the NWCG for compliance with Federal Fire Policy.

## 3.5 Natural Resources

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, and hitchhiking). Their ability to ultimately reach the island and adapt to local conditions was no doubt influenced by fluctuations in sea levels, the changing area of land exposed over time, distance from source populations on the mainland and other islands in the archipelago, and the presence or absence of favorable conditions 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 is also influenced by island size.

The island’s isolation has resulted in the presence of numerous endemic species, many of which have declined because of past disturbances. 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. varieties or sub-species). SCI harbors more endemics than any other island in the Channel Islands archipelago. Past land use history threatened the viability of some of these species, and for this reason they became listed under the ESA.  In total, the SCI INRMP identifies 48 plant and wildlife species endemic to SCI (INRMP 2002). However, some groups, especially invertebrates, have been inadequately studied on SCI. In total, 17 species are federally or state listed as endangered or threatened, and many others are considered species of concern because of their vulnerability to disturbance. Approximately three million dollars is spent annually on SCI for natural resources management, most of which is directed toward federally listed species.

### 3.5.1 Topography, Geology, and Soils

San Clemente Island's area is about 56 square miles. Within that area are a large variety of soil and topographic features. Marine terraces dominate the western side of the Island. A higher elevation plateau lies across much of the center which drops off into steep slopes on the eastern side. Canyons, some of which are relatively deep and wide, cut down through the slopes from the plateau on all sides of the Island. Dunes and sandy beaches are also present in some parts of SCI. The highest point of elevation, located slightly east of the center of the Island, is Mt. Thirst at 1,964 ft.

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 and on the west and south shores. Dacite is extremely resistant to weathering and the marine terraces cut in dacite are much less defined than those cut in andesite (Olmstead 1958). The youngest of the volcanic flows is rhyolite which is found in the form of loose boulders or stacks on the terraces or more commonly at the base of eastern escarpments. Sedimentary limestones, siltstones, diatomites, and shales of Middle to Upper Miocene partly overlay, and in some places are interrelated with, the upper part of volcanic rocks (Olmstead 1958).

Natural Resource Conservation Service (NRCS) completed a draft soil survey for SCI in 1982 (USDA Soil Conservation Service 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.

Most soils on the Island are less than 3,000 years old and contain well developed profiles and high clay content. Soils on the western slopes have a distinctive silt loam surface cap or horizon. This horizon is a thin (five to 21 centimeters [cm]), 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 (Muhs 1980). This soil may have arrived on the Island via wind transport.

In some parts of the Island the upper soil layers, and sometimes down to subsoil, have eroded away due to the actions of feral animals. Steep slopes denuded by historic grazing have quickly become sites of mass wasting. Grazers suppressed the fire fuel loads of most habitats, which are now increasing after their removal. In addition, there may be a general lack of burrowing animals and soil arthropods to turn the soil and facilitate nutrient cycling on SCI compared to the mainland (D. Estrada, pers. comm.), so mulch in the grassland continues to build up rather than turn over with decomposition. 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.

Large, intense fires often have a negative effect on site productivity and water quality because of associated soil erosion, and the resulting sedimentation into watercourses. The magnitude of post fire erosion and sedimentation depends upon soil type and its moisture content at the time of a fire, type and condition of vegetation cover on watershed slopes, steepness, aspect, and fire intensity, proximity to the nearest drainage, and timing and intensity of storms that follow the fire. In most shrub communities, erosion rates are highest post-fire, and then return to pre-fire levels within a few years.

Certain varieties of the Island's soils are more prone to erosion than others. Past or current erosion caused by overgrazing or unimproved road conditions is a concern on the high plateau loamy soils, along drainage margins where established tree roots have been undercut, and on upper canyon wall soils supporting oak groves. Even fairly level areas on the west side have been eroded by wind, especially on the siltier westshore soils and in sandy locations.

### 3.5.2 Water Resources, Including Regulated Waters and Wetlands

When wildfire consumes vegetation that anchors and protects the soil surface, erosion by water commonly follows the following winter. If soil actually erodes off the slope into a water body, it is called sedimentation. Erosion alone causes a reduction in site productivity over both the short and long term. Sedimentation compounds the loss of productivity by potentially affecting water quality, suffocating living organisms in the downslope drainage, and affecting the hydrologic balance of both waterways and uplands. Whether soil erosion results in drainage sedimentation depends upon a number of factors: inherent soil erodibility, slope position, distance to the drainage, steepness, rainfall intensity and duration, saturation condition of the soil, and the amount of protective vegetation on the soil surface.

Proper watershed functioning supports riparian habitats, which can contain some of the most concentrated biological values. During normal or above average rainfall years, runoff collects in drainages or vernal pools on SCI. A three-parameter wetland delineation (USACOE 1987) has been completed that identified which pools meet soil, water, and vegetation criteria to be called waters of the U.S. under Clean Water Act definitions. However, since they are non navigable, isolated, intrastate waters, their jurisdictional status is complicated and it is likely that most pools are not jurisdictional, but some are.

Increased sedimentation from onshore areas of SCI could have considerable impact not only to water bodies on SCI, but to the ocean waters directly surrounding the Island, which are designated an Area of Special Biological Significance (ASBS) by the State Water Resources Control Board. This designation is intended to protect 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 [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:

- Elevated temperature wastes shall comply with limitations necessary to assure protection of the beneficial uses and areas of special biological significance.
- Under the National Pollutant Discharge Elimination System (NPDES) Program, all facilities which discharge pollutants from any point source into waters of the United States are required to obtain a NPDES permit.

- 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 ASBSs, is not applicable to vessel wastes, the control of dredging, or the disposal of dredging spoil.

### 3.5.3 Plant Communities and Fire

In order to consider effects of fire on plants, they may be grouped by similar life history characteristics. Response to variation in the fire regime varies with regeneration strategies. The following breakdown of plants and their fire adaptation was conceived to function as a resource for future adaptive management of this WFMP. Information for dominant shrubs was derived from the USFS Fire Effects Information System (USFS FEIS 2009). The breakdown of life histories used for shrubs and trees is based on Zedler (1977, 1995). Classification of herbaceous species is based on Zedler (1995), Keeley and Keeley (1984), and Keeley (1986). Lichens are also considered in the herbaceous species table. The life history breakdown is as follows:

- Shrubs and trees
  - Obligate seeders (reproduce almost exclusively by seed)
  - Obligate sprouters (reproduce almost exclusively by sprouting)
  - Facultative seeders/sprouters (commonly reproduce by both seed and sprouts)
  - Suffrutescents (plants which are woody at the base only, do not die each year)
  - Intermediate- to long-lived canopy dominants of coastal sage scrub
  - Insufficient information to classify with confidence
- Stem succulents and cacti
- Herbaceous Species
  - Herbaceous perennials with underground storage structures
  - Herbaceous perennials dependent on seed for propagation
  - Opportunistic native annuals (plants that die each year and do not need fire for germination, but instead germinate under many conditions)
  - Pyrophyte annuals (plants that die each year and only appear after fire because seeds are stimulated to germinate by heat, smoke, or charate)
- Lichens

The following paragraphs break down life histories of plants in relation to fire, and a number of the sensitive or dominant species from SCI are listed if they are expected to fall under each category. The groupings are based on best judgment and should be treated with some caution until specific observations are made on the Island. This is because some plants that may have close counterparts on the mainland may behave differently in this insular setting.

***Obligate Seeders.*** When mature, these shrubs are killed by fire, and recruitment is mostly from the soil seed bank. The primary period of population expansion for obligate seeder species is post fire. They are often fire-dependent, with shallower roots, higher tolerance of water stress, and have greater post-fire seedling survivorship than obligate sprouters. Obligate seeders can be lost with a single premature burn. For non-sprouting species, 7-15 years are needed for seedlings to mature enough to replenish the population, depending on weather and other factors. These species have only limited dispersal ability and once lost from an area, recolonization from other established populations can be extremely slow (Zedler and Zammit 1989). Obligate seeders can also disappear from an area after a long fire-free period, but still remain in the soil seed bank. Species on SCI that are obligate seeders include the Island big-pod shrub (*Ceanothus megacarpus insularis).*

***Obligate Sprouters.*** Seeds of these shrubs and suffrutescents are probably killed by fire, with regeneration by vegetative resprouting. They also sprout between fires but may need fire to create gaps for saplings to recruit to the canopy and for population expansion. They are more resilient to short fire return intervals (Zedler et al. 1983, Fabritius and Davis 2000), but nevertheless may be severely impacted by sustained high-frequency fire regimes or short return intervals. Successful germination and recruitment of new individuals is correlated with the cooler, moister, low light conditions and increased litter depth associated with mature closed-canopy chaparral that develops over fire-free intervals of 40 years or more (Lloret and Zedler 1991, Keeley 1992a and b, DeSimone 1995). S. Keeley et al. (1981) investigated seedlings of obligate sprouters, finding that seedlings are established primarily in mature chaparral in gaps resulting from the death of senescing, shorter-lived species. Seedling establishment is often episodic and coincides with periods of above-normal rainfall. Although initial establishment may occur in burned or unburned stands during very wet years, continued survival is favored beneath mature stands on sites that are relatively mesic (north slopes) and which possess a well-developed litter layer. Long-term survival beneath mature chaparral is rare; seedlings are subjected to herbivory by small mammals. Seedlings are most common in very old stands (60 to 100+ years) where long fire-free intervals allow for the build-up of seedling populations. Examples from SCI are:

- *Lyonothamnus floribundus asplenifolius* (Santa Cruz ironwood). No known regeneration by seed on SCI.
- *Rhus integrifolia* (lemonade berry). Tall canopy dominant, moderately vigorous resprouter. Expanding on SCI. Seedling recruitment occurs under fire-free conditions (Lloret and Zedler 1991) and after fire, but survivorship after fire has not been determined (Keeley 1998). Species is expected to continue to increase with extended fire-free period due to height and ability to dominate the canopy, as well as ability to recruit seedlings.
- *Malacothamnus clementinus* (San Clemente Island bush mallow). No known natural regeneration by seed on SCI.

***Facultative Seeders/Sprouters (mixed seedling recruitment and vegetative resprouting).*** Mortality of the lignotuber (a woody swelling below or just above the ground, containing buds from which new shoots develop if the top of the plant is cut or burnt) can be very high if fire returns prematurely (Zedler et al. 1983, Haidinger and Keeley 1993). Since a premature fire also kills seedlings that germinated in response to the previous fire, facultative seeders show only limited ability to persist under repeated disturbance.

- *Eriogonum giganteum formosum* (San Clemente Island buckwheat)
- *Galvezia speciosa* (island snapdragon)
- *Quercus tomentella* (island oak)
- *Rhamnus pirifolia* (island redberry)
- *Crossosoma californicum* (island apple-blossom)

- *Lycium californicum* (California desert thorn, boxthorn). Leaves of boxthorn are succulent to tolerate drought stress, dropping in the summer. It regenerates from root suckering and layering, as do other species in this genus. It probably experiences variable mortality with fire depending on fire intensity. Severe fires may kill it, but moderate-severity fires probably only consume its aerial portions. It may resist burning in low-intensity fires. It may take as long as 10-20 years for it to reach preburn densities on a burned site (E. Kellogg and D. Pivorunas, pers. obs. on San Clemente Island). On San Clemente Island, it has been observed to recover from fire through both resprouting and seed, but short fire intervals cause long-term loss (E. Kellogg, pers. obs.). Emery (1988) reports no treatment required for seed germination.

***Subshrubs (Maritime Desert Scrub).*** Intermediate- to long-lived dominant and canopy species which tolerate fire, but do not require it for establishment; they are sensitive to fire intensity because it affects sprouting ability (Zedler in Kalin et al. 1995). The ability of surviving shrubs to seed in the first year after fire appears to allow coastal sage scrub to persist under fire frequencies that eliminate chaparral (O'Leary 1995).

- *Artemisia californica* (California sagebrush)
- *Artemisia nesiotica* (island sagebrush)
- *Galium catalinense acrispum* (San Clemente Island bedstraw)
- *Deinandra clementina* (island tarplant)
- *Hazardia cana* (San Clemente Island hazardia)

***Suffrutescents.*** These are smaller, short-lived shrubs with slightly-woody above ground stems. They are killed by fire with no ability to resprout. Seedling establishment is fire-stimulated and these plants would be expected to be noticeable post-fire as they tend to flourish. They are obligate seeders following fire but will respond to other disturbances. Mostly absent in older communities or persist in gaps, they have no special dispersal mechanism. Germination is heat or charate stimulated, with a portion germinating without treatment (Keeley et al. 1985).

- *Lotus dendroideus traskiae* (San Clemente Island broom)
- *Castilleja grisea* (San Clemente Island Indian paintbrush)
- *Eriophyllum confertiflorum* (golden yarrow)
- *Eriophyllum nevinii* (Nevin’s eriophyllum)
- *Coreopsis gigantea* (giant coreopsis)

***Insufficient Information to Classify With Confidence.*** Basic fire effects information is lacking: percent mortality and percent resprouting in mature plants, presence or absence of postfire seedling recruitment, postfire seedling survival, and presence or absence in the seed bank.

- *Lavatera assurgentiflora glabra* (southern island tree mallow [malva rose]). Known regeneration is from seed.

***Herbaceous Perennials.*** With underground storage structures such as a bulb, tuber, rhizome, or large tap root; these plants are normally dormant when a fire passes through. So they are not directly affected, but benefit from nutrient flush, canopy opening, and other aspects of altered competitive status. They are obligate resprouters.

- *Brodiaea kinkiense* (San Clemente Island brodiaea), *Triteleia clementina* (San Clemente Island triteleia), *Delphinium variegatum* ssp. *kinkiense* (San Clemente Island larkspur), *Delphinium variegatum* ssp. *thornei* (Thorne's royal larkspur), *Jepsonia malvifolia* (island jepsonia), *Lithophragma maximum* (San Clemente Island woodland star), *Calystegia macrostegia amplissima* (island morning-glory), *Scrophularia villosam* (Santa Catalina figwort)

***Herbaceous Perennials Dependent on Seed for Propagation.*** Generally germinate well without treatment, but high temperatures are lethal (Keeley et al. 1985)

- *Lotus argophyllus adsurgens* (San Clemente Island silver hosackia)

***Stem Succulents and Cacti.*** These plants are somewhat fire resistant due to succulence and low fuel loads associated with typically open habitats. They establish no soil seed bank, so population recovery is slow if plants are killed by fire. Each species varies in its ability to survive or resprout following fire. Most have some ability to resprout, but most also suffer some degree of mortality if fire is moderate or severe.

- *Dudleya virens virens* (island green dudleya)

***Opportunistic Native Annuals (Zedler 1995).*** These plants are usually found in canopy gaps or in otherwise open habitat. They exist only as seed when fires pass through.

- *Sibara filifolia* (Santa Cruz Island rock cress). Annual habit makes this plant resilient to fire. Also there is no record of a fire in its current location and fuel hazard is very low.
- *Camissonia guadalupensis clementina* (San Clemente Island evening primrose)
- *Aphanisma blitoides* (Aphanisma)
- *Trifolium gracilentum palmeri* (Palmer's clover)
- *Lupinus guadalupensis* (Guadalupe Island lupine)
- *Lepidium virginicum robinsonii* (Robinson's pepper-grass)
- *Microseris douglasii platycarpha* (small-flowered microseris)

***Pyrophyte Annuals (Keeley and Keeley 1984).*** These plants are considered fire followers because seeds stored in the soil seed bank are stimulated to germinate following fire by heat, smoke, or charate (ashy burned material). Fire eliminates the canopy cover of competing species. They have no special dispersal mechanisms, and they largely disappear by the third year after fire. Their seed is long-lived.

- *Emmenanthe penduliflora* (whispering bells)
- *Papaver californicum* (fire poppy)
- *Phacelia floribunda* (San Clemente Island phacelia). Species in these genera are generally considered pyrophytic. Population expansion likely following either prescribed fire or wildfire, but these are fairly common species that appear able to maintain themselves at low levels without fire.

***Lichens.*** Foliose lichens on rocks and shrubs on the southern California coast and Channel Islands (Brodo et al. 2001) are highly flammable because they desiccate when relative humidity drops.

### 3.5.4 Wildlife Populations and Fire Concerns

In total, approximately 23 native resident breeding birds, two reptiles, six terrestrial mammals, and 83 species of terrestrial invertebrates have been documented on SCI (INRMP 2002). 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 more vulnerable to disturbance.

Seven federally endangered and four federally threatened animal species are located on the Island (Table 2-9). An additional three species are recognized by CDFG as endangered or threatened including the San Clemente 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. Management programs for the San Clemente sage sparrow (Map 2-5, WFMP), San Clemente loggerhead shrike (Map 2-6, WFMP), Island night lizard, and San Clemente Island fox are in place. Some groups such as invertebrates have been inadequately studied on SCI and may reveal additional unique species when they are surveyed more thoroughly.

The following passages discuss species groups of interest.

### *Terrestrial Mammals*

Seventeen terrestrial mammal species have been recorded on San Clemente Island. Six of these terrestrial mammal species are natives: the San Clemente Island Fox, San Clemente Island deer mouse (*Peromyscus maniculatus clementis*), California bat (*Myotis californicus*), fringed bat (*Myotis thysanodes*), Townsend's big-eared bat (*Plecotus townsendii*), and the free-tailed bat (*Tadarida brasiliensis*).

Native populations of SCI animals have in the past been under pressure from eleven non-native species of mammal, introduced deliberately and inadvertently to the island as a result of human occupation. Most of the agricultural livestock have been removed from the island, but animals such as the house cat (*Felis domesticus*), California vole (*Microtus californicus*), black rat (*Rattus rattus*), house mouse *(Mus musculus),* and the harvest mouse (*Reithrodontomys megalotis*) remain. It is assumed that these species displace native populations through predation and competition for resources.

### *Birds*

Most of the birds recorded from SCI are transient and found while migrating using the Pacific Flyway. There have been more than 300 bird species recorded on the island. Thirty bird species known to be resident or migrants are listed by either federal or state agencies as threatened or endangered. Almost all of these species are also covered by the Migratory Bird Treaty Act (MBTA) and two of them, the San Clemente sage sparrow and San Clemente loggerhead shrike are endemic to SCI.

A list of migratory birds that have been identified as declining or of concern by government agencies non-governmental organizations and documented in or near the project area is provided in Table 3-2. This list includes Federal Species of Concern, State of California Endangered, California Special Concern species, and CDFG fully protected species. The list also contains species on the Audubon and Birds of Conservation Concern (USFWS 2008) watch lists.

*Table 3-2: Special status avian species documented in the project area.*

| Common Name ***(Scientific Name)*** | Status* | Use on San Clemente Island |
|---|---|---|
| American merlin *(Falco columbiarus columbiarus)* | CSC | Winter resident<br>Transient |
| American oystercatcher *(Haematopus palliatus)* | HC | Transient |
| American peregrine falcon *(Falco peregrinus anatum)* | Recovered, BCC, CE, CFP | Winter resident<br>Transient |
| American white pelican *(Pelecanus erythrorynchos)* | CSC | Transient |
| ashy storm-petrel *(Oceanodroma homochroa)* | CSC, BCC | Breeding |
| bald eagle *(Haliaeetus leucocephalus)* | FT, CE, CFP, BEPA | Transient |
| Barrow’s goldeneye *(Bucephala islandica)* | CSC | Transient |
| black oystercatcher *(Haematopus bachmani)* | BCC, HC | Breeding |
| black skimmer *(Rynchops niger niger)* | BCC, CSC | Transient |
| black storm-petrel *(Oceanodroma melania)* | CSC | Transient |
| black turnstone *(Arenaria melanocephala)* | BCC, HC | Winter resident<br>Transient |
| black-chinned sparrow *(Spizella atrogularis)* | BCC | Transient |
| black-footed albatross *(Phoebastria nigripes)* nb | BCC | Transient |
| black-vented shearwater *(Puffinus opisthomelas)* nb | BCC | Transient |
| burrowing owl *(Athene cunicularia hypugaea)* | BCC, CS | Winter resident |
| California brown pelican *(Pelecanus occidentalis californicus)* | CE, CFP | Year-round |
| California gull *(Larus californicus californicus)* | CSC | Winter resident |
| California horned lark *(Eremophila alpestris actia)* | CSC | Breeding |
| Cassin’s auklet *(Ptychoramphus aleuticus)* | BCC | Transient |
| common loon *(Gavia immer)* | CSC | Winter resident |
| common yellowthroat *(Geothlypis trichas)* | BCC | Transient |
| Costa’s hummingbird *(Calypte costae)* | BCC | Transient |
| double-crested cormorant *(Phalacrocorax auritus)* | CSC | Breeding |
| dunlin *(Calidris alpine arcticola/pacifica)* | HC | Transient |
| elegant tern *(Sterna elegans)* | BCC, CSC | Transient |
| ferruginous hawk *(Buteo regalis)* | CSC | Transient |
| laughing gull *(Larus atricilla)* | CSC | Transient |
| Lawrence’s goldfinch *(Carduelis lawrencei)* | BCC | Transient |
| Lewis’ woodpecker *(Melanerpes lewis)* | BCC | Transient |
| long-billed curlew *(Numenius americanus)* | BCC, CSC, HI | Transient |
| marbled godwit *(Limosa fedoa fedoa)* | BCC, HC | Transient |
| mountain plover *(Charadrius montanus)* | BCC, CSC | Transient |
| northern harrier *(Circus cyaneus hudsonius)* | CSC | Winter resident<br>Transient |
| osprey *(Pandion haliaetus carolinensis)* | CSC | Transient |
| pink-footed shearwater *(Puffinus creatopus)* | BCC | Transient |
| prairie falcon *(Falco mexicanus)* | BCC, CSC | Transient |
| purple martin *(Progne subis subis)* | CSC | Transient |
| red knot *(Calidris canutus roselaari)* | BCC, HC | Transient |
| ruddy turnstone *(Arenaria interpres)* | HC | Winter resident<br>Transient |
| San Clemente loggerhead shrike *(Lanius ludovicianus mearnsi)* | FE, CSC | Breeding |
| San Clemente sage sparrow *(Amphispiza belli clementae)* | FE, CSC | Breeding |
| sanderling *(Calidris alba)* | HC | Winter resident<br>Transient |

| Common Name ***(Scientific Name)*** | Status* | Use on San Clemente Island |
|---|---|---|
| sharp-shinned hawk *(Accipiter striatus velox)* | CSC | Winter resident, transient |
| short-billed dowitcher *(Limnodromus griseus)* | BCC, HC | Transient |
| short-eared owl *(Asio flammeus flammeus)* | CSC | Winter resident<br>Transient |
| spotted towhee *(Pipilo maculatus)* | BCC | Winter resident<br>Transient |
| Swainson's hawk *(Buteo swainsoni)* | CT, BCC | Transient |
| Vaux's swift *(Chaetura vauxi vauxi)* | CSC | Transient |
| western sandpiper *(Calidris mauri)* | HC | Transient |
| western snowy plover *(Charadrius alexandrinus nivosus)* | FT, CSC, HI | Winter resident<br>Rare breeding |
| whimbrel *(Numenius phaeopus hudsonicus)* | BCC, HC | Winter resident<br>Transient |
| white-faced ibis *(Plegadis chihi)* | CSC | Transient |
| white-tailed kite *(Elanus leucurus)* | CFP | Breeding<br>Winter resident<br>Transient |
| Wilson's phalarope *(Phalaropus tricolor)* | HC | Transient |
| Xantus' murrelet *(Synthliboramphus hypoleucus)* | BCC, CSC | Breeding |
| yellow-billed cuckoo *(Coccyzus americanus)* | BCC | Transient |
| * Status derived from the CDFG Special Animals Lists, 2009.<br>FE=Federal Endangered; FT=Federal Threatened; C=Candidate (USFWS); BEPA=Bald Eagle Protection Act; CE=State Endangered; CT=California Threatened; CSC=California Special Concern Species; CFP=CDFG fully protected=Species may not be taken without permit from Fish and Game Commission; BCC watch list= Birds of Conservation Concern for California region (USFWS 2008); Audubon=National Audubon Society Watch List species; US Shorebird Conservation Plan (2004) High Priority Shorebirds: HC = High Concern, HI = Highly Imperiled | | |

***Reptiles and Amphibians***

The reptile population on San Clemente Island consisting of only two species, the side-blotched lizard (*Uta stansburiana*) and the Federally Threatened Island night lizard. The hazards for Island Night Lizard have been reduced, but due to the fact that the species range consists of only on a few islands off the coast of southern California, the population of this lizard requires protection.

***Terrestrial Invertebrates***

The island is home to 87 different species of terrestrial invertebrates. This number incorporates 30 San Clemente Island endemics and 17 Channel Island endemics, as well as two species of Mollusca and the San Nicolas island snail (*Micrarionta feralis*).

## 3.5.5 Special Status Wildlife and Endemic and Special Status Plants

Most wildlife populations on SCI, including listed species, are probably resilient to fire, unless fires become exceptionally frequent. Fires and firebreaks can temporarily create new foraging habitat for shrikes and foxes. However, frequent or hot fires that kill shrubs and trees are detrimental to shrike nesting (USFWS 2001) and reduce woody species preferred by foxes. Island night lizards are 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). Since fire negatively affects boxthorn cover (Kellogg and Kellogg 1994), frequent fires that consume shrubs in this habitat are expected to be detrimental to San Clemente sage sparrow populations.

Species-specific profiles of plants and wildlife that are a focus of management on SCI may be found in Appendix D of the INRMP, and Map 26 of the WFMP shows the distribution of shrike territories (2008). Condensed versions of the wildlife profiles are below. A comprehensive species list is provided in the SOCAL EIS, and profiles of the known special status species are available in the SCI INRMP (U.S. Navy 2002). See Table 3-3 for special status wildlife species of San Clemente Island (SOCAL EIS (2008)).

*Table 3-3. Special status wildlife species of San Clemente Island.*

| Scientific name | Common name | Foraging/ Resident/ Migratory/ Breeding | Sensitivity status | Occurences and Individuals |
|---|---|---|---|---|
| **REPTILES & AMPHIBIANS** | | | | |
| *Xantusia riversiana* | Island night lizard | F, R, B | FT | From 462 individuals per acre in grassland to 1,036 individuals per acre in MDS-prickly pear phase |
| **BIRDS** | | | | |
| *Lanius ludovicianus mearnsi* | San Clemente loggerhead shrike | F, R, B | FE | Estimate 89 individuals (26% inside SHOBA, 74% outside SHOBA) |
| *Amphispiza belli clementae* | San Clemente sage sparrow | F, R, B | FT | 716 (adults only) |
| **MAMMALS** | | | | |
| *Urocyon littoralis clementae* | San Clemente Island fox | F, R, B | ST | Estimates range from 387 to 595 |
| *Status Codes: FE = Federal Endangered FT= Federal Threatened FPT= Federally Proposed for listing as Threatened SE = California Endangered ST = California Threatened CSC = California Species of Concern CDF Sensitive= California Department of Forestry and Fire Protection classify these as species that warrant special protection during timber operations.* | | | | |

**Island night lizard (USFWS Threatened, CDFG Special Animal).** The island night lizard is small (6-10 cm vent-to-snout), sedentary, and reclusive. 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 vegetation canopy. They thermo regulate 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 and Nagey 2000; Mautz 2001.)

Island night lizards start breeding in March and produce a brood of 2-7 (mean = 4) young in the fall. 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. They are opportunistic feeders of various insects, plants, mollusks, new-born mice. Plant material (stems, flowers, seeds, leaves) comprise about 30% of the diet.

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 located along the west shore. This habitat 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. Micro-habitats containing loose stones on the soil surface and dense vegetation are particularly favorable. Wooden boards and other debris will also attract night lizards.

The island night lizard is endemic to SCI, 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 On SCI, population densities are estimated at 1900-2600 lizards/hectare in appropriate habitat.

**San Clemente loggerhead shrike (USFWS Endangered, CDFG Species of Special Concern).** The San Clemente loggerhead shrike is a subspecies of loggerhead shrike that is endemic to SCI. It is genetically and morphologically distinct from other populations that occur on the mainland and nearby Santa Catalina Island (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. Loggerhead shrikes are often called “butcher birds” because of their habit of impaling and caching prey items on thorns or fences for later consumption. Nest-building takes approximately one week. Nests are most frequently placed in or near canyon bottoms within canyon shrubland/woodland vegetation (Lynn et al. 1999).

During the summer, shrikes rely primarily on beetles, bees, and wasps; during the winter ants, grasshoppers, crickets, and lizards may be more important; and, small mammals, 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).

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 et al. 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). Shrikes use trees, coastal cholla, rocks, tall forbs, snags, and artificial substrates for perches. They use perches > 2 m tall in significantly higher proportion than their availability (Lynn et al. 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.

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 (Turner et al. 2002, Lynn et al. 2004). Based on observations through mid-April 2009, 153 birds were alive in the wild comprising 71 pairs, 51 north of SHOBA and 20 within SHOBA. The shrike population reached its highest numbers ever documented in 2009 and has reoccupied much of its former breeding range with nests occurring from Wilson Cove southward in both eastern and western draining canyons, as well as several mid-island terrace sites (M. Booker, pers. comm.).

**San Clemente sage sparrow (USFWS Federally Threatened subspecies, CDFG Species of Special Concern).** 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). 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.

Reproductive success rates for San Clemente sage sparrows are substantially higher than those for mainland populations (Munkwitz et al. 2001). Breeding activity may start as early as late-December, but usually not until February (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), much of which is at least partially covered by lichen. Other nesting substrates include: island tarweed *(Hemizonia clementina),* island butterweed *(Senecio lyonii),* cactus, sagebrush *(Artemisia* sp.*),* saltbush *(Atriplex* sp.*),* grass, wishbone bush *(Mirabilis californica),* Island sunflower *(Encelia 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. 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).

In contrast to its mainland relatives, which are obligates of sagebrush communities, the San Clemente sage sparrow has adapted to maritime desert scrub habitat. The majority of breeding territories are found on the lower, gently sloping terraces between 10 m and 30 m above sea level, although nesting sites have been found as high as 150 m above sea level. Nests are typically placed low to the ground in a boxthorn shrub, using the surrounding vegetation as cover. Nests have also been documented in island tarweed (*Hemizonia clementina*), island butterweed (*Senecio lyonii*), cactus, sagebrush (*Artemesia* sp.), and saltbush (*Atriplex* sp.). The population density of sage sparrows on SCI is generally positively related to the height and density of the boxthorn vegetation. The San Clemente sage sparrow will regularly use boxthorn that has reached a minimum height of 20 cm (8 inches), and in areas of evenly distributed dense vegetation on relatively flat areas. Sage sparrows spend most of their time within boxthorn habitat, nesting close to shore. It is assumed that juvenile birds disperse to upland areas during the non-breeding season; however, dispersal patterns, habitat use, and mortality of juveniles is under further investigation. While 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 proportion of boxthorn within an area and the elevation coincide with the densities of sage sparrows found on SCI (adapted from Turner et al. (2005)). Munkwitz et al. (2000) found that high density habitat had a higher percentage cover of snake cactus, grasses, and forbs, and less bare ground than medium or low density habitat.

Surveys by Munkwitz et al. (2000, 2002a, 2002b), Beaudry et al. (2003, 2004), Turner et al. (2005, 2006), and Kaiser et al. (2007) monitored the population within 2,098 ha of suitable habitat (Munkwitz et al. 2000). Results from these surveys suggest a fluctuating sage sparrow population since the 1980s, with estimates ranging from 452 – 1,519 adults from 2000 – 2006, with a peak of 1,519 adults in 2002 and 1,295 adults in 2006 (Munkwitz et al. 2000, 2002a, 2002b; Beaudry et al. 2003, 2004; Turner et al. 2005, 2006; Kaiser et al. 2007). The difference in population size between years may represent normal annual variation. Fecundity data suggest that sage sparrows forgo breeding in drought years and take advantage of wet conditions by attempting up to 5 nests and producing larger clutches; thus, larger population variations correspond to El Nino and drought cycles. In 2008, the estimated sage sparrow breeding population size was 511; 33% lower than the estimate from the previous year, and the 2nd lowest population estimate since 1999.  In 2007, little reproduction occurred. The 2000-2008 cumulative incubation stage survival was 78.2%, the nestling stage survival was 78.2%; nest survival rate for the entire nesting cycle for nests monitored from 2000 – 2008 was 61.1% (Stahl et al. 2009).  Based on 2008 nest survival a population increase is expected for 2009.

**San Clemente Island fox (CDFG Threatened).** The San Clemente island fox is believed to have first been introduced to SCI approximately 3,400 years ago by Native Americans. 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; although, there is some evidence that the Island fox subspecies on SCI may breed and whelp earlier. 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. They are eventually forced to be independent by their parents in early-fall (CDFG 2000). 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. 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 2000).

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. From 1988-2005 three to six trapping grids were utilized to derive fox population estimates. Over this period of time, monitoring indicated three periods of different dynamics.  From 1988 to 1995 populations fluctuated with small net decline.  From 1995-2002 there was sustained decline, followed by an increase from 2003 through 2004 (Schmidt et al. 2005). The island-wide population estimate for 2004 was 762 (Schmidt et al. 2005). In 2006, the Navy undertook an effort to redesign fox population monitoring to provide data that would address the Navy's specific objectives (beyond an island-wide population estimate).  In 2008, the newly designed population monitoring methods estimated the island-wide fox population at approximately 1094 (Garcia and Associates *Draft* 2009). The 2008 population estimate was higher than 2007 (727; Garcia and Associates 2008) and higher than the estimate obtained in 2004 (762; Schmidt et al. 2005). However, due to the change in sampling methodologies island-wide estimates from 1988 through 2005 may not be directly comparable to estimates obtained from 2007 onward. Recent measures of average home range sizes vary from 0.58 $km^2$ to 0.96 $km^2$ depending upon the abundance of road area within the homerange (Andelt et al. 2008).

On three other Channel Islands, predation by golden eagles has severely impacted fox populations (Garcelon 1999). The foxes are opportunistic foragers of mice, birds, insects, fruit, carrion, crabs, and eggs. Mice may be particularly important for feeding pups (Garcelon 1999). Populations may fluctuate greatly over relatively short periods of time, perhaps in response to prey availability. 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. Fire may improve the short-term availability of prey for foxes.

### *Endemic and Special Status Plants*

SCI's isolation combined with recent degradation from introduced herbivores has resulted in the presence of numerous endemic plant species that have undergone severe declines. However, recent transect data suggest that much of the native vegetation has begun to recover from past damage (Kellogg and Kellogg 1994, see Section 2.2.6.2 “Vegetation Condition and Trend”). 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 as well as trampling effects by goats and pigs have likely contributed to contemporary erosion problems in some areas of the Island.

In total, SCI is home to approximately 272 native terrestrial plants, 107 exotic terrestrial plants, 10 cryptograms, 179 lichens, and 89 algae. Of these, 43 terrestrial plant species are endemic to SCI or the Channel Islands (Table 3-5). Three plant species formerly located on the Island are now presumed extinct on SCI. Six species are listed as endangered by USFWS, all but one of which are also considered endangered by CDFG (Table 2-4). Another 22 species were formerly on the USFWS Category 2 list as species of concern, but this list is no longer maintained. A 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. Surveys took place again in 2003 through 2007. The plants depicted in Table 2-4 show results from early surveys by NRO staff, by Pacific Southwest Biological Services, and the surveys referenced above and conducted in 1997, 1998, and 2003 through 2007.

A number of woody perennials that do not neatly fit into community categories also 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 because of their low population numbers and because of a 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.

A comprehensive list of plant species known to occur on SCI is provided in Appendix B of the SCI INRMP. Table 3-4, following, lists the plant species considered sensitive that have been identified on San Clemente by government agencies and non-governmental organizations (SOCAL EIS (2008)).

*Table 3-4. Special status plants of San Clemente Island.*

| Scientific name | Common name | Sensitivity status | Numbers of occurrences and individuals |
|---|---|---|---|
| **PLANTS** | | | |
| *Sibara filifolia* | Santa Cruz Island Rock Cress | FE, CNPS 1B | 12 occurrences with 905 individuals |
| *Lotus dendroideus* var. *traskiae* | Trask's Island Lotus | FE, SE, CNPS 1B | 147 occurrences with 9,674 individuals |
| *Malocothamnus clementinus* | San Clemente Island Bush Mallow | FE, SE, CNPS 1B | 80 occurrences with 1,591 individuals |
| *Delphinium variegatum kinkiense* | San Clemente Island Larkspur | FE, SE, CNPS 1B | 38 occurrences with 7,389 individuals |
| *Lithophragma maximum* | San Clemente Island Woodland Star | FE, SE, CNPS 1B | 12 occurrences with 482 individuals |
| *Castilleja grisea* | San Clemente Island Indian Paintbrush | FE, SE, CNPS 1B | 335 occurrences with 14,064 individuals |
| Status Codes: FE = Federal Endangered FT= Federal Threatened FSC= Federal Species of Concern FPT= Federally Proposed for listing as Threatened SE = California Endangered CSC = California Species of Concern CDF Sensitive= California Department of Forestry and Fire Protection classify these as species that warrant special protection during timber operations. | | | |
| CNPS 1B = Rare or Endangered in California and elsewhere CNPS 2 = Rare or Endangered in California, more common elsewhere CNPS 3= Plants about which we need more information CNPS 4= Plants of limited distribution, a watch list | | | |

*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 |
| *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. | | | | |

## 3.5.6 Invasives and Fire Effects

While most southern California plant communities are known to be fire adapted, under certain biophysical conditions fires can reduce the competitive ability of native species in favor of herbaceous non-natives. This shift can have severe consequences for community structure, function, and native biodiversity. On the other hand, prescribed fire can be an indispensable tool to eliminate invasives in the context of a restoration plan (Parson and Stohlgren 1989, Hastings and DiTomaso 1996, both as referenced in D'Antonio 2001).

The degree to which fire can influence community structure in Mediterranean shrublands depends most strongly upon the fire interval (Hobbs and Huenneke 1992, Keeley 2001, Zedler et al. 1983). The decline of canopy species allows invasive weeds to gain a foothold. Once established, these annuals increase the surface fuel load, creating a positive feedback loop that facilitates low-intensity, frequent fires that can drive the community structure toward a non-native annual grassland.

## 3.5.7 Other Disturbance Processes That Interact with Fire Disturbance

Conservation of species and the ecological processes that support them is a primary goal of U.S. Navy natural resource management. This may mean managing for an array of vegetation conditions and the interaction of disturbance processes rather than a simple, long fire-free regime. Hobbs and Huenneke (1992) reviewed the intermediate disturbance hypothesis, which suggests that species diversity within a given patch should be highest at intermediate frequencies or intensities of disturbance. They explained that any change in the historical disturbance regime of an ecosystem may alter species composition by reducing the importance of native species, by creating opportunities for invasive species, or both. They provided examples where the interaction between different disturbances has the largest effect. They concluded that "natural" disturbance regimes may be desirable but are often impracticable in the altered settings of contemporary reserves. Management decisions must now be made on what disturbance regime is required. This requires decisions on which species are to be encouraged or discouraged, as well as the disturbance regime that will achieve their specific conservation goals (Hobbs and Huenneke 1992).

The consequences due to variations in the fire regime on San Clemente Island are impossible to foresee because we do not fully understand the range and extent to which certain organisms may depend on any given disturbance condition. Another reason is that other processes are at work in the natural systems of the island besides fire regime. These additional processes may act at the landscape, community, or population scales. Examples include drought/El Niño cycles, inter-species competition that results in shifts in relative abundance of species groups, herbivory by native mammals, food chain dependencies, and dispersal and colonization. The following processes that are linked to plants and which interact with fire regime could be affected by the fire management actions.

- Population processes
  *Dispersal and germination of seeds*
  *Gene flow (seeds and pollen)*
- Community processes
  *Movement of seed dispersers*
  *Movement of pollinators*
  *Movement of herbivores, seed predators, and parasites*
  *Movement of mutualists (e.g. mycorrhizal fungi)*
  *Dispersal and colonization of invasive weeds*
  *Competition*
  *Herbivory*
- Landscape or coarser scale processes
  *Drought*
  *El Niño*
  *Habitat fragmentation and isolation*
  *Nutrient cycling*
  *Erosion and sedimentation*
  *Global warming and sea level rise*

The life histories of plants are dependent on processes at all these scales. Canopy gap-dependent species establishment is an example of a disturbance process that is not necessarily cued by fire. Very few plants are capable of dispersing to a fully occupied habitat and maturing without relief, at some stage, from the competition of surrounding established individuals (Zedler 1982). Grime (1979) explained some of the reasons for this pattern. Some species appear to require large gaps in which the effect of competition is minimal, while others are capable of establishment in small gaps in which only limited growth is possible before competition with established individuals becomes significant. Capacity to invade depends not only on a plant’s stress tolerance and competitive ability (Grime 1979), but also on dispersal characteristics which determine the ability of a species to find all available habitat. During long fire-free periods, openings created by senescent shrubs are the likely location where gap species become established.

### 3.5.8 Air Quality

Air quality is defined by ambient air concentrations of specific pollutants determined by the Environmental Protection Agency (EPA) to be of concern to the health and welfare of the general public. The State of California Air Resources Board (CARB) also sets its own, more stringent air quality standards. The specific pollutants monitored are carbon monoxide (CO), sulfur dioxide (SO2), nitrogen dioxide (NO2), ozone (O3), suspended, respirable particulate matter (PM-10), sulfates, lead, hydrogen sulfide, vinyl chloride, and visibility reducing particles. 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.

The USEPA is the agency responsible for enforcing the federal Clean Air Act (CAA) of 1970 and its 1977 and 1990 amendments (42 U.S.C 7401 et seq.). The purpose of the CAA is to establish non-attainment air quality standards (NAAQS), to classify areas as to their air pollution status relative to the NAAQS, to develop schedules and strategies to meet the standards, and to regulate emissions of pollutants and air toxics to protect public health and welfare. The Clean Air Act Amendments (CAAA) (1990) established new deadlines for achievement of the NAAQS, dependent upon the severity of non-attainment.

Under the CAA, individual states are allowed to adopt ambient are quality standards and other regulations, provided they are at least as stringent as federal standards. The USEPA requires each state to prepare a State Implementation Plan (SIP) that describes how that state will achieve compliance with the NAAQS. A SIP is a compilation of goals, strategies, schedules, and enforcement actions that will lead the state into compliance with all federal air quality standards. Each change to this schedule or plan must be incorporated in the SIP. In California, the SIP consists of separate elements for each air basin, depending on the attainment status of that air basin.

The CAA also requires that states develop an operation permit program that requires all major sources of pollutants to obtain an air permit, and contains programs designed to reduce mobile source emissions and control emissions of hazardous air pollutants by establishing control technology guidelines for various classes of sources.

*Clean Air Act Conformity*

In November of 1993, the USEPA instituted final rules for determining general conformity of federal actions with state and federal air quality implementation plans. In order to demonstrate conformity with the CAA, a project must clearly demonstrate that it does not: 1) cause or contribute to any new violation of any new standard in any area; 2) increase the frequency or severity of any existing violation of any standard in any area; or 3) delay timely attainment of any standard, any requirement interim emission reductions, or other milestones in any area. A conformity applicability analysis is required for each of the non attainment pollutants or its precursor emissions. Compliance with the General Conformity Rule is presumed if the emissions associated with the federal action are below the relevant de minimis emissions levels for the region in which the action is proposed.

*New Source Review*

A New Source Review (NSR) is required when a source has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specified major source thresholds (100 or 250 tons [110 or 280 metric tons, respectively] per year) which are predicated on the source's industrial category. A major modification to the source also triggers an NSR. A major modification is a physical change or change in the method of operation at an existing major source that causes a significant "net emission increase" at that source of any pollutant regulated under the CAA.

*Regional Setting*

Coastal southern California and the adjacent valleys, mountains, and basins experience generally warm, dry summers and cool winters interspersed with wet storms from the Pacific Ocean and dry winds from the interior. During the summer months, a semi-permanent region of high pressure over the Pacific is responsible for creating cooling sea breezes, which tend to keep the coastal strip generally comfortable, while inland areas become very warm. Temperature inversions that occur in the stable air may trap pollutants that become photo chemically modified in the abundant sunshine. During the winter months, the moderating influences of the ocean together with a protective ring of mountains inland insulate much of southern California from very cold air except for inland, and over higher terrain. Most of the precipitation that occurs during the year falls from winter-season storms that traverse the Pacific when the region of high pressure is displaced.

On average, San Clemente Island generally experiences frequent northwesterly surface winds. However, such conditions are interrupted by: 1) cool season storms (with southerly winds) and periods of dry offshore northeast winds (Santa Ana winds); 2) mainly warm season coastal eddies with southeast winds over the inner waters; and 3) alternating land/sea breeze circulations.

Identifying the region of influence (ROI) for air quality requires knowledge of the type of pollutant, emission rates of the pollutant source, proximity to other emission sources, and local and regional meteorology. For inert pollutant (all pollutants other than ozone and its precursors), the ROI is generally limited to a few miles downwind from the source. However, for photochemical pollutants such as ozone, the impact area may extend much farther downwind. That is because it is a secondary pollutant that is formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors (reactive organic gases [ROG], NOX, and PM-10). The maximum effect of precursors on O3 levels tends to occur several hours after the time of emission during periods of high solar load (i.e., sunlight) and may occur many miles from the source. O3 and O3 precursors transported from other regions can also combine with local emissions to produce high local O3 concentrations.

*San Clemente Island*

SCI is in the South Coast Air Basin and the South Coast Air Quality Management District (SCAQMD). According to the more stringent state standards, the South Coast Air Basin is currently in extreme non-attainment for ozone and non-attainment for CO and PM-10. The federal and state air quality standards for specific pollutants are shown in Table 3-5.

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 conditions on the Island. From 1994–1995, the San Diego Air Pollution Control District operated an ambient air monitoring station on SCI and during this period there was one exceedance of measured pollutants. High ozone measurements were detected in April of 1995 associated with an extremely unusual wind pattern.

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

Air quality at SCI can be affected by a phenomenon known as "Santa Ana" winds which come from the northeast from the deserts of inland California and the Great Basin. These winds usually occur during the fall, are warm and dry, and are characterized by very high velocity near the mainland shore. They can affect SCI by carrying out to sea the 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. Normally, sea breezes push air pollutants to the mainland and help maintain low levels of pollutants on SCI.

### *Consequences of Fire*

Prescribed fires and the resulting smoke emissions are considered to be man-made sources of PM-10. These are considered to be under the “control” of man, and so are regulated. The EPA requires smoke management planning to control this pollution source, and includes burning permits, emissions reduction techniques, and measures to mitigate the impact of smoke emissions by identifying the most favorable wind and weather conditions under which to conduct fires.

### *Criteria Pollutants*

Table 3-6 shows the federal and state ambient air quality standards to which activities on San Clemente Island are held. Major topographical features (e.g. the Cuyamaca Mountains) impact the transport and diffusion of pollutants by hindering their eastward movement. Sources of emissions on San Clemente Island include civilian, military, and commercial vehicles; ships; tactical support equipment and vehicles; ground support equipment; and small stationary sources.

*Table 3-6. Federal and California ambient air quality standards (California Air Resources Board 2005).*

| Pollutant | Averaging Time | Federal Standard | California Standard |
|---|---|---|---|
| Ozone | 1-hour<br>8-hour | ---<br>0.08 ppm | 0.09 ppm<br>0.070 ppm |
| Carbon Monoxide | 1-hour<br>8-hour | 35.0 ppm<br>9.0 ppm | 20.0 ppm<br>9.0 ppm |
| Fine Particulate Matter (PM2.5) | 24-hour<br>annual | 65 ug/m3<br>15 ug/m3 | ---<br>12 ug/m3 |
| Nitrogen Dioxide | 1-hour<br>annual | ---<br>0.053 ppm | 0.25 ppm<br>--- |
| Lead | 30 day average<br>calendar quarter | ---<br>1.5 ug/m3 | 1.5 ug/m3<br>--- |
| Sulfates | 24-hours | No | 25 ug/m3 |
| Hydrogen Sulfide | 1-hour | Federal | 0.03 ppm |
| Vinyl Chloride | 24-hour | Standards | 0.01 ppm |
| Sulfur Dioxide | 1-hour<br>24-hour<br>annual | ---<br>0.14 ppm<br>0.03 ppm | 0.5 ppm<br>0.05 ppm<br>--- |
| Respirable Particulate Matter (PM10) | 24-hour<br>annual | 150 ug/m3<br>50 ug/m3 | 50 ug/m3<br>20 ug/m3 |

### *Regional Haze Regulations*

The Environmental Protection Agency (EPA) , the federal agency responsible for enforcing the Clean Air Act, recognizes that all types of fire (wildfire, prescribed fire, etc.) contribute to regional haze, and there is a complex relationship between what is considered a natural fire versus a human-caused fire. For example, the increased use of prescribed fire in some areas may lead to particulate emission levels lower than those that would be expected from a catastrophic wildfire. Given that in many instances the purpose of prescribed fires is to restore the natural fire cycles to ecosystems, the EPA works with state and federal land managers to develop enhanced smoke management plans that minimize effects of fire emissions on public health and welfare (EPA OAR 1999).

SCI is not in a Class I airshed for regional haze. The Clean Air Act defines certain federal areas as mandatory Class I airsheds, such as particular national parks (over 6000 acres), wilderness areas (over 5000 acres), national memorial parks (over 5000 acres) and international parks that were in existence as of August 1977. Because of evidence that fine particles are frequently transported hundreds of miles, all 50 states, including those that do not have Class I areas, participate in planning, analysis, and in many cases, emission control programs under the regional haze regulations. The same pollution that causes haze also poses serious health risks, especially for people with chronic respiratory diseases (EPA OAR 1999).

## 3.6 Noise

The noises associated with fire management activities are generally from mechanical equipment, motor vehicles, and aircraft. Machinery used and amount of noise produced while performing specific fire or fuel management activities varies by the location of the activity (different equipment is used in wilderness than along road corridors, for example). However, since human noise receptors are few on SCI, this section is eliminated from further analysis.

## 3.7 Cultural Resources

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 elements built by humans 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 (A. Yatsko, pers. comm.). 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.

### *Cultural Context of the Fire Environment*

Cultural resources at SCI (the "project area") include prehistoric and historic archaeological sites, historic sites and structures, cultural landscapes, and traditional cultural properties or ethnographic resources (both natural and cultural resources) that are important to the continuing culture and traditions of American Indian people. Some of the cultural resources are housed in museum collections. These resources reflect early settlement, use, and management of the lands by indigenous people; westward expansion of Euro-American people (as well as Asian and other non-European people) and their conflict with American Indian groups; resource extraction such as logging, mining, and herding; early tourism; early environmental conservation efforts; development of water resources; and park planning, design, and land management—they are the physical evidence of human presence spanning the majority of the Holocene.

While SCI holds important museum collections, these are not discussed in depth in the WFMP because they are not generally affected or threatened by wildland or prescribed fire management practices. However, actions associated with implementation of elements of the alternatives could indirectly affect the museum collections. Such changes would typically involve additions to the collections generated from archaeological data recovery conducted as mitigation for direct site impacts. These changes would be minimal and would require additional museum storage space and ongoing collections maintenance and management.

Prior to about 1979, there is little direct information on fire history for San Clemente Island. Lightning-caused fire appears to be rare in recorded history for the Channel Islands (three documented fires over the past 140 years, on Catalina in 1967, on Santa Cruz Island in 1987, and

Santa Rosa in 1988) (Carroll et al. 1993). However, two recent lightning fires have occurred since these records on Santa Catalina Island (P. Schuyler, pers. comm.). Additional lightning strikes are documented on other islands that did not result in fires (Carroll et al. 1993). Charcoal deposits from the Pleistocene and Holocene on San Miguel Island (Johnson 1972) and Holocene on Santa Cruz (Brumbaugh 1980) may have resulted from natural prehistoric fires. It is appropriate to assume that fire has played at least some ecological role in shaping the Island's natural resources and will continue to do so in the future.

During habitation by the Gabrieliño 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 was compiled by Blackburn and Anderson (1993). Although none of their assembled data is derived specifically from SCI, the Island's late prehistoric Island Gabrieliño 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 (A. Yatsko, pers. comm.).

No direct archaeological evidence of intentionally-set aboriginal fires has been examined for the island, although sedimentary deposits 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. 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; however, such fires probably would not have carried far due to discontinuous and low-volume fuels.

Sheep grazing leases were immediately cancelled when the Navy took control of the Island in 1934. The goat population expanded without controls at this point, and fuel loads probably became progressively lower and less continuous as the goats browsed it down. Military 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. A change in fire pattern developed coincidentally with the use of incendiary ordnance.

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# 4.0 Environmental Consequences of Proposed Action and Alternatives

This Chapter describes the potential effects each alternative would have on the environment. The alternatives constitute various combinations of the available natural resource and fire management techniques that are legally compliant, feasible, and effective in the environment of San Clemente Island. The alternatives to be considered are:

a. Alternative 1: Proposed Action and Preferred Alternative. The Proposed Action is a programmatic, ecosystem-based plan to implement the strategies and actions described in the WFMP.

b. Alternative 2: Substantial implementation of the Proposed Action; however, the Prescribed Burning for Patch-Level Fuels Management, designed to achieve natural resources stability, would not be implemented.

c. Alternative 3: No Action/Baseline to include continuation of Current Management levels.

Alternatives 1 and 2 would meet Department of Defense and U.S. Navy operating instructions regarding fire management at all times. Wildland fire management is guided by fire management plans that provide direction for protecting natural and cultural resources while providing for public safety. Fire management plans are required by the 2001 Federal Wildland Fire Management Policy (hereafter, Federal Fire Policy), which requires an up-to-date Fire Management Plan for all federal lands with burnable vegetation. Federal Fire Policy made DOD fire policy through DOD Instruction 6055.6 (Fire and Emergency Services Program October 10, 2000). This Instruction requires that fire department and natural resources preparedness and response to wildland fires shall be in accordance with federal policy, and provides criteria for the allocation, assignment, operations, and administration of the DOD Fire and Emergency Services (F&ES) and Emergency Medical Service programs. Alternative 3 does not comply with current Federal Fire Policy.

All alternatives also comply with the Sikes Act Improvement Act (SAIA) of 1997 (16 USC Section 670a), which directed that the Secretary of Defense shall carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. In keeping with the principal use of military installations to ensure the preparedness of the U.S. Armed Forces, the SAIA mandates that an INRMP shall provide for no net loss of the capability of the installation’s lands to support the military mission while providing for this conservation and rehabilitation of natural resources. An INRMP is an ecosystem-based plan intended 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.

For each resource topic the impacts associated with each type of fire management action proposed in the alternatives are evaluated. Table 4-1 summarizes the effect each alternative would have on each resource topic. In keeping with the principal mission of DOD installations to ensure the preparedness of the U.S. Armed Forces, Navy policy mandates that natural resource management actions shall permit no net loss of the capability of the installation’s lands to support the military mission while providing for conservation and rehabilitation of natural resources. This subject is included in Table 4-1.

*Table 4-1. Summary comparison of positive and negative environmental effects of the Proposed Action and Alternatives.*

| Resource Topic | Alternative 1<br>Preferred Alternative-Full Implementation of WFMP | Alternative 2<br>WFMP Without Prescribed Burning | Alternative 3<br>No Action/Baseline |
|---|---|---|---|
| Designated Land Use for Military Mission | + | + | -- |
| Utilities and Infrastructure | + | + | - |
| Public Health and Safety | ++ | ++ | - |
| Cultural Resources | + | + | - |
| Watersheds, Soils, and Water Quality, reduce risk due to fire/fuels management, and improved practices | ++ | + | - |
| Plant Communities and Wildlife Habitat | ++ | + | -- |
| Wildlife Populations Including Migratory Birds | ++ | + | -- |
| Special Status Plants and Wildlife | ++ | + | - |
| Air Quality | + | + | - |
| Sustainability and Long-Term Management: Relationship of Short-Term Uses and the Maintenance and Enhancement of Long-term Productivity | ++ | + | - |

*+ indicates that the environmental effect is expected to be a positive benefit*

*++ indicates the environmental effect is expected to be strongly positive*

*- indicates the environmental effect is expected to be negative*

In analyzing the environmental consequences of the alternatives proposed in the WFMP, several factors are looked at for each resource: type of fire impact, fire location and footprint, duration of impact, timing (seasonality, for example), and intensity (fire frequency and severity). After the environmental consequences of the alternative are examined for separate resource topics, the cumulative impact of implementing the alternative is considered together with the impacts of other relevant actions in the area.

The *type of impact* describes a relative measure of beneficial or adverse effects on biological or physical systems, cultural resources, or on the social environment. For example, adverse impacts on ecosystems might be those that would degrade the size, integrity, or connectivity of a specific habitat. Conversely, a beneficial impact would enhance ecosystem processes, native species richness, or native habitat quantity or quality. Types of impact range from soil compaction and erosion, to habitat loss or species mortality.

Because fire could have short-term adverse effects while benefitting resources in the long-term, it is important to look at the effect's duration. Effects of fire management described within this WFMP are likely to occur within multiple time scales. Some adverse impacts may last for relatively short time periods while concurrent improvements to the ecosystem are longer term. After a fire, for example, some habitats begin to resemble pre-fire conditions within one or two growing seasons, while others may take decades. On a population scale, the benefits from a change in shrubland condition and restoration of a more appropriate fire regime may take a short time for some species, and decades for others.

Examining the type and duration of an effect is not enough because an impact could cover a large area or a large proportion of a population or could even be irreversible. Environmental effects vary in intensity from small and imperceptible to large and substantial. Measures of intensity consider whether an effect would be negligible, minor, moderate, or major.

A *cumulative impact* is described in the Council on Environmental Quality regulations (1508.7) as: "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

## 4.1 Overview of Potential Effects of Implementing the WFMP

In broad terms, the biological footprint and potential effects of the WFMP as it accommodates existing ignitions and an anticipated increase in ignitions are:

- Increased road maintenance to make roads accessible to fire emergency vehicles.
- Smaller fire sizes and lower fire frequency (on average across the Island as a whole), due to implementing the FDRS, improving suppression capability and response times to confine fire footprints, and adjusting management as needed through habitat success thresholds.
- Smaller fire sizes by using a combination of fire retardant, herbicide, and prescribed fire around SHOBA Impact Areas and other locations. Some Impact Area boundaries and certain existing roads are augmented to function as fuelbreaks through application of up to 5 miles/year of strip burns (18.2 acres) rotated over a 10-year period over up to 20 miles, 15 miles of fire retardant (54.5 acres), and up to 5 miles of herbicide spraying once every 5 years (12.1 acres).
- Prescribed burning for up to 300 acres per year for strategic resource protection or habitat enhancement.
- Lengthened fire return intervals across SCI as a whole by confining areas of likely repeat fires, and reduced fire sizes.

## 4.2 Analysis of WFMP Footprint and Expected Ignitions

A fire spread model called FARSITE (Fire Area Simulator (Finney 1998), version 4.1 of February 2005) was run to evaluate effects of ignitions in new and previous locations. FARSITE is a program for personal computers that simulates the growth and behavior of a fire as it spreads through variable fuel and terrain under changing weather conditions. It includes surface and crown fire spread and intensity, transition to crown fire, and spotting models. FARSITE has been used to project the growth of ongoing wildfires and prescribed fires, and in planning activities for suppression, prescribed fire, prevention, and fuel assessment (Finney and others, in press).

FARSITE was run for VERY HIGH and EXTREME fire weather conditions, using both northwest and northeast wind scenarios, in order to evaluate fire spread behavior under the varying fire danger conditions. With elevating fire danger, wind speeds increase and fine fuel moistures decrease (along with relative humidities). Northwest winds are the predominate condition on SCI, and the northwest winds are strongest and most constant during the warm months. However, northeast “Santa Ana” winds are lower humidity, typically occur in the fall and winter months, and can be severe with respect to fire danger. In advance of the winter storms, winds in the region are commonly southeasterly. These winds were not modeled because they are moisture-laden and pose little fire danger. The model was also run under MODERATE conditions with southwest winds and for longer duration than the other scenarios, in order to approximate nighttime fires, including fires inside and outside of SHOBA when aerial fire suppression is not possible (between one hour after sunset and sunrise). Fuels were mapped using standard fuel models as described in the WFMP. Six fuel models were hybrid models which combined varying percentages of short or tall grass with short shrubs based on familiarity with SCI vegetation. Example ignition points (11 locations) were modeled within Training Area Ranges (TARS) or impact areas. Wind direction and wind speed were varied to simulate differing fire danger conditions such that a total of 77 separate fire spread runs were conducted (11 ignition points under 7 fire danger-wind direction combinations). These were then analyzed using a geographic information system and customized code in dBase® (using Foxpro® programming software) to calculate acres of various habitats affected.

Other FARSITE assumptions were as described in Table 4-1. The WFMP presents the results for all scenarios (WFMP 2009).

*Table 4-2. Assumptions used in the FARSITE fire spread model scenarios under four fire danger conditions. Example fires were modeled at 11 locations. Wind direction and wind speed were varied such that in total, 77 separate fire spread runs were conducted. Six fuel models were hybrid models which combined varying percentages of short or tall grass with short shrubs based on familiarity with the Island vegetation.*

| **Factor** | **MODERATE** | **VERY HIGH** | **EXTREME 15 mph WINDS** | **EXTREME 20 mph WINDS** |
|---|---|---|---|---|
| Initial Fuel Moisture 1-hr Fuels | 12% | 5% | 5% | 5% |
| Initial Fuel Moisture 10-hr Fuels | 8% | 8% | 8% | 8% |
| Initial Fuel Moisture 100-hr Fuels | 12% | 12% | 12% | 12% |
| Initial Fuel Moisture Live Herbaceous | 100 | 100 | 100 | 100 |
| Initial Fuel Moisture Live Woody | 100 | 100 | 100 | 100 |
| Fuel Adjustments Based on Local Knowledge | None | None | None | None |
| Topography | Based on USGS Digital Elevation Model (10-m grid) | Based on USGS Digital Elevation Model (10-m grid) | Based on USGS Digital Elevation Model (10-m grid) | Based on USGS Digital Elevation Model (10-m grid) |
| Slope and Aspect | Derived from Digital Elevation Model | Derived from Digital Elevation Model | Derived from Digital Elevation Model | Derived from Digital Elevation Model |
| Cloud Cover | 0 | 0 | 0 | 0 |
| Elevation (feet above sea level) | 600 ft | 600 ft | 600 ft | 600 ft |
| Diurnal Air Temperature | 60- 90 degrees F | 60- 90 degrees F | 60- 90 degrees F | 60- 90 degrees F |
| Diurnal Humidity | 30% - 60% | 30% - 60% | 30% - 60% | 30% - 60% |
| Ignition Start TIme | 1800 hours | 1300 hours | 1300 hours | 1300 hours |
| Wind variation | Constant | Constant | Constant | Constant |
| Wind Direction (degrees) | 225 | 45, 315 | 45, 315 | 45, 315 |
| Duration | 12 hours (2-hr increments) | 4 hours (1/2-hr increments) | 4 hours (1/2-hr increments) | 4 hours (1/2-hr increments) |

Table 4-3 shows the acreages burned under fire scenarios in 30 minutes and two hours (longer for the MODERATE scenario). The durations can be found in the WFMP (2009). Locations listed in the table correspond to the ignition points shown on the Maps in the WFMP. The higher spread rates are occurring where grasses (fine fuels) are dense. Under the MODERATE scenario, three fires self-extinguished prior to the end of the 12-hour model run. This is because the model modifies humidities on a diurnal basis within a defined range; certain fuels simply do not burn under more humid conditions, which normally occur at night.

*Table 4-3. Acreages of simulated fires after 30 minutes and two hours (plus longer periods for the MODERATE scenario), based on fire spread scenarios from 77 FARSITE model runs. Example ignition points are labeled across the top of the table and correspond to those shown on Map 4-1. The MODERATE condition was run for a longer duration and with winds from the southwest in order to simulate nighttime when aerial suppression is not conducted. *Asterisks indicate fires that self-extinguished prior to the end of the 12-hour model run.*

| **TIME** | **TAR-4** | **Airfield** | **TAR-10** | **TAR-14** | **TAR-17** | **TAR-20** | **Impact Area I** | **TAR-21** | **Impact Area II / TAR-22 ‘A’** | **Impact Area II/ TAR-22 ‘B’** | **Skippy** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Southwest Winds (225°)*** | | | | | | | | | | | |
| ***Fire Danger Rating MODERATE, nighttime winds 5 miles per hour*** | | | | | | | | | | | |
| 30 minute | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| 2 hours | 2 | 140 | 2 | 171 | 2 | 2 | 6 | 1 | 2 | 2 | 3 |
| 4 hours | 9 | 407 | 6 | 656 | 6 | 9 | 18 | 6 | 6 | 7 | 12 |
| 12 hours | 24* | 1,291 | 42 | 2,539 | 41 | 13* | 23* | 39 | 48 | 47 | 34 |
| ***Northeast Winds (45°)*** | | | | | | | | | | | |
| ***Fire Danger Rating VERY HIGH, winds 10 miles per hour*** | | | | | | | | | | | |
| 30 minute | 3 | 57 | 2 | 58 | 2 | 4 | 3 | 2 | 2 | 2 | 3 |
| 2 hours | 60 | 632 | 41 | 721 | 22 | 85 | 59 | 19 | 46 | 49 | 62 |
| ***Fire Danger Rating EXTREME, winds 15 miles per hour*** | | | | | | | | | | | |
| 30 minute | 8 | 114 | 5 | 122 | 5 | 13 | 11 | 4 | 5 | 5 | 7 |
| 2 hours | 103 | 794 | 57 | 1,038 | 31 | 193 | 227 | 27 | 88 | 119 | 156 |
| ***Fire Danger Rating EXTREME, winds 20 miles per hour*** | | | | | | | | | | | |
| 30 minute | 16 | 177 | 9 | 184 | 6 | 28 | 24 | 5 | 9 | 8 | 13 |
| 2 hours | 127 | 862 | 64 | 1,321 | 33 | 320 | 440 | 32 | 115 | 204 | 287 |
| ***Northwest Winds (315°)*** | | | | | | | | | | | |
| ***Fire Danger Rating VERY HIGH, winds 10 miles per hour from northwest*** | | | | | | | | | | | |
| 30 minute | 3 | 58 | 2 | 58 | 2 | 5 | 6 | 2 | 2 | 2 | 2 |
| 2 hours | 73 | 826 | 48 | 1,094 | 41 | 43 | 86 | 20 | 51 | 49 | 53 |
| ***Fire Danger Rating EXTREME, winds 15 miles per hour from northwest*** | | | | | | | | | | | |
| 30 minute | 8 | 120 | 5 | 123 | 5 | 12 | 13 | 5 | 5 | 5 | 6 |
| 2 hours | 183 | 1,288 | 116 | 1,521 | 199 | 65 | 190 | 27 | 211 | 112 | 137 |
| ***Fire Danger Rating EXTREME, winds 20 miles per hour from northwest*** | | | | | | | | | | | |
| 30 minute | 16 | 182 | 9 | 202 | 8 | 16 | 25 | 6 | 9 | 8 | 14 |
| 2 hours | 382 | 1,590 | 255 | 1,826 | 368 | 82 | 413 | 32 | 410 | 296 | 276 |

**Fire History and Habitat Age Class Condition**

To address the habitat success thresholds and establish the baseline condition from which the Proposed Action may be evaluated, we estimated whether success thresholds were currently being achieved. Estimates are based on known fire history maps since 1979, and do not consider actual fire damage to natural resources (that is, many burns leave shrubs behind or they are only scorched, and some fires benefit target resources). This analysis assumes that mapped fire history equates to vegetation age.

This review of the fire history maps and database shows that age class thresholds are currently being met, on average, in all habitats and plant communities with certain exceptions. In the mid-1990s, loamy grassland was younger than the minimum average threshold age due to certain excessively large fires that affected a high percentage of the habitat. Thresholds for maximum area burned in a given period are currently being met in high-density sage sparrow habitat, but an 8-acre fire in this habitat in 1987 exceeded the maximum threshold patch size of five acres. The 40-year fire return interval minimum in small areas of moderate-density sage sparrow habitat north of the airfield and above Eel Cove has not been met; however, it has been met Island-wide. For canyon woodlands, thresholds for a 10-year maximum acreage burned were exceeded in 1985, 1993, and 1994. Desired maximum patch sizes were also exceeded these years.

## 4.3 Designated Land Use Effects

NEPA requires the identification of potential conflicts with local, state, and other federal land use planning, policies and regulations. Special land use designations on SCI are associated with the military mission and include the shore bombardment area (SHOBA), Special Warfare Training Areas (SWATs), other impact ranges, and a few developed faciities in concentrated areas.

**Alternative 1: Proposed Action/Preferred Alternative to fully implement WFMP 2009**. The Proposed Action would mostly benefit the current land use and military mission by opening up the training schedule and target areas for military training while reducing the risk of training shutdown due to fire impacts on life, infrastructure, or federally listed species.

**Alternative 2: Proposed Action without prescribed burning.** The effects on designated land use would be similar to that of Alternative 1, the Preferred Alternative.

**Alternative 3: No Action/Baseline.** The military training schedule has been impaired due to restrictions on the use of incendiary ordnance during the San Clemente loggerhead shrike breeding season. This impairment was a primary driver behind developing WFMP, and so the No Action alternative can be characterized as having mostly long-term adverse effects.

## 4.4 Utilities and Infrastructure Effects

**Alternative 1: Proposed Action/Preferred Alternative to fully implement WFMP 2009**. The Proposed Action reduces the potential for loss of human life and infrastructure values through enhanced suppression capability, guidance, and fuels management. The enhanced fuelbreak infrastructure involves reduced fuel loads but no new road footprint or other bare ground. Certain roads that are currently abandoned, unmaintained, and eroding would be brought into better condition. The WFMP calls for enhanced access to VC-3 airfield but no new footprint for the airfield. The infrastructure would result in an improved ability to control and contain wildfires, and so a reduction in average fire size. This is all a net benefit in the long term for utilities and infrastructure.

**Alternative 2: Proposed Action without prescribed burning.** The effects on designated land use would be similar to that of Alternative 1, the Preferred Alternative; however, there is a slight increased risk of larger, uncontrolled wildfires that may affect utilities and infrastructure without the ability to perform patch-level burns.

**Alternative 3: No Action/Baseline.** The width of most Island roads, including the Ridge Road, is insufficient to stop a fire or be a firefighting anchor point during a wildfire. The ability to manage fuels along key roads provides the benefit of enhanced fire control. In addition, many miles of roads are inaccessible for firefighting equipment due to lack of maintenance, and they are a source of erosion. The current situation carries adverse risk to utilities and infrastructure because it is insufficient to control fires.

## 4.5 Public Health and Safety Effects

The health and safety of the public and fire personnel would be affected in varying degrees under all alternatives. There are two major concerns related to health and safety. One is the actual danger of fire-caused injuries or fatalities – firefighters, military personnel, or contractors becoming trapped and burned by fire, or injuries that are indirectly caused by the fire, such as injury or death from unexploded ordnance cooking off, or losing balance and falling. The other is smoke inhalation, either by firefighters on the fireline or by the personnel in areas away from the fire. Due to the presence of a flammable landscape, natural and human ignition sources, and hot, dry summers, no alternative eliminates the health risk of smoke for firefighters, military personnel, or contractors. Unwanted wildland fires will occur and produce smoke under all alternatives. Alternatives that allow more control over the timing, placement, and conditions under which fires burn will be more successful at minimizing smoke impacts over the long term.

**Alternative 1: Proposed Action/Preferred Alternative to fully implement WFMP 2009.** While there is no history of death or injury to personnel directly caused by wildland fire on SCI, the potential for injuries or fatalities exists. Potential impacts to health and safety of firefighters and others are prevented by improved wildfire suppression, policies that keep firefighter safety as a first priority during incidents, providing adequate response time to fires and infrastructure to contain them, developing improved communications, and improved notification procedures. The strategy of the WFMP is to contain wildland fires within easily defended borders. This alternative increases the survivability of human life and protects human health in the event of a wildfire, reduces the risk of a large fire, and allows more control over the timing, placement, and conditions under which fires burn.

The prescribed burn projects will be managed under conditions and constraints consistent with the Air Pollution Control District's regionally permissive burn days that allow for good convection and upper-level air transport, which will maintain smoke emissions below the legal thresholds as defined by the State of California and the Environmental Protection Agency. To accomplish this, smoke impacts will be managed and minimized according to requirements contained in the Smoke Management Plan appended to the Prescribed Burn Plan. SCI is a remote island with regard to smoke sensitive locations, except for the inhabited town of Wilson Cove..

The WFMP program also works to reduce long-term threats to public safety by reducing hazardous fuels with the use of mechanical fuel reduction around developments and along roadways where people could become trapped by fire.

**Alternative 2: Proposed Action without prescribed burning.** The effects of this alternative are nearly the same as Alternative 1, the Preferred Alternative.

**Alternative 3: No Action/Baseline.** Current fire management does not accommodate newly planned locations for potential ignitions north of SHOBA as a result of the placement of new TARs, so the effect of this alternative is adverse and long-term.

## 4.6 Cultural Resources Effects

NEPA and the National Historic Preservation Act, as amended in 1992 (16 USC 470 et seq.), require the consideration of impacts on cultural resources listed on or eligible for the National Register of Historic Places. The undertakings described in the WFMP are also subject to section 106 of the National Historic Preservation Act.

Effects under both NEPA and the National Historic Preservation Act are considered adverse when they diminish the significant characteristics of a historic property or its setting, such as removal or burning of historically important vegetation or burning of historic structures. A beneficial impact is one that would reduce heavy fuels adjacent to structures, or measures that reduce risk of loss through burning. For archeological resources, a change in the physical attributes of an archeological site that affects the information contained in that site is considered adverse and irreparable. Adverse impacts to archeological resources can result from manual or mechanical fuels treatment, direct heating during fire, fire response and suppression, post-fire ecological processes, emergency rehabilitation, and fire damage restoration. Fire can also have beneficial impacts to archeological resources. Burning duff, leaf litter, and grassland mulch exposes mineral soil not visible during inventories of unburned areas, allowing for greater accuracy in documenting site constituents and boundaries. Burning within a natural fire regime also reduces the threat of high-intensity fire and the need for suppression.

Impacts can be either direct or indirect. Direct impacts result from specific actions, such as biomass removal or fire line construction using a bulldozer. Indirect impacts generally occur after an action, and are a result of changes in the condition of the landscape (such as loss of vegetation and subsequent erosion).

The intensity of impacts to archeological resources can range from negligible to major, depending on the potential of the resource to yield important information, as well as the extent of the physical disturbance and/or degradation. For example, moving earth at an archeological site with low data potential might result in a minor, adverse impact. The majority of these impacts are long-term. Fires occurring with a greater return interval (longer interval between fires) are more likely than those with a shorter return interval to burn at an intensity that would impact cultural resources. For areas with long fire return intervals, fuel accumulation is high and fires (both prescribed burns and wildland fires) could generate soil and below-soil temperatures that damage archeological materials. Burns in these areas would also be more difficult to control to the degree needed to protect known resources, unless mitigation measures were implemented prior to the burn (such as fuelbreaks).

Some of the measures laid out in the WFMP to avoid adverse effects on historic and archeological resources include defensible space around structures that cannot afford to be lost in a wildfire, a map of sensitive sites that is updated annually, assignment of a Resource Advisor during larger fires, fuels reduction in key areas, and in general enhanced control of wildfire starts. Annual planning for fire management actions would include protection of known cultural resources. Wherever possible, archeologists or cultural resource specialists would document significant cultural resources prior to a prescribed burn.

**Alternative 1: Proposed Action/Preferred Alternative to fully implement WFMP 2009.** The proposed WFMP would provide a long-term net benefit to historic and archeological resources because there would be enhanced control over the size, return interval, location, and intensity that fires burn. No earth-disturbing fuelbreak construction is proposed in the WFMP, as such work is done with prescribed fire, retardant, and herbicide. Some benefit can be expected from prescribed burns since burning off of vegetation exposes mineral soil not visible during inventories of unburned areas, allowing for greater accuracy in documenting site constituents and boundaries.

**Alternative 2: Proposed Action without prescribed burning.** The effects of this alternative would be similar to that of the Preferred Alternative, except that there is a slightly greater risk of soil erosion that could impact archeological resources due to a reduced level of control over the size, return interval, location, and intensity that fires burn.

**Alternative 3: No Action/Baseline.** Status quo fire management with the addition of new TARs north of SHOBA allows for less control of fire behavior than the Proposed Action or any other alternative. Negative impacts are would be expected to cultural resources because of the possibility of large, intense (very hot), or over-frequent fires that could result in soil erosion from the loss of soil staibility.

## 4.7 Watersheds, Soils, Wetlands, and Water Quality Effects

Water resources, watershed, and soils are interrelated in their reactions to the treatments proposed by the alternatives. Due to these relationships, the analysis has been done on them as a group. Effects upon soils and watersheds are assessed by considering the likely footprint of the effect—whether fire would affect all or part of the watershed slope (ridge, mid-slope, bottom)—and as a result, the likely effect upon water yield, peak flows, sediment yield, nutrient yield, and/or drainage system response.

An adverse impact is considered one that moves the system outside of or away from the natural range of variability for watershed conditions (organic matter condition, carbon/nitrogen cycling, crypotogammic cover, water yield, peak flows, sediment yield, nutrient yield or stream system response). In contrast, a beneficial impact moves the system inside of or toward the natural range of variability for watershed conditions (organic matter condition, carbon/nitrogen cycling, crypotogamic cover, water yield, peak flows, sediment yield, nutrient yield, or stream system response). Effects that contribute to the recovery of shrublands where they are missing are considered beneficial, as well as those that allow for better control of fire size, duration, intensity, and location. A loss of control of these factors would be considered an adverse impact.

An impact would be considered short term if it can be reversed when fire is excluded for about two average fire return intervals. The resilient fire return intervals are part of success criteria in the WFMP and vary by each plant community. If an area takes longer to recover, such as would result when the effect is a vegetation type conversion, then this effect would be considered long term. Effects are considered negligible if they are imperceptible or undetectable. If effects are slightly perceptible or localized, they would be considered minor. Obvious impacts that are localized would be classified as moderate. Major impacts are substantial, highly noticeable, and with the potential for landscape (watershed) -scale effects, such as sedimentation of sensitive nearshore waters.

Fire impacts can manifest themselves in changes of soil physical, chemical, and biological properties. These include breakdown in soil structure, reduced moisture retention and holding capacity, devlopment of water repellency, changes in nutrient pools and cycling rates, atmospheric losses of elements, offsite erosion losses, combustion of the shrubland or woodland floor, reduction or loss of soil organic matter, alteration or loss of microbial species and population dynamics, reduction or loss of invertebrates, and partial elimination (through decomposition) of plant roots (Neary et al. 2005).

A full evaluation of potential soil impacts of past, current, and proposed fire regimes on San Clemente Island is not possible without understanding the role of cryptogammic crusts and organic matter in the functioning and sustainability of this ecosystem. They are poorly understood in ecosystems in general, and even less so on SCI. Also, such consequences are subtle, long term, and hard to detect. For example, carbon and nitrogen are the key nutrients affected by burning, and changes in the cycling of these elements are directly tied to ecosystem productivity. Increases in nitrogen and carbon cycling amounts and rates in this naturally nitrogen-stressed system with slow turnover rates are not predictable with the current state of knowledge (Neary et al. 2005).

The protection of wetlands is facilitated through Executive Order 11990, Protection of Wetlands; Clean Water Act, Section 404; and the “no net loss” goal outlined by the White House Office on Environmental Policy in 1993. Executive Order 11990 requires that leadership be provided by involved agencies to minimize the destruction, loss, or degradation of wetlands. Directors Order 77-1 and Procedural Manual 77-1 provide the procedural structure in which Executive Order 11990 may be implemented. Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act authorize the U.S. Army Corps of Engineers to grant permits for construction and disposal of dredged material in waters of the United States.

Similar to watersheds and soils, the assessment of fire management impacts to wetlands needs to addresss wetland condition and natural disturbance processes. For this analysis, several assumptions were made. The greater the size of a biotic community and the stronger its links to neighboring communities, the more valuable it is to the integrity and maintenance of essential biotic processes. Although specific fire management activities may result in short-term fragmentation and the disassociation of communities from each other, these same impacts may result in long-term ecological benefits.

An adverse impact to wetlands occurs when it degrades the size, integrity, or connectivity of wetlands. A beneficial effect occurs when a wetland is enhanced hydrologically for its biological functions, native species richness or diversity, or native habitat quantity and quality. A short-term effect lasts less than 10 years, whereas a long-term effect lasts longer or appears after 10 years.

Wetlands are likely to begin to resemble the pre-existing condition within one or two growing seasons following fire events or management activities (Davis et. al 1998). The benefits following changes in woodland condition and fire regime are likely to occur at much longer time scales.

**Alternative 1: Proposed Action/Preferred Alternative to fully implement WFMP 2009.** The WFMP offers a benefit to soils and water quality because it allows for burns under more controlled conditions, and places management controls on fire size, severity, and return interval. These controls directly limit soil erosion potential.

Some of the measures laid out in the WFMP to avoid or minimize adverse effects to watershed, soils, and water quality are:

- Land management unit boundaries are delineated along canyons and fire suppression personnel are directed to hold the fire ahead of those lines so wildfires do not enter the canyons.
- The use of prescribed fire provides the manager with alternatives for minimizing damage done to soils. Cool burning fire impacts are considered minor and short-term (Neary et al. 2005); however, shrubland plants are sometimes adapted to hot fires. Burning of concentrated or dense fuels can result soil damage that is long-term and moderate because such areas are usually localized. To protect soils, such fires need to be small and the sites isolated from water sources.
- Monitoring for fire severity which considers ground surface condition after fires. Fire severity can be used to estimate soil temperatures, and thus soil impacts.
- Implementing these low-fuel fuelbreak zones will not cause soil degradation or change hydrologic processes or available water because these areas will remain sufficiently vegetated to provide protective soil cover. Road maintenance is expected to improve the sometimes serious erosion and sedimentation condition of the secondary roads.
- Retardant and herbicide lines are kept away from canyons and from water sources of any kind. Aerial fire retardant or Class A foams will not be applied within 100 ft of drainages. Other fire retardant BMPs are described under "Fire Retardant Application Best Management Practices." Since effects are short-term, they are considered unlikely to adversely affect any listed species. 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 its use is beneficial in the long-term.
- Fuelbreak lines installed with retardant can have a short-term temporary fertilizing effect on vegetation (up to about one year). The WFMP provides for rotating the position of these lines within a band designated for the fuelbreak so they are not in exactly the same place each year. This would help prevent the possible buildup of nitrogen and phosphorus in a single location, which could perhaps attract invasive species that would overcome native vegetation.
- Minimum Impact Suppression tactics are implemented. Suppression tactics involving off-road vehicles that impact soils are generally avoided in the WFMP, so soil compaction or disturbance of soil cryptogammic crusts is avoided. The preferred tactics are backburning

from a road and the use of water drops by helicopter. Salt water drops for suppression may affect soils in a minor, short-term way if repeated in the same locations. However, many westshore soils are already known to be quite saline, and in this case the expected long-term effect would be negligible. The possible effects of practice salt water drops are minimized by conducting such pilot training on roads.

- Better road maintenance practices to keep areas accessible for fire vehicles are expected to curb erosion along many Island roads.
- The Proposed Action also results in better fire management that would limit fire size and severity. This protects water quality and Essential Fish Habitat of ocean waters surrounding San Clemente Island from sedimentation, which would most likely result from large fires.

**Alternative 2: Proposed Action without prescribed burning.** By removing a tool for controlling fire size, return interval, and intensity, this alternative places soil and water resources at greater risk despite short-term, localized, adverse effects on cover conditions of the soil. There would be a slightly greater potential for high fire intensities in drainages, and therefore sediment yield and water quality problems, under this alternative.

**Alternative 3: No Action/Baseline.** There are adverse effects of current fire management. This is because there is less control of fire size, return interval, and intensity as the Island shrublands and woodlands recover from overgrazing by goats, including added continuity of fuels between the canyons and plateau areas. On top of this, there is additional wildfire ignition potential due to the new TARs and new training activities proposed in the next several years. There is a much greater potential for high fire intensities in drainages, and therefore sediment yield and water quality problems, under the No Action alternative. Many roads are not maintained routinely on SCI, and continue to cause erosion and sedimentation problems.

## 4.8 Plant Community Effects

The alternatives will be evaluated by looking at structure and composition of the plant communities. An adverse impact moves the system outside of or away from the range of variability for vegetation to retain its structure, composition, and variability in biomass (fuels). A beneficial effect would move the system inside of or toward this range of variability (resilience), so the plant community can heal or regulate itself with fire as a stress on it.

Some specific examples of fire and other stresses on plant communities and wildlife habitat that would be adverse include:

- Fire intervals outside the resilience of a particular plant community such that type conversion or a permanent shift in the community’s natural composition is possible.
- Fire size that creates a uniform fire regime across SCI over many decades such that biodiversity is lost.
- Fire intensity that kills seeds or resprouting capability, or low intensity that does not germinate heat- or smoke-obligate seeds.
- Fire season which has a differential effect on the herbaceous layer.
- Invasive, non-native plants that can outcompete natives and prevent the normal sequence of post-fire succession from proceeding.

- Soil erosion due to short fire return interval or severe (all vegetation consumed) fire regime.

These impacts are short-term if they can be reversed within one or two average fire return intervals specific to each plant community, but long-term if three or more fire return intervals are needed. In grasslands, for example, minimum fire intervals can be quite short, perhaps 3-5 years, without any permanent impacts. Woodlands, however, require much longer fire intervals in order to retain their species composition and recover structure, on the order of a few decades.

The intensity of impact to plant communities would be

| | |
|---|---|
| Negligible: | Imperceptible or undetectable effects upon vegetation. |
| Minor: | Slightly perceptible and localized effects. |
| Moderate: | Measurable change in plant community structure and composition; changes in ecosystem processes (e.g. fire, fuels, nutrient cycling, hydrology) on a localized, small scale. |
| Major: | Substantial change in plant community structure, composition or fuels results in changed ecosystem processes (e.g. role of fire, fire regime, nutrient cycling, hydrology, vegetation type conversion) on a landscape scale. |

The following discussion provides background for the effects analysis regarding fire intervals and fire size. Smaller fires are beneficial in that they are expected to improve habitat diversity by spatially diversifying the fire regime (making it more patchy). Smaller fires also reduce the potential for a catastrophic loss of threatened/endangered species habitat.

Extending the time between fires will allow shrub and tree recovery and promote the maturation and spread of shrublands as they recover from historic overgrazing by feral goats. In general, longer fire intervals in maritime desert scrubs have an interacting effect with small fires and long fire intervals can result in fewer herbaceous and suffrutescent (short-lived perennial) plants (which tend to be “pioneer” plants) overall. In a plant community without fire and without burrowing mammals to create disturbance patches for plant colonization, the listed plants must depend upon naturally shallow soils, fine-textured soils, steep slopes, or other harsher sites to colonize without competition from both native and non-native plants.

An example can be found in the mainland counterpart of maritime desert scrub and maritime sage scrub, and that is coastal sage scrub. Mainland coastal sage scrub is better studied and probably tolerates a wide range of fire intervals, from 12-40 years, as evident by the mix of resprouting and seeding capabilities of the component species (Malanson 1984). In coastal areas, most sage scrub species resprout from below ground root crowns, although there can be substantial seedling germination (White 1995). Post-fire resprouting in coastal sage scrub subshrubs tends to be more successful in younger, rather than in older shrubs and at coastal rather than inland sites (Keeley 1998). The lack of fire in sage scrub stands (and in Island scrubs) or very long fire intervals is expected to result in a structural simplification as shrubs age and canopy cover diminishes recruitment, an overall reduction in above-ground stand diversity (Westman 1981; Westman 1982; O'Leary 1989; Malanson and O'Leary 1982; DeSimone and Zedler 1999), low numbers of above ground annuals, and a general absence of nitrogen-fixing organisms (Westman 1982; DeBano and Dunn 1982). Canopy dominants such as lemonade berry would be expected to expand, while California sagebrush may decline in cover due to plant aging. Concentration of dominance by a small number of shrub species will be at its maximum (Westman 1981) after about 25 years.

Mainland chaparral (a counterpart to canyon shrublands on SCI) is generally believed to be resilient to fire return intervals ranging from between 20 to 150 years, with average natural return intervals of 50 to 70 years at least in inland situations (Minnich 1983; Davis and Michaelson 1995; Conard and Weise 1998; Mensing et al. 1999). The degree to which fire can influence community structure in Mediterranean shrublands depends most strongly upon the fire interval (Hobbs and Huenneke 1992; Keeley 2001; Zedler et al. 1983). Keeley and Zedler (1978) hypothesized about evolutionary selection pressures under both short and long fire-free periods that favor dominance by different species groups. During a short fire cycle, there are fewer dead shrubs prior to the fire, thus more potential resprouts. Subsequent fires are less intense, so there is less fire-induced mortality, and fewer openings for seedlings to become established. The result is low selection pressure for obligate-seeder life histories, or plants that depend on fire for regeneration by seed and do not recover by sprouting. Sprouting species are at a disadvantage during long fire-free periods. The intensity of a fire produced by the accumulated fuel load will reduce the number of individuals that can successfully resprout. Also, there are fewer resprouts after a burn because more shrubs were already dead prior to the burn. The result is larger openings for seedlings and high selection pressure for the obligate-seeding strategy. The successful species will be the one with the most seeds per unit area in the soil seed bank when the eventual fire does occur. Under long-term absence of fire, chaparral composition will shift towards taller canopy dominants which are in the vigorous crown sprouter group (such as oak and toyon), and loss of ceanothus and other obligate seeders. Van Dyke et al. (2001) found that more than half of the herbs growing above ground were absent in samplings 25 years apart in maritime chaparral of Monterey County. The remaining herbs were restricted to the few remaining canopy gaps, and the understory was bare except for litter and seedlings of trees, which need shade to germinate, then a canopy opening to establish new individuals.

**Alternative 1: Proposed Action/Preferred Alternative to fully implement WFMP 2009.** The Proposed Action results in some benefits to plant community structure and diversity due to better fire management, limiting the amount of vegetation potentially burned at one time, and some adverse but minimized effects of fuels management. Some Impact Area boundaries and certain existing roads are augmented to function as fuelbreaks through application of up to 5 miles/year of strip burns (18.2 acres) rotated over a 10-year period for up to 20 miles; 15 miles of fire retardant (54.5 acres); and up to 5 miles of herbicide spraying once every 5 years (12.1 acres). Prescribed burning may be conducted for up to 300 acres per year for strategic resource protection or habitat/biodiversity enhancement.

The effect on plant communities from roadside fuels management would be adverse, long-term, and minor in shrublands, and negligible in grasslands. The adverse effect in shrublands would be a type conversion of dense to thinned, shorter-stature vegetation. These effects would be localized since most vegetation adjacent to roads on San Clemente Island is grassland. However, the fuelbreak work will allow greater control over fires Island-wide, so there is a net benefit in the long term. Some areas will be treated with “Phos-chek” fire retardant, and all retardants contain ammonia, a plant nutrient. If applied at high concentrations, all plant nutrients, including retardant salts, will cause leaf burn and drop. This effect is short-term, temporary, and localized. Best management practices for handling fire retardant are to prevent spills and to locate mixing and loading stations away from water sources, drainages, drainage banks, or generally where there is a lack of opportunity for natural water contact.

Implementing the WFMP is expected to result in some long-term benefit as a result of smaller fires and longer fire return intervals across the Island as a whole compared to past fire patterns, when this implementation occurs in concert with the habitat condition thresholds and controls on fire patterns these thresholds are intended to provide. While it is expected that implementing the WFMP will have a beneficial effect compared to past fire patterns, it is not so clear what can be expected when new fire ignition locations are added beyond those typical of the past. Based on this uncertainty, there is a need to consider the possibility of both shorter intervals in certain localized areas and longer return intervals across the Island as a whole.

The benefit of smaller fires and longer return intervals are expected mostly in SHOBA, where current ignition locations are expected to be similar to future locations. North of SHOBA, new fire ignition locations at TARs may introduce fires where they have not occurred in the modern fire record. These shorter intervals north of SHOBA would be expected to benefit grassland plant communities due to the relative benefit fire can provide to the survival of native versus non-native species. The same is true of shrublands and woodlands only if the fire interval remains sufficiently long for the dominant shrubs and trees to re-establish themselves, which could require one or a few decades. This effect is minimized by the required FDRS implementation to reduce ignitions under hazardous fire conditions; staged suppression resources for a quick attack of fire starts; improved accessibility to sites by roads; the use of fire retardant as needed as a pre-suppression tool; natural resource success thresholds to manage fire size, return interval, and severity; and training of on-site personnel. Under full compliance with the WFMP, expected new fire locations at TAR 10 and TAR 17 will likely adversely affect the maritime desert scrub-boxthorn community in an area at each TAR of less than 1 acre. Allowing for a worse than standard response at these locations shows burns in this community to not exceed 2 acres (TAR 10 and TAR 17) in size, for a total of 4.2 acres (assuming an unintentional ignition in VERY HIGH conditions and 30 minutes to extinguish). This is a worse scenario than what is allowable under full implementation of the WFMP, but provides for a certain level of failure to perform to the standards required, fire danger prediction errors, or short-term weather changes.

**Alternative 2: Proposed Action without prescribed burning.** Without the option to conduct prescribed burns in patches, the plant community structure and diversity would become more uniform over time except for when fires escaped control. The temporary and adverse but minimized effects of up to 300 acres per year of these burns would be outweighed by the improved control of fire size and return interval, and by the potential benefit to habitat/biodiversity enhancement. The expected effect would range from negligible to moderate, and localized.

While it is expected that implementing the WFMP will have a beneficial effect compared to past fire patterns, it is not so clear what can be expected when new fire ignition locations are added beyond those typical of the past. The ability to conduct patch burns provides one more tool to protect plant communities from type conversion due to too-short fire intervals. Without prescribed fire in patches, there is a higher risk in the shrublands and woodlands that the fire interval will be too long for short-lived subshrubs and herbs to find a niche where they are not outcompeted by longer-lived canopy dominants.

**Alternative 3: No Action/Baseline.** The current program has been benefiting plant communities because of reduced fire incidence coming from SHOBA. However, major (landscape-level), long-term, adverse effects are expected due to the establishment of new TARs north of SHOBA for which there is no current fire response infrastructure or assets for suppression. These added locations for ignitions risk the sustainability of plant communities in the area through increased fire frequency, size, and severity.

## 4.9 Wildlife Population Effects

General wildlife populations are discussed here, with specifics on migratory birds and special status wildlife addressed separately in sections to follow.

Fire affects the structure, distribution, and diversity of wildlife and wildlife habitats. As there are successions of species and age classes of plants that occur between fires, there are successions of animal species that are favored or disfavored as habitats change. The effects of fire on wildlife populations are either "direct" or "indirect." Direct effects include injury and mortality due to direct exposure to the fire. Indirect effects are caused by the alteration or destruction of habitat utilized by wildlife within the perimeter of the fire (Walter 1977). Most animals are able to escape the lethal effects of fire by selecting an insulated micro environment (burrows, riparian areas) or by rapidly emigrating from the area of the fire. Therefore the majority of the effects is indirect, a result of alterations in the vegetation structure and temporary loss of habitat. These alterations include the removal of favorable nesting sites, disappearance of host and forage plants, and loss of protective vegetation cover. Additionally, the loss of vegetation results in change to biophysical conditions, altering temperature, wind, incident radiation, and soil moisture among other parameters that make up a microhabitat. Fire suppression and prescribed burning activities can inadvertently and adversely affect wildlife through direct disturbance of animals and habitats; even though both activities are designed to benefit habitat condition in the long run.

Broadly speaking, examples of fire regime sensitivity for wildlife species include: short-lived species with sedentary life histories that depend on understory or herbaceous plants such as some butterflies; species that depend on an open vegetation condition; canopy-dependent species; interior versus edge species; others that have narrow requirements; understory versus tall canopy dominants. Endemic island populations are particularly susceptible to extinction (Soule 1983) with these characteristic traits: small population size leading to vulnerability to demographic and environmental stochasticity and inbreeding depression; limited spatial distribution; evolution in the presence of few predators and competitors; and vulnerability to the introduction of ecologically disruptive non-native species (Simberloff 1994).

In adverse fire regimes, wildlife persistence and recovery could be substantially altered by the combined effects of fragmented habitats and fire due to: 1) the local disappearance (extinction) of some species in burned habitat fragments; 2) the inability of some species to respond to and recover from fire because escape routes are blocked and there is reduced chance of recolonization; and 3) frequent fire or short fire return intervals in fragmented areas may facilitate the movement of invasive species into natural systems, impacting native biota. Each of these effects is exacerbated by large, intense fires and by short fire return intervals. Although there is virtually no quantitative data on the interactive effects of habitat fragmentation and wildfire on wildlife populations, wildfire suppression is interpreted as generally beneficial to the degree that it limits the amount of area burned at short intervals, which would have the greatest potential to make habitat unsuitable for wildlife.

Most wildlife populations on SCI, including listed and Conservation Agreement species (the Island fox), are resilient to fire, unless fires become exceptionally frequent, with intervals shorter than the habitat can recover from, or uniformly large. Fires and fuelbreaks can temporarily create new foraging habitat for predatory species such as Island foxes. An adverse effect would be an unnatural change in the abundance, diversity, and distribution of wildlife species. Changes could occur through direct disturbance or mortality, or through destruction or alteration of habitats. In contrast, a beneficial effect would likely protect or restore the natural abundance, diversity, and distribution of wildlife species. This would occur through protection and restoration of the natural structure, succession, and distribution of habitat. A major change is one that is substantial, highly noticeable and affects a large area. The change would not reverse without active management.

**Alternative 1: Proposed Action/Preferred Alternative to fully implement WFMP 2009.** As the Proposed Action results in some benefits to plant community structure and diversity, described above, such benefits carry over to wildlife species. The WFMP allows for fires to occur under more controlled conditions, and places management controls on fire size, severity, and return interval. These controls directly protect the ongoing recovery of plants and wildlife from historical overgrazing by goats. Habitat condition success thresholds are proposed in order to manage the risks of fire. These thresholds prevent large-scale, stand-replacing losses, which may be catastrophic to individual wildlife species.

Prescribed fire is also available as a tool to manage fuel loads in strategic areas or to achieve ecological objectives. Results of the prescribed burns would help manage for gap-dependent wildlife and those that depend on a younger or more open canopy condition. Impacts to wildlife from prescribed burns would be adverse, short-term, and minor due to mortality in a small number of species and beneficial, moderate, and long-term with regard to habitat. The desired future condition for the various plant commuities (and wildlife habitats) allow for vegetation age classes that range from zero to 40 years or more in patches. However, other beneficial effects are anticipated from prescribed fire. Smaller fires are expected to improve habitat diversity by spatially diversifying the fire regime (making it more patchy). Smaller fires also reduce the potential for a catastrophic loss of threatened/endangered species habitat. Extending the time between fires will allow shrub and tree recovery and promote the maturation and spread of shrublands as they recover from historic overgrazing by feral goats.

A long-term, adverse, and minor effect on wildlife populations would occur due to habitat modification for fuels reduction for species that depend on dense shrubs on habitat edges.

Since Phos-chek and all retardants contain ammonia, they can be potentially toxic to marine life. Best management practices for handling fire retardant are to prevent spills especially near water, and to locate mixing and loading stations away from water sources, drainages, drainage banks, or generally where there is a lack of opportunity for natural water contact.

**Alternative 2: Proposed Action without prescribed burning.** Without the ability to conduct patch burns, there would be a slight reduction in the temporary effects of the burns on wildlife; however, it could take a longer time time for SCI to achieve ecological stability. By diversifying the fire regime under controlled conditions using prescribed fire, managing for some younger age classes of vegetation that will benefit particular wildlife species, allowing for scientific study of unknown fire dependencies on the Island, broader opportunities for prescribed burning allows for an increased probability that all classes of wildlife are protected, consistent with the mission of NBC.

**Alternative 3: No Action/Baseline.** The current program has been benefiting wildlife habitat because of reduced fire incidence coming from SHOBA. However, major (landscape-level), long-term, adverse effects are expected due to the establishment of new TARs north of SHOBA for which there is no current fire response infrastructure or assets for suppression. These added locations for ignitions without any fire planning would risk the sustainability of wildlife habitat in the area through increased fire frequency, size, and severity.

## 4.10 Migratory Bird Effects

Federally listed birds (San Clemente sage sparrow, San Clemente loggerhead shrike, and western snowy plover) are addressed in Section 4.11.

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711) is legislation that covers species protected under four international treaties. These treaties are agreements between the U.S., Canada, Mexico, Japan, and Russia and protect most species of birds. The MBTA prohibits the taking or pursuing of migratory birds, their eggs, feathers, or nests. Game birds are listed and protected except where specific seasons, bag limits, and other factors govern their hunting. Exceptions are also made for some nuisance pests, which have standing federal depredation orders (e.g. yellow-headed, red-winged, tri-colored, Rusty and Brewer's blackbirds, cowbirds, all grackles, crows, magpies, rock doves, European starlings, and house sparrows).

The USFWS has sole authority for coordinating and supervising all federal migratory bird management activities, including enforcement of federal migratory bird statutes regulating the taking of protected species (game and nongame) by individuals and federal agencies. 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. Violations of the MBTA can result in fines of up to $2,000 or two years imprisonment.

USDOD policy states that migratory bird programs shall be established in support of and consistent with the military mission.The fire management activities that constitute the Proposed Action fall under a Memorandum of Understanding (MOU) between the USFWS and USDOD on Migratory Birds. This is in contrast to the Migratory Bird Rule , which covers military readiness activities and is guidance that addresses past conflicts arising between military readiness activities and the MBTA. The USFWS issued the final rule on, "Migratory Bird Permits: Take of Migratory Birds by the Armed Forces" (50 CFR Part 21 in the February 28, 2007 Federal Register, pages 8931-8950). The Migratory Bird Rule authorizes the military to "take" migratory birds during military readiness exercises under the MBTA without a permit, but if the military determines that the activity will significantly affect a population of migratory birds, they must work with the USFWS to implement conservation measures to minimize and/or mitigate the effects.

The MOU, cited above and under which the proposed fire management falls, was a result of the 2001 Executive Order (EO) 13186, requiring federal agencies whose actions may affect migratory birds to develop and begin implementing, within two years, an MOU with the USFWS aimed at conserving these birds. In addition, the EO required NEPA evaluations to include effects on migratory birds and that advance notice or annual reports must be made to the USFWS concerning actions which result in the taking of migratory birds. The EO also required agencies to control the establishment of exotic species that may endanger migratory birds and their habitat.

The USFWS/USDOD MOU (Fed Reg 8/30/06) that evolved out of the requirements of the EO addresses the conservation of migratory birds on military lands in relation to all activities except readiness. The MOU is a guidance document on how the USDOD will conserve migratory birds and does not authorize any take. In April 2007, further guidance was issued by the Under Secretary of Defense for Acquisition, Technology and Logistics on implementing the MOU to Promote the Conservation of Migratory Birds between the USFWS and USDOD in accordance with EO 13186 (USDOD 2007). This guidance covers all activities at SCI, including natural resources management, routine maintenance and construction, industrial activities, and hazardous waste cleanups. The guidance emphasizes interdisciplinary collaboration in framework of recognized Bird Conservation Regions, collaborative inventory and long-term monitoring.

All birds are managed through the SCI INRMP, including, at a minimum, baseline inventory and regular monitoring. All are also managed through the project site approval process through which avoidance and minimization measures are communicated to those working on a project site. Migratory birds are typically managed through measures to avoid the breeding season, and routinely checking for nests before undertaking actions which may affect nesting birds. Migratory birds also benefit incidentally from the threatened and endangered species conservation. These include feral cat and rat control, and predator management. Finally, the invasive plant control program helps keep habitat in its natural condition, and this benefits use by native birds.

As stated above for fire effects on wildlife in general, fire affects the structure, distribution, and diversity of migratory birds and their habitats. As there are successions of species and age classes of plants that occur between fires, there are successions of avian species that are favored or disfavored as habitats change. Most birds are able to escape the lethal effects of fire by fleeing. Therefore the majority of the effects is indirect, a result of alterations in the vegetation structure and temporary loss of habitat, or as a result of site erosion and sedimentation. These alterations include the removal of favorable nesting sites, disappearance of host and forage plants, and loss of protective vegetation cover. Additionally, the loss of vegetation results in change to biophysical conditions, altering temperature, wind, incident radiation, and soil moisture among other parameters that make up a microhabitat. Fire suppression and prescribed burning activities can inadvertently and adversely affect birds through direct disturbance, even though both activities are designed to benefit habitat condition in the long run.

Broadly speaking, examples of fire regime sensitivity for avian species include: species with resident or sedentary life histories; species that depend on an open vegetation condition; canopy-dependent species; interior versus edge species; others that have narrow requirements; understory versus tall canopy dominants. Endemic island populations are particularly susceptible to extinction (Soule 1983) with these characteristic traits: small population size leading to vulnerability to demographic and environmental stochasticity and inbreeding depression; limited spatial distribution; evolution in the presence of few predators and competitors; and vulnerability to the introduction of ecologically disruptive non-native species (Simberloff 1994).

In adverse fire regimes, avian population persistence and recovery could be substantially altered by the combined effects of fragmented habitats and fire due to: 1) the local disappearance (extinction) of some species in burned habitat fragments; and 2) frequent fire or short fire return intervals in fragmented areas may facilitate the movement of invasive species into natural systems, impacting native biota. Each of these effects is exacerbated by large, intense fires and by short fire return intervals. Although there are virtually no quantitative data on the interactive effects of habitat fragmentation and wildfire on avian populations, wildfire suppression is interpreted as generally beneficial to the degree that it limits the amount of area burned at short intervals, which would have the greatest potential to make habitat unsuitable for birds.

Most avian species on SCI, including listed species, are probably resilient to fire, unless fires become exceptionally frequent, with intervals shorter than the habitat can recover from, or uniformly large. Fires and fuelbreaks can temporarily create new foraging habitat for predatory species such as the San Clemente Island shrike. An adverse effect would be an unnatural change in the abundance, diversity, and distribution of bird species. Changes could occur through direct disturbance or mortality, or through destruction or alteration of habitats. In contrast, a beneficial effect would likely protect or restore the natural abundance, diversity, and distribution of birds. This would occur through protection and restoration of the natural structure, succession, and distribution of habitat. A major change is one that is substantial, highly noticeable and affects a large area. The change would not reverse without active management.

Of the migratory bird species documented on SCI and identified in Table 4 of Chapter 3 as by government agencies and non-governmental organizations as sensitive, most have only transient use of SCI land and nearshore waters. The following are winter residents: American merlin, American peregrine falcon, black turnstone, burrowing owl, Cassin's auklet, common loon, common yellowthroat, northern harrier, ruddy turnstone, sanderling, sharp-shinned hawk, short-eared owl, spotted towhee, whimbrel, and white-tailed kite. The California brown pelican is believed to be a year-round resident.

These special status birds are known to breed on SCI: black oystercatcher, California horned lark, double-crested cormorant, San Clemente loggerhead shrike, San Clemente sage sparrow, western snowy plover (documented on rare occasions), white-tailed kite, and Xantus' murrelet. Breeding for the western snowy plover, which is primarily a winter resident, was never confirmed on SCI until an adult and a chick were observed at West Cove in 1989. The only subsequent records were in 1996 and 1997 (Foster 1998; Powell et al. 1998). More recent surveys have shown no evidence of snowy plover breeding activity on SCI from 2000 to 2003 (Foster and Copper 2000, Foster and Copper 2003; Lynn et al. Western Snowy Plover Surveys 2004b, Lynn et al. 2005, Lynn et al. 2006).

**Shorebirds.** Thirteen shorebird species occurring on SCI are ranked by the U.S. Shorbird Conservation Plan (Brown et al. 2001) as High Concern or Highly Imperiled. These winter resident shorebirds include: western sandpiper; dunlin, sanderling, ruddy tirnstone, whimbrel; and black turnstone. While it is possible that fire or fire-related activities that come within close proximity to the beach, dunes, or shore could affect these species, these habitat are naturally lacking in fuel and the interface between the WFMP and these shorebirds is very infreqent and considered inconsequential. Effects might include noise from fire suppression helicopters, accidental water drops on nests, smoke from unintentional or prescribed fires, or sedimentation of foraging areas due to high intensity fires followed by heavy rain post-fire.

**Seabirds.** The nearshore areas of SCI, including cliffs and offshore rocks, are used by foraging and breeding sea birds. Resident seabird populations depend on coastal islands relatively free from human disturbance and close to important foraging grounds. Additionally, migratory sea birds utilize the productive offshore waters associated with the California Current to forage during wintering and migratory movements. Although the importance of the Southern California Bight waters and Channel Islands is well described, current specific locations of bird species (aside from some island nesting populations), population estimates, and the effect of spatially diffuse military training and testing activities on these values is not well known.

However, similar to shorebirds, their use of areas predominantly without vegetation that would fuel a fire limits the interface between their life histories and the WFMP. Effects might include noise from fire suppression helicopters, accidental water drops on nests, smoke from unintentional or prescribed fires, or sedimentation of foraging areas due to high intensity fires followed by heavy rain post-fire. The effects of fire or fire management strategies on nesting seabirds such as the black oystercatcher or Xantus' murrelet would be rare and inconsequential considering how localized fire activities are and the nesting and foraging area available to seabirds. The spatial extent of fire activity is small and the surrounding available habitat so wide that sea bird species have ample opportunity to move to adjacent quality habitat, thereby lessening any effects. Breeding sea birds have high nesting fidelity and most require some degree of isolation from disturbance and predation to maintain viable breeding success. Since none of the alternatives propose any new or expanded land-based impact areas near currently documented roosting and breeding sea bird colonies, there would be no increase in the direct or indirect effects on seabird populations. It is likely that effects to protected and migratory seabirds would be minimal. Feral cat and rat control on SCI likely beneifts the Xantus murrelet as well as other avian species.

**Terrestrial Resident Breeding Birds.** The California horned lark and the white-tailed kite are examples of terrestrial birds that benefit from an open vegetation condition, including partially cleared areas. Fires would open up foraging areas and these species could evade a fire and smoke unless nests were burned. Other breeding birds that prefer a more dense or complex vegetation structure can similarly escape fires except for when nesting; these are more exposed to the effects of habitat destruction resulting from fires including extended recovery times of vegetation.

**Alternative 1: Proposed Action/Preferred Alternative to fully implement WFMP 2009.** As the Proposed Action results in some benefits to plant community structure and diversity, such benefits carry over to avian species. The WFMP allows for fires to occur under more controlled conditions, and places management controls on fire size, severity, and return interval. These controls directly protect the ongoing recovery of plants and wildlife from historical overgrazing by goats. Habitat condition success thresholds are proposed in order to manage the risks of fire. These thresholds prevent large-scale, stand-replacing losses, which may be catastrophic to individual avian species, especially resident birds that require dense or complex vegetation structure.

Prescribed fire is also available as a tool to manage fuel loads in strategic areas or to achieve ecological objectives. Results of the prescribed burns would help manage for gap-dependent birds and those that depend on a younger or more open canopy condition. Impacts to migratory birds from prescribed burns would be adverse, short-term, and minor due to mortality in a small number of species and beneficial, moderate, and long-term with regard to habitat. The desired future condition for the various plant commuities (and wildlife habitats) allow for vegetation age classes that range from zero to 40 years or more in patches. However, other beneficial effects are anticipated from prescribed fire. Smaller fires are expected to improve habitat diversity by spatially diversifying the fire regime (making it more patchy). Smaller fires also reduce the potential for a catastrophic loss of threatened/endangered species habitat. Extending the time between fires will allow shrub and tree recovery and promote the maturation and spread of shrublands as they recover from historic overgrazing by feral goats.

A long-term, adverse, and minor effect on bird populations would occur due to habitat modification for fuels reduction for species that depend on dense shrubs on habitat edges. A short term effect from helicopter or airplane noise could bother avian species nearby.

Since Phos-chek and all retardants contain ammonia, they can be potentially toxic to marine life. Best management practices for handling fire retardant are to prevent spills especially near water, and to locate mixing and loading stations away from water sources, drainages, drainage banks, or generally where there is a lack of opportunity for natural water contact.

**Alternative 2: Proposed Action without prescribed burning.** Without the ability to conduct patch burns, there would be a slight reduction in the temporary effects of the burns on migratory birds; however, it could take a longer time time for SCI to achieve ecological stability. By diversifying the fire regime under controlled conditions using prescribed fire, managing for some younger age classes of vegetation that will benefit particular bird species, allowing for scientific study of unknown fire dependencies on the Island, broader opportunities for prescribed burning allows for an increased probability that all classes of migratory birds are protected, consistent with the mission of NBC. Without prescribed fire in patches, there would be one less tool for achieving habitat condition success thresholds.

**Alternative 3: No Action/Baseline.** The current program has been benefiting wildlife habitat because of reduced fire incidence coming from SHOBA. However, major (landscape-level), long-term, adverse effects are expected due to the establishment of new TARs north of SHOBA for which there is no current fire response infrastructure or assets for suppression. These added locations for ignitions without any fire planning would risk the sustainability of wildlife habitat in the area through increased fire frequency, size, and severity. The result would be an increase in openness of vegetation cover which could benefit birds that prefer such conditions, such as the horned lark and white-tailed kite. These species are most often found in grasslands or savanna, including areas with a high percentage of bare ground.

## 4.11 WFMP Effects on Special Status Plants and Wildlife

Fire plays a role in the management of many special-status plant species by maintaining open habitat, encouraging reproduction, and affecting competing species. Fire may injure or kill individual plants while the effect on the species as a whole is beneficial because competition has been reduced or openings created. Fire suppression activities can adversely affect these same species because of ground disturbance. Prescribed fires can also be detrimental, especially when timing, frequency, and intensity of fire are outside of the fire regime to which the species is resilient.

Like most wildlife, special status animal species are resilient to many fire regimes. Complete absence of fire could result in densification and structural simplification of both habitats. This affects special-status species by altering habitat and placing these species and their habitats at risk of high-intensity, stand-replacement fire. In addition, stand-replacement fire could create unsuitable habitat conditions that would last for many years. Fire control activities could also adversely affect special-status species through direct disturbance of animals and habitats. Even management actions designed to benefit habitat, such as prescribed fire, can have inadvertent adverse effects on special-status species.

An adverse impact would likely result in an unnatural change  in or threat to the abundance, distribution, or viability of a special-status species. This could occur through direct disturbance or mortality, or through destruction or alteration of habitat. It may also lead to increased competition by both native and non-native species, or reduce or prevent reproduction. In contrast, a beneficial impact would likely protect or restore the the abundance, distribution, or viability of a special-status species. This would occur through protecting and restoring the structure, succession, and distribution of habitat, including eliminating competitive species.

The WFMP shows estimated numbers of individuals of federally listed species affected under variable fire scenarios and assuming an estimated one-hour duration to extinguish the fire, or 12 hours in the case of a MODERATE fire danger condition. The latter is especially relevant to nighttime ignitions without aerial suppression support in SHOBA. These durations can be expected once the WFMP is implemented, assuming the time to actually extinguish the fire, and some extra time as a precaution. However, the tables on the WFMP do not take into account incendiary device restrictions under VERY HIGH and EXTREME conditions, so such scenarios are not expected, or would be accidental. Specific ignition locations affecting the species are identified (see maps in the WFMP). Northwest winds are used as the most extreme condition because fire spreads are greater for these fires than for northeast winds, since the winds are blowing along the length of the Island rather than across its narrower width. The sage sparrow densities are based on 2000 data during which a total of 460 adults were located. That number has been higher in each subsequent year (579 adults in 2001, 1519 adults in 2002, and 544 adults in 2003). Complete data for all scenarios are provided in the WFMP.

If there are no flaws in both FDRS prediction and implementation, few direct, adverse effects on listed species are foreseen. The FARSITE analysis in the WFMP shows fire spread under VERY HIGH and EXTREME fire danger scenarios, but does not take into account incendiary device restrictions under these conditions, so such scenarios are not expected, or would be accidental. There are potential effects to shrikes, sage sparrows, the island night lizard, and listed plants from the smaller fires that are allowed, and both the pre-suppression and suppression activities necessary to keep them small (covered in other sections). These effects may be temporary or negligible, or potentially adverse if the confined locations of future fires are more likely to experience repeat fires, and therefore vegetation type conversion.

However, other beneficial effects are anticipated. Smaller fires are expected to improve habitat diversity by spatially diversifying the fire regime (making it more patchy). Smaller fires also reduce the potential for a catastrophic loss of threatened/endangered species habitat. Extending the time between fires will allow shrub and tree recovery and promote the maturation and spread of shrublands as they recover from historic overgrazing by feral goats.

In the following effects analysis, each potential effect is addressed individually for each species, because of these species' listed status under the federal Endangered Species Act..

**Alternative 1: Proposed Action/Preferred Alternative to fully implement WFMP 2009.** The Proposed Action is expected to provide a net benefit to special-status plants and wildlife by reducing the potential for fires igniting under hazardous conditions and providing controls over fire size, frequency, return interval, and severity. The WFMP enhances the scientific and planning basis for managing these species. Each species has a different tolerance to fire effects, discussed below.

**Effect of New Fire Locations**

*Island night lizard.* Since island night lizards occur in many habitats, nearly all fire scenarios may affect them. Island night lizards can escape the immediate effects of fire by moving underground or finding refuge under rocks. Ecological studies on fire effects (Mautz 2001, his Appendix II) have shown no adverse effects either short-term or long-term on island night lizard populations. A monitored population survived the initial impact of a fire and populations persist in areas burned four times in 17 years.

The largest numbers potentially affected would be from nighttime fires emanating from TAR 14, and ignitions under extreme danger conditions at TAR 10, TAR 17, and the "Airfield" location (see the WFMP). Repeated wildfires may over time alter the vegetation community composition, and as vegetation cover is altered, so will lizard population densities (Mautz 2001). Another indirect effect of fires for the island night lizard could be to become more vulnerable as prey with a more open vegetation condition that is a consequence of fires.

*San Clemente loggerhead shrike.* Uncontrolled fires ignited in TAR 14 could have adverse affects on the habitat that has started to support nesting loggerhead shrikes. Only a negligible effect of new fires at other locations are expected for the San Clemente loggerhead shrike, which could use this area for foraging. Various scenarios are summarized in the WFMP, ranging from MODERATE to EXTREME fire weather conditions. Without any experience with ignition patterns at TAR 14, it is not known to what extent fires are likely to repeat themselves in the same location, risking type conversion of shrublands on the high plateau which have been recently used for nesting by the shrike.

*San Clemente sage sparrow.* Recent work has concluded that the sage sparrow is resilient to some loss of habitat which may result from new fire locations, which can result in both a temporary loss of habitat and possible type conversion of small acreages. A population viability analysis (PVA) was conducted on the San Clemente sage sparrow (Beaudry 2004) using field data from 2000 and 2002. Beaudry (2004) summarized the value of PVA models: they are considered the best way to evaluate extinction risk since the alternatives are subjective, less rigorous, and likely to provide poorer predictions (Brook et al. 2000; Burgman 2000). PVA models can be used to evaluate management options by contrasting relative predictions, rather than absolute ones, and this is empirically supported (Beissenger and Westphal 1998; Brook et al. 2000; Coulson et al. 2001; McCarthy et al. 2001).

A sensitivity analysis was conducted to determine the relative influence of several population parameters. A sensitivity analysis can detect the parameters with the most effect on model outcomes, helping to identify effective management strategies (Wisdom and Mills 1997; Reed et al. 1998; Cross and Beissenger 2001). Additionally, a metapopulation model was used to examine the effects of habitat loss. The baseline model resulted in no extinction of the 1000 simulated populations, and a mean residual population size of 997 individuals. Models with a lower fecundity and higher juvenile mortality yielded up to 7.7% chance of extinction. Using the baseline model, extinction risk did not change until high-density habitat was reduced below 60% of the initial value, but the mean residual population size decreased from 903 to 804 individuals. When annual variation in carrying capacity was increased from 20% to 30% and 40%, habitat loss had large effects on the model outcome, with probabilities of extinction ranging between 2.5 and 30%. The highest extinction rates, between 25 and 30%, were obtained when the habitat loss models incorporated 40% variation in carrying capacity. Surprisingly, the probability of extinction was unaffected by a reduction in the carrying capacity until it fell below 10% of the baseline value. Using baseline parameter values in a metapopulation model, none of the habitat loss scenarios considered yielded a measurable risk of extinction. A high annual reproductive capacity, driven by high nest success and the ability to produce several broods within a breeding season, typifies the San Clemente Sage Sparrow population. This high fecundity is accompanied by substantial variation, as demonstrated by the 2002 breeding season when the vast majority of females did not breed.

Primary fire effects could be at TAR locations (such as TARs 10 and 17) in sage sparrow habitat, and fires that spread into sage sparrow habitat from the vicinity of VC-3 (such as TAR 14). TAR 14 fires under northeast winds have the greatest potential to affect sage sparrow habitat if left unchecked. Existing fire patterns north of the runway (TAR 4) also contribute to effects on sage sparrows. These effects will be avoided and minimized through staging quick-attack suppression equipment, water, and managing the use of flame-producing ordnance with the FDRS. Fires are not expected to actually burn on SCI under EXTREME danger conditions because the use of incendiary ordnance is restricted under those conditions. Under full compliance with the WFMP, expected new fire locations at TAR 10 and TAR 17 will each encompass less than 1 acre in sage sparrow habitat. Allowing for a worse than standard response at these locations shows burns in sage sparrow habitat to not exceed 2 acres (TAR 10 and TAR 17) in size, for a total of 4.2 acres (assuming an unintentional ignition in VERY HIGH conditions and 30 minutes to extinguish). This is a worse scenario than what is allowable under full implementation of the WFMP, but provides for a certain level of failure to perform to the standards required, fire danger prediction errors, or short-term weather changes. While TAR 14 fires without any suppression or effective firebreaks have the potential to affect the largest acreage of sage sparrow habitat, the TAR is located in non-native grassland and reaches sage sparrow habitat under northeast winds only after about 1-1/2 hours. The WFMP has a fuelbreak suppression apparatus, FDRS, and response times to control this spread.

Repeated wildfires may over time alter the vegetation community composition, and as vegetation cover is altered, so will sage sparrow population densities. Without any experience with ignition patterns at each new TARs, it is not known to what extent fires are likely to repeat themselves in the same location, risking type conversion of sage sparrow habitat.

*Santa Cruz Island rock cress.* Fuel hazard is very low where this plant occurs, and the area is unlikely to carry a fire. Because of the extremely low fuel load, the only time this area would have the potential of supporting a fire would be after it had set seed, which would further minimize risk to this species.

According to fire behavior models, no fires occurring within the constraints of the WFMP will affect Sibara filifolia. Analyzing the effect of fire on this plant is complicated by its possibly relictual appearance on this site, its appearance each year dependent on the current-year 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.

Under EXTREME conditions (15 mph northwest winds) and no suppression, a fire in Impact Area 1 could affect patches of Santa Cruz Island rock cress, with a single patch of 11 plants lying within the 4 hour perimeter. Under higher winds (20 mph), such a scenario would affect two patches, totalling 61 plants within the 2½ hour perimeter, and 14 patches totalling 850+ plants within the 4 hour perimeter. However, given the low fuel loads in areas where rock cress occurs it is unlikely that a fire would be carried through these areas, minimizing fire impacts to this species. The current low-fuel condition should be monitored for future invasion by Mediterranean grass (Schismus barbatus), which potentially could create a situation in which fires could be sustained (S. Junak, pers. comm. 2005).

*Trask's island lotus.* 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 directly 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. It is expected to benefit from fire due to enhanced seeding and altered competitive status through gap opening and decreased competition.

*San Clemente Island bush mallow.* Shortened fire return intervals could also result from new fire locations for some populations of San Clemente Island bush mallow. Even under very short intervals this species persists and resprouts. Populations in the fire support area are scarred by fire but persist despite very frequent burns. However, it is possible that long-term protection of genetic diversity may require some establishment by seed, and this could require locations where the fire-free interval may need to be 40 years or greater to build up sufficient viable seed supply (or growing in the nursery) to replace the population. More information is needed about genetic diversity of these species across the Island in order to address this risk, which is largely speculative since implementation of the WFMP is intended to prevent the risk of too-short return intervals (intervals that do not sustain listed species or degrade natural habitats) in the future except in very localized areas. Seeds of other species of Malacothamnus 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). Obligate sprouters like SCI bush mallow sprout between fires but may need fire to create gaps for saplings to recruit to the canopy and for population expansion. They are more resilient to short fire return intervals (Zedler et al. 1983, Fabritius and Davis 2000), but nevertheless may be impacted by sustained high-frequency fire regimes. Successful germination and recruitment of new individuals is correlated with the cooler, moister, low light conditions and increased litter depth associated with mature closed-canopy chaparral that develops over fire-free intervals of 40 years or more.

Fire is considered a net benefit to this plant as long as the interval between fires is at least five years.

*San Clemente Island larkspur.* Regular fires are expected to favor native perennial grasses over non-native annual grasses in grassland habitats. This would benefit San Clemente Island larkspur. This herbaceous perennial has a fleshy tap root, and is likely to be dormant when a fire passes through, so would not be directly affected, but could benefit from canopy opening and other aspects of altered competitive status. Fire is considered a benefit to this plant as long as the interval between fires is at least several years, and burns occur when the plant is dormant (mid-summer or later). 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. 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.

*San Clemente Island woodland star.* No plants would be affected by any of the model scenarios. It is expected to be resilient to a light fire regime. These plants would normally be dormant, with all of its carbohydrate reserves stored underground, during the time of year when a fire could pass through, so are not directly affected by fire. However, it could benefit from nutrient flush (as long as this does not increase competitive exotics), canopy opening, and other aspects of altered competitive status.

*San Clemente Island Indian paintbrush.* Shortened fire return intervals could also result from new fire locations for some populations of SCI Indian paintbrush. Even under very short intervals this species is expected to persist and resprout. Members of this genus tend to follow fire and other non-catastrophic disturbance. While this plant is larger and more woody than its mainland counterparts and its adaptability may be different, the available evidence suggests occasional fires may benefit it. It also may be dormant when some fires pass through. A monitored population in Pyramid Cove peaked in 1984 after a fire in 1983, and declined for numerous years after that (USDON 1996). Fire is considered a benefit to this plant as long as the interval between fires is at least five years. Despite it adaptability, it is possible that long-term protection of genetic diversity may require some establishment by seed, and this could require locations where the fire-free interval may need to be 40 years or greater to build up sufficient viable seed supply (or growing in the nursery) to replace the population. More information is needed about genetic diversity of this species across the Island in order to address this risk, which is largely speculative since implementation of the WFMP is intended to prevent the risk of too-short return intervals (intervals that do not sustain listed species or degrade natural habitats) in the future except in very localized areas.

### Effects of Ground and Aerial Suppression Actions

There is a remote possibility that a water drop, foam applied with a backpack sprayer, swatting, or shovel work, could directly affect a federally listed species, but this is considered the preferred approach compared to potential losses from a much larger fire. The on-the-ground effect will be some minor ground disturbance from swatters and foot traffic at the fire location, minor soap film on plants from suppressant foam, or the physical impact of either fresh water or sea water drops. The main indirect effects of suppression actions on federally listed species are due to the occasional larger fire due to backfiring from roads. In general, the direction to firefighters north of SHOBA after initial action is unsuccessful (use of hand swatters, backpack pumps, and the quick-attack asset) is to backfire from roads. This indirect effect is most likely north of SHOBA at the location of new or existing TARs. Once the FDRS is fully implemented, this should be a rare occurrence. Any indirect effects of the use of sea water for suppression is very localized and short-term, and compensated for by smaller fires overall. Pilots are directed to avoid using both fresh water and sea water in the same bucket during practice, to preclude adding salt water to fresh water areas.

The primary indirect impact of suppression would be expanded fire perimeters due to backburning to control fires without introducing ground-disturbing equipment into areas or to protect firefighter safety. The effect is considered temporary and minor, and is minimized compared to the use of off-road staging with heavy equipment.

*Island night lizard.* Water drops, foam applied with a backpack sprayer, swatting or shovel work and the associated foot traffic may affect island night lizards in the vicinity of the suppression work. Allowing backfires to burn through in order to avoid taking ground-disturbing equipment into an area or for firefighter safety may also have direct effects. These effects are considered temporary and negligible.

*San Clemente loggerhead shrike.* Aerial suppression assets, either from helicopter rotor wash or noise, may affect the shrike depending on how close the nearest shrike territory is to the 1) ignition site or 2) position of front (advancing) line of the fire before suppression assets arrive or the backfire from a road that is lit either for firefighter safety or to avoid taking ground-disturbing equipment into sensitive habitats. These effects are considered temporary and negligible. Pilots are provided maps of nests and given direction to prevent fires from approaching the nests. To extinguish a fire they are directed to attack the head of the fire or use logical terrain features such as roads, fuelbreaks, canyon rims, and land management unit boundaries. However, priority is given to preventing fire entry into canyon shrubland or woodland. Once fires enter canyon shrubland or woodland, they will be kept as small as possible through direct attack. Fires which threaten shrubland or woodland stands that are less than five years old (based on the most recent fire in which shrubs were consumed) receive priority and will be kept as small as possible rather than containing at logical control lines. This does not apply to coyote brush-grassland areas from Stone Station northward on the upper plateau. Therefore, suppression actions have only a remote possibility of directly affecting shrikes.

*San Clemente sage sparrow.* Water drops, foam applied with a backpack sprayer, swatting or shovel work and the associated foot traffic related to ground suppression may affect sage sparrows close to the activity. Aerial suppression assets, either from helicopter rotor wash or noise, may affect the sage sparrow depending on how close the nearest shrike territory is to the activity. Pilots and ground crews are directed to control fires in sage sparrow habitat by direct attack using swatters, foam units, and water supplied by the on-site engine, to keep the fire as small as possible. However, once Federal Fire Department arrives on scene, they are directed to keep engines on the road with backfiring from the road as the best approach to containment (unless an aerial asset is available due to concurrent training in SHOBA). It is assumed that ground disturbance is more damaging in the long term than a fire. Firefighters are directed to give priority to avoid new burns in boxthorn stands on the first or second terrace of the west shore that are less than five years old (based on the most recent fire in which shrubs were consumed). Therefore, suppression activity may have temporary localized effects on sage sparrow habitat (on the order of square feet), but the primary impact would be expanded fire perimeters due to backburning.

*Federally listed plants.* Direct suppression action on federally listed plants is not foreseen. These plants are identified on maps provided to firefighters, and they are directed to allow burn-through at these locations rather than direct attack. The effect of burn-through is considered insignificant or beneficial for all listed plants, except when repeat fires create a risk of type conversion or that plant populations have not stored up sufficient seed bank to reproduce themselves since the last fire.

**Effects of FDRS Implementation: Smaller Fires and Longer Return Intervals**

*Federally listed wildlife.* An expected benefit of the FDRS implementation is increased nesting habitat for shrikes and sage sparrows due to increased return intervals and smaller areas affected by fire. The following species that function as habitat components, for example, would clearly benefit from long fire intervals (but not necessarily fire exclusion) because they require time to replenish their seedbank before the next fire comes, or because their growth is very slow.

- *Lycium californicum* (boxthorn)
- *Eriogonum giganteum formosum* (San Clemente Island buckwheat)
- *Galvezia speciosa* (island snapdragon)
- *Quercus tomentella* (island oak)
- *Rhamnus pirifolia* (island redberry)
- *Crossosoma californicum* (island apple-blossom)
- *Ceanothus megacarpus insularis* (island big-pod ceanothus)

In contrast, potential habitat for shrike foraging could lessen with long fire intervals. Invasive grasses continue to colonize the Island and a long-interval fire regime may promote their foothold where previously the annual exotic grasses lost ground to native perennial grasses and native forbs. Native perennial grasslands, which benefit from frequent fire, are more open and thus have higher foraging potential for the shrike. However, foraging habitat is not known to be limiting shrike sustainability on SCI.

Long fire intervals would indirectly affect the island night lizard's availability as prey to predators such as the loggerhead shrike. This would be adverse to the lizard, beneficial to the shrike.

*Federally listed plants.* Certain federally listed plants could be adversely affected by longer fire intervals, such as San Clemente Island larkspur which inhabits grasslands, or those that thrive in openings or gaps in shrub canopies (all the other listed plants). All of the federally listed plants have low dispersal capability, and this could be a problem in very large fires that affect all the populations at one time. Very few plants are capable of dispersing to a fully occupied habitat and maturing without relief, at some stage, from the competition surrounding established individuals (Zedler 1982). These potential disadvantages to listed plants can be offset by prescribed burns targeted to enhance conditions for these species.

**Effects of Fuelbreaks**

*Listed wildlife.* Strategic fuels management in the form of fuelbreaks to protect human life, facilities, and threatened and endangered species also benefits wildlife by buffering catastrophic habitat losses for sensitive species (e.g. a single event that removes much of the habitat needed by a species for reproduction such as for nesting), improving natural edge effects, and reducing erosion by keeping fires smaller and cooler and so consuming less vegetation.

Fires and fuelbreaks can temporarily create new foraging habitat for shrikes and foxes. However, frequent or hot fires that kill shrubs and trees are detrimental to shrike nesting (USFWS 2001) and reduce woody species preferred by foxes. Island night lizards are 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). Since fire negatively affects boxthorn cover (Kellogg and Kellogg 1994), short-interval or large fires that consume shrubs in this habitat are expected to be detrimental to San Clemente sage sparrow populations.

The process of installing fuelbreaks necessarily occurs during the breeding season of the San Clemente loggerhead shrike or San Clemente sage sparrow. There are a number of reasons for this requirement as a practical matter. First and foremost, fuelbreaks need to be prepared prior to the start of the fire season in order to do their job of stopping fires. This effect is compensated by a net gain in fire protection and control, which consists of smaller fire sizes and longer fire intervals, and lower risk of catastrophic fire that can affect entire populations at one time.

The fuelbreak zone contains some areas of low-to-moderate Island night lizard densities, but only negligible effects are expected from fuelbreak establishment. Active San Clemente loggerhead shrike nests are avoided through coordination with shrike monitors during fuelbreak maintenance work. There is no long-term effect expected on shrike foraging habitat, as the low-fuel condition with scattered shrubs is expected to be appropriate as shrike foraging habitat. West shore habitat that may be suitable to support sage sparrows south of Kinkipar canyon is not occupied, thus sage sparrows are not likely to be affected by the application of fire retardant or herbicide to prevent fires from spreading from Impact Area 2 to Kinkipar Canyon. The area classified as low-density here is about 2-1/2 acres, and the classification was based on a few annual observations of sparrows between Seal Cove and the mouth of Kinkipar Canyon and not on vegetation composition of the habitat (in terms of how many sparrows it may be able to support [K. Brock, pers. comm.]).

*Listed plants.* In all case, threatened and endangered plants will be flagged and avoided, even though prescribed burns to establish fuelbreaks may benefit them in some cases. Assuming a 100-foot buffer along each side of Ridge Road, the area affected includes three populations of San Clemente Island larkspur outside but adjacent to the buffer. These will be avoided by flagging in advance and identifying the location to the Fire Boss. Foam or retardant will be used as needed to place a perimeter around the plants.

### Prescribed Fire

The well-planned use of prescribed fire will result in a net benefit to all federally listed species. The reduced fuel loads will result in future unplanned wildfires burning in smaller patches with less intensity, and provide for safer, less costly fire suppression. Younger age classes of vegetation are expected to reduce flame lengths during a fire and thus improve the opportunity for suppression. Fuels management can be accomplished before or after the fire season between November and April, with good weather conditions and approval of the SCI Wildland Fire Coordinator Group. Prescribed fire may also be used specifically to benefit threatened or endangered species by reducing competition from native or non-native plants, or by fostering a more beneficial vegetation structure for wildlife. Prescribed can provide ecological benefits, for example, in managing grasslands and creating openings within shrublands.

The risk of doing nothing (no prescribed fire intervention) is too high because 1) entire habitats or populations can be affected in a single event; 2) there is a chance of declines in species that depend on an intermediate seral condition, are short-lived, and have limited dispersal capability; 3) there is a chance of irreversibly degrading biodiversity with the dominance of weedy non-native species; and 4) there is a risk of diminishing returns to biodiversity from a single versus a range of structural conditions in the shrublands. Any uniform fire regime carries risks to biodiversity.

*Listed wildlife.* Successful prescribed burn treatments require the flexibility to be accomplished during the breeding season of the San Clemente sage sparrow and San Clemente loggerhead shrike. The benefits of such burns include better control over fire spread, fire size, fire return interval; enhanced structural diversity of habitats; and control of competition for federally listed plants. Prescribed fire will not be used in high-density sage sparrow/boxthorn or moderate-density sage sparrow/boxthorn habitats. Up to 300 acres of prescribed burns may be conducted annually. Burns are designed with specific, written objectives to keep potential wildfires smaller, more patchy overall, and to extend return intervals in specific locations. They may also be conducted for exotic species control or other habitat enhancement. Another direct beneficial effect of strategic prescribed fire is protection of nesting areas. Any direct adverse effects of prescribed fire to listed wildlife are avoided by preemptive timing and strategic location, or are short-term in favor of a long-term benefit. No prescribed fires are planned in sage sparrow habitat except possibly patches in low-density sage sparrow habitat in order to manage non-native grasses. Other prescribed burns could affect foraging areas for the shrike, and will benefit foraging conditions in both the short and long terms. Nest sites would be avoided in selecting the burn location. Shrike nest monitors will also be used. The island night lizard, as ubiquitous as it is, will routinely be in the burn footprint. Prescribed burns may affect up to 300,000 lizards per year. Island night lizards can escape the immediate effects of fire by moving underground or finding refuge under rocks. Ecological studies on fire effects (Mautz 2001, his Appendix II) have shown no adverse effects either short-term or long-term on island night lizard populations.

*Listed plants.* Direct beneficial effects of strategic prescribed fire for listed plants include reduced competition from both native and non-native species by careful placement and timing of fires, reduced risk of losing all populations at once, and enhanced soil nutrient conditions post-fire (when this does not give a competitive advantage to non-natives). All adverse effects can be avoided through pre-burn surveys and other avoidance measures.

**Expanded Fire Season Boundary**

Restrictions on target area size during fire season are expected to be lifted once the fuelbreaks are established in SHOBA and implementation of the FDRS takes place. The fuelbreak in addition to the FDRS is expected to control fires sufficiently that the target area reduction is not necessary. While an important improvement in training is permitted by alleviating this restriction, no biological effects on federally listed species are foreseen by this allowance.

**Alternative 2: Proposed Action without prescribed burning.** Without the ability to conduct patch burns, there would be a slight reduction in the temporary effects of the burns on special status species; however, it could take a longer time time for SCI to achieve ecological stability on both the landscape level and with respect to at-risk species. By diversifying the fire regime under controlled conditions using prescribed fire, managing for some younger age classes of vegetation that will benefit certain species (foraging for the shrike, and most of the listed plants), allowing for scientific study of unknown fire dependencies on the Island, broader opportunities for prescribed burning allows for an increased probability that all classes of natural resources are protected, consistent with the mission of NBC. Without prescribed fire in patches, there would be one less tool for achieving habitat condition success thresholds to manage the impacts on natural resources.

As SCI recovers from historic overuse by goats, pigs, and other feral animals, vegetative cover has increased dramatically (Tierra Data 2005). While the Navy's success in spurring this recovery is overall a significant benefit to the ecological health of the Island, it may pose a dilemma for achieving the specific needs of at-risk species, some of which are federally protected. Without prescribed burning opportunities for patch-level fuels management or for meeting INRMP objectives for sustaining sensitive or at-risk natural resources, the Navy would have fewer management options for achieving its natural resource sustainability objectives as identified in the INRMP.

**Alternative 3: No Action/Baseline.** The current program has been benefiting federally listed species and their habitat because of reduced fire incidence coming from SHOBA. However, major (landscape-level), long-term, adverse effects are expected due to the stepping up of training activity on the Island and the establishment of new TARs north of SHOBA for which there is no current fire response infrastructure or assets for suppression. These added locations for ignitions without any fire planning would risk the sustainability of wildlife habitat in the area through increased fire frequency, size, and severity.

## 4.12 Air Quality Effects

The smoke and ash created from fires can impact air quality within a region, especially if burning is frequent and intense. The federal 1963 Clean Air Act (42 U.S.C. 7401 et seq. as amended), stipulates that federal land managers have a responsibility to protect air quality values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse air pollution impacts. Air quality would be affected in the short-term during any type of fire; therefore, it is analyzed as a relevant impact topic. 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.

Fire management activities could potentially affect air quality on the Island through smoke emissions from wildland and prescribed fires. An adverse impact would be one that increases emissions or raises pollutant concentrations. It would be considered short term if it is associated with the duration of a specific fire event, and long term if it continues to occur when threshold natural resource conditions are met. The intensity of impact would be as shown below:

Minor: 5 to 20 % increase or decrease compared to the existing program.

Moderate: 21 to 50 % increase or decrease compared to the existing program.

Major: > 50 % increase or decrease compared to the existing program.

In order to assess the effect on air quality of the different management options, Table 4-3 compares the expected use of prescribed fire, incidence of wildfire, and expected Island recovery times leading to a stable fire regime and sustainable natural resource condition among the alternatives. Since an unstable fire regime results in additional years of either uncontrolled wildfire or the need to intervene with prescribed fire, this adds to air quality concerns. As the

Island recovers to an ecologically stable state and heavy fuel loadings are isolated by fuelbreaks, it is expected that unwanted wildland fires would occur less frequently and burn less intensely. Air emissions from fire will diminish when fire regimes are restored to a regime of maintenance burning.

*Table 4-4. Comparison of the expected use of prescribed fire, incidence of wildfire, and expected Island recovery times leading to a stable fire regime and sustainable natural resource condition among the alternatives. Since an unstable fire regime results in additional years of either uncontrolled wildfire or the need to intervene with prescribed fire, this adds to air quality concerns.*

| Alternative | Estimated Recovery Time to a Stable Fire Regime & Natural Resource Condition | Use of Prescribed Fire | Uncontrolled Wildfire Potential |
|---|---|---|---|
| 1 – Proposed Action | 20 Years | 318 acres/year | Low |
| 2 – Without Patch-Level Prescribed Burns | 20-50 years | 18 acres/year | Low (slightly higher than Alternative 1) |
| 3 - No-Action/Baseline (Current Program) | 20-50 years | 0 | Moderate |

The National Wildfire Coordinating Group Fire Effects Guide (http://fire.fws.gov/ifcc/monitor/ EFGuide/ air_quality.htm 31 May 2001) provides a quantified range of particulate matter pollutants per ton of vegetation consumed. Particulate matter is the most important category of pollutants from wildland fire, because it reduces visibility and can absorb and transmit harmful gases. Particles vary in size and chemical composition, depending upon fireline intensity and the character of the fuels. Proportionately larger particles are produced by fires of higher fireline intensity (longer flames) than are found in low intensity and smoldering combustion fires (Ward and Hardy 1986 in USDA Forest Service and Johns Hopkins University 1989). The amount of particulate released when burning sagebrush/grass fuel types averages 45 pounds per ton (22.5 g/kg), mixed chaparral ranges from 24 to 30 pounds per ton (12 to 15 g/kg) (Hardy 1990). Emission factors for particulate matter less than 2.5 microns in diameter (PM2.5) range from 9 to 32 pounds per ton (4.5 to 16 g/kg) for prescribed fires in the Pacific Northwest, averaging about 22 pounds per ton (11 g/kg). The amount of smoke produced depends on the total amount of fuel consumed. For example, even though the emission factor for sagebrush is higher than that for chaparral, total smoke production from burning sagebrush is often lower because the total amount of fuel on a sagebrush site is generally less than on a chaparral dominated site.

In order to calculate total emissions from approximately 318 acres prescribed burns per year, the following fuel loadings are assumed:

- Grassland: 0.5 – 2.5 tons/acre
- Maritime Desert Scrubs: 5 – 20 tons/acre
- Chaparral/woodlands: 20 – 50 tons/acre

Estimated smoke emissions by fire type are provided by the Environmental Protection Agency's Compilation of Air Pollution Emission Factors (AP-42) for this region. These factors "can vary as much as 50 percent with fuel and fire conditions" (EPA 1996). In order to approximate total emissions from prescribed burns and compare them to wildfire emissions, a median fuel load of about 20 tons per acre was assumed, and the resulting emission factors are as follows for 318 acres of prescribed fire:

- PM10 – 143 tons/year
- PM2.5 - 70 tons/year

Tests indicate that, on average, 90 percent of smoke particles from wildland and prescribed fires are PM-10, and 70 percent are PM-2.5. Fuel models show that high-intensity wildfires emit at least 1.5 times the emissions than the same fire burning under prescribed fire or managed conditions (examples from First Order Fire Effects Model 5.0 (FOFEM) (U.S. Department of Agriculture 1997).

Prescribed burns are expected to affect local air quality minimally for a very short period of time on the burn day, with air quality quickly returning to normal afterwards. With particulate matter being the primary air pollutant, and its effects usually localized in the vicinity of the burn, no significant long term impact to human health is expected. Short term localized effects to the Wilson Cove area can be serious in terms of particulate matter and visibility; however, the proposed burns are too small to have this effect.

**Alternative 1: Proposed Action/Preferred Alternative to fully implement WFMP 2009.** Based on the above analysis, the Preferred Alternative provides a net long-term benefit to air quality by allowing fires to burn under more controlled conditions, managing fire size, and preventing unwanted intense wildfires. The prescribed burns will have a short-term adverse impact that is localized, minor, and short duration. This is compensated by the long-term benefit of fire control.

As an added precaution, smoke effects are minimized with good smoke management planning. Any prescriptions implemented would require daily certification that the fire remains in prescription and an assessment of smoke dispersal considering wind patterns that disperse smoke from sensitive areas and fuel moisture conditions, which promote rapid burnout and good convection and upper air transport, to reduce air quality impacts. Coordination with the South Coast Air Quality Management District and implementing burns only on regionally permissive burn days will ensure that air quality standards are not impaired by prescribed burning activities, and that burns are conducted on days that allow for good convection and upper-level transport. The planned prescribed burns would not produce enough smoke to impact airport operations at the north end of the Island. A smoke management plan will be made to include all potential measures and techniques to prevent or minimize adverse smoke events. Smoke-sensitive areas include the airfield and the Wilson Cove residential areas. There are no Class I airsheds on or near SCI for special smoke consideration.

**Alternative 2: Proposed Action without prescribed burning.** Without the ability to conduct patch burns, there would be a slight reduction in the short-term adverse effects of the burns; however, it could take a longer time for SCI to achieve ecological stability on both the landscape level and with respect to at-risk species. There is also a higher risk of fires burning under uncontrolled conditions and, therefore, of exceeding their thresholds of resilience to the imposed fire regime. It would be more difficult to achieve INRMP natural resource objectives as well as fire regime success thresholds.

**Alternative 3: No Action/Baseline.** Current management which does not utilize prescribed burns is insufficient to address the potential for uncontrolled, high-intensity wildfires with new TARs and stepped-up training activity on the Island. Therefore, the No Action Alternative is adverse to air quality, and this effect could be at least moderate due to unmanaged wildfire size.

# 5.0 Cumulative and Other Impacts

## 5.1 Cumulative Effects Analysis

The approach taken to analysis of cumulative impacts (or cumulative effects)[1] follows the objectives of the National Environmental Policy Act (NEPA) of 1969, Council on Environmental Quality (CEQ) regulations, and CEQ guidance. CEQ regulations (40 Code of Federal Regulations [C.F.R.] Sections [§§] 1500-1508) provide the implementing procedures for NEPA. The regulations define "cumulative effects" as:

> ". . . the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 C.F.R. 1508.7).

CEQ provides guidance on cumulative impacts analysis in *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ 1997). This guidance further identifies cumulative effects as those environmental effects resulting "from spatial and temporal crowding of environmental perturbations. The effects of human activities will accumulate when a second perturbation occurs at a site before the ecosystem can fully rebound from the effects of the first perturbation." Noting that environmental impacts result from a diversity of sources and processes, this CEQ guidance observes that "no universally accepted framework for cumulative effects analysis exists," while noting that certain general principles have gained acceptance. One such principal provides that "cumulative effects analysis should be conducted within the context of resource, ecosystem, and community thresholds—levels of stress beyond which the desired condition degrades." Thus, "each resource, ecosystem, and human community must be analyzed in terms of its ability to accommodate additional effects, based on its own time and space parameters." Therefore, cumulative effects analysis normally will encompass geographic boundaries beyond the immediate area of the Proposed Action, and a time frame including past actions and foreseeable future actions, in order to capture these additional effects. Bounding the cumulative effects analysis is a complex undertaking, appropriately limited by practical considerations. Thus, CEQ guidelines observe, "[i]t is not practical to analyze cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful."

As such, the following projects are in various stages of implementation on SCI.

- ***Road and Tank Trail Construction.*** Reconstruction of the Ridge Road and addition of a Tank Trail should benefit fire control and protection of natural resources in the east side canyons where many sensitive species are located.

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[1] CEQ Regulations provide that the terms "cumulative impacts" and "cumulative effects" are synonymous (40 C.F.R. § 1508.8[b]); the terms are used interchangeably in this document.

- ***Environmental Impact Statement on the SOCAL Range.*** This EIS addresses an anticipated increase in military training footprint and intensity on Island.
- ***INRMP Implementation Projects.*** San Clemente loggerhead shrike recovery actions, plant community restoration, erosion control actions, invasive species control, predator management, and monitoring of plants and wildlife on island.

# 5.2 Terrestrial Biological Resources

This analysis for cumulative impacts to terrestrial biological resources focuses on these current projects and their impacts on biological and cultural resources.

## 5.2.1 Effect of WFMP on biology

Numerous activities having the potential to ignite wildfires have been described previously in the SOCAL EIS. These activities have a cumulative contribution to wildfire risk, and various measures identified in this document are intended to address the cumulative impacts of wildfire. The implementation of the WFMP could mitigate any impacts on sensitive species to a less than significant level: the WFMP 2009 builds on recently implemented measures that have been reducing the frequency and size of operations-related fires. While after mitigation, there would remain some potential for fire impacts associated with each operation in the SOCAL EIS, the remaining potential impacts on sensitive species, including the San Clemente loggerhead shrike, were judged to be less than significant individually. With implementation of the WFMP, cumulative impacts of fire would be less than significant.

Further, the end-product of fuels management or prescribed burns themselves would not result in any irreversible and irretrievable effects. Implementation of the proposed WFMP would result in a minor irreversible and irretrievable commitment of certain non-renewable resources. Fuels management, weed control, and long term monitoring, for example, associated with the WFMP 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 WFMP, and are generally understood to be tradeoffs, which benefit natural, cultural, and public resource values if the WFMP is implemented. These long-term impacts associated with the Proposed Action that are considered irreversible have been discussed in greater detail in Chapter 4 of this EA

Several activities contribute cumulatively to habitat degradation, including disturbance to soils and vegetation, spread of invasive nonnative species, erosion and sedimentation, and impacts on native plant species. Although individual impacts may be less than significant, collectively they have the potential to be significant over time and space. The Navy is addressing these effects in several important ways including implementation of the SCI INRMP, as well as implementation of the WFMP.

Any project at SCI would be required to be in compliance with the established INRMP, the WFMP, and USFWS BO 2008 issued after Endangered Species Act (ESA) Section 7 consultation addressing direct, indirect, and cumulative impacts. As identified in Section 3 of this EA, there are minor potential impacts of the Proposed Action on terrestrial biology on SCI. However, even minor impacts have the potential for significant cumulative impact on such resources.

To that end, mitigation measures identified in the SOCAL EIS, SCI INRMP, and the WFMP, considered together with any additional mitigation or conservation measures that might be appropriate after Section 7 consultation, will substantially mitigate direct, indirect, and cumulative effects.

### 5.2.2 Effect of WFMP on Cultural Resources

This EA determined that the Proposed Action would have little or no potential to impact cultural resources, primarily because most of the Proposed Action's fire management activities would not generally disturb areas where cultural resources are known or expected to be present. However, due to the large number of known and estimated cultural sites on SCI and the widespread use of the island for training of ground combat forces, Naval Special Warfare, and

missile operations, the Proposed Action could increase the potential for adverse effects on cultural resources. Mitigation strategies such as avoidance measures should reduce substantially reduce or eliminate effects on cultural resources that are subject to such measures. To the extent adverse effects to cultural resources are not avoided, any activities with the potential for significant effects will require Section 106 consultation. Adverse-effect determinations resulting from activities identified in the Proposed Action have been or will be resolved in the regulatory Section 106 process.

## 5.3 Summary

No significant, negative cumulative impacts have been identified for the Proposed Action addressed in this EA when combined with any of the above projects. These projects are being addressed through separate NEPA documents. Therefore, cumulative impacts with the No-Action Alternative have been addressed during the approval process for each project. The WFMP strategies were designed to protect and conserve SCI's plant and wildlife populations. They generally enhance and build on the ecological goals of the INRMP, while providing a management strategy for ignitions resulting from past, present, and future military activities.

In addition, the implementation of all alternatives of the WFMP 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 neither alternative 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.

As described in this EA, the WFMP 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 SCI. The Proposed Action would not result in any new ground disturbance, thus it would not take lands out of production as natural ecosystems. However, fires would continue to affect ecosystem integrity. Compared to the No Action Alternative, the Proposed Action would include an amount of prescribed burning and fuel reduction that would reduce significantly the potential for unsustainable natural resource conditions on SCI. Any Alternative that allows better fire control would allow for protection of long-term productivity by greatly reducing the potential for large, catastrophic fires or sever fires, or type conversion of habitats necessary to sustain special status species. Use of fuels reduction, fire retardant, localized herbicide applications, prescribed burning, and other treatments are generally understood to be trade-offs and would not degrade long-term productivity, because restoration of threshold conditions would be based upon the SCI INRMP’s Desired Future Condition objectives, which are designed to provide long-term sustainability and productivity to the SCI ecosystem.

# 6.0 List of Environmental Assessment Preparers

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### *Qualifications: Education, Degrees and Specialization*

Post-graduate study in Rangeland Ecology, focusing on natural resource planning, UC Davis, 1981-1983. Advisor: Dr. John Menke.

M.S. International Agricultural Development with specialization in Range Management. UC Davis, 1981. B.S. Agricultural Science and Management, UC Davis, 1978.

### *Current Professional Registrations (and other qualifications)*

Certified Rangeland Manager Lic. #28, State of California Board of Forestry and Fire Protection

Endangered Species Act Permit 10(a)(1)(A) / #TE036034-0 / Threatened and Endangered Species

Board of Directors, California-Pacific Society for Range Management

Professional Wetlands Delineation Training Course based on US Army Corps of Engineers 1987 Wetland Delineation Manual certificate, March 1996.

Society for Ecological Restoration

### *Experience*

Twenty-five years experience working with federal and regulatory agencies in natural resources management and planning including:

- Preparation of Environmental Assessments for Integrated Natural Resources Management Plans.
- Development of approximately 30 Integrated Natural Resources Management Plans.
- Development of Wildland Fire Management Plans for military installations and other Open Space (Reserves), including fire studies projects.
- Preparation of Biological Assessments for impacts on more than twenty endangered species in various environments.
- Development and Implementation of long-term ecological trend monitoring plans and surveys, rare plant and endangered species surveys, restoration plans and projects, erosion control plans and projects, and wetland delineations.
- Development of integrated training and land use management plans.

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# 7.0 Persons and Agencies Consulted

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Jenny Marshall, NEPA Coordinator, Commander Pacific Fleet

***Other Technical Support***
R.G. Head, SRS Technologies
Steve Junak, Santa Barbara Botanic Garden

***Firewise 2000, Inc.***
Richard Montague, Fire Consultant

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United States Fish and Wildlife – Carlsbad

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# Appendix A: Acronyms

| Acronym | Definition |
|---|---|
| AAAV | Advanced Amphibious Assault Vehicle |
| AAV | Amphibious Assault Vehicle |
| ASBS | Area of Special Biological Significance |
| ASW | Anti-Submarine Warfare |
| ATV | All Terrain Vehicle |
| BO | Biological Opinion |
| BMP | Best Management Practice |
| BUDIS | Basic Underwater Demolition/SEALs |
| CARB | California Air Resource Board |
| CDFG | California Department of Fish and Game |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| CNRSW | Commander Navy Region Southwest |
| CO | Commanding Officer |
| COMHELWINGRES HC-85 | Reserve Helicopter Wing |
| COMPTUEX/ITA | Composite Training Unit Intelligence Exercise |
| COMSTKFORTRAPAC | Commander Strike Force Training Pacific |
| COMTHIRDFLT | Commander THIRD Fleet |
| CRMP | Cultural Resources Management Plan |
| DOD | Department of Defense |
| DON | Department of Navy |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| EOD | Explosive Ordnance Disposal |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| EW | Electronic Warfare |
| FACSFAC | Fleet Area Control and Surveillance Facility |
| EWTGPAC | Expeditionary Warfare Training Group Pacific |
| FDRS | FDRS |
| F&ES | Fire and Emergency Services |
| FFD | Federal Fire Department |
| FONSI | Finding of No Significant Impact |
| FSCEX | Fire Support Coordination Exercise |
| I MEF | 1st Marine Expeditionary Force |
| INRMP | Integrated Natural Resources Management Plan |
| INS | Immigration and Naturalization Service |
| JSOW | Joint Standoff Weapon |
| JTFEX | Joint Task Force Exercise |
| LCAC | Landing Craft Air Cushion |
| LCU | Landing Craft Unit |
| LMU | Landing Management Unit |

| | |
|---|---|
| MCB | Marine Corps Base |
| MEF | Marine Expeditionary Force |
| MIST | Minimum Impact Suppression Tactics |
| MLLW | Mean Lower Low Water |
| NALF | Naval Air Landing Field |
| NBC | Naval Base Coronado |
| NEPA | National Environmental Policy Act |
| NOAA | National Oceanic and Atmospheric Administration |
| NRCS | Natural Resource Conservation Service |
| NRO | Natural Resources Office |
| NSFS | Naval Surface Fire Support |
| NSWG-1 | Naval Special Warfare Group One |
| NUWC | Naval Under Sea Warfare |
| OIC | Officer-in-Charge |
| OMP | Operations Management Plan |
| OPNAV | Chief of Naval Operations |
| RAWS | Remote Automated Weather Stations |
| RCMP | Range Complex Management Plan |
| RDT&E | Research, Development Training and Education |
| REWS | Radar/Electronic Warfare Simulator |
| RSO | Range Safety Officer |
| RWQCB | Regional Water Quality Control Board |
| SACEX | Supporting Arms Coordination Exercise |
| SAIA | Sikes Act Improvement Act |
| SCAQMD | South Coast Air Quality Management District |
| SCI | San Clemente Island |
| SCIUR | SCI Underwater Range |
| SCORE | Southern California Offshore Range |
| SDAB | San Diego Air Basin |
| SFCP | Shore Fire Control Party |
| SHOBA | Shore Bombardment Area |
| SHPO | State Historic Preservation Office |
| SOAR | Southern California Anti-Submarine Warfare Range |
| SOCAL RCMP | Southern California Range Complex Management Plan |
| SPAWARSYSCEN | Space and Naval Warfare Systems Center |
| SSC SD | SPAWAR Space Center San Diego |
| SWDIV | Southwest Division Naval Facilities Engineering Command |
| TACP | Tactical Air Control Party |
| USACOE | U.S. Army Corp of Engineers |
| USFWS | U.S. Fish and Wildlife Service |
| USMC | U.S. Marine Corps |
| VDS | Variable Depth Sonar |
| WFC | Wildland Fire Coordinator |
| WFMP | San Clemente Wildland Fire Management Plan |
| WHA | Wildlife Hazard Assessment |

# Appendix B: San Clemente Island and Wildland Fire Management Plan Biological Opinion

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**U. S. Fish and Wildlife Service**
**Biological Opinion**
**FWS- LA-09B0027-09F0040**

# San Clemente Island Military Operations and Fire Management Plan 2008

# Los Angeles, California

Carlsbad Fish and Wildlife Office
Carlsbad, California

November 2008

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## TABLES



## Acronyms and Abbreviations Used in the San Clemente Island Military Operations and Fire Management Plan Biological Opinion

**<u>A</u>**

| | |
|---|---|
| AA | Assault Amphibian |
| AAV | Amphibious Assault Vehicles |
| ac | Acre or acres |
| Act | Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) |
| AFP | Artillery Firing Point |
| AMP | Artillery Maneuver Point |
| ASW | Anti-Submarine Warfare |
| ATACMS | Army Tactical Missile System |
| AVMA | Assault Vehicle Maneuver Area |
| AVMC | Assault Vehicle Maneuver Corridor |

| | |
|---|---|
| AVMR | Assault Vehicle Maneuver Road |

**B**

| | |
|---|---|
| BA | Biological Assessment |
| BAT | Ballistic Aerial Target |
| BMP | Best Management Practice |
| BOMBEX | Bombing Exercise |
| BTS | Basic Training Sites |
| BUD/S | Basic Underwater Demolition/SEAL |
| BUDS | Basic Underwater Demolition School |

**C**

| | |
|---|---|
| CAS | Close Air Support |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| cm | centimeter or centimeters |
| CNDDB | California Natural Diversity Database |
| CNRSW | Commander, Naval Region Southwest |
| COMPUTEX | Composite Training Unit Exercise |
| CPF | Commander, U.S. Pacific Fleet |
| CQC | Close quarter combat |
| CRRC | Combat Rubber Raiding Craft |
| CSAR | Combat Search and Rescue |

**D**

| | |
|---|---|
| DNA | Deoxyribonucleic acid |
| DPS | Distinct Population Segment |
| DT | Developmental Testing |
| DZ | Drop Zone |

**E**

| | |
|---|---|
| EA | Environmental Assessment |
| EC | Electronic Combat |
| EFEX | Expeditionary Firing Exercise |
| EFV | Expeditionary Fighting Vehicle |
| EOD | Explosive Ordnance Disposal |

**F**

| | |
|---|---|
| FCLP | Fleet Carrier Landing Practice |
| FDRS | Fire Danger Rating System |
| FIREX | Firing Exercise |
| FLETA HOT | Fleet Training Area Hot |
| FMP | Fire Management Plan |
| FOT&E | Follow-on Test and Evaluation |
| FR | Federal Register |
| FSCEX | Fire Support Coordination Exercise |

| | |
|---|---|
| ft | foot or feet |
| FTX | Field training exercise |

**G**

| | |
|---|---|
| g | gram or grams |
| GPS | Global Positioning Satellite |

**H**

| | |
|---|---|
| ha | hectare or hectares |
| HMMWV | High mobility multipurpose wheeled vehicle |

**I**

| | |
|---|---|
| IAD | Immediate Action Drills |
| in. | inch or inches |
| INLMA | Island Night Lizard Management Area |
| INRMP | Integrated Natural Resources Management Plan |
| INS | Inertial Navigation System |
| IOA | Infantry Operations Area |

**J**

| | |
|---|---|
| JSOW | Joint Standoff Weapon |
| JTFEX | Joint Task Force Exercise |

**K**

| | |
|---|---|
| kg | kilogram or kilograms |
| km | kilometer or kilometers |
| km/h | kilometers-per-hour |

**L**

| | |
|---|---|
| LACA | Landing Craft Air-Cushion |
| LASW | Land Attack Standard Missile |
| LAW | Light Anti-tank Weapon |
| LAV | Light Armored Vehicles |
| lb | pound or pounds |
| LCU | Landing Craft Utilities |

**M**

| | |
|---|---|
| m | meter or meters |
| MAROPS | Maritime Operations |
| MCBCP | Marine Corps Base Camp Pendleton |
| MPPEH | Munitions Potentially Possessing Explosive Hazards |
| MCM | Mine Counter-Measures |
| METT-T | Mission Enemy Terrain, Troops available and Time |
| MEU | Marine Expeditionary Unit |
| mi. | mile or miles |

| | |
|---|---|
| MIR | Missile Impact Range |
| MIST | Minimal impact suppression tactics |
| mm | millimeter or millimeters |
| MOUT | Military operations in urban terrain |
| mph | mile/s per hour |
| MU | Management Unit |

**N**

| | |
|---|---|
| NALF | Naval Auxiliary Landing Field |
| NECC | Navy Expeditionary Combat Command |
| NEPA | National Environmental Policy Act |
| NEW | Net Explosive Weight |
| nm | nautical mile |
| NOTS | Naval Ordnance Test Station |
| NRO | Natural Resource Office/Officer |
| NSFS | Naval Surface Fire Support |
| NSW | Naval Special Warfare |

**O**

| | |
|---|---|
| OP | Observation Point |
| OT | Operational Testing |
| OTB | Over-The-Beach |
| oz | ounce or ounces |

**P**

| | |
|---|---|
| POW | Prisoner of War |
| PVA | Population Viability Analysis |

**R**

| | |
|---|---|
| RAPD | Randomly Amplified Polymorphic DNA |
| RAW | Remote Automatic Weather |
| RCRA | Resource Conservation and Recovery Act |
| RDT&E | Research, development, test and evaluation |
| RIB | rigid-hulled inflatable boat |
| RPV | Remotely Piloted Vehicle |
| RSO | Range Safety Officer |

**S**

| | |
|---|---|
| SAIC | Science Applications International Corporation |
| SBT | Special Boat Team |
| SCB | Southern California Bight |
| SCIRC | San Clemente Island Range Complex |
| SCORE | Southern California Offshore Range |
| SDV | SEAL Delivery Vehicle |
| SEALS | Naval Special Warfare Forces |

| | |
|---|---|
| SHOBA | Shore Bombardment Area |
| SOAR | Southern California (SOCAL) ASW Range |
| SOC | Special Operations Craft |
| SOCAL | Southern California |
| SPAWAR | Space and Naval Warfare Systems Command |
| SQT | SEAL Qualification Training |
| SWAT | Naval Special Warfare Training Area |
| SWCC | Special Warfare Combatant Crew |
| SWS | SEAL Weapons Systems |

**T**

| | |
|---|---|
| t | metric tonne / tonnes |
| TAR | Training Area Range |
| TLAM | Tomahawk Land Attack Missiles |
| TTC | Terrorist Training Camp |

**U**

| | |
|---|---|
| UAS | Unmanned Aerial Systems |
| UAV | Unmanned Aerial Vehicle |
| UXO | Unexploded Ordnance |

**V**

| | |
|---|---|
| VC | |
| VLS | Vertical Launch System |
| VORTEX | A Population Viability Analysis software program |
| VSW | Very Shallow Water |

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92011

NOV 17 2008

In Reply Refer To:
FWS-LA-09B0027-09F0040

Captain Anthony Gaiani
Commanding Officer
Naval Base Coronado
P.O. Box 7033
San Diego, California 92132

Subject: Biological Opinion on the U.S. Navy's San Clemente Island Military Training Program and Fire Management Plan, Los Angeles, California

Dear Captain Gaiani:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion regarding effects on federally listed species of: 1) the existing and proposed U.S. Navy (Navy) military training program on San Clemente Island and 2) implementation of the proposed San Clemente Island Fire Management Plan (FMP), in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). This biological opinion is the result of a programmatic level consultation on Navy activities proposed for San Clemente Island.

Programmatic consultations evaluate planning documents or broad programs and may include actions where the best available scientific data may not support the determination of any anticipated incidental take (U.S. Fish and Wildlife Service and National Marine Fisheries Service Endangered Species Consultation Handbook, p.4-48). In such instances, actions are reexamined under the umbrella of the larger planning document during subsequent consultations on site-specific actions.

During consultation on the overall actions of the Navy to implement military training and their proposed fire management plan on San Clemente Island, we determined that adequate details were available to determine anticipated levels of incidental take for most of the proposed actions included in the Navy's military training program and proposed fire management plan. For these actions an incidental take statement is included in this biological opinion. Nonetheless, project-level consultation may be necessary in the future for some actions (*e.g.*, fuel break establishment, controlled burns, erosion control measures) as additional project-specific details become available. The Service will continue to coordinate with the Navy to determine if future activities require project-level consultation. We anticipate future consultations for site-specific actions under the umbrella of this programmatic consultation may be streamlined and any required incidental take statement appended to this biological opinion.

Eleven federally listed species that occur on the island are evaluated within this biological opinion including four federally threatened species: the island night lizard (*Xantusia riversiana*), San Clemente sage sparrow (*Amphispiza belli clementeae*), western snowy plover (*Charadrius alexandrinus nivosus*), and California brown pelican (*Pelecanus occidentalis californicus*) and seven federally endangered species: the San Clemente loggerhead shrike (*Lanius ludovicianus mearnsi*), San Clemente Island broom (*Lotus dendroideus* var. *traskiae*), San Clemente Island larkspur (*Delphinium variegatum* ssp. *kinkiense*), Santa Cruz Island rock-cress (*Sibara filifolia*), San Clemente Island woodland-star (*Lithophragma maximum*), San Clemente Island bush mallow (*Malacothamnus clementinus*), and San Clemente Island Indian paintbrush (*Castilleja grisea*).

We received your request for consultation on the FMP on February 28, 2007, and your request for consultation on military training operations on May 22, 2008. This biological opinion includes an analysis of the combined effects of military training and fire management.

This biological opinion is based on information provided in the draft San Clemente Island Wildland Fire Management Plan (September 2005 draft); San Clemente Island Wildland Fire Management Plan Biological Assessment (December 2005); draft Southern California Range Complex Environmental Impact Statement-; Programmatic Terrestrial Biological Assessment for San Clemente Island (May 2008); previous biological opinions developed addressing operations and activities on San Clemente Island (biological opinions FWS 1-6-97-F-21, FWS 1-6-97-F-58, FWS 1-6-00-F-19, and FWS-2808); species-specific annual reports submitted to the Service; literature relevant to species and effects of the activities addressed; supplementary materials provided during the consultation process; site visits conducted before and during the consultation process; and on other available information.

This consultation supersedes biological opinions FWS 1-6-97-F-21, FWS 1-6-97-F-58, FWS 1-6-00-F-19, and FWS-2808.

## CONSULTATION HISTORY

On February 28, 2007, the Service received a request from the Navy for consultation on a draft FMP, which included training and ignition sources that were not yet in existence, but would be forthcoming as part of proposed training actions.

Between Feb 2007 and April 2008 discussions between the Navy and Service focused on determining the scope of the consultation to include the future training actions. As a result of these discussions the Navy agreed to consult on the FMP and training activities simultaneously so that these actions could be covered in one comprehensive programmatic biological opinion.

Between April 9, 2008, and October 28, 2008, we met with Navy biologists at least monthly, but at times weekly, to conduct site visits and to discuss the proposed action, effects to species and associated incidental take, and conservation measures to avoid, minimize, and monitor impacts.

The Service provided draft effects analyses for the individual species addressed in this biological opinion for the Navy's review and comment beginning November 9, 2008, and until a completed draft was provided on November 16, 2008. The Navy provided comments on these draft effects analyses during this same time period and their final comments on November 17, 2008. The Navy's comments have been addressed or incorporated in this final biological opinion.

The complete administrative record for this consultation is on file at the Carlsbad Fish and Wildlife Service Office.

## PROJECT DESCRIPTION

San Clemente Island has been administered by the Navy since 1934. The island is currently used for a variety of training and research and development activities and supports buildings, roads, an electrical distribution system, a sewage treatment plant, an airfield, and quarries as infrastructure for existing uses. The island lies within a larger area recently identified as the Southern California Range Complex (SOCAL).

The Navy has a history of consultation and coordination with the Service regarding the effects of various activities on federally listed species. The Service has consulted formally or informally on numerous activities on the island, including training activities and fire management, installation of wind turbines, installation of hydrophones, missile tests, maintenance and construction of Ridge Road and the Assault Vehicle Maneuver Route (AVMR), Island Night Lizard Management Area (INLMA) designation, construction of berthing buildings, and development and use of Training Area Ranges (TARs). The Service has also coordinated on an ongoing basis as the Navy monitors the island-wide status of listed plant and animal species on San Clemente Island and continues an active recovery program to improve the status of the San Clemente loggerhead shrike. The Navy has supported and managed several significant conservation programs on the island under the Integrated Natural Resources Management Plan (INRMP), and the Service has been involved in the development of this plan and review of plan implementation. The proposed action represents a comprehensive description of proposed training activities and includes proposed continuation of a variety of natural resource management programs that monitor species status and minimize adverse effects of proposed training.

Military activities on San Clemente Island have contributed to fires on the island, which may affect plants and wildlife. The Navy had developed a fire management plan as early as 1989. Between 1994 and 1997 several large-scale fires burned within occupied endangered species habitat on San Clemente Island. The location, magnitude, and frequency of these fires raised awareness of the potential for adverse effects to vegetation and wildlife, and in 1997, the Navy initiated formal section 7 consultation under the Act with the Service regarding the effects of military activity related fires on federally listed plant and animal species on San Clemente Island. Fire management on the island is linked to military training and other human activities/facilities on the island because these activities represent the primary source of ignitions. Efforts to prevent ignitions have included seasonal range modifications and seasonal training modification.

Prevention of ignition, containment, and suppression of fires were addressed in Biological Opinion FWS 1-6-97-F-21. The Navy re-initiated consultation on Biological Opinion FWS 1-6-97-F-21 in 2000 to address changes to proposed training that could increase ignition sources and associated management measures to reduce the potential spread of wildfire. Effects of these changes were addressed in Biological Opinion FWS-2808. The current proposed action will revise the operations addressed in Biological Opinion FWS-2808 because a more comprehensive description of ongoing and proposed training activities for San Clemente Island is now available. This biological opinion therefore supersedes biological opinions FWS 1-6-97-F-21 and FWS-2808.

Navy tenants on San Clemente Island include Navy Special Warfare (NSW) Groups. NSW Group 1 had proposed 22 TARs in the late 1990's. The initial proposal included 2 training areas along the West Shore (TAR 10 and TAR 17) that were of particular concern due to their potential impacts on the San Clemente sage sparrow. The Navy consulted with the Service in 1999 only on the designation, construction, and use of TARs 1, 4, 16, and the steel ranges (Biological Opinion FWS 1-6-00-F-19) to allow additional evaluation of proposed training areas along the West Shore. Since issuance of Biological Opinion FWS 1-6-00-F-19, the Navy has collected additional information to support assessment of the effects of training activities to the San Clemente sage sparrow. The current proposed action includes TAR 10 and 17, additional TARs, and revisions of proposed activities at TAR 4. Therefore, this biological opinion also supersedes Biological Opinion FWS 1-6-00-F-19.

The Navy proposes to increase the frequency of existing training operations on San Clemente Island and conduct new operations to support the Fleet Readiness Training Plan. The Navy also proposes to implement enhanced range complex capabilities to support training, which includes use of new live-fire ranges, construction of TAR range gates and TAR/Basic Training Sites (BTS) range buildings, use of an Infantry Operations Area (IOA), and use of an Assault Vehicle Maneuver Corridor (AVMC). The Navy recognizes that proposed uses are likely to increase ignition sources throughout the island and thereby proposes to implement a FMP to manage fire frequency on the island. Details pertaining to the proposed action are provided in the draft FMP, FMP Biological Assessment (BA), draft Southern California Range Complex Environmental Impact Statement, and the San Clemente Island Terrestrial BA. Throughout the course of this consultation, some components of the proposed action have been amended at the request, and/or with the concurrence, of the U.S. Navy, as identified in this document. A map of San Clemente Island (5 parts) depicting proposed training areas and the distribution of listed species in relationship to proposed training areas is provided as Figure 1a-1e.

The proposed action includes the following six components, each of which is described in more detail below:

1) Increase in the frequency of training operations in current training ranges; this includes construction of range buildings (TARs 1, 10, 18, 19, 21 and BTS 1, 3, 4, 5, 6) and range gates (TARs 5, 9, 10, 11, 12, and 17) to support TAR/BTS use;

Figure 1a-e.  San Clemente Island Listed Species and Proposed Training Areas

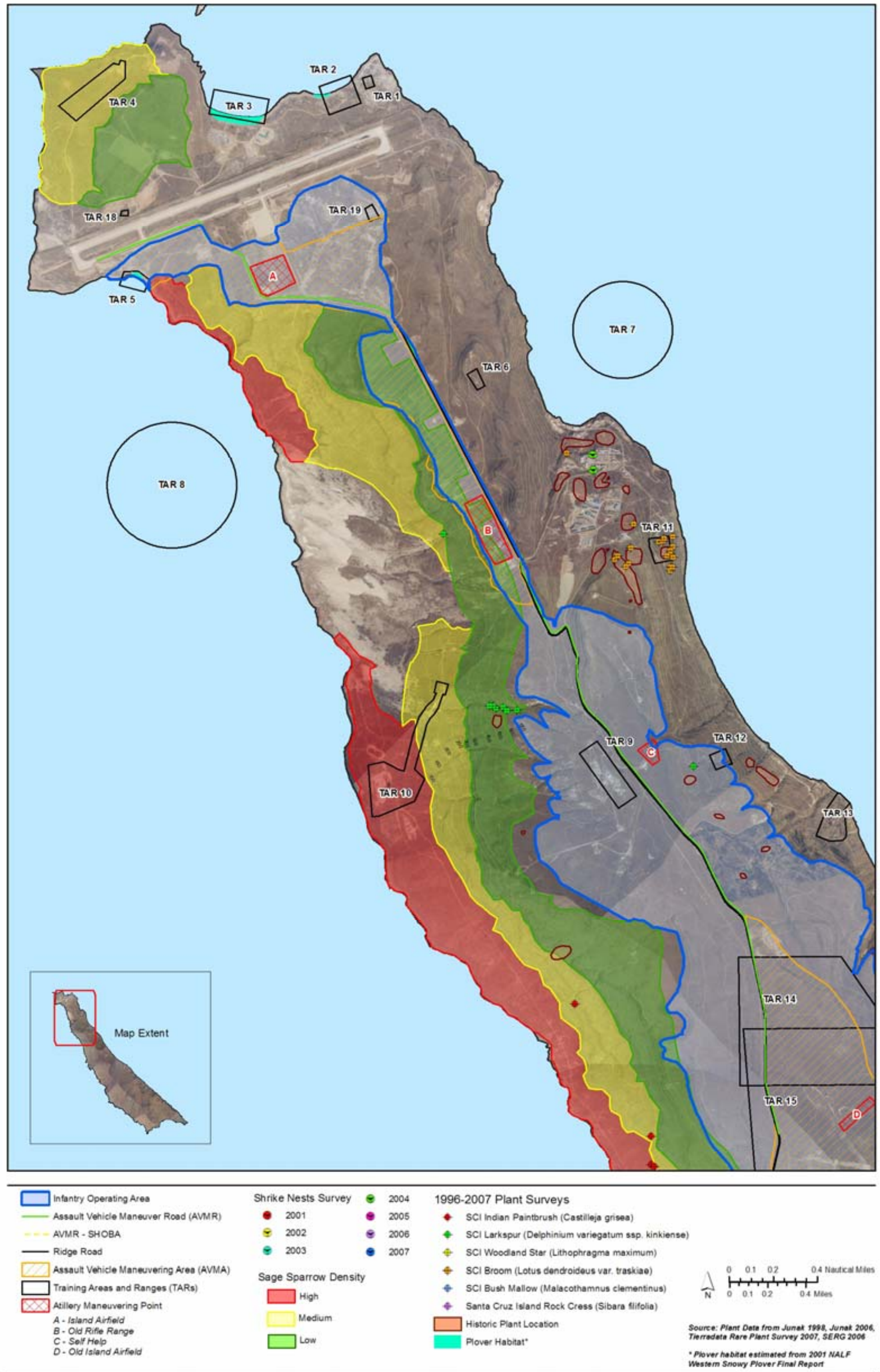


Figure 1b. San Clemente Island Listed Species and Proposed Training Areas

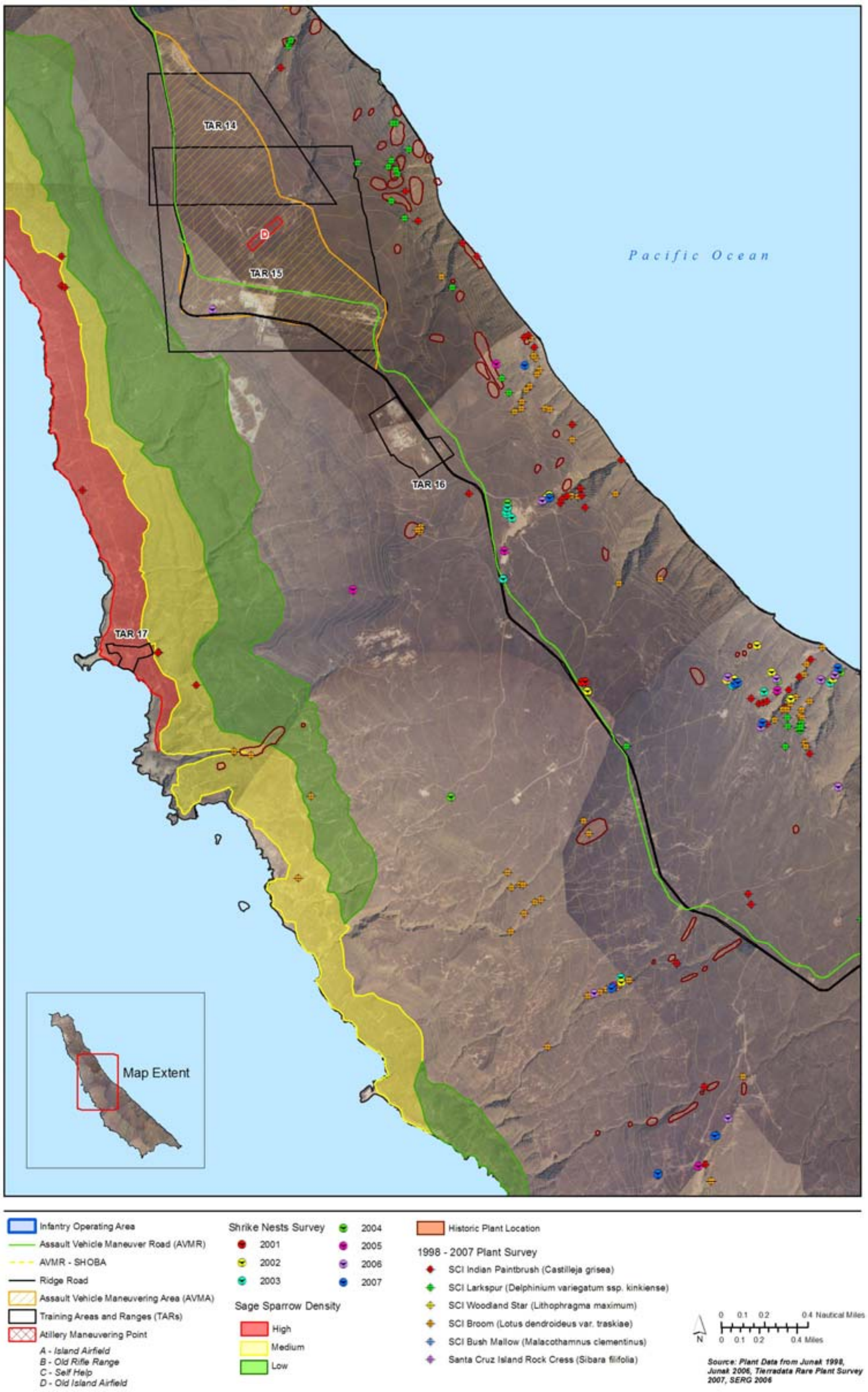


Figure 1c. San Clemente Island Listed Species and Proposed Training Areas

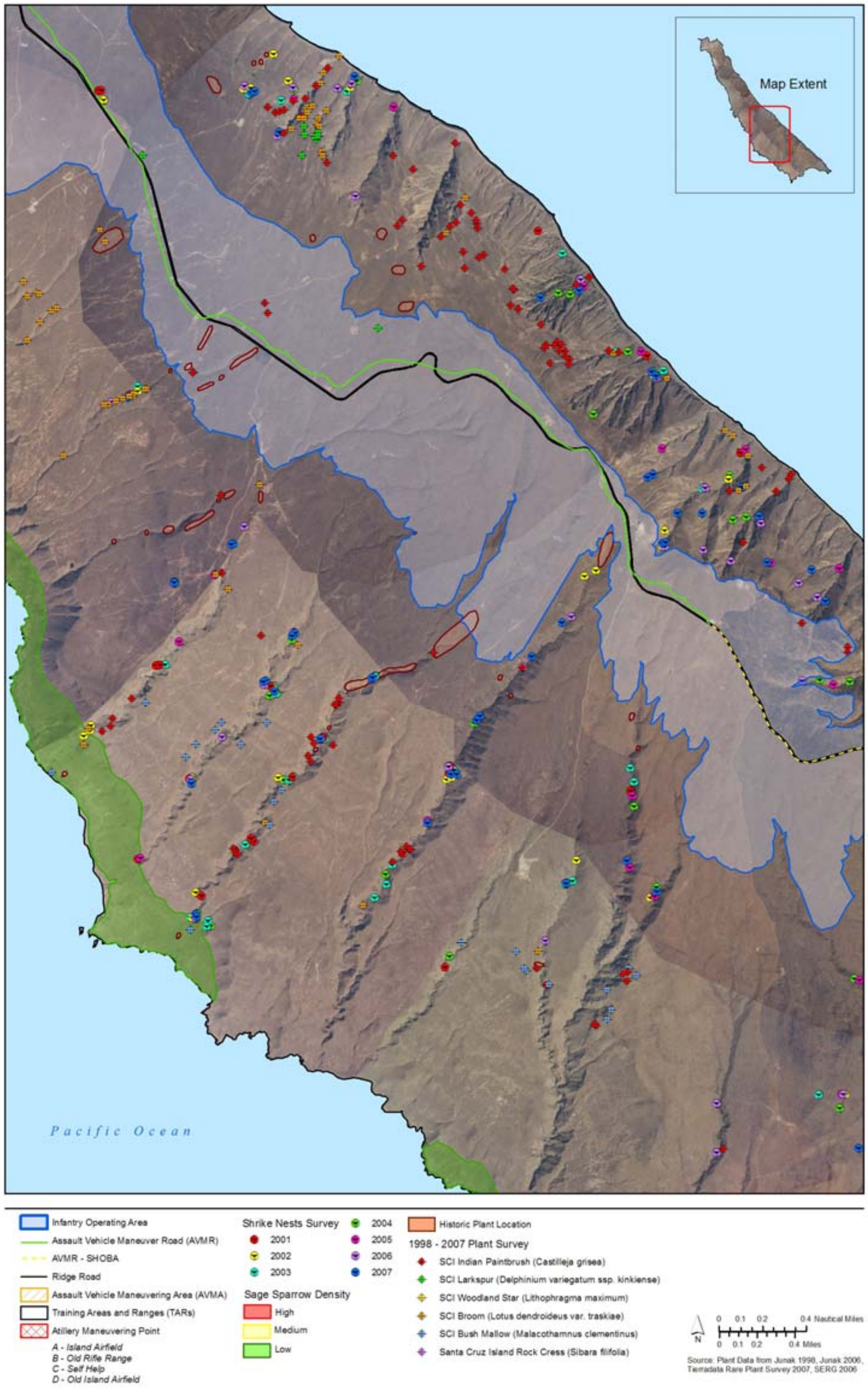


Figure 1d. San Clemente Island Listed Species and Proposed Training Areas

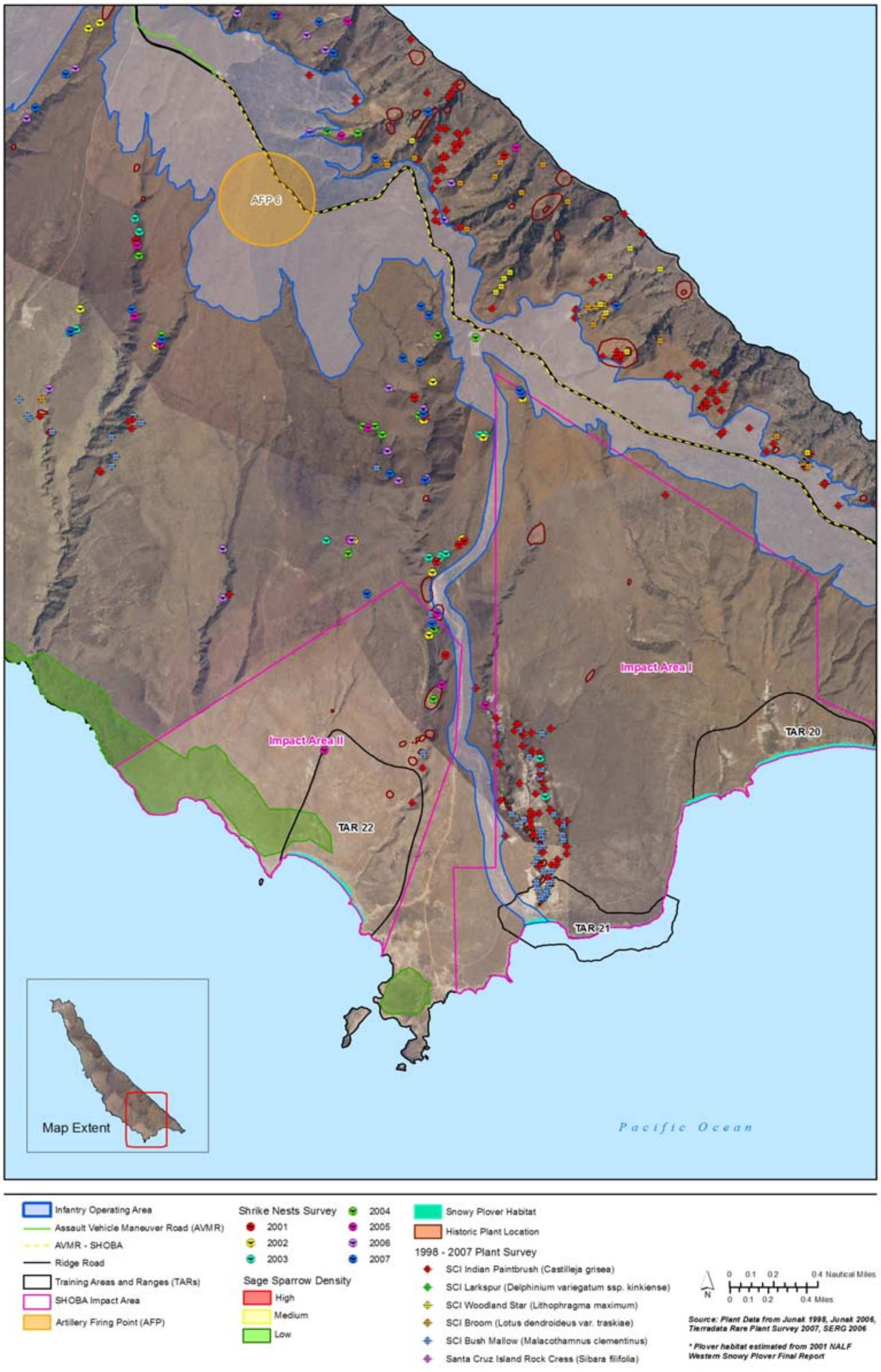
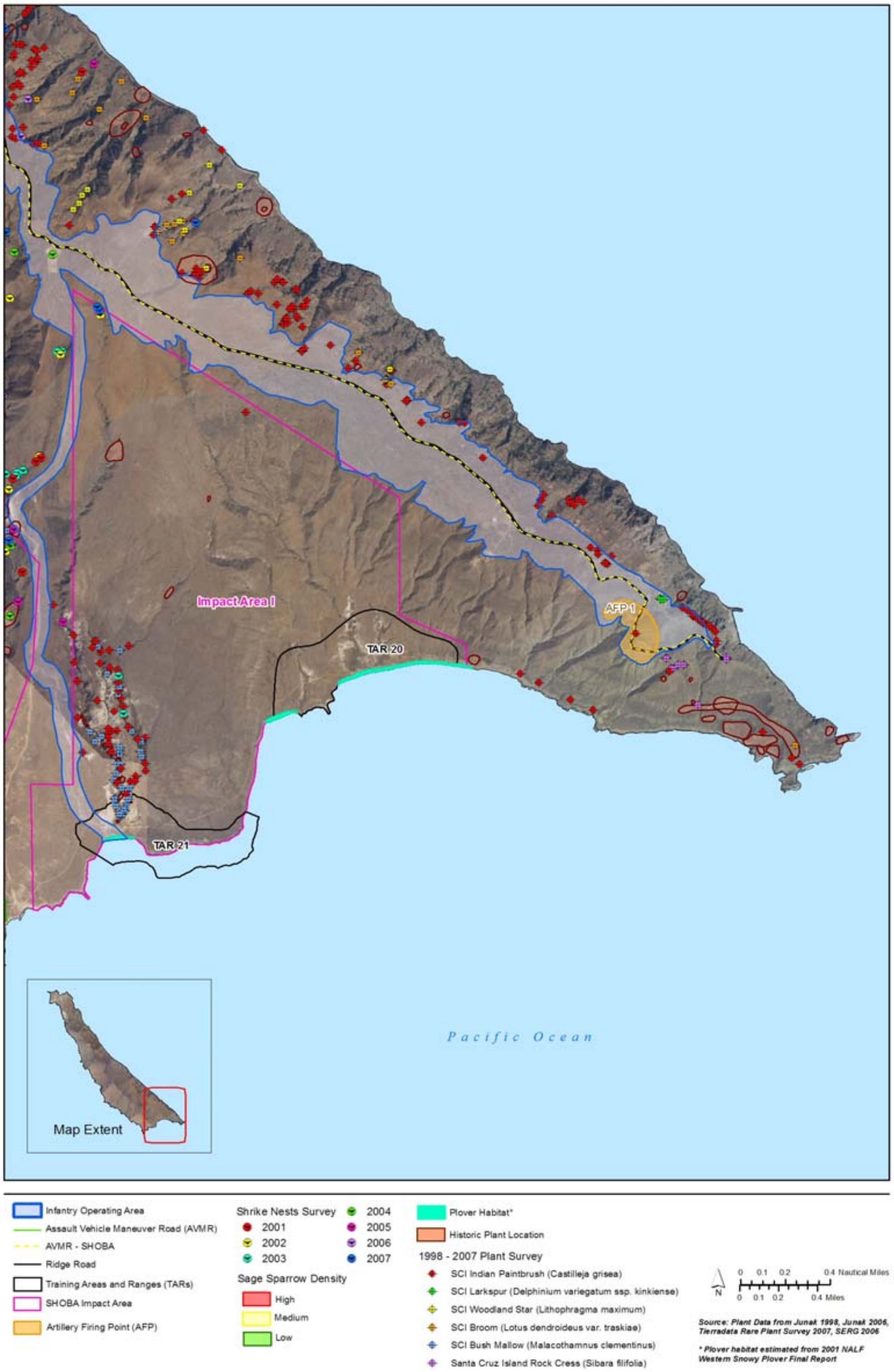


Figure 1e. San Clemente Island Listed Species and Training Areas



2) Introduction of new training exercises and expansion of training exercises into additional areas of San Clemente Island. New training exercises primarily increase the: a) scope of United States Marine Corps (USMC) use of San Clemente Island; b) use of amphibious and off road vehicles; and c) number of Navy SEAL ranges that include live-fire and demolition. New exercises include use of three Assault Vehicle Maneuver Area (AVMAs), two Artillery Firing Points (AFPs), and four Artillery Maneuver Points (AMPs);

3) Modification of the boundaries of ordnance Impact Areas I and II to include Horse Beach and part of Horse Beach Canyon, TARs 21 and 22, and to exclude China Point Road and parts of Horse Beach Canyon Road;

4) Restriction of access to Impact Areas I and II that will preclude monitoring and management within these areas;

5) Implementation of a FMP to shape fire-related policy, management, and decisions on San Clemente Island for 5 years (2009-2014); and

6) Implementation of ongoing natural resource programs and other conservation measures to monitor, avoid and/or minimize potential impacts to federally listed species.

1. **<u>Increase frequency of existing uses in current training ranges</u>**

San Clemente Island has supported military training activities since 1934. The island currently supports a significant level of training. The Navy proposes to increase the frequency of existing operations to support the Fleet Readiness Training Plan. Many of the existing operations that are proposed to continue and increase in frequency occur at fixed ranges or objectives that currently sustain concentrated impacts from existing uses. Table 1 provides a synopsis of training exercises that currently occur on the island and the frequency at which activities are proposed for the future to provide a general idea of the increased intensity of baseline uses. Training exercises listed in Table 1 are often accumulated into and incorporated into larger scale exercises. Major range exercises could combine any of the listed exercises, which may be conducted at the same time to practice coordination of various commands. The number of exercises presented in Table 1 includes those that are conducted as part of major range exercises.

Table 1. Frequency of Current Operations and Proposed Increases in Frequency

| Navy Warfare Area | Operation Type | Baseline # Annual Events | Proposed (# annual events) | % Increase Over Baseline Level of Use |
|---|---|---|---|---|
| **Amphibious Warfare** | Naval Surface Fire Support | 47 (81 5-in shells/exercise) | 52 | 11% |
| | Expeditionary Fires Exercise and Fire Support Coordination Exercise | 6 (3-day exercise) | 8 | 33% |
| **Strike** | Bombing Exercises (Land) | 176 | 216 | 23% |
| | Combat Search and Rescue | 7 | 8 | 14% |
| **Explosive Ordnance Disposal** | Explosive Ordnance Disposal | 4 | 10 | 150% |
| **Air Operations-** | Naval Auxiliary Landing Field Airfield Activities | 26,376 | 33,000 | 25% |
| **Research, Development, Test and Evaluation** | Missile Flight Tests | 5 | 20 | 300% |
| **Artillery Operations** | Artillery Operations | 5 | 8 (3-day events) | 60% |
| **Naval Special Warfare** | Land Demolition | 354 | 674 | 90% |
| | Underwater Demolition-Single Point Source Charge | 72 | 85 | 18% |
| | Underwater Demolition Multiple Charge - Mat Weave and Obstacle Loading | 14 | 18 | 29% |
| | Small Arms Training | 171 | 205 | 20% |
| | Land Navigation | 99 | 118 | 19% |
| | Unmanned Aerial Vehicle/Unmanned Aerial Systems Operations | 72 | 1176 | 1533% |
| | SEAL Platoon Operations | 340 | 668 | 96% |
| | Direct Action | 156 | 190 | 22% |

- The “Baseline” frequency of training exercises was determined by selecting the frequency during a “representative year” preceding 2008. Some activities that are not included in the baseline occurred at some time in the past on the island, but they have not occurred recently. The frequency of training exercises has fluctuated on the island based on training needs.

## Amphibious Warfare

Naval Surface Fire Support

Naval Surface Fire Support (NSFS) includes ship to shore weapons use. A surface ship naval gun firing operation is called a Firing Exercise (FIREX). These exercises are annual requirements for Navy ships. During FIREXs in Shore Bombardment Area (SHOBA), guns (13 centimeters (cm) (5-inch (in.)) MK 45) are fired against surface targets in Impact Areas I and II

(Figure 1d) with range control and fire direction being provided by qualified Shore Fire Control Party spotters [usually from Observation Point-3 (OP-3)]. Each operation is organized in a logical sequence of events to simulate support for an opposed amphibious landing. Operations typically include a period of continuous illumination accomplished by illumination rounds. Approximately 81 13 cm (5-in.) shells are fired per exercise. Approximately 47 FIREX operations were conducted in 2007, and 52 per year are proposed. At current FIREX frequency, approximately 3,807 13 cm (5-in.) shells are expended in Impact Areas I and II each year. At proposed frequency, approximately 4,212 13 cm (5-in.) shells would be expended in Impact Areas I and II annually. Most FIREX exercises utilize Impact Area II.

<u>Expeditionary Firing Exercise and Fire Support Coordination Exercise</u>

The Expeditionary Firing Exercise (EFEX) is a complex operation that involves the coordination of NSFS from surface ships with land-based artillery and mortar and Close Air Support (CAS). A related exercise, the Fire Support Coordination Exercise (FSCEX), is focused on USMC artillery firing on San Clemente Island. Artillery for both the EFEX and FSCEX can be delivered only from AFPs in SHOBA. AFP 1 [(13.8 hectares (ha) (34.1 acres (ac))] lies in SHOBA east of the Impact Areas and has experienced use for many years. AFP 6 (49.9 ha (123.3 ac)), north of the Impact Areas, was first used in 2004 and has been used two times. All AFPs need to remain unpaved to allow gun crews to dig the weapon’s recoil spades into the ground to prevent the howitzer from moving when it fires. EFEX is a required Marine Expeditionary Unit (MEU)/Navy Amphibious Squadron pre-deployment exercise, using all supporting arms, naval gunfire, artillery, mortars, and aircraft CAS. EFEXs usually extend over a 3-day period, with 10-12 hours of live firing per day. Approximately 30 percent of the firing occurs at night. Approximately 1,206 naval artillery rounds would be expended annually during EFEX operations. Approximately 3,068 naval gun rounds are associated with EFEX. EFEX operation also include the use of other types of ordnance, including bombs, mobile land-based artillery rounds, cannons, mortars, grenades, flares, smoke, and small arms fire. Amphibious landing operations may be associated with an EFEX, and all amphibious landing for this exercise occurs outside of SHOBA. A typical EFEX operation is to land a USMC artillery battery [three to four 7.3-metric tonne (t) (16,000-pound (lb)) howitzers, four to five 9-t (20,000-lb) trucks, and four 2-t (4,500-lb) high mobility multipurpose wheeled vehicle (HMMWVs)) at West Cove, NW Harbor, or Wilson Cove with a Shore Fire Control Party spotter team. These units travel to SHOBA via Ridge Road since the artillery is wheeled. The artillery units set up at the firing position(s) with the spotter team at OP-3. The spotter teams coordinate the artillery firing with those of the ships and aircraft using both SHOBA impact areas. Eight operations are proposed per year, two more than are conducted in the baseline.

**Strike**

<u>Bombing Exercises (Land)</u>

Bombing exercises include air strikes and Close Air Support (CAS) operations. Air strikes are aircraft or missile attacks of ground targets that are located in SHOBA’s Impact Areas I and II.

The operations can originate from an aircraft carrier or land base. The purpose is to identify, attack, disable, or destroy one of the many targets in the San Clemente Island integrated coastal defense system. The operations can be either no-drop or active drop of bombs or missiles. Principal weapons are the small, 11-kilogram (kg) (25-lb), inert MK-76 (a type of training ordnance); the MK-82, a 227-kg (500-lb) bomb; or the MK-83, 454-kg (1,000-lb) bomb and the MK-84 908-kg (2000-lb) bomb. The MK-82, MK-83, MK-84 and all other live ordnance over 113 kg (250 lb) must be dropped in Impact Area IIA. MK-76, other inert practice bombs, and any explosive ordnance up to 250 lb can be dropped elsewhere in Impact Areas I and II. Laser guidance systems may be used to guide weapons. The typical duration is less than 1 hour, and training takes place during the day and night.

CAS operations differ from air strikes in that CAS must be integrated with the fire and maneuver of ground forces. They are controlled by airborne or ground-based observers in a Tactical Air Control Party. CAS can be provided to ground forces by armed helicopters or fixed-wing aircraft. The aircraft can be USMC, Navy, and Air Force, and typical aircraft include AV-8, FA-18, A-10, F-16, AC-130, and AH-1. CAS can be flown with no-drop passes over virtually any part of the island as long as the aircraft does not carry live ordnance. Under all circumstances, aircraft must make an initial dry pass to identify the target visually and ensure that the area is clear of any non-participants. Sorties can be flown day or night. A total of 216 operations are proposed per year, 40 more than are conducted in the baseline.

Combat Search and Rescue

The Combat Search and Rescue (CSAR) operation occurs north of SHOBA and is usually in conjunction with a larger Composite Training Unit Exercise (COMPTUEX) or Joint Task Force Exercise (JTFEX). The purpose of the CSAR is to locate, protect, and evacuate a pilot or other crewmembers who have landed in hostile territory. The operation can include reconnaissance aircraft to find the downed aircrew, helicopters to conduct the rescue, and fighter aircraft to perform CAS to protect both the downed aircrews and the rescue helicopters. Eight operations are proposed per year, one more than are conducted in the baseline.

**Explosive Ordnance Disposal**

Explosive Ordnance Disposal (EOD) operations consist of specially trained personnel conducting sweeps, inspections, and cleanup. The teams search for Unexploded Ordnance (UXO) and, using extensive safety precautions and procedures, detonate any unexploded items in place or move them for disposal. They also demilitarize inert ordnance, supervise the periodic collection of metal debris from previously expended ordnance, and arrange for transportation of the debris out of the Impact Areas to clean up the range and reduce the amount of metal that may affect laser safety. EOD sweeps and inspections are proposed annually. EOD operations are conducted both inside and outside of SHOBA. Operations inside SHOBA are more frequent. Outside SHOBA, EOD activities are conducted after live warheads are used in the Missile Impact Range (MIR) and in conjunction with NSW operations. Ten operations are proposed per year, six more than are conducted in the baseline.

**Air Operations**

Naval Auxiliary Landing Field Airfield Operations

Operations at the Naval Auxiliary Landing Field (NALF) include aircraft landing practice, visual and instrument approaches and departures, aircraft equipment calibration, survey and photo missions, range support, exercise training, research and development test support, medical evacuation, and supply and personnel flights. The airfield is restricted to military aircraft and contract flights. The NALF has the primary mission of training Naval Air Force Pacific aircrews in Fleet Carrier Landing Practice (FCLP) to operate aircraft safely and to land on an aircraft carrier. The distance from the mainland and the surrounding marine environment make the island an ideal place to conduct night carrier landing practice. The NALF is also available for emergency landings year round.

FCLP is the most prevalent aviation use of the NALF, accounting for approximately 40 percent of aircraft operations. FCLPs are actual landings on a simulated aircraft carrier deck painted on the surface of the runway near its east end. Operations include low approaches, “touch and go” landings, usually in repeated sets, and full-stop landings. This type of training is conducted by naval aviators in a variety of aircraft: rotary and fixed wing, jet and propeller driven, in day and night landings. A total of 33,000 operations are proposed per year, 6,624 more than are conducted in the baseline.

**Research, Development, Test and Evaluation**

The Space and Naval Warfare Systems Command (SPAWAR) group conducts research, development, test and evaluation (RDT&E) engineering and Fleet support for command, control, and communications systems, as well as ocean surveillance. SPAWAR’s tests on San Clemente Island include a wide variety of ocean engineering, missile firings, torpedo testing, Electronic Combat (EC), and other Navy weapons systems. SPAWAR’s recent proposed test and evaluation programs on San Clemente Island are missile flight tests

Missile Flight Tests

SPAWAR conducts multiple missile tests. Two of the most typical tests are with the Joint Standoff Weapon (JSOW) and Tomahawk Land Attack Missiles (TLAM). Most of these tests are conducted using the MIR; however, Impact Area I has been identified as an emergency termination point. JSOW is an unpowered glide weapon capable of carrying different modular warhead payloads. The weapon is 4 meters (m) (13 feet (ft)) in length, 1.2 m (4 ft) in diameter and has an unfolded wingspan of 2.6 m (8.8 ft). One version of the JSOW employs a 227 kg (500-lb) BLU-111 (MK-82 general purpose bomb) warhead. This version is intended for use against medium or high-value fixed targets. The purpose of the testing program is to verify the design compliance with specifications and perform live-fire testing in a coastal marine environment. Testing of the JSOW began in 1996 and is ongoing. Testing is for both live and inert warheads. All missile tests are in the daytime.

TLAM testing is the continuation of flight testing of the TLAM live warhead in support of the overall Tomahawk weapons systems improvement testing. National Environmental Policy Act (NEPA) documentation for Tomahawk testing includes an Environmental Assessment (EA), *Tomahawk Flight Test Operations on the West Coast of the United States* (November 1998), which is incorporated in this biological opinion by reference. The TLAM is a terrain-following missile that uses several navigation aids to position itself along a preprogrammed course. The primary methods of navigation are signals from Global Positioning System (GPS) satellites and Terrain Contour Mapping. The testing program will use both live and inert warheads. The live warheads contain either unitary conventional high explosives or dispensed submunitions. TLAMs in the San Clemente Island area are usually fired from surface ships or submarines with all targets being the MIR. Impact Area II is a contingency landing/recovery location for terminated test flights. There are also expected to be Tactical Tomahawk underwater launch tests. This program would verify the applicability of Tactical Tomahawk for submarine use. These will include boosted flight tests and instrumented test vehicles, which would impact the water, and full-up missiles, which would land in the MIR.

The Navy is considering adapting and employing the Army Tactical Missile System (ATACMS, MGM-140) from surface ships equipped with the Vertical Launch System (VLS). The ATACMS is an inertially guided ballistic missile with a range in excess of 278 kilometers (km) (150 nautical miles (nm)). Proposed changes for the Navy ATACMS variant include the use of a GPS guidance package. The current version of the missile carries a warhead equipped with submunitions. Test firings of the ATACMS missile have taken place from a Navy ship, the USS Mount Vernon, LSD 39. Test launches occurred in February 1995 on the Point Mugu Sea Range.

The Land Attack Standard Missile (LASM) is a Navy development program to test a land attack variant of the Navy's primary air defense weapon, the STANDARD Missile. The LASM is a solid rocket propellant missile that will use a combined GPS/Inertial Navigation System (INS). The LASM is approximately 4.7 m (185.6 in.) long, 0.3 m (13.5 in.) diameter, and weighs 710 kg (1,566 lb) at launch. The round will use the current MK-125 blast fragmentation warhead. Possible future variants may include a new submunitions or anti-armor warhead option, addition of a terminal guidance beyond the GPS/INS, and an uplink/downlink capability. The range capability of LASM will be greater than 161 km (100 mi.). An additional option to increase LASM range is also being evaluated. Testing of the baseline LASM will include Developmental Testing (DT) (2 rounds) and Operational Testing (OT) (2 rounds) at the Southern California Offshore Range (SCORE). After OT is complete, Follow-on Test and Evaluation (FOT&E) and Fleet training firings will be conducted on a periodic basis of approximately eight per year. Test firings will be from Aegis VLS ships located offshore from San Clemente Island. Proposed impact areas include the MIR or possibly Impact Areas I or II. Threat representative targets will be inserted and range instrumentation provided for LASM impact scoring measurements. Range safety planning includes provisions for helicopter availability and aircraft surveillance. The

LASM is planned to be configured with telemetry and a Range Safety approved Flight Termination System that will restrict/minimize the hazardous footprint. A C-band beacon transponder will be installed in the missile to assist range safety with missile track. Prior to LASM's first testing at San Clemente Island, both the missile and ship fire control system will have undergone extensive land based testing and firings. Tests are daytime only.

The Navy proposes to conduct up to 20 missile tests on San Clemente Island per year, which is up to 15 more than the baseline. Missile tests are 1 day per flight, but for scheduling purposes they take about 10 days for buildup and another 10 days for range cleanup of debris.

Artillery Operations

Artillery operations are the landing and movement of artillery pieces, trucks, and support vehicles for up to 50 Marines. These activities will occur primarily within the AVMA, AFPs, and AMPs. AFPs and AMPs provide the positions to positions artillery guns for attack. Exercises conducted within AMPs will not involve live ammunition; however, live-fire exercises will be conducted within the boundaries of AFPs. A typical operation entails Marines and vehicles landing in Wilson Cove and debarking from Navy Landing Barges. Vehicles used include four M198 155-millimeter (mm) (6-in.) Howitzers, six 7-t (15,680-lb) trucks, and three HMMWVs. In addition two helicopters provide escort as the artillery convoy travels from Wilson cove to Ridge Road on to SHOBA. The exercise lasts for 3 days. The howitzers are then airlifted by CH-53 helicopters and returned to amphibious ships offshore. Vehicles return to Wilson Cove on Ridge Road. Approximately 30 percent of the operations are at night. Eight operations are proposed per year, three more than are conducted in the baseline.

**Naval Special Warfare Training**

Naval Special Warfare Forces (SEALs) conduct two types of military operations on San Clemente Island: those conducted by the Naval Special Warfare Center, which includes the Basic Underwater Demolition/SEAL (BUD/S) indoctrination for new recruits, other basic military courses, and SEAL Qualification Training (SQT); and Maritime Operations (MAROPS) conducted by NSW Groups—basic, intermediate, and advanced tactical training for SEAL platoon readiness.

Land Demolition

Land demolition training to instruct in the construction, emplacement, and safe employment of explosives for breaching or demolition is currently conducted at TARs 1, 2, 3, 4, 16, 20, 21, and 22. This type of training is proposed in new locations, including TARs 9, 10, 13, 14, 15, 17, 18 and 19 and BTSs 1 through 8. In addition, land demolitions would occur in existing demolition range areas in Naval Special Warfare Training Area (SWAT-2) that lie outside of a TAR. In-place explosive ordnance disposal could occur throughout the island depending on where explosives are found. A significant increase (90 percent) in the number of land demolition training exercises is proposed over the number of such operations that were conducted in 2007.

Underwater Demolition-Single Point Source Charge

Underwater demolition, to teach the safe use of explosives for beach clearance is conducted in the nearshore areas of BUD/S beach or Graduation Beach, both in the Northwest Harbor area, as well as TAR 21, Southern California Anti-Submarine Warfare (ASW) Range (SOAR), and SWAT offshore waters. Charge size is small, 2.3 kg (5-20 lb) net explosive weight (NEW). The proposed action includes an increase in the frequency of this type of training, as well as new ranges to support this training. A total of 96 operations are proposed per year, 24 more than are conducted in the baseline.

Underwater Demolition Multiple Charge

Underwater demolition, to teach the safe use of explosives for beach clearance is conducted in the nearshore areas of BUD/S beach or Graduation Beach, both in the Northwest Harbor area. The largest of the underwater demolitions is a Mat Weave, which is comprised of 10 charges of 8-m (25-ft) demolition tubing and haversacks 218 to 226 kg (480 to 498-lb) NEW. A total of 24 operations are proposed per year, 10 more than are conducted in the baseline.

Small Arms Training

BUD/S small arms qualification training occurs on the rifle range at Northhead approximately 171 times per year, expending about 1.0-1.2 million rounds of small arms ammunition. A total of 205 operations are proposed per year, 34 more than are conducted in the baseline.

Land Navigation

Land Navigation takes place throughout San Clemente Island. A BUD/S class is divided into squads of six to eight men. Each squad is assigned a reconnaissance/tactical patrol mission to locate and retrieve an item of equipment. Typically, three squads are deployed per night, and each squad is considered a separate operation. Thus, there would be about 24 personnel moving across the terrain per night. SEAL Platoons also conducted land navigation. This activity is dispersed throughout SWAT ranges, and a 19 percent increase in land navigation exercises is proposed.

Unmanned Aerial Vehicle/Unmanned Aerial Systems Operations

NSW Unmanned Aerial Vehicle/Unmanned Aerial Systems (UAV/UAS) operations are conducted throughout San Clemente Island. UAVs have the unique ability to provide reconnaissance of opposition forces without risking the lives of military personnel. UAVs obtain information about the activities of an enemy or potential enemy or tactical area of operations by use of various onboard surveillance systems including: visual, aural, electronic, photographic, or other means. There are currently numerous types of UAVs employed. Operations typically entail launch, overflight over the ocean and island, and then recovery. The UAVs may be controlled by a pilot at a remote location, just as if the pilot were onboard, or may fly a preplanned, preprogrammed route from start to finish. The combination of Navy-controlled airspace and proximity to Fleet assets makes San Clemente Island an ideal site for UAV operations. UAVs range from small 1-kg (3-lb) systems that are launched by hand to systems that are several hundred kg (lb) and take off from the NALF runway. UAVs are typically flown at a wide range of cruising altitudes ranging from 46 to 3,048 km (150 to 10,000 ft) mostly dependent upon their size. They are designed to fly quietly and at high enough altitudes so that they cannot be detected from the ground (*i.e.*, higher altitudes for larger, noisier UAVs). Smaller UAVs can be hand launched from any location on the island and are typically recovered in the same spot. Medium-sized UAVs may be launched off of a rail at VC-3 or a truck parked on the road. Large UAVs would take off and land at VC-3 or the NALF runway.

Ordnance used in UAV-supported target operations would be no larger than the Hellfire and would be dropped into either the Impact Areas or the MIR. UAV aircraft include the Swift, Pointer, Raven, Silverfox, Neptune, Aqua Puma, Scan Eagle, and Predator. Missions can last 1 to 20 hours and vary depending on the scheduled mission training. A significant increase in UAV use has occurred on San Clemente Island since 1997, and training involving UAVs is proposed to expand exponentially on the island (*i.e.*,1,533 percent).

<u>SEAL Platoon Operations</u>

SEAL Platoon Operations are primarily ground operations involving amphibious landings, ground maneuver, and/or live-fire by SEAL platoon members. This category also includes boat-to-shore gunnery (*e.g.*, NSW MK V .50-caliber firing). A single SEAL Platoon Operation consists of a single component of an integrated Full Mission Profile, such as amphibious warfare exercises, breaching, escape and evasion, HMMWV training, immediate action drills, MAROPS, hydrographic reconnaissance, military operations in urban terrain (MOUT), physical conditioning, over-the-beach (OTB) operations, and special boat team operations. SEAL Platoon Operations also include SEAL participation in operation such as bombing exercises (BOMBEX), in which SEALs identify and/or mark the target for strike aircraft. Participants in a NSW Full Mission Profile include a SEAL platoon of 14-16 men, a Special Operations Craft (SOC), and a support element consisting of a Range Safety Officer (RSO) and five to eight other personnel. If the unit is to enter SHOBA from the sea, then a SOC with the SEAL platoon would transit over the open ocean to a point close to San Clemente Island. The SEAL platoon transitions to Combat Rubber Raiding Craft (CRRC), proceeds a short distance toward the beach, and then swims the remaining distance. They transition from the water to the land environment and proceed to the simulated inland target. Nearing the target, they are subjected to adversary weapons fire, simulated by small demolitions charges placed in the sand ahead of time by the support group. Using live-fire to defend themselves against personnel and vehicle targets, the platoon sets a number of demolitions charges on the target. Egress from the area is conducted with a "hot" extract off the beach by the support boat. This involves bringing the boat close to the shoreline, providing ship-to-shore cover fire with machine guns and mortars, while the SEALs swim back to the boat. SEAL Platoon Operations currently occur at all TARs except for 5, 6, 7, 8, 12, 18 and 19, and are proposed for all TARs. A significant increase in SEAL Platoon

Operations (96 percent) over the baseline number of operations is proposed. The intensity of use of TARs throughout the island is likely to increase if the proposed action is fully implemented.

Direct Action

Direct Action is conducted by NSW or Navy Expeditionary Combat Command (NECC) personnel who use covert or overt small unit tactics against an enemy force to seize, damage, or destroy a target and/or capture or recover personnel or material. A squad or platoon size force of NSW or NECC personnel are inserted into and later extracted from a hostile area by helicopter, CRRC, or other technique, and then use small-scale offensive actions to attack hostile forces or targets. These offensive actions can include: raids, ambushes, standoff attacks by firing from ground, air, or maritime platforms, designating or illuminating targets for precision-guided munitions, providing support for cover and deception operations, and sabotage. Opposing forces and targets within range areas are required for realism. Small arms such as 7.62 mm (0.3 in.), 5.56 mm (0.2 in.), 9 mm (0.4 in.), 12-gauge, 40 mm (1.6 in.) grenades, laser illuminators, and other squad or platoon weapons may be used against live fire targets, or with blanks. This exercise may be combined with other exercises such as insertion and extraction, close air support, and others. Direct Action involving live fire and demolition is currently conducted at TARs 2, 3, 4, 16, 20, 21, and 22 and BTS 1 (demolition only), 7 (live-fire only), and 8 and is proposed for additional TARs, including TARs 1 (demolition only), 9 (indoors), 10, 13 (indoors), 14, 15, 17, 18, and 19 (demolition only) and BTSs 2, 3, 4, 5, and 6 (demolition only). The number of Direct Action operations is proposed to increase approximately 22 percent over the number conducted in 2007, and the number of ranges available for this activity is proposed to double.

Naval Special Warfare Center conducts BUD/S training, SEAL Special Weapons System Training, Special Warfare combatant Crew Training and SQT

- Part of the third phase of BUD/S training is conducted on San Clemente Island, throughout the island particularly in the TARs and the BTS with the majority of training conducted in the Northwest Harbor area. BUD/S training is currently conducted in five classes per year for 5 weeks each (40-60 students per class) or 168 training days per year, and up to six classes are proposed with an increase in class size to 90 students per class. Increases in the anticipated number of some SEAL exercises reflect the additional class and students that would be receiving training on San Clemente Island. The first week involves basic training on pistol firing at the pistol range located in SWAT 1. The second week involves basic demolition training in the demolition donut and grenade range in SWAT 2 and the TAR 3. The third week involves basic rifle training in rifle range in SWAT 2. The fourth week involves tactics training which begins to integrate the previous three weeks of training in the field. The last week, BUD/S students are involved in field training exercises (FTXs) where the student locate and attack a mock target in a TAR or BTS. FTX training includes the usage of blank fire, land demolition with small charges, grenade simulators which are used away from the sites on roads to harass students, parachute/star cluster pyrotechnics, which are used in emergency situations to illuminate the area, smoke grenades, and booby traps. Limited harassment activities, which include blank fire, may occur outside the training areas as the students patrol out of the target areas.

- The SEAL Weapons Systems (SWS) course provides training in a wide range of underwater and land demolitions. There are typically six 1-week classes per year with 16 students per class. The classes are conducted both in the classroom and in the field, resulting in about one operation per day of instruction for each class. SWS operations are estimated at 30 days per year.

- The Special Warfare Combatant Crew (SWCC) course is taught four times per year, for 1 week at a time (25 students per class). This course involves about 20 operations per year.

- SEAL Qualification Training is proposed to incorporate expanded use of San Clemente Island, particularly in SHOBA, for Direct Action, Immediate Action Drills (IAD), and live-fire insertion/extractions. SEAL Qualification Training is currently conducted in five classes per year. Six classes per year are proposed. Increases in the anticipated number of some SEAL exercises reflect the additional class that would be receiving training on the island.

**Naval Special Warfare Training is Conducted in Training Areas called SWATs, TARs, and BTS Sites**

Naval Special Warfare groups that conduct exercises on San Clemente Island include Naval Special Warfare Groups, and BUD/S. Naval Special Warfare organizes, trains, and deploys combat-ready SEAL platoons, and provides support with high performance surface craft. Training for these groups is conducted within training areas called SWATS and TARs (Figure 2a). SWATs are large areas that support movement of small groups to reach an objective, but they are not subject to demolition or more intensive uses, except in designated range areas. TARs are training sites that sustain more intensive operational use and provide an objective for demolition, live fire, or other types of activities. TARs are intended for tactical training, so virtually all the operations are conducted by combat-ready NSW personnel and those combat-ready forces of other military Services. Basic Underwater Demolition School (BUDS) conducts basic training for SEALS candidates at training sites called BTS sites as well as the TARs. BTS sites are similar to TARs because they provide an objective for BUDS trainees. Operations conducted at BTS sites differ from those typically conducted at TAR, because they are used by students who are not yet combat ready and have less experience with munitions used. See Table 2 for acreage figures.

Figure 2. Locations of SWATS and TARs on San Clemente Island


<u>TAR 1—Demolition Range Northeast Point (0.7 ha (1.8 ac))</u>

The Navy proposes to continue existing uses at TAR 1 and expand the number of operations and training days. Existing training includes 74 operations conducted over 23 days. Proposed use would increase to 169 operations over the course of 30 days. Training at TAR 1 includes over the beach operations, land demolitions, and target assault with UAVs. Explosives used in land demolitions would include non-shrapnel producing 100 lb net explosive weight charges. No construction is proposed at this TAR.

TAR 2—Graduation Beach Underwater Demolition Range [5.6 ha (13.8 ac) (2 ha (5 ac) disturbed)]

This area is currently in use as an underwater demolition range and has been for over 20 years. Existing training includes 80 operations over the course of 5 days. An increase in use is anticipated - 140 operations are proposed over the course of 30 days. The Navy proposes to continue to use this area for underwater demolition, hydrographic reconnaissance, CRRC Transit, Reinforced Inflatable Boat Operations, SEAL Delivery Vehicle (SDV) Operations, Nearshore/Fore-shore Obstacle Clearance, Standoff Weapons Employment, UAVs, Beach Feasibility Reconnaissance, Advanced SDV Operations, Swimmer Harbor Penetration, CRRC landings, Very Shallow Water Mine Counter-Measures (VSW MCM), and Land Demolition Training. To accommodate ongoing training, the Navy proposes to make site improvements for safety and environmental purposes, including: implementing erosion control measures on the access road and in the demolition area, adding a telephone communications line, developing a demolition staging area, and making a demolition preparation area. Lightweight, mobile remote cameras would digitize training events for feedback and reconstruction. These improvements will be accompanied by appropriate gates and signs.

Weapons used at this site include: blank fire, small arms, simunitions, short range training rounds, and crew-served weapons. Larger underwater demolitions up to 227-kg (500-lb) NEW and larger land demolitions up to 91-kg (200-lb) NEW would be conducted at the site.

TAR 3—BUD/S Beach Underwater Demolition Range (1.7 ha (4.1 ac))

BUD/S Beach Demolition Range is an existing training area that supports the BUD/S. The Navy proposes to increase the tempo of existing training activities at this range from 82 operations over 82 days/ year to 198 operations over 95 days/year. Land demolition including small charges up to 2 kg (5 lb) NEW are currently used at this site. Underwater demolitions up to 227 kg (500 lb) are currently conducted at this site. The Navy proposes to implement erosion control measures, maintain a demolition preparation area, a demolition staging area, and a communication line telephone at this site. Operations include Hydrographic Reconnaissance, Parachute Drop, Basic Underwater Demolition Training as a part of BUD/S Camp, operational demolition training for SEAL platoons as part of their proficiency and readiness training. CRRC Transit, Reinforced Inflatable Boat Operations, SDV Operations, Nearshore/Fore-shore Obstacle Clearance, Standoff Weapons Employment, Beach Feasibility Reconnaissance, Advanced SDV Operations, Swimmer Harbor Penetration, CRRC landings, VSW MCM. Weapons used include blank fire, flares, simunitions, and underwater demolitions.

TAR 4—Whale Point/Castle Rock (11 ha (27.1 ac))

This range was previously used as a demolition range and is under development as a MOUT/ village with expanded operational capabilities. The Navy consulted on the construction and use of this area in Biological Opinion FWS 1-6-00-F-19, which is incorporated herein by reference and is superseded by this opinion. New uses proposed include UAV use and convoy operations.

There were 176 operations conducted over 176 days at TAR 4 under the baseline; however, this level of use may be higher than actual use in the past few years because the MOUT proposed at TAR 4 has been under construction during this time. Proposed operations are estimated to be 604 operations over 237 days. Basic land demolition training, OTB, strategic reconnaissance, direct action tactical training, immediate action drills, small arms live-fire, land navigation, MOUT operations, helicopter landings, UAV operations, and Convoy/mounted operations would be conducted at TAR 4. Operations would include a SEAL platoon or Task Force/Task Group conducting street scene operational training. Of the operations proposed, only UAVs and convoy/mounted operations are not addressed in the Biological Opinion FWS 2808. A wide range of explosives are used in this area, including a proposal to increase the maximum size of demolition charges use to a maximum of 136 kg (300-lb) NEW; blanks, smoke and grenade simulators; flares and pyrotechnics; and small arms fire up to .50-caliber. Range facilities that have been previously approved, addressed under section 7 consultation, and are under development include: an urban warfare MOUT site, a rural village with 30 small structures, a paved street scene with 20 buildings, a range bunker, and a 18 m (60-ft) tower. An improved pistol and rifle range is located on the terrace above the MOUT site.

TAR 5—West Cove Amphibious Assault Training Area (0.8 ha (2.1 ac))

This area is adjacent to the SCORE Cable Termination Facility. The beach has historically been, and is currently being, used for insertion/extraction and routine amphibious landings and assaults. Hydrographic Reconnaissance, Land Navigation, SEAL Platoon Operations, and UAV training would be conducted at this TAR. This TAR currently supports some amphibious vehicle use, but this use would increase under the proposed action. No live-fire or demolition would be used at this TAR.

Gates and signs are proposed for use in this area. These are needed to provide notice and care to avoid damage to the Cable Termination Facility or the underwater cable that runs from the south side of West Cove to the SOAR underwater range sensors offshore.

TAR 9—Photo Lab Training Area (10.6 ha (26.3 ac))

TAR 9 is proposed to be used as an adversary-building complex. The area is heavily disturbed from past military activity. Existing buildings and facilities would be used as realistic simulated targets. Operations would include Tactical Environmental Movement, Direct Action, Close Quarter Combat, Urban Combat and Platoon Pre-Planned Attack, Helicopter Hover Personnel Insertion (Fast Rope), Tactical Ambush, Raid (Silent Assault), Land Navigation, Strategic Reconnaissance, and UAV training. Baseline use was 16 training days (NSW) and approximately 19 training days (NSW) and 14 USMC training days are proposed. No live-fire would be conducted outside existing buildings. Blanks and live-fire would be used in close quarter combat (CQC) facility with portable bullet traps. Small arms up to 5.56 mm (0.2 in.) and breaching charges are proposed for use in designated areas. Gates and signs would be constructed, and minor modification of the Photo Lab building would be required.

TAR 10—Demolition Range West [22.2 ha (54.9 ac) (2 ha (5.0 ac) developed for use)]

TAR 10 is proposed to encompass 22.2 ha (54.9 ac), but only 2 ha (5 ac) would be developed for use. Two ha (5 ac) of the site have concentrated impacts from historical use. TAR 10 would be used to provide a land-based location for safe, operationally realistic live-fire and high explosive demolition training. The site would support live-fire training for IAD with a minimum of 180 degrees of live-fire, optimum 360 degrees. TAR 10 has a secondary mission of supporting OTB operations. The operations conducted at TAR 10 would include a SEAL platoon conducting a live-fire assault on a target. At the objective, the SEALs would place explosive charges on the target and demolish it. Clean-up procedures would be incorporated after each operation. This TAR would not include the use of any vehicles off-road, and no new roads would be constructed. Access to the target area would be controlled. Range construction would last approximately 180 days. The site would usually be accessed by the road, and parking would occur in a lot adjacent to the proposed range building, or on existing roads. Existing uses include 27 operations conducted over 3 days; however, existing uses do not include use of live rounds or demolition charges. Proposed uses include 87 operations over 40 days, with equal night and day use. All types of explosives (136 kg (300-lb)) would be used, as well as blanks, smoke and grenade simulators tracers; small arms 5.56 mm (0.2 in.), 7.62 mm (0.3 in.), and .50-caliber surgical sniper would be used. All explosives would be non-shrapnel-producing.

There are no existing facilities within the area. The proposed facility includes a parking area and a 20 x 30 $ft^2$ range building. The range building would be a concrete block structure. The building would be constructed on an existing previously disturbed site and would necessitate construction of a driveway to access the site. All construction would be conducted outside of the San Clemente sage sparrow breeding season, and all staging of construction vehicles would be accomplished within the existing disturbed footprint adjacent to the proposed range building. The building site would be flagged prior to construction activities to minimize the potential for disturbances to adjacent sage sparrow habitat. Erosion control measures that assure no offsite habitat degradation would be incorporated prior to construction activities. Such measures would entail review by the Natural Resource Office (NRO) botanist. Proposed use would include the use of small wooden structures as targets ranging in size from 50 to 500 $ft^2$. Structures would be constructed and demolished, so would require reconstruction. Erosion control measures may be necessary on the access roads and in the demolition area. The demolition area and target area would be located to the south and west of the existing oval berm onsite, as indicated in diagrams provided to the Service during consultation. The Motorola Base communication system would be incorporated for communication.

TAR 11—Surveillance Training Area [3.6 ha (8.8 ac) (0.4 ha (1 ac) concentrated impact)]

TAR 11 is an old missile site on a bluff facing east, about 1.6 km (1 mi.) south of Wilson Cove. It has been disturbed due to previous military activity. The proposal is for operational use only; no facilities would be developed. The site would be used as an objective, a target area for insertion, reconnaissance, and attack. Operations include Insertion and Extraction, Tactical Environmental Movement, Direct Action, Reconnaissance, Helicopter Hover Personnel Insertion

(Fast Rope), SEAL Team Raid, and UAV training. Existing annual operations include 10 operations conducted over 4 days. Approximately 33 NSW operations over 20 days and use during 2 USMC Battalion landings are proposed. No live-fire or demolitions would be used. Smoke, flares, pyrotechnics, and all types of blanks would be used. The original proposed location for this TAR supported several occurrences of listed plant species. NSW evaluated the site and was able to slightly modify the site boundaries to avoid most of the listed plants (Figure 3).

Figure 3. Modified boundary for TAR 11

TAR 12—Radar Site Training Area [2 ha (5.1 ac) (0.01 ha (.03 ac) concentrated impacts)]

This a small target area high on the bluff overlooking Naval Ordnance Test Station (NOTS) Pier, on the site of an abandoned RDT&E radar facility. It is used to provide an objective close to the shore in proximity to RDT&E facilities to simulate a realistic adversary target. The size of TAR 12 is 2 ha (5.1 ac). However, the area of concentrated impacts is only 0.01 ha (.03 ac). Operations include Land Navigation, Direct Action, Helicopter Insertion, Reconnaissance, and UAV training. Currently, operations span 11 days, and 17 days of use per year are proposed. No demolitions, flares, or pyrotechnics would be used. Smoke and blanks would be used. Gates and signs would be installed. Some erosion control on the access road and a communications telephone line may be necessary.

TAR 13—Randall Radar Site Training Area [6.9 ha (17.1 ac) (0.8 ha (2 ac) concentrated disturbance)]

This site is on the Eastern Escarpment. The area contains an abandoned bunker with attendant facilities. The bunker was previously used for weapons system development. This site would be used to provide a bunker area to conduct tactical land demolitions training and CQC. Operations would include Strategic Reconnaissance, Land Navigation, Direct Action, Tactical Weapons and Light Demolitions Training with Tactical Maneuvering and CQC. Baseline use of this TAR included 29 operations, and 50 operations per year are proposed. Small arms would be used at this TAR; however, all live firing of weapons would be conducted inside the existing bunker. Land demolitions under 2-kg (5-lb) NEW would be conducted. A demolition area would be cleared for target placement, and a firebreak would be installed because demolition activities would occur outdoors. This area is currently used for training operations; however, proposed uses are different than current use. Baseline use includes 29 training days, and 50 training days are proposed. In addition, this site would be used as a staging area during two USMC Battalion sized landing exercises per year.

TAR 14—VC-3 Onshore Parachute Drop Zone "Twinky" [137 ha (338.7 ac) (8.1 ha (20 ac) of concentrated impacts)]

The Drop Zone, named "Twinky," is off the north end of the VC-3 northwest/southeast abandoned runway. Its use coincides with the use of VC-3, which includes parachute drops, patrolling, and related tactical operations. This TAR would be used as a Drop Zone for land-based parachute drops, static line and free-fall and would also support a variety of Special Warfare Operations, including; Strategic Reconnaissance, Live-fire, Combat Equipment Parachute Drop, Combat Personnel Parachute Insertion, Helicopter Rappelling, Land Navigation, UAV Training, Land Demolition Training, Direct Action, and Tactical Patrol. All types of special warfare aircraft could be used at the site, including, fixed wing and helicopter aircraft. From this area SEAL teams would patrol to Eel Point range, TAR 17, or other TARs on the island. The area is currently used for a subset of the proposed activities, but baseline use does not include the expenditure of live fire or demolition. The baseline use included 59 operations conducted over 3 days and 12 SPAWAR RDT&E operations. Proposed uses include 147 NSW operations conducted over 19 days, 24 USMC operations, and 24 SPAWAR RDT&E operations. Proposed weapons use includes all types of weapons up to 7.62 mm fired in an easterly direction and demolitions up to 45-kg (100-lb) NEW, flares, illumination, and pyrotechnics. No range facilities are proposed.

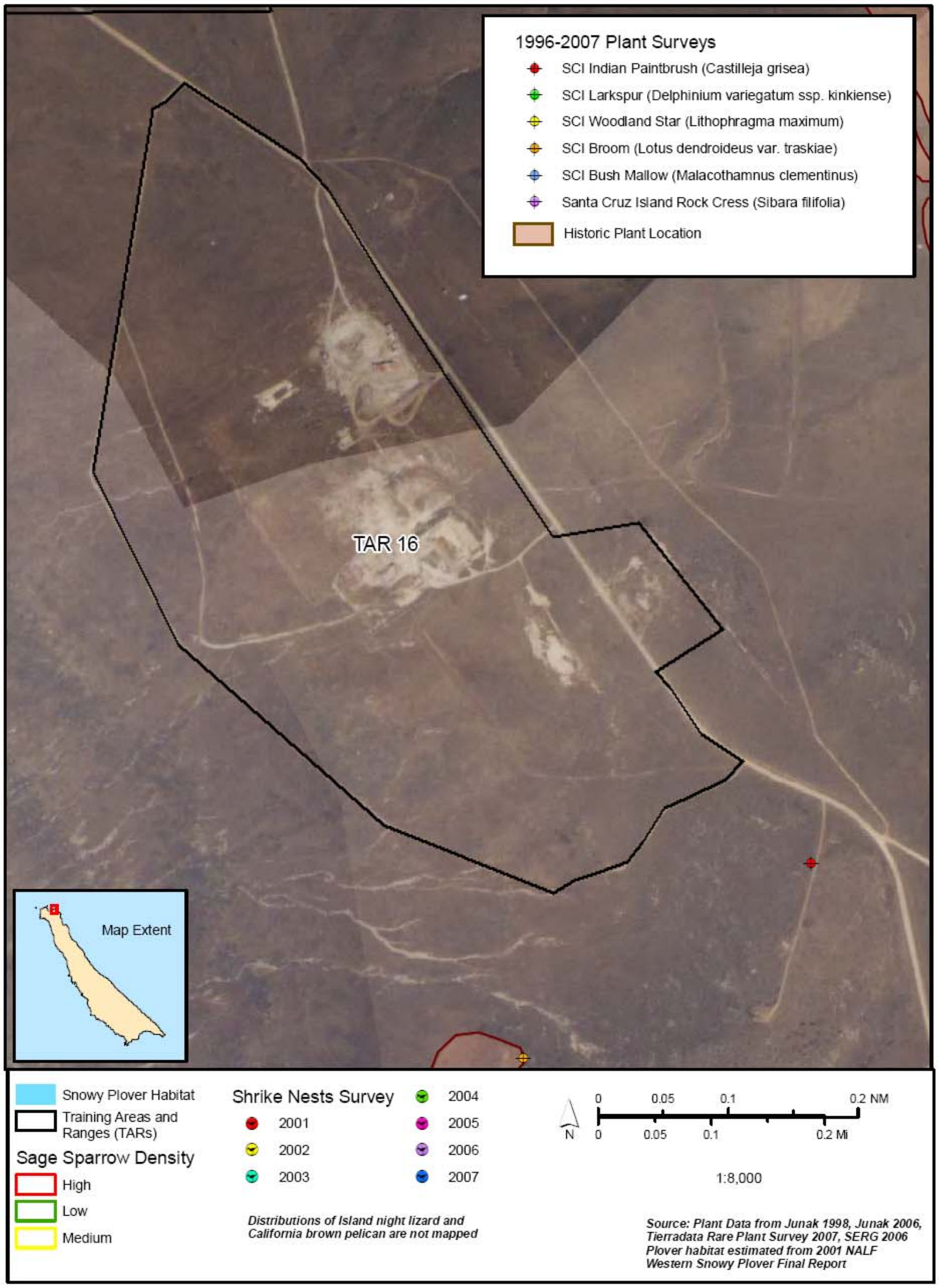
TAR 15—VC-3 Airfield Training Area [311.9 ha (770.8 acre) (8.1 ha (20 ac) concentrated impacts)]

The purpose of TAR 15 is to provide a training venue for SEAL platoon land raids, airfield attack training. The area also supports an existing structure that houses the Special Warfare "Center of Excellence for UAV Training and Testing". The area would provide the launching point for a variety of UAVs. The area has been heavily disturbed due to previous military activity and overlaps substantially with the proposed AVMA. Existing training operations conducted in TAR 15 include: Strategic Reconnaissance, SEAL Team Land Raid, Land Navigation, Land Demolition Training, Airfield Takedown, Direct Action, UAV training and testing. No live-fire exercises are currently conducted, and live-fire and demolition are proposed for this TAR. Baseline use of TAR 15 includes 120 NSW operations conducted over 20 days. Proposed use includes 265 NSW operations conducted over 30 days, 54 USMC operations, and 10 EOD operations per year. All types of weapons up to 5.56 mm (0.2 in.) and 7.62 mm (0.3 in.) are proposed for use and would be fired in an easterly direction. Land demolitions up to 45-kg (100-lb) NEW would be used, as well as flares, illumination and pyrotechnics. No range facilities are proposed.

TAR 16—South VC-3 [54.5 ha (134.7 ac) (21.9 ha (54.2 ac) highly disturbed)]

Use of the Missile Impact Range as TAR 16 is addressed in the EA Small Arms, Demolition Ranges and Training Areas for NSW Group ONE at San Clemente Island, California, and the accompanying Biological Opinion FWS-2808, which is incorporated herein by reference and is superseded by this biological opinion. The Navy proposes to increase the size of the area identified as TAR 16 and expand the boundaries of the TAR beyond the boundaries of the MIR (from 21.9 to 54.5 ha (54.2 to 134.7 ac)) (Figure 4). The MIR is not proposed for an increase in size and would be delineated separately from TAR 16. Live fire would be conducted throughout the expanded TAR 16 area and demolitions would occur in much of this expanded area. The MIR is currently used for testing JSOW and Tomahawk Missiles by NSW as a parachute drop zone and tactical air assault area. At the target, SEALs would place explosive charges, demolish the target, and extract from the area via beach, airlift, or existing roads. Operations in this area include Strategic Reconnaissance, Live-fire, Land Demolition Activities, Direct Action, Convoy/Mounted operations, Parachute Drops, and UAV Training. Current operations include 77 operations conducted over 25 days, and proposed activities include approximately 187 operations over 50 days and two USMC battalion landings. Live fire is currently conducted within this area. Munitions proposed for use include 5.56 mm (0.2 in.) and 7.62 mm (0.3 in.), machine guns, and .50-caliber sniper and crew-served weapons mounted on vehicles, flares, pyrotechnics, tracers, and demolition charges up to 450-kg (1,000-lb) NEW. No construction would be necessary.

Figure 4. Revised boundary of Tar 16



TAR 17—Eel Point Tactical Training Range [4.8 ha (11.9 ac) (0.6 ha (1.5 ac) proposed development)]

Uses at TAR 17 are proposed to provide a shore-based location for safe, operationally realistic live-fire and high explosive demolition training for "actions at the objective" and support amphibious landings, OTB operations, and patrol to other land-based TARs. TAR 17 is currently used approximately 15 days per year. The site previously had demolition activities; however, demolition and live-fire activities are not currently conducted at this site. Proposed uses include more intensive assault and sniper training, live-fire exercises, as well as use by the USMC for insertion during Battalion Sized Landings and for CSAR operations.

Proposed operations include: Standoff weapons, Land Navigation, Direct Action, Demolition Training, and UAV Training. The operations would include a SEAL platoon conducting a pre-planned live-fire assault on a target. The platoon would covertly swim up to the beach, maneuver across the beach and assault a target, and return to the beach under live-fire conditions to escape. At the target the SEALs would place explosive charges on the target and demolish the target. Long-range sniper training would also be conducted. Baseline operations include 47 NSW operations conducted over 12 days and one CSAR operation; however, existing operations do not include live-fire training. Proposed operational use would be 115 NSW operations conducted over 25 days, two USMC Battalion landings, and 8 CSR operations with equal night and day use. All types of explosives (25 lb maximum net explosive weight), 5.56 mm (0.2 in.) and 7.62 mm (0.3 in.) rifles and machine guns, .50-caliber sniper/standoff, flares and pyrotechnics would be used. All explosives would be non-shrapnel-producing explosives.

The existing facilities within the area include a gate and a target building. No new facilities or site improvements are proposed at this TAR. The targets would be the same type of pop up targets used at other TARs. The targets for the sniper range are handset targets, meaning the targets are carried and setup by hand. The demolition area would be contained in the existing demolition area.

The beach exit is on the south side of Eel Point and is somewhat protected from the north. The exit consists of medium-sized rocks with a slope of 10 degrees up to the first marine terrace. The first marine terrace in the vicinity of the beach exit is a flat area traversed by an ephemeral drainage swale and an unpaved road. There would be no vehicle use off the existing roads and no expansion of the road system. Communication would be through the Motorola Base radio system. Clean-up procedures would be incorporated after each operation as per range instructions.

TAR 20—Pyramid Cove Training Area [67.6 ha (167.2 ac) (1.2 ha (3 ac) conc. use)]

This site is located in SHOBA and has been used extensively over the past decade for NSW training. Recently, it has become a preferred training location for Special Boat Team (SBT) 12, with its rigid-hulled inflatable boats (RIBs) and MK-V boats, Mobile Security Unit 31 and Naval

Coastal Warfare Group ONE. This TAR provides a tactical firing area close to the shoreline for water and land use. Since it is located within SHOBA, it has been used for live-fire training exercises. Proposed operations include Gunnery Exercises, Special Boat Unit Tactics, Firing from Boat to Boat, Boat to Shore, Small Arms Training, Land Navigation, OTB, Reconnaissance, Hot Extract from Beach, UAV, CAS, Land Demolition, Mounted Patrol, Direct Action, and IADs. Baseline training tempo included 64 operations conducted over 44 days. Proposed use includes 173 operations over 60 days per year. Live-fire and inert training munitions; small arms, .50-caliber rifle, .50-caliber machine gun on boats, 40 mm (1.5 in.), 25 mm (1 in.), 60 mm (2.4 in.), 81 mm (3 in.), 105 mm (4 in.), 127 mm (5 in.) (127 mm (5 in.) naval gunfire mounted on destroyer), 155 mm (6 in.), AT-4, and MK-19; land demolitions 45-kg (100-lb) NEW munitions, illumination rounds, tracers and pyrotechnics would be used onshore. Combat craft include RIBs and Boston Whalers.

No facilities would be constructed. No stationary targets would be in place for more than 1 day. This site is currently used 44 days per year and is proposed for 60 days of use.

<u>TAR 21—Horse Beach Cove Training Area [35.7 ha (88.1 ac) (4 ha (10 ac) conc. impacts)]</u>

This TAR provides an area close to the shoreline for day and night raids, insertion and extraction in proximity to a CQC target. The TAR is located within SHOBA and is used for live-fire exercises. Proposed training includes Gunnery Exercises, Land Demolition, Underwater Demolitions, Air assault, Platoon Pre-Planned Attack, Stand-off Weapons Employment, CAS, Special Boat Unit Tactics, Firing from Boat to Shore, OTB, Strategic Reconnaissance, Convoy/Mounted Drills, CQC, Hot Extract from Beach, VSW MCM, Direct Action, IADs, and UAV Training. Baseline use of TAR 21 includes 218 operations conducted over 79 days. The site is proposed for 455 NSW operations over 90 days, and 12 USMC operations using amphibious vehicles per year. Weapons use would include live-fire and inert training munitions; small arms, 9 mm (0.4 in.), 5.56 mm (0.2 in.), 7.62 mm (0.3 in.), .50-caliber, and training practice (not dud producing) 40 mm (1.5 in.); land demolitions up to 45-kg (100-lb) NEW and underwater demolitions up to 9-kg (20-lb) NEW. Flares, illumination rounds, tracers, and pyrotechnics would be used. Weapons firing would be conducted throughout 360 degrees. Some small building-like targets for CQC and small permanent facilities are proposed.

<u>TAR 22—China Cove Training Area (289 acres, 2 acres concentrated impacts)</u>

TAR 22 provides an area close to the shoreline for day and night raids and stand-off weapons employment in Impact Area II. Since the TAR is within Impact Area II, it is subject to live fire and demolition activities under baseline conditions. Proposed operations include Gunnery Exercises, Strategic Reconnaissance, Air assault, OTB, Insert/Extract, IADs, Land Navigation, Stand-off Weapons Employment, CAS, Land Demolition Training, and UAV Training. Baseline uses include 69 NSW operations conducted over 33 days and 63 non-NSW naval operations. Proposed use includes 143 NSW operations conducted over 40 days, 18 USMC operations, and 162 non-NSW naval operations per year. Proposed weapons use includes Live-fire and inert training munitions; small arms, .50-caliber, 30 mm (1 in.), 40 mm (1.5 in.), AT-4, 105 mm (4 in.), 127 mm (5 in.) naval gunfire, 155 mm (6 in.), Stinger Missile, and Light Anti-tank Weapon (LAW); land demolitions up to 227-kg (500-lb) NEW in an extension of Impact Area IIA (designated for heavy ordnance use) to the shoreline; flares; illumination rounds; tracers; and pyrotechnics. No range facilities are proposed

Table 2. TAR Ranges and BTS Sites on San Clemente Island

| TAR /BTS Site | Land Area (acres) | Area of Concentrated Impacts *(acres) | Changes in Uses Proposed | Baseline Use Days (ops) | Proposed Use Days (ops)* | Percentage Increase in Use Days (% increase in ops) |
|---|---|---|---|---|---|---|
| TAR 1 | 1.8 | All | YES (LIVE FIRE) | 23 (74) | 30 (169) | 30%(128%) |
| TAR 2 | 13.8 | 5.0 | NO | 5 (80) | 30 (140) | 500%(75%) |
| TAR 3 | 4.1 | All | NO | 82 (82) | 99 (202) | 21%(146%) |
| TAR 4 | 27.1 | All | NO | 176(176) | 237(604) | 35%(243%) |
| TAR 5 | 2.1 | 0.0 | NO | 10 | 55 | 450% |
| TAR 6 | 3.3 | Neg.* | YES | 0 | 10 | - |
| TAR 7 | None | None | YES | 0 | 10 | - |
| TAR 8 | None | None | YES | 0 | 10 | - |
| TAR 9 | 26.3 | None | YES | 16 | 33 | 106% |
| TAR 10 | 54.9 | 5.0 | YES (LIVE FIRE) | 3 (27) | 40(87) | 1233%(222%) |
| TAR 11 | 8.8 | 1.0 | NO | 4 (10) | 24 (35) | 500%(250%) |
| TAR 12 | 5.1 | .03 | NO | 11 | 19 | 72% |
| TAR 13 | 17.1 | 2.0 | NO | 29 | 54 | 86% |
| TAR 14 | 338.7 | 20.0 | YES (LIVE FIRE) | 15(59) | 67(195) | 347%(230%) |
| TAR 15 | 770.8 | 20.0 | YES (LIVE FIRE) | 20(120) | 100(329) | 400%(174%) |
| TAR 16 | 200 | 54.2 | NO | 25(77) | 58(189) | 132%(146%) |
| TAR 17 | 11.9 | 1.5+ | YES (LIVE FIRE) | 12(47) | 37(125) | 208%(166%) |
| TAR 18 | 0.6 | All | YES | 0 | 30(88) | - |
| TAR 19 | 2.4 | 2.4 | YES | 0 | 10(47) | - |
| TAR 20 | 167.2 | 3.0 | NO | 44(64) | 60(173) | 36%(170%) |
| TAR 21 | 88.1 | 10.0 | YES (EFV USE) | 79(218) | 104(467) | 32%(114%) |
| TAR 22 | 289.0 | 2.0 | NO | 99(132) | 222(323) | 124%(145%) |
| BTS 1 | 1.4 | 1.4 | NO | 7 (7) | 11(11) | 57%(57%) |
| BTS 2 | 0.5 | 0.5 | YES (DEMOLITION) | 7 (7) | 11 (11) | 57%(57%) |

| | | | | | | |
|---|---|---|---|---|---|---|
| BTS 3 | 0.9 | 0.9 | YES (DEMOLITION) | 7 (7) | 11 (11) | 57%(57%) |
| BTS 4 | 2.1 | 2.1 | YES (DEMOLITION) | 5 (5) | 7 (7) | 40%(40%) |
| BTS 5 | 0.9 | 0.9 | YES (DEMOLITION) | 3 (3) | 5 (5) | 67%(67%) |
| BTS 6 | 0.9 | 0.9 | YES (DEMOLITION) | 7 (7) | 11 (11) | 57%(57%) |
| BTS 7 | 13.8 | 13.8 | YES (DEMOLITION) | 10 (10) | 12 (12) | 20%(20%) |
| BTS 8 | 6.9 | 6.9 | NO | 15 (15) | 18 (18) | 20%(20%) |
| [Assumed: that battalion landing would entail 4 days use in VC-3 TARs and 3 days use in other TARs.] | | | | | | |

BTS 1 - Terrorist Training Camp (TTC)

Terrorist Training Camp (Figure 5a) provides an area near the BUD/S camp to practice day and night basic level NSW field exercises. Operations include Direct Action. Baseline use includes 7 NSW operations occurring over 7 days. Proposed use includes 11 operations over 11 days. Current weapons use includes small arms blank ammo, pyrotechnics (parachute/star clusters, grenade simulators, and smoke grenades) and explosives up to 2-kg (5-lb) NEW. The site consists of an existing bunker and a mobile mock missile launch platform. It also contains .50-caliber targets and is currently jointly used as the .50-caliber impact area. Two to three small target structures (10 x 10 ft2) would be added to the site.

BTS 2 - F-4 Aircraft

The F-4 (Figure 5b) provides training on rescuing personnel from a downed aircraft. Operations include Direct Action. Insertion to the site would typically be on foot, but it may occasionally be via helicopter. Baseline use includes 7 NSW operations occurring over 7 nights. Proposed use includes 11 operations over 11 nights. Current weapons use includes small arms blank ammo and pyrotechnics (grenade simulators). Proposed use would add explosives up to 2-kg (5-lb) NEW and pyrotechnics (parachute/star clusters, booby traps). The site consists of a downed aircraft. No improvements are proposed for the site.

BTS 3 - SAM Site

The SAM Site (Figure 5c) provides a basic NSW mock target missile site with multiple avenues of approach. Operations include Direct Action. Baseline use is 7 operations over 7 nights. Proposed use includes 11 operations over 11 nights. Current weapons use includes small arms blank ammo, pyrotechnics (parachute/star clusters), grenade simulators. Proposed use would add explosives up to 2-kg (5-lb) NEW. The site currently contains mock mobile missile launch platform and an existing plywood structure located on top of an existing concrete slab. Two to three additional small plywood target structures (10 x 10 $ft^2$) are proposed for construction on the existing concrete slab.

BTS 4 - Project “X”

Project “X” (Figure 5c) provides a challenging NSW basic level field exercise site for target location and attack. Operations include Direct Action. Baseline use is 5 operations over 5 nights. Proposed use includes 7 operations over 7 nights. Current weapons use includes small arms blank ammo, pyrotechnics (grenade simulators). Proposed use adds explosives up to 2-kg (5-lb) NEW and pyrotechnics (parachute/star clusters, grenade simulators). The site currently contains an existing target structure. The target structure would be repaired and an additional plywood structure (10 x 10 ft2) and target vehicles would be added to the site. The target vehicles would be located on existing roads.

BTS 5 - Skeet

The Skeet site (Figure 5c) provides a NSW basic level field exercise target site with multiple avenues of approach. Operations include Direct Action. Baseline use is 3 operations over 3 nights. Proposed use is 5 operations over 5 nights. Current weapons use includes small arms blank ammo and pyrotechnics (grenade simulators). Proposed uses add explosives up to 2-kg (5-lb) NEW and pyrotechnics (parachute/star clusters, grenade simulators). The site currently contains two existing structures. Two to three additional plywood target structures (10 x 10 $ft^2$) and vehicles would be added to the site.

BTS 6 - Lookout

Lookout (no Figure provided) provides NSW basic level field exercise night time target site overlooking a bluff. Operations include Direct Action. Current weapons use includes small arms blank ammo, pyrotechnics (grenade simulators). Proposed uses add explosives up to 2-kg (5-lb) NEW, pyrotechnics (parachute/star clusters), and grenade simulators. The site currently contains an existing structure. Three additional target structures (10 x 10 $ft^2$) would be constructed on existing concrete pads.

BTS 7 - Contact Drills

Contact Drills (Figure 5a) provides NSW basic level tactics training. The site is an existing graded automatic weapons range. Operations include Direct Action. Baseline use is 10 operations over 10 days. Proposed use includes 12 operations over 12 days. Current weapons include live-fire up to 7.62 mm (0.3 in.) and pyrotechnics (parachute/star clusters, grenade simulators, smoke grenades, and tracers). Live fire is directed westward towards the ocean. No new structures or uses are proposed for this site.

BTS 8 - Raids

Raids (Figure 5a) provide a safe location for NSW basic level live-fire weapons training. Operations include Direct Action and weapons training. Baseline use is 15 operations over 15 days. Proposed use is 18 operations over 18 days. Current use includes live fire up to 7.62 mm

(0.3 in.) and pyrotechnics (parachute/star clusters, grenade simulators, smoke grenade) and land demolitions up to 2-kg (5-lb) NEW. Live fire is directed westward towards the ocean. The site is graded and contains existing targets. No new structures or uses are proposed for the site.

Figure 5a-c. Location of BTS Sites

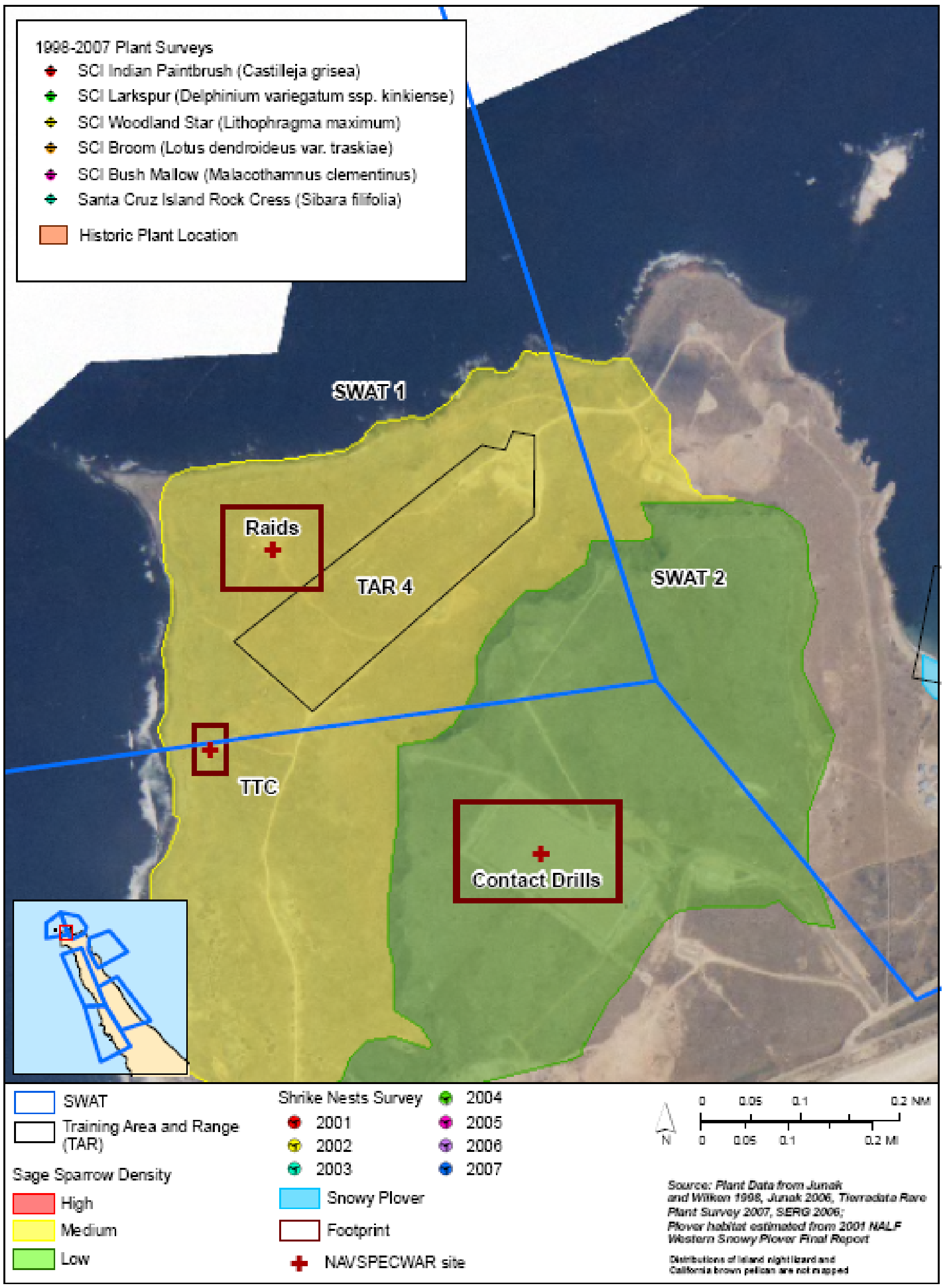


Figure 5b. Location of BTS Sites

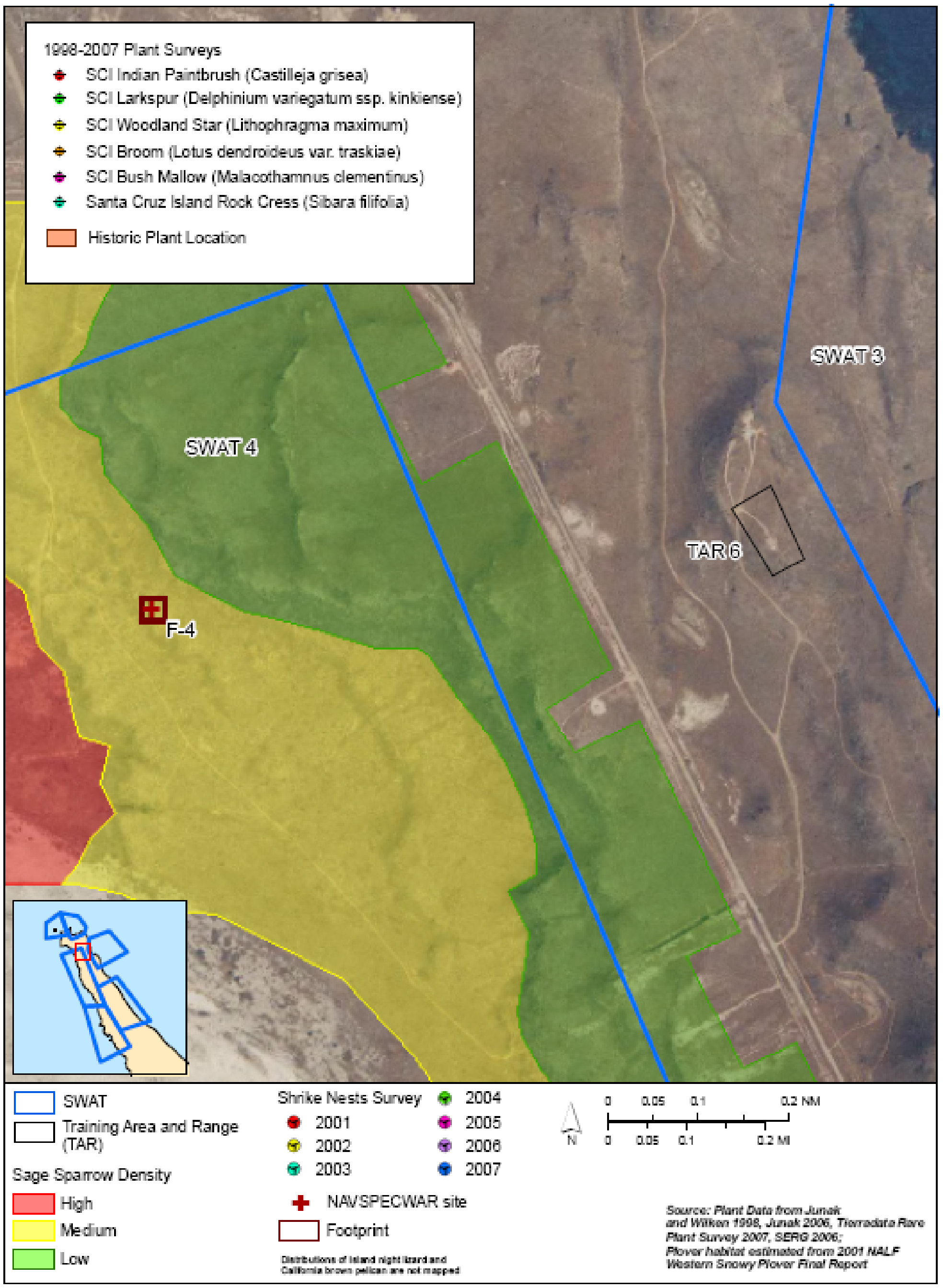
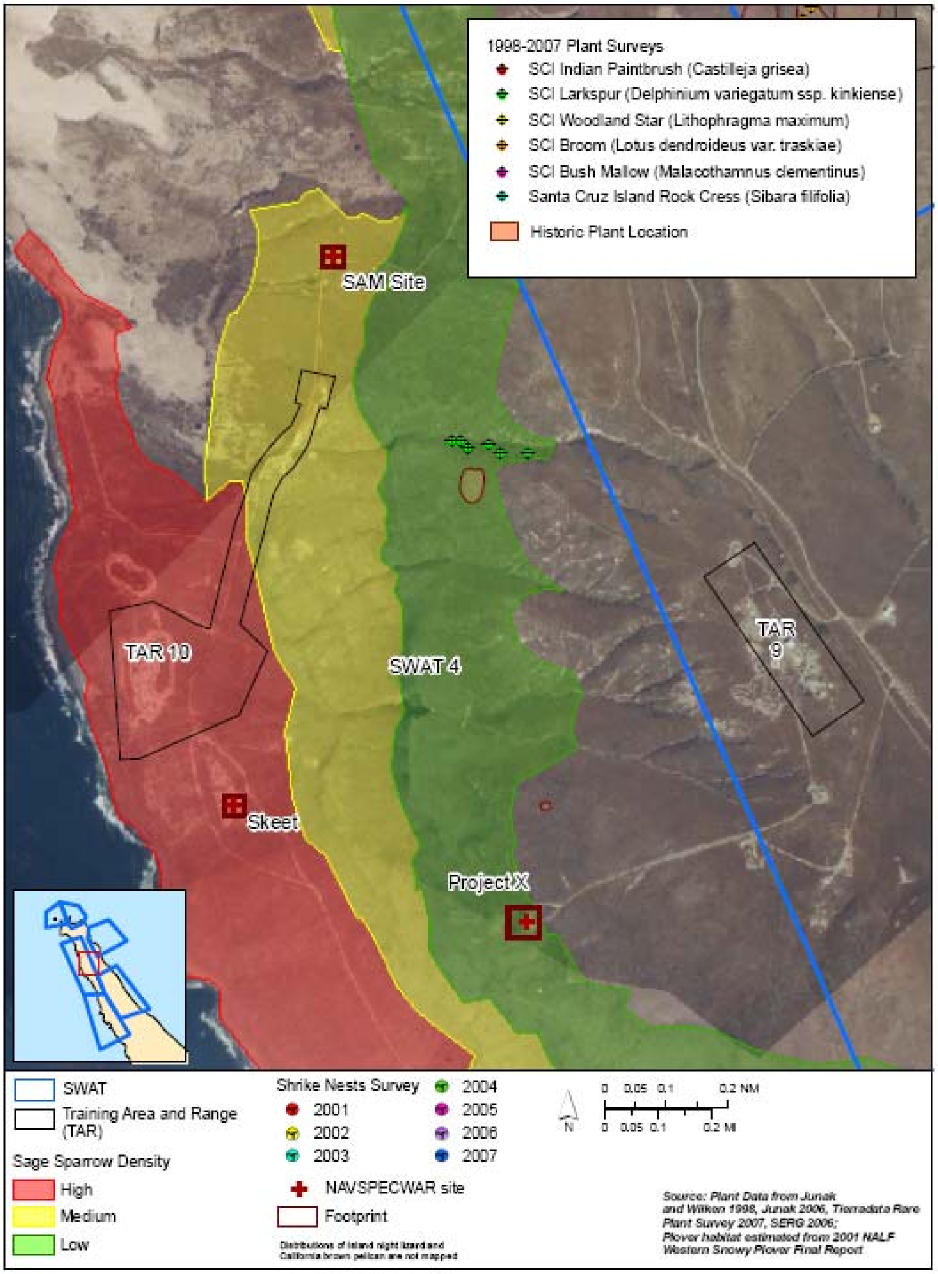


Figure 5c. Location of BTS Sites



2. **Introduction of new training exercises to San Clemente Island**

The Navy has administered San Clemente Island since 1934 as a location for training exercises and for research and development. While the entire island has been used throughout the years for various training activities, some activities and locations were discontinued during the ensuring years. Consequently, those discontinued activities and locations have not been included nor identified as part of the environmental baseline. The proposed action section of this biological opinion, however, now identifies activities previously discontinued, designates them as new training exercises, and places them in locations beyond those currently in use (Table 3).

Table 3. Proposed New Operations and New Uses in Existing Training Areas

| Navy Warfare Area | Operation | Proposed Annual Use Days (Operations) | Locations |
|---|---|---|---|
| USMC Amphibious Landings And Raids | Reconnaissance | 24 (12) | Entire Island |
| | Helicopter Assault | 12 (12) | VC-3 (AMP D) |
| | Armored Operations | 8 (4) | AVMC to SHOBA (AFP 1,6) |
| | Combat Engineers | 2 (2) | Northwest Harbor |
| | Small Boat Raid | 12 (12) | West Cove/ Eel Point |
| | Amphibious Assault Operations | 3 (3) | West Cove/ Horse Beach Cove (AVMC, AMP A,B) |
| | Amphibious Assault Vehicles Operations | 24 (8) | West Cove, AVMC to SHOBA (AMP C,D) |
| | EFV Company Assault | 2 (2) | Transit from West or Horse Beach Cove to VC-3 and SHOBA (AVMC; AMP C,D) |
| | Assault Amphibious School Company Battalion Landing | 75 (15) | Transit from West or Horse Beach Cove to VC-3 and SHOBA (AVMC; AMP D) |
| | Infantry Battalion-sized Amphibious Landing | 8 (2) | Entire Island (AVMA; AFO 1,6; AMP A,B,C,D) |
| | Stinger Firings | 4 | China Point |
| Naval Special Warfare Changes in Training at TARs and BTS sites | TAR 6- White House Training Area | 10 (10) | Above Wilson Cove |
| | TAR 7 – Saint Offshore Parachute Drop Zone | 10 (10) | Offshore Wilson Cove |
| | TAR 8 – West Side Nearshore Parachute Drop Zone | 10 (10) | Offshore western SCI |
| | Live Fire/Demolition Use TAR 10 | 40 (87) | West Shore |
| | Live Fire/Demolition Use TAR 14 | 74 (202) | VC-3 Area |
| | Live Fire Demolition Use TAR 15 | 100 (329) | VC-3 Area |
| | Live Fire Demolition Use TAR 17 | 42 (130) | Eel Point |
| | TAR 18 | 30 (88) | North Quarry |
| | TAR 19 | 10 (47) | South of Runway, Old Quarry |
| | Demolition Use BTS 2 | 11(11) | Northwest of Dunes |
| | Demolition Use BTS 3 | 11(11) | Flasher Road |
| | Demolition Use BTS 4 | 7 (7) | Upper West Shore |
| | Demolition Use BTS 5 | 5(5) | West Shore |
| | Demolition Use BTS 6 | 11(11) | Eastern Escarpment |
| | Demolition Use BTS 7 | 12 (12) | North of Runway |

Amphibious Landings and Raids

USMC operations and training at San Clemente Island would include ground forces, air elements, and service support operations. Amphibious assault landings within SHOBA would occur at Horse Beach, and landings outside of SHOBA would take place in West Cove and Northwest Harbor. Small units would also land on the western shore. Helicopter assaults and infantry operations would be conducted at the Old Airfield. Air operations, air-to-ground weapons delivery, and artillery firings would be conducted in SHOBA, as noted above.

Amphibious landings by the USMC on San Clemente Island would generally be made from Navy ships offshore. USMC units would come ashore in Landing Craft Air-Cushion vessels (LCACs), Amphibious Assault Vehicles (AAVs), and Expeditionary Fighting Vehicles (EFVs). LCACs are high-speed cargo carrying vessels, while the AAVs are lightly armored amphibious troop carriers. The LCAC's air cushion ability allows it to ride onto the beach to unload cargo, vehicles, and personnel. The AAVs are tracked vehicles which are carried aboard Navy ships and come ashore with Marines aboard. The EFV is under development to replace the AAV. Most of the landings at West Cove have been to get Marines ashore for training on other parts of the island (*e.g.*, VC-3 or SHOBA). The typical landing of a Marine company includes the use of one to two HMMWVs and one to two five-ton trucks. The large trucks are used to tow the M198 155 mm (6 in.) Howitzer. Light Armored Vehicles (LAVs) are also used in amphibious landings. The LAV is a high-speed, armored reconnaissance and personnel carrier. It has eight tires and can operate both on roads and rough terrain. However, on San Clemente Island, the LAVs are used only on prepared road surfaces. Any tracked vehicle, tank, AAV, or EFV would use the AVMC (which includes the AVMAs, AVMR, AVMR-SHOBA, AMPs and AFPs). Amphibious landing operations proposed for San Clemente Island include the following:

> Reconnaissance - Small Marine units (approximately 12 individuals) would be inserted onto the island by two UH-1 helicopters. The helicopters would come from amphibious ships offshore. The helicopters would land in flat areas at NALF, VC-3, or on a case-by-case basis, at any flat area that does not interfere with sensitive resources. The Marines then travel on foot to the objective area. They would conduct covert reconnaissance of the area for a follow-on assault. The reconnaissance units are extracted from the island by helicopters and return to the offshore ship. No live ordnance is used during these operations, and the total time of the exercise is approximately 48 hours. Most reconnaissance landings would occur at night, and minimal movement is planned for daytime.

> Helicopter Assault - This operation would consist of the airlift of approximately 150 Marines from amphibious ships offshore into a landing zone near the Old Airfield, VC-3. The aircraft would include CH-46s and CH-53s for inserting Marines and equipment. The force is also supported by AH-1 attack helicopters and AV-8B Harriers. The Marines would proceed to the north along the AVMR to the NALF airfield for to practice airfield seizure techniques. The forces would then leave the island by helicopters from

NALF back to the amphibious ships off shore. The exercise would last about 8 hours. Exercises take place during the day and night.

Armored Operations - These operations would use up to four M-1 tanks and four HMMWVs, which would arrive on the island at West Cove from Landing Craft Utilities (LCUs) and LCACs. Approximately 25 Marines would come ashore with the armor force. The tanks and HMMWVs would proceed to AFP 1 in SHOBA, escorted by two UH-1N/Y or AH-1W/Z and two AV-8B or F-35B helicopters, via the AVMR, AVMR-SHOBA, and nearby Ridge Road. Helicopters would typically fly at altitudes as low as 100 ft and up to 3000 ft depending on which mission they are flying, and what they are doing in the mission. In SHOBA, tanks would conduct live-fire operations from AFP 1, addressing targets in Impact Area I. The tanks would fire only target practice or HE ammunition, not illumination rounds. The exercise would last for 2 days. At the end of the exercise, the armor force would return to West Cove and re-board the amphibious vehicles. Operations would be mostly in the daytime.

Combat Engineer Operations - Combat Engineer Operations consist of approximately 30 Marines coming ashore from and LCU. On San Clemente Island, the proposed operation would consist of Marines coming ashore from an LCU in the Northwest Harbor area. They could bring three HMMWVs and one 5-t (11,023-lb**)** truck ashore and would conduct demolition training with live ordnance in the Northwest Harbor demolition training areas. The exercise would last for 1 day. The Marines would leave the island by LCU from Northwest Harbor. Most operations would be in the daytime.

Small Boat Raid - Small boat raids consist of six CRRCs coming ashore. On San Clemente Island, the proposed operation would occur on the southwest coast of San Clemente Island. Troops would avoid the marine mammal haul out areas. No movement would be authorized into the canyons along the shore. Each CRRC holds four Marines. The CRRCs would come ashore from a Navy amphibious ship afloat about 3.7 km (2 nm) from shore. The Marines would proceed inland on foot to a designated objective such as the Old Airfield, VC-3. After a simulated combat engagement at the objective, the Marines would return to the boats for transport back to the ship. No live ordnance would be used, and the total time of the exercise is approximately 6 hours. Small boat raids would occur mostly at night.

Amphibious Assault Operations - Typical Amphibious Assault Operations include landings by up to 10 AAVs (to be replaced by EFVs in the future). On San Clemente Island, the proposed operation would entail landings in West Cove and simultaneous offload of HMMWVs and LAVs from LCACs and LCUs at Wilson Cove. The two groups would link up on the AVMR and move to the south to SHOBA to conduct live operations. The proposed locations for live-fire operations include segments of Ridge Road, China Road, and Horse Beach Canyon Road that are close to Impact Areas; however, the boundaries for this activity have not been defined. The movement of Marine force could be accompanied by 4 to 5 helicopters, AH-1s, and an UH-1

Helicopters would typically fly at altitudes as low as 30.5 m (100 ft) and up to 914.5 m (3,000 ft) depending on which mission they are flying and what they are doing in the mission. In SHOBA, AV-8Bs could provide CAS during the exercise. These operations would usually take 2 days to complete. The groups would leave the island by moving north along Tank Trail and then into West Cove and Wilson Cove for re-boarding onto Navy amphibious ships. Most amphibious landings would occur in the daytime.

Amphibious Assault Vehicle and EFV Operations - These operations would involve up to 12 AAV and EFVs coming ashore in West Cove or Horse Beach Cove from amphibious Navy ships offshore. About 100 Marines would embark. The AAVs/EFVs would operate on the AVMC. The AAV/EFVs would proceed to the Old Airfield and conduct an assault on the objective in that area. When employed, EFVs would proceed to SHOBA and the nearshore waters to conduct live firing exercises. The length of the event would be approximately 8 hours, almost totally in the daytime.

EFV Company Assault - A company of 46 EFVs would depart naval shipping with 225-300 Marines embarked approximately 46.3 km (25 nm) from San Clemente Island to arrive at West Cove or Horse Beach Cove. The company would practice land maneuvers through the AVMR to the vicinity to VC-3, where the infantry would conduct an assault on the targets there. There would be no live-fire, but blanks and smoke charges would be expended. The EFVs would proceed to SHOBA and conduct live-fire on land with their 30 mm (1 in.) gun, 7.62 mm (0.3 in.) machine gun, and small arms. Live fire would occur on Ridge Road and/or China Point Road with EFV's firing into Impact Areas I and II. Live-fire would occur outside of the Impact Areas, but the targets are located within the Impact Areas. Existing targets or debris in the impact areas would be used as targets. Live-fire from sea to land would be accomplished in the SHOBA nearshore waters into the Impact Areas I and II. Sea to sea live-fire is planned to be conducted in the offshore waters of Laser Training Ranges 1 and 2 (5.6 km (3 nm) west of San Clemente Island) and Fleet Training Area Hot (FLETA HOT) 27.8 km (15 nm) south of San Clemente Island. The exercise would last 2 days. Following completion, the EFVs would traverse back to embarkation beaches via the AVMR and AVMR Extension.

Assault Amphibian School Battalion Operations - The Assault Amphibian (AA) School Battalion, located at Marine Corps Base Camp Pendleton (MCBCP), is the entry-level school for all USMC AAV crewmen and as such will also train EFV crewmen when that system comes on line in approximately 2009. Marines attending the entry-level training are under the full-time supervision of AA School Battalion instructors, and all of their activities are carried out in accordance with the Program of Instruction and associated lesson plans. The EFV would be equipped with a stabilized turret containing a 30 mm (1 in.) cannon and a 7.62 mm (0.3 in.) machine gun, both of which could be fired while the vehicle is on the move, either on land or at sea. In the proposed San Clemente Island operation two LCACs would carry five to six EFVs with approximately 50 Marine students and instructors embarked to arrive offshore near West Cove or Horse Beach Cove. The EFVs would be dropped off about 2.7 km (2 nm) from shore for student open water driving training.  The group would proceed via the AMVR to the vicinity of VC-3 for parking and bivouac.  Since this is a school training event and not tactical, it would be possible for the Marines to park the vehicles in an administrative pattern, which would lessen surface disturbance.  From VC-3 they would proceed to SHOBA for live-fire operations.  Live-fire operations were not defined in the BA, but they may include firing from Ridge Road in the direction of Impact Area I.  The need for targets has not been defined.  The vehicles would also enter the nearshore waters and practice firing from ship to shore.  The exercise is expected to last for 5 days and nights with only 3 days of live-fire, which would also be day and night.

Infantry Battalion-sized Amphibious Landing - Infantry battalion-sized amphibious landing, with opposing forces, is proposed for 1,500 personnel.  This exercise would last up to 4 days, employ the full combined arms team used by the USMC and occur up to 2 times per year.  The amphibious forces would land by helicopter (primarily CH-46s) and across the beach.  Amphibious landings would use rubber boats, LCACs, AAVs (after 2009 the EFV), and LCUs.  Approximately 200 naval gun rounds would be expended during each 4-day operation, approximately 400 per year associated with this exercise.

Proposed operations include the following sequence of events:

**Day 1**:  An opposition force of one company would land by helicopter at VC-3 and take up positions to defend the airfield.  This is estimated to involve 6 CH-46E or MV-22, 2 CH-53E, 3 UH-1N/Y or AH-1W/Z, and 2 AV-8B or F-35B helicopters.  The company of about 140 would bivouac in the field, remaining within the Infantry Operations Area.  That evening, a small reconnaissance unit (12 Marines) would land by rubber boat at Eel Cove and proceed overnight on foot to the outskirts of VC-3.  This movement would occur in tactical formation, across open country, not using established roadways. The recon unit would conceal themselves in positions to overlook VC-3 and report intelligence and operations information back to following units.  They would remain in place until it was safe to join the advancing infantry companies, which would land on Day 2.

**Day 2**:  One company of infantry personnel in rubber boats would land at Northwest Harbor, one company by LCAC and LCU at West Cove, one company (plus artillery) in LCUs at Wilson Cove, and one company at Horse Beach in SHOBA.  The northern companies (3) would assemble at the AVMA just south of the NALF Airfield and coordinate an attack on VC-3, using the Infantry Operations Area as the boundary of their operation.  The company landing at Horse Beach Cove would maneuver northward, using delineated egress lanes from the beach into the IOA and proceed within the IOA and along the AVMR-SHOBA and AVMR to VC-3.  During the attack the infantry companies would be in tactical formation, each company encompassing an area about 500 m (1,641 ft) on front, with about 5 m (16 ft) between individual marines.  Tanks, EFVs and other amphibious assault vehicles would remain in the AVMC.  The size (width) of the AVMC is a critical factor in providing a realistic training venue for armored vehicles.  A tank platoon of four M-1 tanks usually deploys in “Line,” Echelon, “Vee” or Wedge formation for engagement with an enemy.  Spacing is usually 50-100 m (164-328 ft) apart, with 150-300 m

(492-984 ft) needed just to advance the platoon. Maneuvering using the factors of Mission Enemy Terrain, Troops available and Time adds additional space. In areas of the AVMR and AVMR Extension where the track is narrowed to virtually a little more than road width will require the tank platoon to use only a Column formation, which limits the unit to an administrative move. All units would bivouac in the field, using port-o-potties. Bivouac would occur around staged vehicles. The attack could continue into Day 3.

**Day 3**: Operations would center on VC-3 with the attacking companies using the Infantry Operations Area and AMPs. Travel on foot would not be restricted to existing roads or trails. 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. Speeds of tactical vehicles would depend on whether they are participating in a mounted or dismounted attack. Mounted attack will probably move at about 12.9-19.3 kilometers-per-hour (km/h) (8-12 miles-per-hour (mph) (speed of the slowest vehicle, in this case an AAV-7). Dismounted attack (on foot) is at the speed of foot infantry, less than 3.2 km/h (2 mph). An administrative move by tanks or LAVs alone will move at approximately 32.2-40.2 km/h (20-25 mph) on the AVMC (wheeled vehicles on Ridge Road). AAVs alone don't move as fast, about 24.1-32.2 km/h (15-20 mph) on the AVMC. The commander will analyze the factors of Mission Enemy Terrain, Troops available and Time (METT-T) prior to moving and set the speed accordingly. For training purposes, USMC vehicle drivers are typically on blackout. But they can go on headlights if necessary to meet training needs. What is lost is that people in or around the vehicles cannot use their night vision goggles as they would in combat because the headlights wash out the goggles (too much light).

**Days 3 and 4**: Some companies would conduct an administrative movement to SHOBA while others remained in the VC-3 area for field training. All companies would eventually move to SHOBA in the areas around OP-1 and AFP 1. They would conduct an EFEX with live-fire.

**Day 4**: Forces would redeploy off the island. All units would exit off the island as they entered, with the exception of the Recon Force and Boat Company, which would redeploy by AAV from Wilson Cove. Aircraft would support all phases of the operation. Ground training operations would take place in day and night, with firing operations occurring in the daytime. Tracked and amphibious vehicles, once off the beach, would use the AVMC. Wheeled vehicles, artillery, and all personnel within SHOBA would use the AVMR roads and AFP/AMPs for maneuver and set-up of simulated and live-fire positions. Foot traffic would be limited to the shore landing areas and the IOA, which would encompass 3114.2 ha (7,695 ac) on the upland portion of the island. The companies would be administratively repositioned near their objectives after coming ashore to control ground-disturbing activities. The only use of live ordnance would be in SHOBA at AFP 1 for small arms, artillery fire, CAS, and naval gunfire. While most movement of personnel would occur at night, most of the live-fire operations (70-80 percent) would be in the daytime. Bivouacing of all personnel would occur in the field, primarily using areas at VC-3 and OP-1. A maximum of two operations are proposed per year.

Table 4. Battalion Landing Vehicles and Locations

| | | Offshore | VC-3 | AVMC | Eel Point | Horse Beach | NW Harbor | West Cove | Wilson Cove | Airfield | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LHD | | 1 | | | | | | | | | |
| LHA | | 1 | | | | | | | | | |
| LPD | | 1 | | | | | | | | | |
| LCAC Landing | 1st Wave | | | | | 2 | | | | | 2 |
| | 2nd Wave | | | | | 1 | | | | | 1 |
| | 3rd Wave | | | | | | | | 2 | | 2 |
| LCU Landing | 1st Wave | | | | | | | 2 | 2 | | 4 |
| | 2nd Wave | | | | | | | | 2 | | 2 |
| CRRCs | | | | | 3 | | 30 | | | | 33 |
| AAVs (EFVs after 2009) | | | | | | 12 | | 12 | 12 | | 12-14 |
| LAVs | | | | 20 | | 8 | | 4 | 8 | | 20 |
| FAVs | | | 6 | 12 | | | | | | 6 | 12 |
| HMMWVs | | | | 2 | | 2 | | | | | 2 |
| 7-ton Trucks | | | | | | | | | 8 | | 8 |
| M-1 Tanks | | | | 4 | | | | 4 | | | 4 |
| 155 mm Howitzer | | | | | | | | | 6 | | 6 |

Sources: Majors Tom Nemeth, G-3 I MEF; Keith Moore, 3d Assault Amphibian Bn; Michael Kennedy, XO, Assault Amphibious School Bn, 07 November 2001. Major Mike Lawrence, I MEF, 12 November 1999; LT Trovato, February 1998; and LT Griffin, January 1999. Major Wes Sanders, I MEF G-3, 2005

USMC Stinger Firings

The USMC Stinger firings would be conducted from two positions on-shore in SHOBA. The proposed positions include one at China Point and one near the shoreline adjacent to Impact Area II. The stingers would be fired toward the ocean and impact an aerial target over the ocean at ranges of from 1 to 8 km (0.6 to 5 mi.) offshore. Firing positions are temporary, and no construction would be involved. Missiles would be launched from an individual's shoulder, or from an Avenger (a HMMWV armed with eight Stinger missiles and one .50-caliber machine gun). The targets would be either Ballistic Aerial Targets (BATs) or Remotely Piloted Vehicles (RPVs) and would be launched from a catapult type launcher that would be temporarily set up at an existing cleared area on China Point. The BAT is a solid-rocket powered target and is not reusable. The RPV is a small, gasoline powered aircraft and is remote controlled. The RPV could be used repeatedly, if not damaged by the missile. The RPVs would land in SHOBA after the firing exercise. Training would be conducted predominantly in the daytime. This exercise is proposed to occur 4 times per year

Training Activities in Areas Identified as Infantry Operations Area, 4 Assault Vehicle Maneuver Areas, 1 Artillery Firing Point, 4 Artillery Maneuver Points

San Clemente Island currently supports limited tracked vehicle use and a limited number of amphibious vehicle landings per year. The proposed action includes significant increases in the amount of vehicular training conducted on San Clemente Island. Individual operations are identified within the description of USMC exercises (page 42). To facilitate and provide a venue for this training, the proposed action includes use of three AVMAs, 4 AMPs, and 2 AFPs (Figure 3). One artillery firing point has been used extensively in the past (AFP 1), and one is a newly established site (2004) that has been used twice. These sites would be used for operating assault vehicles, staging grounds for supporting vehicles and equipment, and bivouac areas for troops supporting the operations of the assault vehicles and other equipment. Assault vehicles would move between these areas on the AVMR, a stabilized dirt road that extends from West Cove Beach to the SHOBA gate, on Ridge Road in SHOBA, and on Horse Beach Road from Horse Beach to Ridge Road (Figure 6). The insertion points for assault vehicles would include Northwest Harbor, where vehicles would be offloaded from transport vessels, West Cove Beach, and Horse Beach.

Figure 6. Location of IOA, AVMAs, AFPs, and AMPs on San Clemente Island

**Naval Special Warfare Changes in Training at TARs and BTS Sites**

Several TARs that have no use under baseline conditions are proposed. In addition, the Navy proposes to expand the uses at several TARs in a manner that constitutes a new use. Many activities currently conducted at TARs leave little footprint, as platoons are small and activities often involve covert entry and exit on foot from objectives. The addition of small arms and demolitions to existing sites recognized as TARs changes the nature of use at these sites. The use of small arms and demolition charges are currently conducted at a subset of the TARs recognized on San Clemente Island, but these uses are proposed for several new locations on the island. The use of demolitions charges is also proposed for BTS sites where demolition activity does not currently occur. Introduction of live fire or demolition training into a TAR or BTS site is identified as a new training activity/location within the context of this biological opinion, even though some areas identified for this use experience baseline use of a different nature. Small arms training is currently conducted at TAR 2, TAR 4, TAR 20, TAR 21, and TAR 22. Demolition training is currently conducted at TAR 1, TAR 2, TAR 3, TAR 4, TAR 16, TAR 20, TAR 21, TAR 22. The Navy proposes to expand these training activities and conduct live-fire training and demolition training at TAR 9, TAR 10, TAR 14, TAR 15, TAR 16, TAR 17, TAR 18, and TAR 19. The Navy also proposes to conduct basic demolition training at BTS sites 2, 3, 4, 5, 6 and 7, which do not currently support this type of training. More detailed descriptions of these training areas are provided below.

<u>TAR 7— Saint Offshore Parachute Drop Zone</u>

This Drop Zone (DZ) would be in the offshore waters opposite Wilson Cove on the lee side of San Clemente Island. The purpose is to provide a DZ in offshore area for the parachute insertion of SEAL platoons and equipment. Operations include Ingress and Egress by Aircraft, CRRC Paradrop Insertion, Helicopter (Limp Duck) Insertion, Inflatable Boat Air Drop (Combat Duck), CRRC transit, Combat Personnel Parachute Drop Insertion, and UAVs. This area is proposed for approximately 10 operations per year over the course of 10 days. No live weapons or demolitions would be used.

<u>TAR 8—Westside Nearshore Parachute Drop Zone</u>

This Drop Zone is proposed in the San Clemente Island nearshore area to provide a windward-side water Drop zone for day and night parachute drops, personnel insertion, and underwater demolition. The TAR would be used for ingress and egress by aircraft, UAVs, CRRC Paradrop Insertion, Helicopter (Limp Duck) Insertion, Inflatable Boat Air Drop (Combat Duck), CRRC transit, Combat Personnel Parachute Drop Insertion. The area is proposed for approximately 10 operations per year.

<u>TAR 9—Adversary Building Complex</u>

TAR 9 is proposed to be used as an adversary-building complex. The area is heavily disturbed from past military activity. Existing buildings and facilities would be used as realistic simulated targets. Operations would include Tactical Environmental Movement, Direct Action, Close Quarter Combat, Urban Combat and Platoon Pre-Planned Attack, Helicopter Hover Personnel Insertion (Fast Rope), Tactical Ambush, Raid (Silent Assault), Land Navigation, Strategic Reconnaissance, and UAV training. Baseline use was 23 training days (NSW) and approximately 30 training days (NSW) and 14 USMC training days are proposed. No live-fire would be conducted outside existing buildings. Blanks and live-fire would be used in CQC facility with portable bullet traps. Small arms up to 5.56 mm (0.2 in.) and breaching charges are proposed for use in designated areas. Gates and signs would be constructed, and minor modification of the Photo Lab building would be required.

TAR 10—Demolition Range West [22.2 ha (54.9 ac) (2 ha (5 ac) developed for use)]

This site is currently used on a limited basis; however, proposed uses significantly increase the frequency of training activities and include range building construction and introduction of live-fire of training to this site. TAR 10 is proposed to encompass 22.2 ha (54.9 ac), but only 2 ha (5 ac) would be developed for use. Two ha (5 ac) of the site have concentrated impacts from historical use. TAR 10 would be used to provide a land-based location for safe, operationally realistic live-fire and high explosive demolition training. The site would support live-fire training for IADs with 180-360 degrees of live-fire. TAR 10 has a secondary mission of supporting OTB operations. The operations conducted at TAR 10 would include a SEAL platoon conducting a live-fire assault on a target. At the objective, the SEALs would place explosive charges on the target and demolish it. Clean-up procedures would be incorporated after each operation. This TAR would not include the use of any vehicles off road, and no new roads would be constructed. Access to the target area would be controlled. Range construction would last approximately 180 days. The site would usually be accessed by the road, and parking would occur in a lot adjacent to the proposed range building, or on existing roads. Existing uses include 27 operations conducted over 3 days; however, existing uses do not include use of live rounds or demolition charges. Proposed uses include 87 operations over 40 days, with equal night and day use. No USMC use of this area is proposed. All types of explosives (300 lb maximum) would be used, as well as blanks, smoke and grenade simulators, tracers, and small arms 5.56 mm (0.2 in.), 7.62 mm (0.3 in.), and .50 cal surgical sniper would be used. All explosives would be non-shrapnel-producing.

There are no existing facilities within the area. The proposed facility includes a parking area and a 20 x 30 $ft^2$ range building. The range building would be a concrete block structure. The building would be constructed on an existing previously disturbed site and would necessitate construction of a driveway to access the site. All construction would be conducted outside of the San Clemente sage sparrow breeding season, and all staging of construction vehicles would be accomplished within the existing disturbed footprint adjacent to the proposed range building. The building site would be flagged prior to construction activities to minimize the potential for disturbances to adjacent sage sparrow habitat. Erosion control measures that assure no offsite habitat degradation would be incorporated prior to construction activities. Such measures would entail review by the NRO botanist. Proposed use would include the use of small wooden structures as targets ranging in size from 50 to 500 $ft^2$. Structures would be temporary structures that could be demolished and rebuilt to support demolition training. Debris associated with target demolition would be removed from the site to reduce impacts to island night lizards. Erosion control measures would be implemented, if necessary, on the access roads and in the demolition area. The demolition area and target area would be located to the south and west of the existing oval berm onsite, as indicated in diagrams provided to the Service during consultation. The Motorola Base communication system would be incorporated for communication.

TAR 14—Onshore Parachute Drop Zone “Twinky”

This site is currently used extensively; however, proposed uses include live fire and demolition exercises. In addition, the proposed TAR boundaries overlap proposed boundaries of the VC-3 AVMA, which would support assault vehicle off road use.

TAR 15—VC-3 Airfield Training Area

This site is currently used; however, proposed uses include changes in the type of training conducted to include live fire and demolition exercises. In addition, the proposed TAR boundaries overlap proposed boundaries of the VC-3 AVMA, which would support assault vehicle off road use.

TAR 17—Eel Point Tactical Training Range [11.9 acres (1.5 proposed development)]

This site is currently used; however, proposed uses include direct action exercises involving live fire, which is not currently used at this site. Proposed uses include more intensive assault and sniper training, live fire exercises, as well as use by the USMC for insertion during Battalion Sized Landings and for CSAR operations.

Proposed operations include: Standoff weapons, Land Navigation, Direct Action, Demolition Training, and UAV Training. The operations would include a SEAL platoon conducting a pre-planned live-fire assault on a target. The platoon would covertly swim up to the beach, maneuver across the beach and assault a target, and return to the beach under live-fire conditions to escape. At the target, the SEALs would place explosive charges on the target and demolish the target. Long-range sniper training would also be conducted. Baseline operations include 49 NSW operations conducted over 14 days and one Combat Search and Rescue operation; however, existing operations do not include live fire training. Proposed operational use would be 120 NSW operations conducted over 30 days, 2 USMC Battalion landings, and 8 CSR operations with equal night and day use. All types of explosives (11.3 kg (25 lb) maximum NEW), 5.56 mm (0.2 in.) and 7.62 mm (0.3 in.) rifles and machine guns, .50-caliber sniper/standoff, flares and pyrotechnics would be used. All explosives would be non-shrapnel-producing explosives.

The existing facilities within the area include a gate and a target building. No new facilities or site improvements are proposed at this TAR. The targets would be the same type of pop up targets used at other TARs. The targets for the sniper range are handset targets, meaning the targets are carried and setup by hand. The demolition area would be contained in the existing demolition area.

The beach exit is on the south side of Eel Point and is somewhat protected from the north. The exit consists of medium-sized rocks with a slope of 10 degrees up to the first marine terrace. The first marine terrace in the vicinity of the beach exit is a flat area traversed by an ephemeral drainage swale and an unpaved road. There would be no vehicle use off the existing roads and no expansion of the road system. Communication would be through the Motorola Base radio system. Clean-up procedures would be incorporated after each operation as per range instructions.

TAR 18—Close Quarter Battle Training Complex (0.2 ha (0.6 ac))

TAR 18 is currently proposed for construction within the disturbed boundaries of the quarry northwest of the airfield. The purpose of the TAR would be to provide a set of moveable target buildings that realistically simulate a terrorist camp (hostage location) for SEAL training. The proposed design would support four different types of CQC scenarios at one time. The size of TAR 18 is 0.2 ha (0.6 ac), and the entire site could become disturbed. Operations that would be conducted at this location include: CQB Training, small arms fire, Helicopter Hover Personnel Insertion (Fast Rope) Tactical Ambush, Raid (Silent Assault), and Demolition Training. Once constructed, the facility is proposed for 88 annual operations conducted over 30 days each year. Small arms munitions including 5.56 mm (0.2 in.), 9 mm (0.4 in.), and small demolition charges under 2 kg (5 lb) would be used. All weapons firing would be inside non-ballistic walls with berms surrounding the complex.

No facilities exist at this site, but the following structures are proposed for construction: five bermed enclosures (four for shooting and one for command), four shooting mazes/houses/ temporary buildings with non-ballistic walls. The TAR's command building would be small with phones, a public address system, and a video system. The structures would include wood/metal construction. Communication off site would be via hard line phones with a phone to the gate for access control. Clean-up procedures would be incorporated after each operation.

TAR 19—Simulated POW Camp and SAM Site

This site would provide a site that realistically simulates a Prisoner of War (POW) holding camp (hostage location) in the immediate vicinity of a Surface-to-Air Missile site for SEAL training. The size of TAR 19 is 1 ha (2.4 ac), and the entire site is previously disturbed from the runway construction. Additionally, the area has been used most recently as a dirt quarry for road repair and barracks construction. Operations include Raid Training, small arms simunitions and blanks, Helicopter Hover Personnel Insertion (Fast Rope) Tactical Ambush, Raid (Silent Assault), Demolition (Breaching) Training. This site is not currently used for operations and is proposed for approximately 47 operations over the course of 10 days per year. No live-fire would be conducted, and 5.56 mm (0.2 in.), 9 mm (0.4 in.), simunitions and small demolition charges approximately 0.5 kg (1 lb) NEW would be used. Five small temporary structures are proposed. Communication off site would be via hard line phones with a phone to the gate for access control. Clean-up procedures would be incorporated after each operation.

BTS 2 - F-4 Aircraft

This site is currently used for small arms blanks and grenade simulators, but the proposed action includes additional training using 2-kg (5-lb) NEW demolition charges and parachute/star cluster pyrotechnics and booby trap pyrotechnics.

BTS 3 - SAM Site

This site is currently used for training that includes the use of small arms blank ammo, parachute/star clusters pyrotechnics and grenade simulators. Proposed use would add explosives up to 2 kg (5 lb) NEW and entail construction of 2 to 3 small plywood structures (10x10 $ft^2$) on an existing concrete slab.

BTS 4 - Project “X”

Project “X” site supports training that uses small arms blank ammo, pyrotechnics, and grenade simulators. Proposed use adds explosives up to 2 kg (5 lb) NEW and parachute/star cluster pyrotechnics. An existing target structure would be repaired and an additional plywood structure (10x10 $ft^2$) and target vehicles would be added to the site to support expanded training. The target vehicles would be located on existing roads.

BTS 5 – Skeet

The Skeet site provides a NSW basic level field exercise target site with multiple avenues of approach. Operations include Direct Action. Baseline use is 3 operations over 3 nights. Proposed use is 5 operations over 5 nights. Current weapons use includes small arms blank ammo and pyrotechnics (grenade simulators). Proposed uses add explosives up to 2 kg (5 lb) NEW and pyrotechnics (parachute/star clusters, grenade simulators). The site currently contains two existing structures. Two to three additional plywood target structures (10x10 $ft^2$) and vehicles would be added to the site.

BTS 6 – Lookout

Lookout provides NSW a basic level field exercise night time target site overlooking a bluff. Operations include Direct Action. Current weapons use includes mall arms blank ammo and pyrotechnics (grenade simulators). Proposed uses add explosives up to 2 kg (5 lb), and pyrotechnics (parachute/star clusters), and grenade simulators. The site currently contains an existing structure. Three additional target structures (10x10 $ft^2$) would be constructed on existing concrete pads.

BTS 7 - Contact Drills

Contact Drills provides NSW basic level tactics training. The site is an existing graded automatic weapons range. Operations include Direct Action. Baseline use is 10 operations over 10 days. Proposed use includes 12 operations over 12 days. Current weapons include live-fire up to 7.62 mm (0.3 in.) and pyrotechnics (parachute/star clusters, grenade simulators, smoke grenades, and tracers). Live-fire is directed westward towards the ocean. No new structures or uses are proposed for this site.

3. **Modification of the boundaries of Impact Areas I within SHOBA**

Impact Area I has been used for ship to shore gunnery practice for over 20 years (Figure 1e). The mouth of Horse Beach Canyon was previously outside the boundary of Impact Area I and supports a SEAL Team training area, TAR 21. TAR 21 is used for a variety of small arms training and land demolition activities. The Navy has now expanded the boundary of Impact Area I to include the mouth of Horse Beach Canyon and TARs 20 and 21.

4. **Revise Access Policy for Impact Areas I and II**

The Navy has recently revised its access policy to high explosive impact areas for both military and non-military personnel throughout the Navy Region Southwest. To reduce the risk to non-military personnel, for High Explosive Impact Areas (including Impact Areas I and II), the policy explicitly states: “Any activity associated with archeological or biological monitoring and surveys or recreational use (to include hunting) is strictly prohibited.”

5. **Implement San Clemente Island Fire Management Plan**

The Navy proposes to implement a FMP for San Clemente Island to increase training flexibility and to offset the anticipated increase in ignition sources as a result of expanded training activities described in this biological opinion.

The FMP is planned to shape fire-related policy, management, and decisions on San Clemente Island for 5 years (2009-2014). Its primary purpose is to increase military training flexibility while complying with environmental laws and achieving sustainable ecosystem management. The FMP is intended to protect personnel, facilities, training areas, and natural and cultural resources of the island from fire damage and to prioritize assets to be protected in the event of a fire. Prior to the end of time period covered by the FMP, the FMP Working Group will convene to determine whether an update is needed. Beyond 2014, the Navy will continue fire management on San Clemente Island in accordance with the FMP or its update. The Navy will consult with the Service, as necessary, on continued adherence to the original FMP or implementation of its update.

San Clemente Island, the southernmost of the California Channel Islands, has been administered by the Department of Defense as a military installation since 1934. Military training activities, facilities maintenance, and other human activities have contributed to a high fire frequency on the 14,164.5 ha (35,000-ac) island. San Clemente Island has experienced a shortened fire return interval due to frequent human-caused ignitions. Measures to reduce the frequency of wildfire have been implemented since 1997 and have included prevention measures (scheduling operations with high ignition potential outside a "fire season" and electrical system improvement), containment measures (vegetation management and use of prophylactic fire retardants), and suppression measures (staging and use of suppression resources). The 2005 draft FMP includes similar measures directed at prevention, fuels management, and suppression. The proposed FMP calls for increased funding, improved oversight, improved coordination, and improved reporting in areas pertaining to fire management. Significant changes to the fire fighting infrastructure are proposed to allow improved oversight, coordination, and reporting.

Whereas recent fire management on San Clemente Island has focused on two areas, (1) prevention primarily by temporal modifications to incendiary use and other high risk training during a lengthy "fire season" and (2) containment using fire and fuel breaks, a need for increased training flexibility is driving the proposed revised approach. Real-time assessment of fire risk (and associated ignition source reductions/ suppression asset availability), as proposed in the draft FMP, is expected to allow an increase in training capability throughout the calendar year while protecting personnel, facilities, and natural and cultural resources from fire damage. Due to the uncertainty associated with the size, location, and frequency of future fires that may occur on San Clemente Island, the FMP also identifies thresholds for re-evaluation of fire management in several plant communities on the island.

*Prevention*

Managers and users of San Clemente Island currently use a Fire Danger Rating System (FDRS) based on two ratings; Fire Season and Non-Fire Season. The ratings are based on information from the U.S. Forest Service (Forest Service) and local conditions (FMP, Encl 8, p.2). The dates of the fire season on San Clemente Island are currently determined and disseminated annually to all island tenants and users. During the fire season, the use of pyrotechnics is limited, the size of target areas is administratively reduced, and aerial suppression units remain on standby during operations that could cause fires. The current approach does not allow for day to day assessment of variation in the conditions on the island, but rather a broader, more conservative estimate of the general fire risk on the island. The current approach to prevent ignitions appears to be successful based on recent fire history on the island (FMP, Appendix D), but results in a lengthy period each year during which some training activities may not occur or may only occur during the early morning hours.

The proposed FMP proposes to refine the process for assessment of ignition risk on the island and modify the level of fire suppression resources required to be present during training activities. Implementation of the plan would entail adoption of the Forest Service FDRS and require a sophisticated network of weather inputs that would be disseminated daily on a web site. The Navy would continue to recognize the current designations of Fire Season and a Non-Fire Season, but they would also use daily/hourly weather conditions to determine the risks of ignition daily or throughout the day during the fire season. In addition, the Navy would use weather information to assess fire risk during all periods that could increase the potential for ignition. Training activities would then be aligned with appropriate suppression resources to reduce the potential for wildfire. Collection and dissemination of data to accurately assess the real time weather conditions on San Clemente Island is contingent upon installation and maintenance of Remote Automated Weather (RAW) stations and on staffing and training a Fire Coordinator. To date, six RAW systems are functional on San Clemente Island: at the Target Shop (airfield), Wilson Cove, Mt Peak, REWS, OP-1, and OP-3. RAW stations will be properly functioning and accessible for fire weather information prior to modifying existing training restrictions to assure that ignition risk is known. Collection and dissemination of vegetation data pertinent to fire risk assessment is dependent upon botany contractors on San Clemente Island and clear communication between those collecting this data and the Fire Coordinator. Vegetation conditions are variable between the plant communities on the island (*i.e.*, some shrub communities become drier and more flammable earlier than others), so precautions necessary to reduce the potential for wildfire may vary accordingly.

The Forest Service FDRS, as proposed for use on San Clemente Island, uses five Fire Danger Ratings, which are color coded Blue (lowest risk), Green, Yellow, Orange, and Red (highest risk). Based on the Fire Danger Rating, a generalized statement pertaining to “Caution to be Exercised” and “Necessary Precautions” would be recognized and adhered to by island users (Tables 5 and 6). SHOBA, including TARs that are within SHOBA (TARs 20, 21, and 22), would have a set of necessary precautions (Table 5) that differ from those used at TARs that lie outside of SHOBA (Table 6). The use of the FDRS would increase the potential types of training conducted during the Fire Season, over those that are currently conducted, if weather/moisture conditions indicate that fire risk is low or moderate, as defined in the FDRS.

The necessary precautions and allowed activities outlined in Table 4 are based on certain assumptions regarding suppression, including: 1) 3-minute notification of the first fire observation; 2) 5-minute fire engine getaway; and 3) 30-minute response to fire escaping fuelbreaks around Impact Areas, MIR, or other approved fuelbreaks. The necessary precautions and allowed activities outlined in Table 6 (TAR precautions) are based on the assumption of a 10-minute response time to the scene with a quick-attack fire suppression apparatus. This assumes that equipment and parties trained to appropriately use this equipment will be onsite during training operations that have ignition potential. Assumptions regarding response time require that fuelbreaks, drivable roads, and full water storage tanks (VC-3, Mt. thirst, TAR 10) be in place at the start of fire season.

Table 5. Fire Danger Rating and Precautions for SHOBA

| Fire Danger Rating | Caution to Be Exercised | Necessary Precautions |
|---|---|---|
| **LOW**<br><4 mph 20-ft wind speed><br>11-12% 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. Consistent with NALFSCIINST 5560.4D, smoking is not permitted in vehicles or in remote areas of San Clemente Island.* Any designated training area with required fuel treatment using retardant fuelbreaks and strip burning must be completed by start of fire season annually. |
| **MODERATE**<br>4-5 mph 20-ft wind speed<br>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 all required fuelbreaks are in place. This condition is the beginning of a fire ignition concern. Any type of small arms rounds or other non-incendiary ordnance may be used within designated ranges. The use of pyrotechnics, demolitions, white phosphorous and illumination ammunition and other heat/flame producing devices within designated training areas (outside of SHOBA Impact Area I & II or other area with fuel treatment meeting standards of the Fire Management Plan or its amendment) will be limited as much as possible to night time activity, a cleared area, or areas previously burned over. Training exercises using heat/flame producing devices will be conducted in the night time, early morning (before 1000 hours) or late evening (after 1900 hours) when relative humidities can be expected to be at their maximum. |
| **HIGH**<br>5-8-mph 20-ft. wind speed<br>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 all required fuelbreaks are in place. A helicopter will be placed on fire alert on San Clemente Island between 0900 and one-half hour after sunset whenever training activities are scheduled within SHOBA such that the aircraft can be airborne in 5 minutes. Other San Clemente Island military helicopter missions can take place during this fire alert; however, a fire dispatch should be given a high priority. North of SHOBA, and apart from NSWG TAR use, a quick-attack fire engine and crew will meet the 3-minute notification, 5-minute getaway, and 30-minute on-site criteria in the event of a fire. This fire suppression apparatus scheduling and location to be coordinated with SCORE. Use of TARs north of SHOBA is guided by a separate FDRS. |
| **VERY HIGH**<br>8-10 mph 20-ft wind speed<br>5-8% 1-hr FFM | Extra protection caution. Fires will start easily and spread rapidly. Fires are expected to exceed 100 acres in 1 hour and burn very hot. Fires will be hard to contain at designated roads and fuel treatment areas without aerial suppression assets and 2 wildland fire engine companies. | All High Fire Danger Precautions are in place. Firing of all types of ammunition will be permitted at all times, unless restricted by the Range Manager. Restrictions on the use of pyrotechnics, demolitions, illumination ammunition and heat/flame producing devices (including blanks and tracers), and white phosphorous will be in place for all other designated training areas during the period of 0800 to one-half hour after sunset. However, these restrictions will not apply to night time (1900 to 0800 hours) training activities, in cleared areas or previously burned areas.<br><br>A helicopter with crew and water bucket is to be placed on fire alert during daylight hours whenever training activities are scheduled within SHOBA. This helicopter will be allowed to conduct other missions, providing the water bucket and water re-fill capabilities are appropriately placed such as at VC-3 or the helopad at OP-3, and ready for pick up by the helicopter crew, and meets the criteria of a 30-minute elapsed time for responding to the site of any fire occurring on the southern end of San Clemente Island. Firefighting will then be designated as the "highest priority" mission, except for those routine ignitions within SHOBA Impact Area I & II. Fires inside SHOBA Impact Area I & II that have the potential to go beyond Impact Area I & II boundaries will be considered the same as any other wildland fire during this fire danger period. All other fires within Impact Area I & II will not be considered "highest priority" missions. Outside of SHOBA, a quick-attack wildland fire engine, with a 3-person crew, is to be located in the vicinity where the highest fire hazard military training is taking place. This means a safe distance away with line-of-sight visibility, as approved by the Range Safety Officer/Safety Observer. The decision about where to put standby firefighting resources will be approved by the Wildland Fire Coordinator, who will coordinate with the Range Safety Officer/Safety Observer and with SCORE. |

| Fire Danger Rating | Caution to Be Exercised | Necessary Precautions |
|---|---|---|
| **EXTREME**<br>>10 mph 20-ft wind speed<br><5% 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 rates of speed and by long distance spotting. Fires will burn at unacceptable intensities. | All Very High Fire Danger Precautions are in place. A helicopter, pilot and crew will be on ready fire alert at the San Clemente Island Auxiliary Landing Field, and will not be assigned any other mission, except upon specific agreement between the Wildland Fire Coordinator and the Range Manager. |
| * NALFSCIINST 5560.4D defines remote areas as anywhere except Wilson Cove, Airfield, West Cove Beach and paved roadways, which includes the unpaved portion of SAN CLEMENTE ISLAND Ridge Road south of VC-3 to Stone Gate. No smoking between the plane and the terminal at the Airfield. | | |

**Note**: "Fire Danger Rating" and "Caution to be Exercised" section is synonymous to that found in to Table 1. "Necessary Precautions" differ from Table 1.

Table 6. Fire Danger Rating and Precautions System for TARs outside of SHOBA.

| Fire Danger Rating | Caution to Be Exercised | Necessary Precautions |
|---|---|---|
| *In all cases, the initial response will be to take immediate action to suppress the fire (if deemed safe) and call the Fire Department. Federal Fire and the Range Safety Officer/Safety Observer will jointly decide if it is safe for the exercise to continue or be postponed until after an incident. The road from just south of the dunes to approximately Marine Terrace Canyon or about 3,100 yards (range of tracers used) from TAR 10 must remain passable for access for firefighting and function as a firebreak. For TAR 17, the unpaved road to Seal Cove along the LMU boundary should remain passable by two-wheel-drive emergency vehicles to the canyon directly east of Eel Point. A gate should be installed at that location. Beyond this point, the road should remain passable by 4-wheel-drive emergency vehicles. Emergency personnel should have access through the ordnance magazine area as necessary for fire suppression. Standby quick-attack fire apparatus location will be approved by the Wildland Fire Coordinator, who will coordinate with the Range Safety Officer/Safety Observer and with SCORE. Scheduling of quick-attack to be coordinated with SCORE.* | | |
| **LOW**<br>4 mph 20-ft wind speed[1]<br>11-12% 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 within a designated TAR during this condition.<br>Consistent with NALFSCIINST 5560.4D, smoking is not permitted in vehicles or in any designated TAR. |
| **MODERATE**<br>4-5 mph 20-ft wind speed[1]<br>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 are in effect. This condition is the beginning of a fire ignition concern. Standby fire truck and quick action by wildland fire trained and qualified cadre members is essential to minimize any fire spread during this or higher condition. Whenever any type of incendiary ordnance is in use within a designated TAR, a fully equipped fire truck, with a minimum of 500 gallons of water, and staffed with 3 wildland fire certified personnel shall be placed in the vicinity where the training is taking place and available to take initial action. The decision about where to place the standby fire engine will be that of the Range Safety Officer/Safety Observer, but there must be line-of-sight visibility and the ability to be pumping water within 10 minutes of an ignition report. The use of pyrotechnics, demolitions and other heat/flame producing devices within that TAR will be limited as much as possible to night-time activity, a cleared area or areas previously burned over. Training exercises using white phosphorous, illumination and tracer heat/flame producing ordnance devices may be conducted in the early morning (before 0800 hours) or late evening (after 1900 hours) when relative humidity is at its highest. One cadre member shall be equipped for and trained in the proper technique in taking on-site wildland fire weather. Weather recordings will be taken every two hours during any training exercise using heat producing |

| | | |
|---|---|---|
| | | ordnance or devices, and restrictions added if the Fire Danger Rating increases. The only exception is when the on-site night-time weather recordings indicate that Fire Weather conditions have reduced to LOW. |
| **HIGH**<br>5-8-mph 20-ft. wind speed[1]<br>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 in grassland. | All Moderate Fire Danger Precautions are in effect. Restrictions on the use of pyrotechnics, demolitions, illumination, heat/flame producing devices (including blanks and tracers), and white phosphorous will be in place for all TARS during the period of 0800 to 1900 hours. However, these restrictions do not apply to night-time (1900 to 0800 hours) training activities, in cleared areas or previously burned areas. The only exception is when the on-site night-time weather recordings indicate a reduction in Fire Weather condition to MODERATE. |
| **VERY HIGH**<br>8-10 mph 20-ft wind speed[1]<br>5-8% 1-hr FFM | Extra protection caution. Fires will start easily and spread rapidly. Fires are expected to exceed 100 acres in 1 hour and burn very hot. Fires will be hard to contain at designated roads and fuel treatment areas without aerial suppression assets or 2 wildland fire engine companies. | All High Fire Danger Precautions are in place. Firing of all types of non-heat producing ammunition will be permitted at all times within a designated TAR. If an ignition occurs, training will cease and firefighting will be designated as the "highest priority" mission. |
| **EXTREME**<br>>10 mph 20-ft wind speed[1]<br><5% 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 rates of speed and by long distance spotting. Fires will burn at unacceptable intensities. | All Very High Fire Danger Precautions are in place. If already on standby for other training missions, the helicopter, pilot and crew on ready fire alert at the San Clemente Island Auxiliary Landing Field will be summoned for suppression support. |
| • NALFSCIINST 5560.4D defines remote areas as anywhere except Wilson Cove, Airfield, West Cove Beach and paved roadways, which includes the unpaved portion of SCI Ridge Road south of VC-3 to Stone Gate.<br>• [1] The 20-ft windspeed is the windspeed measured at 20 feet above the ground surface. The wind gauges on San Clemente Island will be placed as close to 20 feet as possible when mounted on available existing structures to assure accurate information pertaining to the 20-ft windspeed. | | |

Use of the FDRS, as proposed in the FMP is contingent upon filling a significant position on San Clemente Island, that of Wildland Fire Coordinator. The individual that fills the position needs to have experience that would allow for the following duties, as identified in the FMP:

1) Chart live-fuel moisture in key fuel species, including California sagebrush (*Artemisia californica*), California boxthorn (*Lycium californicum*), coyote bush (*Baccharis pilularis*), to declare the start and end of fire season. The start and end of fire season would be declared when the live fuel moisture reaches or drops below 200 percent. Live fuel moisture at four appropriate sites on San Clemente Island once per month would occur and analysis of the live fuel moisture would proceed based on the techniques described on 4-16 and 4-17 of the FMP;
2) Measure fine fuel moisture daily;
3) Map perimeters of all fires;
4) Notify the OIC regarding the condition of vegetation and the start of fire season;

5) Organize a training program for FFD San Diego personnel assigned to San Clemente Island (BA 2-39);
6) Appoint military and civilian personnel to assist in support of suppression efforts during a wildland fire incident on San Clemente Island (BA 2-39);
7) Act as the Fire Departments principal liaison with Military Operators, Aviation Units, and Natural Resources staff;
8) Coordinate all wildland fire training, collection and dissemination of fire weather and Fire Danger Rating information to island users, make necessary notifications and interpret restrictions based on the fire weather information and pre-planned operational guidelines; and
9) In coordination with NRO staff, manage implementation of proposed San Clemente Island prescribed fire and fuelbreak projects, including application of fire retardant and prepare annual budget requests.

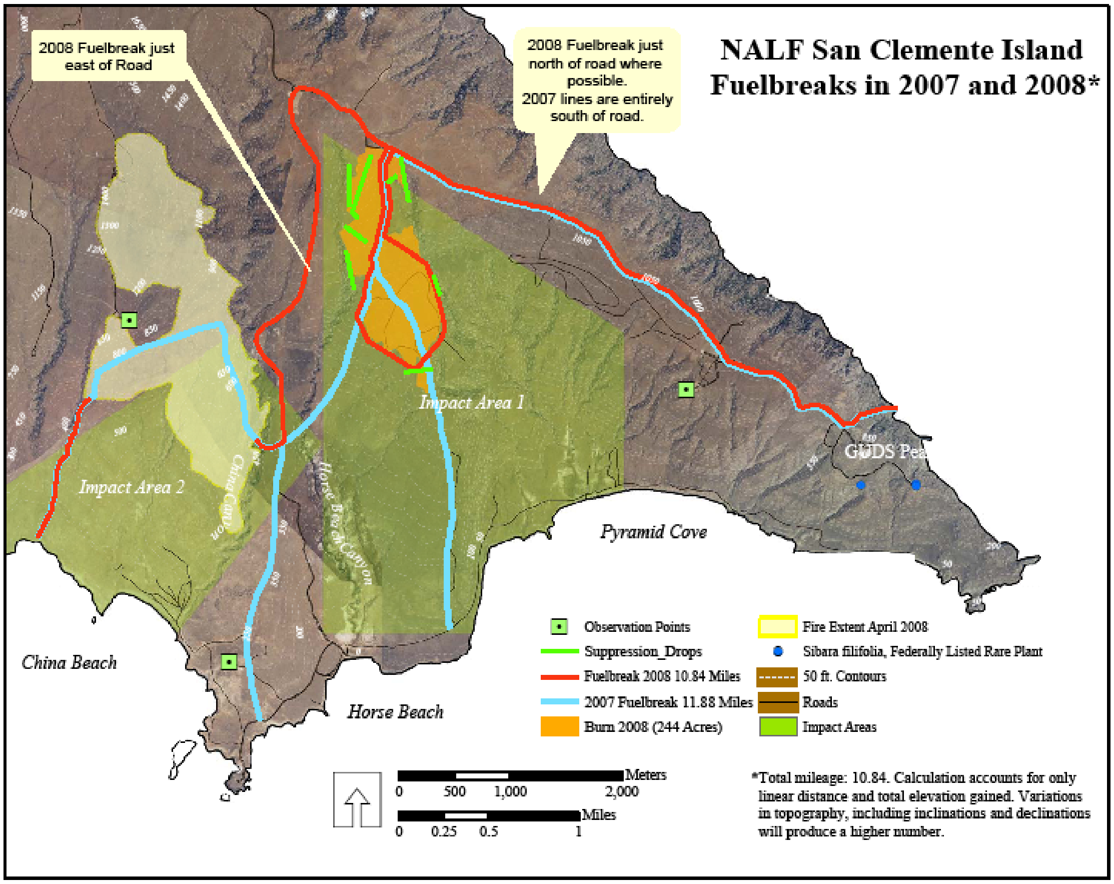
The Wildland Fire Coordinator would be hired (or designated) and trained prior to modifying existing training restrictions or increasing distribution of ignition sources on San Clemente Island to assure that the duties listed above are accomplished. The equipment and tools necessary for this staff person to accomplish the duties listed above will be in place prior to any increases in distribution of ignition sources.

*Fuels Management*

Managers of San Clemente Island currently conduct fuel management activities on a case-by-case basis to provide protection from escape of fire from Impact Areas 1 and 2. A series of existing fuel breaks have been installed in the general vicinity of most areas proposed for continued maintenance as part of the proposed FMP (Figure 7). In addition, existing roads have been considered and used as fuel breaks. Current fuel management activities entail coordination with the Shrike Working Group to reduce the potential for incidental take associated with installation of fuel breaks.

The FMP proposes continued maintenance of existing fuel breaks using fire retardant (Phos-Chek D75-F), development of new fuel breaks, maintenance of existing roads as firebreaks, use of controlled burns including strip burns (Figure 7) (FMP, 4-26). The proposed FMP also mentions three types of fuels management: 1) high intensity fuels management safety corridors or buffer zones; 2) defensible space around structures; and 3) low-intensity landscape modifications with prescribed fire that meets fuels management, resource protection, and habitat restoration goals. Conservation measures that minimize the potential for effects to listed species will be included in annual plans as they are developed in coordination with the Service for controlled burns, vegetation removal, or herbicide application.

Figure 7. San Clemente Island 2007-2008 Existing Fuelbreaks, and General Location for Proposed Fuelbreaks.




*Suppression*

The draft FMP proposes to revise the level of fire suppression resources required to be present during training activities based on revised assessment of ignition risk as defined by the FDRS (FMP Tables 4 and 5, page 59). Suppression resources include aerial assets.

*Infrastructure Improvement*

The draft FMP identifies road network improvement as necessary to improve access and response to fire emergencies and indicates that road design, construction, and maintenance should be to a standard that functions as a fuelbreak, is secure from erosion, and capable of supporting a Type 3 equivalent fire engine.

*Habitat Thresholds and Proposed Review Process*

The Navy proposes to review the fire management processes and ignition sources if fires exceed threshold levels defined in the fire management plan. In addition, the Navy proposes to review fire occurrence and fire management on an annual basis and incorporate changes to management practices identified as necessary during this process. Thresholds that would trigger immediate review of fire management are delineated by habitat type for several plant communities of special management concern:

- High density boxthorn/sage sparrow habitat - Patch size of 2 ha (5 ac) and a total burned area of 18.2 ha (45 ac) over 5 years
- Moderate density boxthorn/sage sparrow habitat - Patch size of 8.1 ha (20 ac)
- Low density boxthorn/sage sparrow habitat - Patch size of 16.1 ha (40 ac)
- Canyon shrubland/woodland - Patch size of 1.2 ha (3 ac) and total burned area of 12.1 ha (30 ac) over 5 years
- Maritime sage scrub - Patch size of 80.9 ha (200 ac)
- Grasslands – Patch size of 121.4 (300 ac)

These thresholds would only apply to fires of moderate severity or higher (Score 3 on NPS scale), and fires would be quantified in 0.2 ha (0.5-ac) mapping units. Thresholds would not apply to habitat north of the runway in the vicinity of TAR 4 and Whale Point, although the location and acreage of fires that occur in this area will be reviewed during annual reviews.

6. **Implementation of ongoing natural resource programs and other conservation measures to monitor, avoid and/or minimize potential impacts to federally listed species**

The Navy will implement the following measures to avoid and/or minimize potential adverse effects of the proposed action on federally listed species:

Proposed General Conservation Measures (G-M 1-9)

- **G-M-1.** The Navy will continue invasive exotic plant species control on an island-wide scale, with an emphasis on the AVMC, the IOA, TARs, and other operations insertion areas such as West Cove, Wilson Cove and the airfield. Due to access restrictions, however, invasive species control would not be possible within the Impact Areas except in Tar 21, as described in measures SCBM-M-1. A pretreatment survey to identify areas needing treatment, one treatment cycle, and a retreatment cycle (when necessary) will be planned each year to minimize the distribution of invasive species. The focus of the invasive exotic plant control program will continue to be the control of highly invasive exotic plants that have the potential to adversely impact habitat for federally listed species in known locations and the early detection and eradication of new occurrences of such species. Where feasible, the Navy will include future construction sites in a treatment and retreatment cycle prior to construction.

- **G-M-2.** The Navy will continue feral cat and rat control and monitoring efforts as long as they are demonstrated to support listed species recovery and population maintenance. To reduce human-induced increases in the feral cat and rat populations, the Navy will ensure that personnel do not feed cats and that all trash, food waste, and training refuse are disposed of properly in animal proof containers.

- **G-M-3.** The Navy will continue implementation of its INRMP, including ongoing monitoring and management of listed plant species on San Clemente Island, with review and revision per Navy directives addressing management of natural resources.

- **G-M-4.** The Navy proposes to continue to review and coordinate the dissemination of environmental conservation measures to island users. Conservation measures will be distributed to island military and civilian staff in accordance with Commander's guidelines and with Fleet operations.

- **G-M-5.** The Navy will conduct any necessary EOD ordnance detonations in or near listed species habitat in a manner that minimizes the potential for wildfire without compromising personnel safety.

- **G-M-6.** The Navy will coordinate range access to achieve optimal flexibility between training operations and natural resource management activities, according to range use instructions and with priority given to military training.

- **G-M-7.** The Navy will locate heavy ordnance targets within Impact Areas I and II, away from sensitive resources, including San Clemente loggerhead shrike, San Clemente bush mallow (*i.e.*, away from Horse Beach Canyon), and coastal salt marsh, to the extent feasible while meeting operational needs.

- **G-M-8.** The Navy will conduct monitoring and control activities for non-native predators outside the impact area boundaries. Predator control activities would include China Point Road and Horse Beach Canyon Road between Impact Areas I and II. Predator control activities may be intensified as needed to prevent elevated predation on listed species outside the Impact Area boundaries attributable to predator populations within the Impact Area boundaries. Access to conduct control efforts would not be limited within SHOBA outside the Impact Area I and II boundaries. (See also related measure G-M-2).

- **G-M-9.** The Navy will conduct monitoring and control activities for invasive non-native plant species outside of the Impact Area boundaries. Monitoring and control activities would include the China Point Road and Horse Beach Canyon Road between Impact Areas I and II. In addition, invasive monitoring and control will be conducted in TAR 21 in accordance with measure SCBM-M-1. Monitoring and control activities may be intensified as needed to prevent spread of invasive species and effects on listed species outside the Impact Area boundaries attributable to invasive species populations within the Impact Area boundaries. Access to conduct control efforts would not be limited within SHOBA outside the Impact Area I and II boundaries. (See also related measure G-M-1).

**Fire Management Plan (FMP-M-1 -)**

- **FMP-M-1.** The Navy will evaluate firelines and bladed areas disturbed by fire suppression activity and rehabilitate these areas as practicable and appropriate.

- **FMP-M-2**. The Navy's Natural Resource Office will, determine whether seeding is appropriate for post fire erosion control. Seeding would be overseen by the San Clemente Island Botany Program and would use native seed collected from San Clemente Island.

- **FMP-M-3**. The Navy will evaluate the potential impacts of fire on Santa Cruz Island rock-cress, San Clemente Island bush mallow, and San Clemente Island larkspur.

- **FMP-M-4**. When designing and implementing fuel breaks, the Navy will factor in the need to protect canyon shrubland/woodland occupied by shrikes. Coordination between Navy Natural Resource personel and applicators will occur prior to fuel break installation in the proximity of occupied nesting areas.

- **FMP-M-5**. The Navy will minimize impacts to listed species and occupied habitat associated with Phos-Chek application by considering the locations of federally-listed species in advance of fuel break installation. This will allow the Navy to avoid impacts to the extent practicable. The Navy will avoid application of Phos-Chek within 91.5 m (300 ft) of mapped Santa Cruz Island rock-cress locations and avoid application of Phos-Chek within 91.5 m (300 ft) of other mapped listed species to the extent consistent with fuelbreak installation.

- **FMP-M-6**. The Navy will monitor soil and vegetation responses to retardants and herbicides and use this information to maximize the effectiveness of fuelbreak installation and minimize impacts to native vegetation.

- **FMP-M-7**. The Navy will coordinate the development of burn plans with natural resources staff to identify potential biological issues.

- **FMP-M-8**. The Navy will consider the locations of federally-listed plants in advance of prescribed fire application so that impacts can be avoided by location or timing where possible and plan prescribed fire to provide a resource benefit where appropriate.

- **FMP-M-9**. The Navy will conduct experimental burns to evaluate the response of the boxthorn plant community to fire.

- **FMP-M-10**. The Navy will conduct prescribed fire experiments to evaluate their effectiveness in controlling non-native annual plants.

- **FMP-M-11**. The Navy will establish post-fire recovery plots to monitor recovery and identify new infestations of non-native invasive plants associated with both wildfire and prescribed fire.

- **FMP-M-12**. The Navy will evaluate burn areas and prioritize them appropriate for inclusion in the weed eradication program, as appropriate.

- **FMP-M-13**. The Navy will conduct pre-season briefings on minimal impact suppression tactics (MIST) for the fire fighting personnel. This would include guidelines on fire suppression materials and tactics, including limitations associated with Phos-Chek and salt water drops.

- **FMP-M-14**. The Navy will conduct an annual review of fire management and fires that will allow adaptive management, if required, as outlined on page 4-56 of the draft Wildland Fire Management Plan (September 2005 draft). The Service will be included as an invited stakeholder to participate in this annual review.

- **FMP-M-15**. The Navy will staff and train a Wildland Fire Coordinator prior to modifying existing training restrictions or increasing distribution of ignition sources on San Clemente Island. The equipment and tools necessary for this staff person to accomplish the duties of this position will be in place prior to any increasing ignition sources on the island.

- **FMP-M-16**. The Navy will submit a final San Clemente Island Fire Management Plan to the Service prior to increasing ignition sources on the island.

**Proposed measures to minimize impacts of AVMC, AVMR, AVMA, AFPs, AMPs, IOA, and Amphibious Landing Sites (AVMC-M 1-10)**

- **AVMC-M-1.** The Navy will survey for federally listed and sensitive plant species within the AVMC (including AVMAs, AFP 1, AFP 6, AMPs) and IOA.

- **AVMC-M-2.** The Navy will conduct periodic monitoring of the AVMC (AVMAs, AMPs, AFPs, AVMR) and IOA as part of vegetation/habitat and sensitive species survey updates for the INRMP.

- **AVMC-M-3.** The Navy will develop a plan that will address soil erosion associated with planned military operations in the AMVP, AFPs, AMPs, and IOA. The Navy will finalize AVMA, AMP, and AFP areas based on field review with soil erosion experts and military personnel, such that operational areas minimize inclusion of steep slopes and drainage heads. The goals of the plan would be to: (1) minimize soil erosion within each of these operational areas and minimize offsite impacts; (2) prevent soil erosion from adversely affecting federally listed or proposed species or their habitats; (3) prevent soil erosion from significantly impacting other sensitive resources, including sensitive plant and wildlife species and their habitats, jurisdictional wetlands and non-wetland waters, the area of Special biological Significance (ASBS) surrounding the island, and cultural resources. The erosion control plan would lay out the Navy's approach in assessing and reducing soil erosion in the AVMAs, AMPs, AFPs, and the IOA, as well as routes used to access these areas. The plan would consider the variety of available erosion control measures and determine the most appropriate measure(s) to control erosion in the area. The plan would include an adaptive management approach and contain the following essential elements: maps defining boundaries of operational areas that provide appropriate setbacks; a Best Management Practice (BMP) maintenance schedule; a plan to monitor soil erosion and review the effectiveness of BMPs; site-specific BMPs to minimize soil erosion on site and minimize offsite impacts, which could include: (a) setbacks or buffers from steep slopes, drainages, and sensitive resources; (b) site specific engineered or bio-engineered structures that would reduce soil erosion and transport of sediment off site; and (c) revegetation. The Navy will coordinate with the Service during development of the erosion control plan and will submit the draft erosion control plan to the Service for review. If the Service does not provide comments within 30 days, the Navy will move forward with implementation of its plan.

- **AVMC-M-4.** The Navy will brief military units on maneuver area boundaries prior to conducting operations in the AVMC.

- **AVMC-M-5.** The Navy will conduct assault vehicle travel or maneuvering only within the boundaries of the AVMC (including AFPs, AMPs, AVMAs, AVMR).

- **AVMC-M-6.** The Navy will develop and implement a project to monitor for erosion, dust generation, and deposition of dust in adjacent habitats.

- **AVMC-M-7.** The Navy will require the following measures to reduce the potential for transport of invasive plants to the island. Prior to coming to San Clemente Island, military and non-military personnel will be asked to conduct a brief check for visible plant material, dirt, or mud on equipment and shoes. Any visible plant material, dirt or mud should be removed before leaving for San Clemente Island. Tactical ground vehicles will be washed of visible plant material, dirt and mud prior to embarkation for San Clemente Island. Additional washing is not required for amphibious vehicles after 15 minutes of self-propelled travel through salt water prior to coming ashore on San Clemente Island.

- **AVMC-M-8.** The Navy will enforce the existing 35 mph speed limit on Ridge Road. The Navy will post signs, continue public awareness programs; mow roadside vegetation; and monitor roadways for kills of protected or conservation agreement species including San Clemente loggerhead shrike, San Clemente sage sparrow, and island fox.

- **AVMC-M-9.** The Navy will direct tracked and wheeled vehicles to use the existing route for ingress and egress to/from the beach at West Cove.

- **AVMC-M-10.** The Navy will identify an ingress/egress and travel route that avoids impacts to wetlands and minimizes impacts to coastal dune scrub at the Horse Beach Cove Amphibious Landing and Embarkation Area at TAR 21. This will involve instructing drivers to: (1) drive amphibious vehicles: westward on the beach and egress from the beach west of the mouth of Horse Beach Canyon and (2) use only Horse Beach and Horse Beach Canyon Roads between ingress and egress. Prior to using the Horse Beach Canyon Road for landings, the Navy will do a site survey to determine whether the road can support the proposed landings and whether their proposed vehicles will create erosion downslope. If it is determined at that time that the roads need to altered and consultation is required, the Navy will conduct separate consultation on that action. An alternate route may be along the coast, on the better maintained road to China Point Road.

**<u>Proposed Measures Specific to Training Areas and Ranges (TAR-M 1-2)</u>**

- **TAR-M-1.** The Navy will develop and implement a five-year monitoring plan with annual surveys for Threatened and Endangered plant species when they are known to occur within or adjacent to TARs outside of Impact Areas I and II.

**<u>Proposed Measures Specific to BTS Sites (BTS-M-1-2)</u>**

- **BTS-M-1.** Construction of structures will not involve grading and will be conducted outside the sage sparrow breeding season. The footprint of the construction areas will be marked to avoid habitat areas in coordination with the San Clemente Island natural resources program. Anti-perch devices will be installed on the structures.

- **BTS-M-2.** FDRS precautionary measures at these sites will be the same measures implemented at TAR sites.

**San Clemente sage sparrow (SCSS-M 1-4)**

- **SCSS-M-1.** The Navy will continue surveys and population analysis for the San Clemente sage sparrow and develop additional surveys to assess sage sparrow juvenile survivorship and habitat use. Surveys will be developed and scheduled such that access to training areas is not restricted when training is needed/requested.

- **SCSS-M-2.** The Navy will manage the San Clemente sage sparrow population for long-term persistence in accordance with recommendations in the San Clemente Sage Sparrow Management Plan to the extent feasible and in a manner that is compatible with military training requirements.

- **SCSS-M-3**: The Navy will develop and implement a monitoring plan to assess the incidental take of San Clemente sage sparrow within and adjacent to TARs 10 and 17 and incorporate the findings into the San Clemente Sage Sparrow Management Plan as recommendations for minimizing or avoiding incidental take, to the extent practicable.

- **SCSS-M-4.** The Navy will address issues associated with habitat and sage sparrow survivorship as part of the INRMP update process, with focus on habitat areas near TARs 10 and 17.

- **SCSS-M-5.** The Navy will conduct construction activities supporting TAR improvements outside the sage sparrow breeding season at TARs and BTS sites that are located within sage sparrow habitat.

**San Clemente Loggerhead Shrike (SCLS-M 1-4)**

- **SCLS-M-1.** The Navy will continue the currently successful program of habitat restoration, predator management, monitoring, captive breeding, and re-introduction to benefit the San Clemente loggerhead shrike until such time that recovery objectives are identified and achieved.

- **SCLS-M-2.** The Navy will evaluate nest success data for San Clemente loggerhead shrike in sites nearest AFP 6, including those in Eagle and Cave Canyons, and compare it to other sites in and out of SHOBA with the objective of determining whether or not success rates are typical for the species.

- **SCLS-M-3.** The Navy's range schedulers will be provided the location of shrike nests within operational boundaries and also provided the location of shrike nests to personnel installing fuelbreaks prior to the installation of fuel/fire beak lines.

- **SCLS-M-4.** Within areas of the IOA that are wider than 1000 ft and not in any AVMA, AVMR, AFP, AMP, or TAR, the range complex schedulers will provide the GPS coordinates of up to four (4) shrike nests at any one time to operators and advise them that sensitive resources occur within a 10 meter radius of these points.

**Island Night Lizard (INL-M-1)**

- **INL-M-1.** The Navy will continue population monitoring and habitat evaluations at 3-year intervals while the delisting petition is being evaluated by the Service.

**California brown pelican (CBP-M-1)**

- **CBP-M-1.** The Navy will ensure that California brown pelicans are not in proximity to over-blast pressure prior to underwater demolition activities. Sequential underwater detonations would be conducted either less than 10 seconds apart or greater than 30 minutes apart to avoid impacts to birds attracted by fish kill.

**Western Snowy Plover (WSP 1-2)**

- **WSP-M-1.** The Navy will continue annual breeding and non-breeding season surveys for the western snowy plover at West Cove and Northwest Harbor.

- **WSP-M-2.** The Navy will explore the feasibility of using remote sensing technology to monitor western snowy plover use of Pyramid Beach and China Beach.

**Santa Cruz Island Rock-Cress (RC-M-1-2)**

- **RC-M-1**. The Navy will investigate feasibility of establishing additional colonies in suitable habitat farther away from the IOA and AFP--1 using the on-island nursery to propagate from local seed.

- **RC-M-2.** The Navy will prioritize areas surrounding Santa Cruz Island rock-cress occurrences as primary targets for weed eradication to the extent practicable and as appropriate based on potential impacts.

**San Clemente Island Bush Mallow (SCBM-M- 1-3)**

- **SCBM-M-1**. The Navy will control invasive exotic plant species in TAR 21 within the vicinity of Horse Beach Canyon and in the Infantry Operations Area along Horse Beach Canyon Road in Impact Area I to benefit the San Clemete Island bush mallow. Specifics of the control will be developed in coordination with the Service and initiated prior to the Navy conducting the new activities proposed in the BA. Control measures will be in accordance with safety requirements.

- **SCBM-M-2**. The Navy will implement management measures to improve the status of the San Clemente Island bush mallow. The Navy will coordinate with the Service to establish success criteria for the status of San Clemente Island bush mallow that, when met, will allow the Navy to discontinue invasive exotic plant control in the area defined in SCBM-1.

- **SCBM-M-3.** The Navy will use remote sensing to the extent feasible to monitor the portion of the bush mallow population within Horse Beach Canyon. The Navy will incorporate this monitoring strategy into the INRMP.

## ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 *CFR* §402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation and the impacts of State and private actions which are contemporaneous with the consultation in progress.

*Action Area*

The action area for the Navy’s proposed new and increased operational training and associated fire management activities includes the area affected directly or indirectly by these actions. Thus, all of San Clemente Island and its offshore rocks and nearby waters are likely to be directly or indirectly affected as a result of the proposed action and are included in the action area.

San Clemente Island is owned by the Navy. The Commander, U.S. Pacific Fleet (CPF), through the Commander, Naval Region Southwest (CNRSW), is responsible for its administration. San Clemente Island is part of a group of installations and ranges collectively called the Southern California (SOCAL) Range Complex. San Clemente Island and the surrounding ranges support the largest concentration of U.S. naval forces in the world.

San Clemente Island is located approximately 68 nm (126 km) offshore from San Diego, California. Prior to U.S. Navy ownership, the island experienced introduction of goats and pigs, which were left to roam the island. The island was used for sheep and cattle ranching activities while under the administration of the Department of Commerce until the Navy assumed ownership and management of the island in 1934. Ranching activities were discontinued under Navy management, but feral goats, pigs, and deer were present on the island for many years. Overgrazing by previous ranching activities as well as goats, pigs, and deer resulted in dramatic changes in the flora and fauna of some areas on the island and a notable reduction in the distribution and abundance of several species native to the island.

Since 1934, the Navy has conducted a variety of training activities in many different areas of the island, although activities in many previously used areas have been discontinued as training needs have changed. San Clemente currently supports the following general categories of naval activities: (1) naval gunfire support, air-to-ground ordnance delivery, and amphibious warfare training in the SHOBA, (2) other USMC amphibious warfare training, (3) NSW training, (4) other island operations, (5) RDT&E of new systems, and (6) airfield operations. Training activities on San Clemente Island are currently conducted within existing ranges and training areas on the island under baseline conditions.

*Description of San Clemente Island and Baseline Conditions*

San Clemente Island is oriented northwest to southeast and is about 34 km (21 mi) long and about 11 km (4 mi) at its widest point. The island is approximately 56 sq mi (14,504 ha; 35,840 ac) in size. The island has a relatively broad plateau on top. Marine terraces extend along the western slope of the island and on the east of the plateau, and steep escarpments drop precipitously to the rocky coastline along the southern half. The southern part of the island is deeply dissected by a number of canyons up to 152 m (500 ft) deep. The highest point is Mt. Thirst, which is approximately 600 m (1,965 ft) above mean sea level.

San Clemente Island is mostly undeveloped with large expanses of grassland and shrub communities punctuated by small complexes of buildings. Wilson Cove on the northeast side is the main developed area on the island, providing most of the housing, dining, and infrastructure. On the north end, the Naval Auxiliary Landing Field and the area north of the landing field is another relatively developed portion of the island that supports the BUD/S Camp and MAROPS facilities as well as several TARs. The remainder of the island contains only small, scattered concentrations of development and/or facilities, mostly located on the edges of the central plateau. Such developed areas include buildings associated with the old VC-3 airfield and smaller facilities at isolated locations.

Although most of the island is undeveloped, both the flora and fauna of the island have been substantially altered by human activities, including the introduction of non-native herbivores and military training. Although the last of the remaining non-native herbivores were removed from the island in the early 1990s, the activities of introduced goats, sheep, pigs, and deer have significantly altered the native vegetation composition and the topsoil. These impacts also affected the remaining wildlife and plants on the island. Since 1934, San Clemente Island has provided instrumented ranges, operating areas and associated facilities to conduct and evaluate a wide range of training exercises within the scope of naval warfare. The baseline condition of the plant and animal communities at individual training areas varies, as some areas sustain extensive use under baseline conditions, while others do not.

1. Shore Bombardment Area and Impact Areas I and II

The southern one-third of San Clemente Island 4,452 ha (approximately 11,000 ac) is known as the SHOBA. SHOBA is effectively a buffer area for Impact Areas I and II, the actual areas that contain targets for ship-shore, aerial bombing, and artillery use. SHOBA is the only remaining range in the United States that supports live ship-to-shore naval surface fire support (NSFS), artillery/mortar and air-to-ground training in unison. SHOBA is also a certified laser range. SHOBA supports notable native perennial grasslands on the upper plateau. While most areas within SHOBA are relatively unaffected by baseline training activities (with the exception of elevated fire frequencies in some areas) the Impact Areas have sustained heavy use for at least 20 years, as evidenced by disturbed vegetation characteristics within these areas.

*Naval Special Warfare Training Areas*

The northern half of the island is divided into six large (40 to 1,781-ha (100 to 4,400-ac)) SWATs. These areas assure NSW's access to required air, land, and sea interoperable areas and infrastructures (*i.e.* TARs). Designation as a SWAT indicates that the area is used for ingress and egress to/from TARs. Both basic and advanced NSW operations utilize these areas, as well as special operations training by MEUs and other special operations forces. Baseline foot traffic within a SWAT is low and dispersed and has little visual effect on the vegetation under baseline conditions.

2. Training Areas and Ranges and NSW Center Basic Underwater Demolition/School (BUD/S) Basic Training Sites

There are 22 TARs (0.4-312 ha (1-770 ac)) spread over the island, which have been subject to varying degrees of use for a variety of training activities for many years. TARs are operating areas that provide tactical ingress and egress training and objectives for NSW personnel. A TAR is a geographically bounded area used for planning and scheduling purposes for specific training operations and range activities. Each TAR was designed to support a typical training exercise based on tactical and safety requirements. These designs vary but may include live fire, demolitions, firing lines and positions, topographical features for ingress and egress, maneuver areas, test pads, and in some areas, restricted access and exclusionary areas. Each TAR that is intended for live-fire has been designed with appropriate Surface Danger Zones (area over which munitions may travel), but the TAR does not include the Surface Danger Zone.

NSW Center BUD/S Basic Training Sites (BTSs) support FTXs for BUD/S students. Conducted at the compellation of the 25-week BUD/S program, FTXs integrate a range of skills including land navigation, reconnaissance, and tactical movement and ambush. BTSs are similar to TARs because they provide a tactical objective for BUD/S trainees.

3. Old Airfield

The Old Airfield, called VC-3, located within TAR 15, is approximately 11 km (7 mi) from the northern end of the island, located in a grassland area dominated by non-native annual grasses. Several small buildings are present, and the area experiences regular use for equipment staging.

4. Missile Impact Range

The MIR, located within TAR 16, is in the north-central portion of the island, just south of VC-3. It is situated at the ridge crest of the island's central plateau. The MIR contains fixed targets and is equipped with sophisticated instruments for recording the flight, impacts, and detonations of weapons. The MIR is highly disturbed from repeated missile tests and is denuded in some areas.

5. Naval Auxiliary Landing Field

The NALF, located at the northern end of the island, has a single runway of 2,835 m (9,300 ft) equipped with aircraft arresting gear. The airfield was constructed on sand that was excavated from locations in the northern part of the island. The runway has separated the beach at West Cove from the sand sources that historically supported this beach. A small air terminal and associated parking area are located adjacent to the airfield. Soils in the area immediately south of the airfield are highly eroded and show evidence of quarry and borrow activities.

6. Artillery Firing Points

There are two AFPs in SHOBA. An AFP is a location from which artillery weapons such as the 155 mm (6 in.) howitzer are positioned and used in live-fire employment of munitions. Guns are towed by trucks along primary roads, often in convoy with munitions trucks and HMMWVs. There are currently two AFPs in use; AFP 1 and AFP 6. Two areas within proposed AFP 1 have been used historically, as evidenced by reduced vegetation at these sites. AFP 6 was requested as a firing point in 2004 and has been used on a limited basis since then. It was approved for one time use by the Navy's NRO, pending consultation. AFP 6 lies in an upland grassland area that has historically received little use.

7. Assault Vehicle Maneuver Road

The Assault Vehicle Maneuver Road (AVMR) consists of a stabilized route that parallels San Clemente Island Ridge Road between West Cove Beach (TAR 5) and the SHOBA Gate. The Service consulted on improvements to the segment of the route that extends from West Cove to VC-3 and development of the segment that extends from VC-3 to the SHOBA gate in Biological Opinion 1-6-04-F-3934.1.

8. San Clemente Island Ridge Road

San Clemente Island Ridge Road (Ridge Road) extends from the NALF all the way to the southern portion of the island at Pyramid Head. The road bisects the central plateau of the island, and several additional relatively well-traveled roads (REWs Road and China Point Road) as well as unimproved and rarely used roads (*e.g.*, Middle Ranch Canyon Road) extend from Ridge Road towards the east and west sides of the island. A road improvement project is currently underway that was addressed in Biological Opinion 1-6-04-F-3934.1. The project entails paving the length of Ridge Road, resurfacing REWs Road, installing culverts, and implementing erosion control measures. The Navy had committed to monitoring loggerhead shrikes and re-vegetating temporarily impacted soils with seed collected from native plants on San Clemente Island as part of this project; however, areas that have been temporarily impacted have not yet been re-vegetated. Under the terms and conditions in the biological opinion, the Navy was also required to install signs to slow traffic along portions of the road close to shrike nests, monitor roadways for shrike roadkills, and care for any eggs or nestlings that would otherwise be taken within the captive propagation facility. The Navy complied with these previous BO terms. Invasive plant species have been repeatedly identified and treated along this road under the Navy's weed management activities despite ongoing efforts to wash vehicles from the mainland prior to coming to San Clemente Island.

9. West Shore Road

West Shore Road is a poorly maintained road that extends from proposed TAR 10 to south of TAR 17. The road is located on the lowest marine terrace and bisects the narrow band of "high quality" or "high density" sage sparrow habitat. The road also extends through the Island Night Lizard Management Area and associated "medium quality" habitat for the island night lizard. Several spur roads have arisen that lead from West Shore Road towards the shore, approximately 656 ft (200 m) away. These routes were historically used for access to camera pads, but are currently used primarily by recreational fishermen. Some of the roads had previously been slated for restoration activities under Biological Opinions FWS 1-6-97-F-58 and FWS 1-6-00-F-19, although restoration activities have not yet occurred, and are now identified in the FMP as areas to remain open (unvegetated) for fire management.

10. Horse Beach Canyon Road

Horse Beach Canyon Road extends from China Point Road towards Horse Beach Canyon. The road is frequently in poor condition. This road parallels Horse Beach Canyon, which lies downslope from the road.

11. Biological Resources

Thirteen vegetation communities have been mapped on San Clemente Island using 1977 aerial imagery flown at 4,572 m (15,000 ft) (U.S. Navy 1996). The Santa Barbara Botanic Garden (under cooperative agreement with the Navy) is in the process of remapping vegetation assemblages on San Clemente Island, which have changed since originally mapped. The Navy's INRMP identifies "Ecological Units" that are based on the mapped vegetation communities, landform, and soils. The acreage of the ecological units identified is depicted in Table 7.

Table 7. Ecological Units, Acreages, and Percentages of Island Area for San Clemente Island

| Ecological Unit | Acreage | Percentage |
|---|---|---|
| Canyon Woodland | 696.2 | 1.9 |
| Maritime Desert Scrub (MDS)-Boxthorn | 3,621.0 | 9.7 |
| MDS-Boxthorn/Grassland | 2,188.8 | 5.9 |
| MDS/Grassland Complex (Terrace Faces and Flats) | 8,921.4 | 23.9 |
| MDS-Pyramid Cove and South Facing Slopes | 1,611.5 | 4.3 |
| Maritime Sage Scrub (MSS) - Northeastern Escarpment | 369.9 | 1.0 |
| MSS/Desert Scrub- Canyon Walls and Escarpments | 5,858.3 | 15.7 |
| Grasslands, Loamy Soils | 5,275.9 | 14.2 |
| Grasslands, Clay Soils | 5,383.7 | 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 |
| Total | 36,060.7 | 96.9 |

Source: U.S. Navy 2002

The native flora and fauna of San Clemente Island includes 455 plant taxa (including species , subspecies, and varieties), 245 bird species, 6 mammal species, and 2 reptile species. San Clemente Island is also inhabited by several non-native species including 159 exotic plants, 5 introduced birds, and 5 introduced mammals (Junak 2003; Ross, Boyd, and Junak 1997). Because of its long history of geographical isolation from the mainland, San Clemente Island supports a variety of plants and animals found nowhere else in the world or only found on one or more of the other Channel Islands. For example, 47 plant taxa on San Clemente Island are restricted to the California Channel Islands and of these, 15 are known only from San Clemente Island (Junak 2003), which is the highest percentage of endemism of the California Channel Islands. A total of 11 federally listed species occur on San Clemente Island, seven of which are endemic to the island (*i.e.*, San Clemente loggerhead shrike, San Clemente sage sparrow, San Clemente Island woodland star, San Clemente Island broom, San Clemente Island larkspur, San Clemente Island Indian paintbrush, San Clemente Island bushmallow) and two of which are endemic to the Channel Islands (island night lizard and Santa Cruz Island rockcress).

In 1992, the Navy completed over a decade of efforts to remove the non-native feral grazing animals from San Clemente Island. This significant accomplishment has created the conditions that are expected to allow vegetation recovery on the island, although the future composition of "recovered" plant communities cannot be predicted. Because past and current uses of the island have significantly affected soils, hydrology, and the seed bank in some areas, and because plant species have responded differently to the removal of grazing animals, the changes in vegetation vary by species and across the island (Tierra Data, Inc. 2008). Some listed plant species have responded significantly to the removal of grazing pressure, including San Clemente Island Indian paintbrush, San Clemente Island larkspur, and the San Clemente Island broom. For other species, significant expansion of distribution and abundance is likely to be a slower process, due to changes in pollinator species, self-incompatibility mechanisms, new threats associated with land use, changes in soils or local conditions, or low genetic diversity.

Additional management actions taken by the Navy that have improved individual species' status include the Navy's intensive recovery program for the San Clemente Island loggerhead shrike, and the continued attention toward habitat protection along the West Shore, which supports high quality habitat for both the San Clemente sage sparrow and the island night lizard.

*Integrated Natural Resources Management Plan*

The Sikes Act Improvement Act of 1997 (Sikes Act) committed the Department of Defense, including the U.S. Navy, to develop INRMPs for lands under military control. The purpose of an INRMP is to guide installation managers in the sustainable management of natural resources on installations while ensuring no net loss to the military mission. As part of the San Clemente INRMP, the island has been divided into18 Management Units (MUs) reflecting ecological, geographical, and mission-related factors. These units are shown in Figure 8. Key issues for the island identified in the development of the INRMP included: conservation of listed species and other endemic species; control of non-native and invasive species; erosion control, especially along roads, in operational areas, and in areas that were historically heavily grazed; fire management in the presence of training-related ignition sources; and protection of cultural resources. Despite the designation of listed plants as "management focus species" within the INRMP, no species-specific management directed at increasing the distribution and abundance of these species has yet been conducted. Management of listed plants has focused on activities that provide broad ecosystem benefits, such as invasive exotic plant species control and erosion control. Genetic research, however, has been conducted on several of the listed plant species and may guide future efforts to increase distribution and abundance of these species. In addition, research on the reproductive biology and ecology of three of the listed plants (San Clemente Island bush mallow, San Clemente Island Indian paintbrush, and Santa Cruz Island rockcress is currently underway. The INRMP identifies numerous stewardship and conservation actions, many of which the Navy is implementing on an ongoing basis. The natural resources programs listed in Table 8 were funded by the Navy in 2008.

Figure 8. Land Management Units on San Clemente Island

Table 8. Natural Resources Management Activities and Studies for Listed Species Funded in 2008

| Category | Studies/Programs |
|---|---|
| Vegetation and Habitat | Vegetation Plots; Seed Collection and Propagation; Site selection, Outplanting, Maintenance; Non-native Plant Control; Fuel break creation; Erosion Control; Fire Suppression Helicopter |
| Threatened and Endangered Plants | Genetic Diversity Study; Endangered Plant Survey; Research on Reproductive Biology/Ecology; Outplanting of San Clemente Island Broom |
| Island Night Lizard | Island Night Lizard Habitat Evaluation and Trap Maintenance |
| **Category** | **Studies/Programs** |
| San Clemente Loggerhead Shrike | Captive Breeding; Monitoring; Predator Management; Release |
| San Clemente Sage Sparrow | Sage Sparrow Monitoring |
| Western Snowy Plover | Western Snowy Plover Surveys |

*Previous Consultations-Biological Opinions Pertaining to Training and Fire Management*

The Navy has coordinated extensively with the Service regarding training, facilities construction, and conservation activities on the island, and the Service has issued several biological opinions addressing such activities. The Navy has directed, to the extent possible, intensive uses into areas of the island that have experienced previous disturbance. The avoidance and minimization measures described as part of the Navy's proposed action(s) and terms and conditions of the biological opinions have defined the environmental baseline of management for listed plant and animal species on the island and have been included within the San Clemente Island INRMP.

The Navy previously consulted with the Service in 1997 on the potential effects of training-related fires on federally-listed species on San Clemente Island. The biological opinion (FWS 1-6-97-F-21) addressed the effects on listed and proposed species of military activities that may cause wildfire along with measures to reduce the potential for impacts to listed species. The consultation was limited to the effects of fires and did not address other impacts of training activities such as vehicle traffic, ordnance use, or foot traffic.

In 2001, the Navy requested re-initiation of this consultation because of changes proposed for military training and in the status of the San Clemente loggerhead shrike. The consultation and resulting biological opinion (FWS-LA-2808) reduced restrictions on ordnance use in Impact Areas I and II, expanded the fire season target boundary, and identified additional fire management and conservation measures to be implemented by the Navy. The Navy currently conducts fire management activities according to the conservation measures and terms and conditions of this biological opinion including: 1) annual or semi-annual coordination with the Service regarding the placement of fuelbreaks around Impact Areas I and II; 2) staffing of on-island fire suppression resources during operations conducted during the "fire season", which is determined by U.S. Navy botanical staff; and 3) compliance with weather restrictions and use illumination rounds, tracers, and white phosphorus only during periods of low-moderate ignition potential and during periods when wind speeds do not exceed 13 knots.  The timing restrictions under baseline conditions do not provide the flexibility that the Navy now needs to accomplish training; thus, the proposed fire management plan is intended by the Navy to minimize the effects of training-related fires in a manner that precludes the need for this term and condition.

After previously consulting on several individual projects that were likely to adversely affect the island night lizard, the Navy and Service completed a consultation to programmatically address the effects on night lizard of construction projects and activities likely to result in surface disturbance.  Due to the broad distribution of the island night lizard on the island, the Navy intended to address impacts in a comprehensive fashion rather than on a project-by-project basis by identifying standard mitigation measures that would apply to all surface disturbing activities, recognizing the western portion of the island as the Island Night Lizard Management Area (INLMA), and developing an island night lizard management strategy.  The biological opinion for this consultation (FWS 1-6-97-F-58) included terms and conditions that required:  1) habitat protection and some restoration outside of areas proposed for development by the Navy as an important measure to reduce the potential for impacts to the island night lizard; and 2) the Navy to designate the INLMA in perpetuity via signature of a Memorandum of Agreement with the Service.  While unused roadway restoration and signature of a MOA have not been implemented, the Navy has complied with the majority of this biological opinion’s terms and conditions, including but not limited to, designation of the INLMA, expansion of the INLMA (in lieu of some restoration), construction-specific minimization measures, weed control actions, annual surface disturbance monitoring and reporting, and feral cat control.

The Navy also consulted with the Service on training activities in TARs 1, 4, and 16.  The biological opinion for this consultation (FWS 1-6-00-F-19) evaluated the effects of range improvements and operational use of TARs 1, 4, and 16 and required ongoing monitoring of the sage sparrow population, restoration of habitat to compensate for habitat modified during construction, and monitoring of habitat surrounding the TAR to identify any effects to habitat that extended beyond the TAR boundary.  The commitment to restore habitat was replaced with an expansion of the INLMA.

## CUMULATIVE EFFECTS

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 this biological opinion.  Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.  Because San Clemente Island is owned and thus under the control of the Navy, we are unaware of any non-Federal actions affecting listed species that are reasonably certain to occur in the action area considered by these opinions.

## SPECIES BY SPECIES EVALUATIONS AND CONCLUSIONS

### Plants

**San Clemente Island Bush mallow** (*Malacothamnus clementinus)*

Status of the Species

*Listing Status*

The San Clemente Island bush mallow was listed as endangered on August 11, 1977 (42 FR 40682) and subsequently addressed in the California Channel Islands Species Recovery Plan (Channel Islands Recovery Plan) (Service 1984). Critical habitat has not been designated for the San Clemente Island bush mallow.

*Species Description*

San Clemente Island bush mallow is a rounded subshrub (with stems woody only at the base) in the Malvaceae (mallow family). It is up to 1-2 meters (3.3-6.6 ft) tall with numerous branched stems arising from its base (Bates 1993; S. Junak pers. comm. 2006). Its leaves are angularly 3-5 lobed or nearly circular or ovate, less than 5 cm (2 in.) in length and conspicuously bicolored, with green, sparsely pubescent (covered with short, fine hairs) upper surfaces and veiny, white hairy under surfaces that are densely matted with branching hairs (Munz and Johnston 1924). Flowers occur in densely compacted clusters and have pink or white and fading lavender petals with well developed calyx lobes that have branched, densely matted pubescence (Munz and Johnston 1924; Bates 1993). Plants bloom from March to August (California Native Plant Society 2001).

*Habitat Affinities*

San Clemente Island bush mallow is restricted to San Clemente Island, where it occurs in a range of conditions, including rock crevices along canyon walls, at the base of rocky walls, at the base of escarpments between coastal terraces, along canyon rims and ridgelines, and in vegetated flats (S. Junak pers. comm. 2006; Junak and Wilken 1998; U.S. Navy 2001). It is often associated with maritime cactus scrub vegetation on coastal flats at the southwestern end of the island (Junak and Wilken 1998). The collection of moisture in rock crevices and at the base of canyon walls and escarpments may provide favorable conditions for this species (S. Junak pers. comm. 2006).

*Life History*

This plant reproduces sexually and vegetatively. It is believed to be pollinated by solitary bees, but the plants appear to be self-sterile, as solitary clumps did not produce viable seed set (Tree of Life Nursery 1987).

Based on the occurrence of San Clemente Island bush mallow in clustered groupings of stems, it generally is believed that stem groupings represent individual plants that have propagated via underground runners or rhizomes (Service 1984; Helenurm 1999; S. Junak pers. comm. 2006). That it propagates via rhizomes is also suggested by the observation that the species is seldom observed to set seed (S. Junak pers. comm. 2006). Recent genetic analyses, however, indicate that clonal growth is not extensive in the species and that patches of closely adjacent individuals may not represent the same genetic individual (Helenurm 1999). Further study is needed to determine the relationship among adjoining individuals, the pattern of mating in the species (*e.g.*, the relative proportion of inbred to outcrossed seeds), and whether a self-incompatibility system exists that prevents or inhibits reproduction among closely related individuals.

The ease of resprouting from rhizomes and the adaptation of other species in the genus to fire (*e.g., Malacothamnus fasciculatus*) suggest that *M. clementinus* may similarly be adapted to persist after fires through its ability to send up shoots from underground stems (Service 1984; S. Junak pers. comm. 2006). A fire did, however, reportedly kill one or more individuals in upper Horse Beach Canyon (M. Elvin pers. comm. in U.S. Navy 2005b). That the species can persist at shortened fire return interval is confirmed by the continued presence of the species within Impact Area II in areas that have burned an estimated three times, based on fire mapping. In addition, vegetation trend monitoring conducted on San Clemente Island between the years of 1992-2003 included monitoring at two plots in Horse Beach Canyon that burned in 1994. Data collected on the study plots appear to show the recovery following fire of a *M. clementinus* population that had been documented before the 1994 fire. In general, obligate sprouters such as *Malacothamnus sp.* are more resilient to short fire return intervals than many species; however, they may be impacted by sustained high frequency fire regimes. In other obligate sprouters, successful germination and recruitment of new individuals is correlated with cooler, moister, low-light conditions and increased litter depth associated with mature closed-canopy chaparral that develops over extended fire free periods. New individuals use gaps to recruit to the canopy and expand (U.S. Navy 2006c). This implies that *Malacothamnus* populations may persist and expand under fire return intervals that are long enough to allow recruitment of new individuals, yet short enough to create gaps for expansion.

Cultivated specimens of San Clemente Island bush mallow live 4 to 6 years. When the parent plant dies, all connected plantlets die (U.S. Navy 2006). Plants on San Clemente Island, however, appear to be long-lived (S. Junak pers. comm. 1996 in U.S. Navy 2006).

A recent genetics study used random amplification of polymorphic DNA (Randomly Amplified Polymorphic DNA (RAPD) analysis) to study genetic variability of 95 plants from19 discrete locations (Helenurm 1999). Genetic variation was detected at RAPD loci within all occurrences sampled. Box Canyon and Horse Beach Canyon exhibited the greatest genetic variability (polymorphism), and Lemon Tank had the least genetic variation (Helenurm 1999). Overall, a substantial proportion of the genetic variation found in San Clemente Island bush mallow was found among different occurrences rather than within single occurrences, indicating that all occurrences may contain genetic variation not found elsewhere (Helenurm 1999). Based on analyses, gene flow is highly limited in San Clemente Island bush mallow, even among patches within the same canyon (Helenurm 1999).

*Rangewide Distribution and Threats*

Since the San Clemente Island bush mallow's entire distribution is restricted to the action area of San Clemente Island, its island-wide distribution and current threats to the species are discussed in the Environmental Baseline section below.

*Conservation Needs*

A recent five- year review of the status of San Clemente Island bush mallow (Service 2007a) resulted in the following recommendations:

(1) Develop and implement a species reintroduction program in coordination with San Clemente Island restoration actions to accelerate the recovery of this species. Such a plan should use genetic data to select source plants from populations with the highest levels of genetic variability (Helenurm 1999);

(2) Based on the recommendations of Helenurm (1999), perform additional genetic studies to determine the relatedness of individuals in patches and to determine the pattern of mating (*i.e.*, proportion of inbred and outcrossed seeds). If results from this study indicate that patches of plants consist of highly related individuals and seed production is impaired by a self-incompatibility mechanism or inbreeding, develop and implement a transplantation program to improve seed production in the species;

(3) To reduce the loss of any remaining genetic variation, incorporate as objectives in the INRMP to conserve as many populations of San Clemente Island bush mallow as possible and to manage those populations so that they support as many individuals as possible. In particular, work with the Navy to develop an environmental clean-up plan for the Lemon Tank dump site that provides for the conservation of San Clemente Island bush mallow in that location;

(4) Study the range of fire conditions, especially fire frequency, that San Clemente Island bush mallow can withstand; and

(5) Perform additional studies on the pollination of naturally occurring populations to determine if low seed production is due to poor pollinator visitation.

Environmental Baseline

*Distribution*

The distribution of San Clemente Island bush mallow is restricted to San Clemente Island and includes a historical occurrence mid-island within northeasterly facing Lemon Tank Canyon. The Lemon Tank occurrence was the only occurrence known at the time of the species' listing in 1977 and was confirmed as recently as 1996, but whether or not this occurrence is still extant has not been determined (K. O'Conner, pers. comm. 2008).

A scattering of about 30 occurrences of San Clemente Island bush mallow have been discovered since the bush mallow was listed. The occurrences span a distance of about 10 kilometers (km) (6.2 miles (mi.)) along the southwesterly-facing coastal terraces at the southern end of the island (Junak and Wilken 1998; Junak 2006) The Lemon Tank Canyon occurrence falls about 6.5 km (4 mi.) to the north of the nearest southern occurrence, with the distance between the northernmost and southernmost occurrences spanning a distance of about 15 km (9.3 mi.). Thus, the southern distribution of San Clemente Island bush mallow (30 occurrences) is disjunct from the historical, and only other known location for the species on San Clemente Island at Lemon Tank Canyon.

The appearance of the 30 new occurrences is likely associated with the removal of feral goats and pigs from the island in the early 1990s, which was the primary threat identified for the species at the time of its listing. Approximately 19 of the new occurrences were documented during sensitive plant surveys conducted during 1996 and 1997. An additional 11 occurrences were documented during 2003 and 2004 surveys. This species was also collected from San Clemente Island in the early 1990's and propagated at Tree of Life Nursery with the intent of future outplanting on San Clemente Island. Although the majority of the plant material propagated at Tree of Life Nursery was returned to San Clemente Island, the fate of the specimens, and whether or not they were outplanted, thereby contributing to the increased distribution of the species, is unknown.

Occurrences along the southwesterly facing coastal terraces are predominantly situated at the base of escarpments between coastal terraces (S. Junak pers. comm. 2006). Seventy percent of the San Clemente Island bush mallow distribution is within SHOBA, in Impact Areas I and II. Within Impact Area I, approximately 68 percent of the known occurrences are within Horse Beach Canyon, adjacent to Horse Beach Canyon Road. About 47 percent of the occurrences are directly within the canyon and 21 percent are at the mouth of the canyon within TAR 21 (Figure 1d). Within Impact Area II, approximately 2 percent of the known occurrences are located in China Canyon. Additional occurrences within SHOBA include those located north and south of Cave Canyon. Two occurrences of the San Clemente Island bush mallow were recorded within fuel breaks in 2002 (Service 2002). The remaining occurrences (30 percent) are not in SHOBA or are in areas not significantly impacted by training. These occurrences are less genetically diverse than the occurrences known from Horse Beach Canyon, and we are unaware of any specific management actions implemented by the Navy to conserve these occurrences.

Occurrences within Horse Beach Canyon have been studied for over 20 years and are significant not only in their magnitude, but in their genetic variability (Helenrum 1999). The significant percentage of the species distribution within Horse Beach Canyon is believed to be due to microhabitat conditions within this canyon, including the availability of water within the canyon (S. Junak, pers. comm. 2008). The San Clemente Island bush mallow population in Horse Beach Canyon has persisted under baseline levels of use, which includes one mapped fire (1979-2005) at the mouth of the canyon and two to three fires further up-canyon, although additional fires and additional unrecorded disturbance are likely to have occurred in this area. This existing fire history (one to three fires in different areas of the canyon over 25 years) also appears to have favored this species and may have contributed to the expansion of the populations in this canyon.

San Clemente Island bush mallow occurs in groupings of stems that are assumed to represent the same genetic individual. Because of this assumption, the size of occurrences has been recorded using several methods, including counting the number of stem groupings or “clumps;” counting the total number of stems within a clump; and/or measuring the approximate area covered by plant groupings. However, uneven application of these enumeration methods causes some ambiguity when comparing occurrence sizes, suggesting more refined methods are needed to document trend beyond the appearance of new occurrences. Occurrences documented in 1996-1997 ranged in size from 1 to 50 clumps, with about half of these made up of 10 or fewer clumps (average 15 clumps per occurrence) (Junak and Wilken 1998).

*Threats*

A number of threats exist for San Clemente Island bush mallow, including competition with invasive plant species, erosion, alteration of San Clemente Island habitats by military activities, unnaturally high fire frequencies, and constrained access to its habitat for conducting active management. Small sizes of occurrences, low genetic diversity (Helenurm 1997, 1999), and little gene flow among occurrences (Helenurm 1999) may threaten San Clemente Island bush mallow due to the vulnerability of small populations to a range of environmental, demographic, and genetic stochastic factors.

The northern Lemon Tank Canyon occurrence, if extant, falls within an area identified by the INRMP as potentially needing environmental clean-up pursuant to the Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Although there are no immediate plans for clean-up at this site (U.S. Navy 2001), this occurrence could be impacted by future environmental clean-up. The historical Lemon Tank Canyon occurrence also falls within the bounds of a Special Warfare Training Area (SWAT-5) and close to the Missile Impact Range (MIR). However, the topography at Lemon Tank likely provides protection from troop movements, and fire frequency would likely be within the range of frequencies under which the species has persisted in the Impact Areas.

Over 70 percent of the known occurrences of San Clemente Island bush mallow lie within SHOBA, with many occurrences near ignition sources. Training activities within SHOBA pose a direct threat to individual plants and occurrences due to the ground disturbance associated with them, potential for invasive plant expansion, and the potential for recurrent fire.

Past and existing munitions use and NSW training within Impact Areas I and II and TAR 21 have impacted San Clemente Island occurrences in these areas. While surveys in the area have monitored species persistence, impacts of munitions and training activities have occurred but have not been quantified (J. Dunn, pers. comm.2006). Periodic fires caused by training activities have occurred in Horse Beach Canyon within Impact Area I and China Canyon within Impact Area II. Lower Horse Beach Canyon burned one time in the vicinity of San Clemente Island bush mallow locations and Upper Horse Beach Canyon burned three times between 1979 and 2004. China Canyon burned three times in the vicinity of the San Clemente Island bush mallow locations within the same time period. The extent to which these fires actually burned bush mallow occurrences and the intensity of the fires is not known. Occurrences within Horse Beach Canyon and China Canyon have persisted without apparent detriment at an apparent fire frequency of one to three fires over a 25-year period (1979-2004).

Fire suppression practices, including maintenance and creation of fuel breaks through vegetation removal or application of herbicide or Phos-Chek fire redardant, may also affect this species. While the effects of the herbicide or Phos-Chek application on San Clemente Island are unknown, the main ingredient of Phos-Chek is agricultural fertilizer that can affect plant communities and rare plants by facilitating the invasion of non-native species (Bell 2003; Larson and Newton 1996). For example, a study by Labat Environmental (2007) found that "similar to the effects of fertilizers, fire retardants may encourage growth of some plant species and giving them a competitive advantage over others, thus resulting in changes in community composition and species diversity (Tilman 1987; Wilson and Shay 1990). Bell *et al*. (2005) recorded enhanced weed invasion in an Australian heathland ecosystem, particularly in areas receiving high concentrations of Phos-Chek. Thus, in or near areas where endangered and threaten plants occur, the use of Phos-Chek fire retardant is of concern because its use may facilitate invasion of non-native weeds.

On San Clemente Island bush mallow is subject to the effects of applications of herbicide and/or Phos-Chek within the boundaries of fuelbreaks. The footprint of fuelbreaks surrounding Impact Areas I and II have evolved over time, and approximately two occurrences of San Clemente Island bush mallow are within the footprint of fuelbreaks (Service 2002). The status of these two occurrences is unknown.

*Conservation Actions*

Monitoring plot trend data and the appearance of around 30 new occurrences of San Clemente Island bush mallow since the early 1990s suggest this species is responding favorably to the removal of feral herbivores from San Clemente Island. Despite ongoing threats from fire, military training, and fire management and control activities, the species also appears to exhibit some tolerance to infrequent fire, as monitoring data has tracked the recovery of a population following fire, and new occurrences have been discovered in recently burned areas (Junak and

Wilken 1998; S. Junak pers. comm. 2006, and Tierra Data Inc. 2005). San Clemente Island bush mallow is also likely benefiting from weed management that occurs under baseline conditions, including treatment of fennel within Impact Area I and *Brassica* ssp. along China Point Road. Fennel was treated in Horse Beach Canyon and along China Point Road in 2005 (U.S. Navy, 2005a).

San Clemente Island bush mallow is among the sensitive plant species periodically monitored by the U.S. Navy on San Clemente Island (Junak and Wilken 1998; Junak 2006). Research pertaining to the genetics of this plant is also underway (Helenurm 1999).

The San Clemente Island INRMP proposes an array of management strategies to address identified goals and objectives for specified management units and their natural resources. Of relevance to the protection of the San Clemente Island bush mallow, the INRMP includes an objective to: "Protect, monitor, and restore plants and cryptogams in order to manage for their long-term sustainability on the island" (U.S. Navy 2001).

Associated with this objective are a number of proposed management strategies that include the following: consideration of San Clemente Island bush mallow as a "management focus plant" such that it is considered independently from its associated plant community for management; conducting status surveys for this species; ensuring that management-focus plants have a network of suitable sites; performing pollination studies on San Clemente Island bush mallow; and continuing to apply genetic research and management approaches to its management. Other INRMP strategies targeted towards the terrace complex of maritime desert scrub, in which San Clemente Island bush mallow occurs, include accelerating the recovery of shrubs on terrace faces and flats; reducing the percent cover of invasive plants from the 1992-93 baseline of 41 percent on terrace faces and 53 percent on terrace flats; controlling erosion, particularly in association with active and abandoned roads; and establishing a preliminary fire return interval of 5 years in grassy areas and 10 years or longer in shrublands.

Possibly in conflict with protection and/or recovery of San Clemente Island bush mallow is the competing objective included in the INRMP to protect military access to the SHOBA firing ranges due to SHOBA's high military value for ship-to-shore bombardment training (U.S. Navy 2001). To date, a number of the INRMP management strategies, or aspects of them, have been implemented. The Navy has implemented rare plant surveys that have documented new occurrences of San Clemente Island bush mallow; however, the status of many previously detected occurrences has not been assessed. Genetic research and pollination studies have also been performed. Concerted efforts have been made to control escape of fire from the SHOBA Impact Areas. However, other objectives have not been achieved, such as ensuring a network of suitable sites; controlling erosion in some areas; and the community goal of reducing the percent cover of invasive plants from 1992-93 baseline conditions (K. O'Connor pers. comm. 2006.).

Effects of the Action

The proposed action includes increased frequency of ordnance use in Impact Areas I and II, increases in munitions that will be fired over Horse Beach Canyon, and increased foot and vehicle traffic along Horse Beach Canyon Road. These activities may result in direct and indirect adverse effects to San Clemente Island bush mallow, particularly to the significant occurrences located within and at the mouth of Horse Beach Canyon in Impact Area I, including occurrences within TAR 21, and other occurrences within China Canyon in Impact Area II. New range management directives will be implemented as part of the proposed action. These directives will limit the ability of Navy resource personnel to assess and manage the portion of the bush mallow population that inhabits Horse Beach Canyon, including occurrences in TAR 21, and the occurrences in China Canyon. The proposed action also includes fire management and suppression activities that are likely to result in application of Phos-Chek or herbicide to San Clemente Island bush mallow occurrences that lie on the periphery of these Impact Areas.

Threats to the bush mallow occurrences within Impact Areas I and II are likely to increase over time as a result of intensified ordnance use and increased foot and vehicle traffic, including AAVs, along Horse Beach Canyon Road.

The Navy will implement significant conservation measures to minimize the effects of their FMP and training activities on the San Clemente Island bush mallow.

**Ordnance Use**

Impact Areas I and II sustain significant heavy artillery use under baseline conditions, and the San Clemente Island bush mallow populations within these Impact Areas have persisted under recent levels of disturbance and fire. Ordnance-related impacts in the vicinity of San Clemente Island bush mallow occurrences are expected to increase as training exercises become more frequent. Increases in NSFS (11 percent), EFEX (33 percent), Bombing Exercises (23 percent), and NSW Use of TAR 21 (32 percent) will increase the risks of direct hits to bush mallow occurrences within Impact Areas I and II. New activities that entail munitions use adjacent to, or over Horse Beach Canyon (AA Operations, AAV Operations, EFV Company Assault, and Battalion-Sized Landings), will also increase the risk of ordnance directly hitting occurrences of San Clemente Island bush mallow. A direct hit from ordnance could damage or destroy individuals or clumps of bush mallow plants.

Horse Beach Canyon, which supports 68 percent of the San Clemente Island bush mallow occurrences, and China Canyon, which supports 2 percent of the bush mallow occurrences, are included within Impact Area I and II boundaries, respectively, due to potential for ordnance to skip into these canyons. Under baseline conditions, heavy artillery targets are not placed within these canyons. TAR 21, which supports 21 percent of the bush mallow occurrences, is also located within the boundaries of Impact Area I, at the mouth of Horse Beach Canyon. Tar 21 is used for live-fire and demolition training, which is expected to increase by about 63 percent under the proposed action. Since plants are located within the boundaries of this training area, they could be directly hit and damaged or destroyed by explosions or live fire associated with training in this area.

As part of the Navy's overall conservation program on San Clemente Island, when consistent with training objectives, the Navy proposes to continue avoiding placement of heavy ordnance targets close to listed species, including San Clemente Island bush mallow occurrences. Close coordination between Navy botanical resource professionals and the military personnel placing targets will be necessary to assure that targets are not placed adjacent to San Clemente Island bush mallow plants. This measure will reduce the potential for direct impacts on San Clemente Island bush mallow and loss of known occurrences from ordnance use within Horse Beach Canyon, China Canyon, and adjacent to bush mallow plants in TAR 21. It is reasonable to conclude, however, that some San Clemente Island bush mallow plants will be impacted in TAR 21 and that the risk of ordnance entering Horse Beach and China canyons will increase as the number of operations increase. Thus, we anticipate that there may be some loss and damage to individuals or clumps of bush mallow plants. Based on the past history of training in this area, persistence of occurrences in spite of training activities, and life history information that indicates the San Clemente Island bush mallow exhibits some tolerance to fire, we believe the impacts to individuals and occurrences at Horse Beach Canyon, China Canyon, and TAR 21 from explosions or live fire will be low such that the overall distribution of the species at these sites is not reduced by more than 10 percent of the baseline condition at any one site (*i.e.*, Horse Beach Canyon: 47 percent of baseline occurrences; Tar 21: 21percent of baseline occurrences; and China Canyon: 2 percent of baseline occurrences).

**Fire**

Approximately one to three fires have occurred in Impact Areas I and II over a 25-year period under existing training and management conditions. San Clemente Island populations have persisted within Impact Areas I and II despite this fire frequency.

Increased use of large ordnance within Impact Area I and II, introduction of live-fire exercises from EFVs and increased frequency of NSW training could increase the frequency of fires in habitat occupied by San Clemente Island bush mallow within the SHOBA. Precautionary measures included as part of the FDRS are intended to reduce the ignition potential and allow for adequate suppression response to prevent repeated large-scale fires. The FDRS includes precautionary measures that discourage training with incendiary munitions during periods of high ignition potential; however, the increased intensity of munitions use (11 percent increase in FIREX, 33 percent increase in EFEX, 63 percent increase in TARs exercises, etc.) combined with the less restrictive ordnance use guidelines (over baseline conditions outlined in Biological Opinion FWS-2808), limit inference as to the potential future ignition frequency and fire pattern. Ignition frequency and fire patterns are also likely to change over time as a result of anticipated expansions of invasive plant species distributions and resulting increases in fuel.

San Clemente bush mallow displays adaptive characteristics that allow it to tolerate relatively high fire frequencies; however, fires that occur at frequencies greater than once every 5 to 10 years are believed to be detrimental to the species (U.S. Navy 2006). Increased fire frequency resulting from intensified uses could also lead to localized changes in vegetation (type conversion) that could indirectly affect San Clemente Island bush mallow. The Navy's fire management practices are anticipated to minimize ignitions as well as the spread of fires. The proposed action also includes a Navy commitment to conduct an annual review of fire management and fires that will allow adaptive management, if required. These measures should minimize the frequency and spread of fires that could result in type conversion of native habitat.

Fuelbreaks and suppression measures outlined within the FDRS should prevent fire frequency outside Impact Areas (*e.g.* San Clemente Island bush mallow occurrences south and north of Cave Canyon) from increasing to levels incompatible with the persistence of this species. Fire suppression is not proposed, however, within Impact Areas I and II, so bush mallow occurrences in these Impact Areas (70 percent of baseline occurrences) will likely be subject to a higher fire frequency than occurrences that occur outside Impact Area boundaries (30 percent of baseline occurrences). Fire could result in mortality to individual plants and reduce or eliminate (over-time) the species' seed bank.

**Fire Management and Suppression**

Fire management and suppression activities are likely to result in continued application of herbicide or Phos-Chek on the two known San Clemente Island bush mallow occurrences (if they are still extant) within fuel breaks along on the periphery of the Impact Areas. Phos-Chek may also favor the expansion of non-native species due to the fertilizing effect of this retardant that could also lead to the loss of these two occurrences. These two occurrences represent a small percentage of the overall San Clemente Island bush mallow population. The Navy will minimize the effects of Phos-Chek use on these and other bush mallow occurrences by conducting preseason briefings for fire fighting personnel addressing guidelines on fire suppression materials and tactics, including limitations associated with Phos-Chek and salt water drops.

The Navy proposes to minimize the potential for effects to listed species associated with future fuelbreak installation by considering the locations of documented occurrences as fuelbreak lines are developed, by studying the effects of Phos-Chek on San Clemente Island vegetation, and avoiding application of Phos-Chek within 91 m (300 ft) of mapped listed species to the extent consistent with fuelbreak installation. Since the boundaries of future fuelbreaks have not yet been identified, we anticipate that the Navy will consult with the Service regarding any future plans to establish fuel breaks with the potential to impact San Clemente Island bush mallow. Thus, the impacts of new fuelbreaks on San Clemente Island bush mallow are not considered in this analysis.

**Vehicle and Foot Traffic**

Proposed training activities would include significant increases in vehicle use entering and exiting TAR 21, both from the water and from elsewhere on San Clemente Island. NSW training activities are expected to increase approximately 63 percent under the proposed action.

Although many of these operations do not entail vehicle traffic (since insertion is from the water), it is expected that vehicle traffic to the TAR will increase proportionally to the amount of training. TAR 21 is located at the mouth of Horse Beach Canyon and is one of two proposed insertion points for AA School Battalion Operations (6 EFVs, 15 times/year), EFV Company Assault (46 EFVs 2 times/ year), and AA Vehicle and EFVO (12 AAVs, 8 times/year) and is an insertion point in the proposed Battalion Sized Landing (25 vehicles, 2 times/year).

Several proposed operations include more than one potential insertion point, so the exact number of operations and vehicles that would transit Horse Beach Canyon Road per year under the proposed action is not known. Based on vehicle numbers provided in the BA, approximately 656 assault vehicle trips up and down Horse Beach Road to and from TAR 21 could occur if all activities that identify TAR 21 as the insertion or exit point use this route.

Assault vehicles are large vehicles, many of which are tracked and weigh approximately 76,000 pounds. Increased travel along Horse Beach Road may result in erosion problems and/or transport of invasive plant material into Horse Beach Canyon, which lies downslope from the road. One of the most significant ecological effects that vehicular routes have on soils in desert regions involves changes in water runoff patterns. Vehicular routes that run straight up hillslopes can promote soil erosion and the development of rills and gullies. Vehicular routes that run parallel to elevation contours can also alter runoff patterns by redirecting water along roadside ditches to low points along the road, after which water continues on downslope in a more concentrated stream than otherwise would have occurred. This process concentrates channels at higher slope positions (Montgomery 1994), resulting in more elongated first-order drainage basins and accelerated rates of soil erosion (Forman and Alexander 1998).

Vehicular routes are also a primary pathway for plant invasions into arid and semi-arid ecosystems (Johnson *et al.* 1975; Amor and Stephens 1976; Brooks and Pyke 2001; Gelbard and Belnap 2003). Vehicles serve as dispersal vectors for alien plant propagules (Clifford 1959; Schmidt 1989; Lonsdale and Lane 1994), and disturbances within vehicular route corridors facilitate establishment of invading ruderal plants (Greenberg *et al.* 1997). Horse Beach Canyon Road and portions of TAR 21 that are used by vehicles as part of the proposed action are likely to support conditions that will allow establishment of invasive plant species adjacent to significant portions of the San Clemente Island bush mallow distribution on San Clemente Island (*i.e.*, 68 percent of the baseline occurrences of bush mallow are known from Horse Beach Canyon or TAR 21).

Vehicular routes with dirt surfaces can also be a significant source of dust, which can have significant effects on plant vigor downwind from vehicle activity. Dust is likely to be generated on Horse Beach Canyon Road during training activities that use heavy assault vehicles. Whether such dust could accumulate on plants that lie in Horse Beach Canyon is unknown; however, given the prevailing wind direction, downwind dust deposition appears likely to occur up to an undetermined distance from this road.

The intensity of foot traffic is also likely to increase within the proposed IOA and TAR 21 as a result of the proposed action. Foot traffic will come from off-island (predominantly Camp Pendleton), other areas of the island during Battalion-Sized Landings, and TAR 21 training activities, which are anticipated to increase approximately 63 percent. Plans for the TAR include construction of temporary plywood targets that would be used for demolition practice and re-constructed as necessary. Frequent foot traffic by small groups and placement of targets could directly affect the bush mallow occurrences located within the boundaries of the TAR. Foot traffic is also likely to disturb soils and can increase the potential for spread of invasive plant species.

To address erosion problems and transport of invasive plant material into Horse Beach Canyon, , the Navy will identify an ingress/egress and travel route that avoids impacts to wetlands and minimizes impacts to coastal dune scrub at the Horse Beach Cove Amphibious Landing and Embarkation Area at TAR 21. This will involve instructing drivers to: (1) drive amphibious vehicles: westward on the beach and egress from the beach west of the mouth of Horse Beach Canyon and (2) use only Horse Beach and Horse Beach Canyon Roads between ingress and egress. Prior to using Horse Beach Canyon Road for landings, the Navy will do a site survey to determine whether the road can support the proposed landings and whether their proposed vehicles will create erosion downslope. If it is determined at that time that the roads need to altered and consultation is required, the Navy will conduct separate consultation on that action. An alternate route may be selected along the coast on the better maintained road to China Point Road.

The Navy also proposes to develop and implement an erosion control plan in coordination with the Service to minimize the potential for erosion problems beyond the Horse Beach Canyon Road boundaries and reduce the potential for impacts to listed species. The erosion plan will include using BMPs to the reduce potential for erosion beyond boundaries of operational areas, potentially including setbacks from steep slopes such as those along Horse Beach Canyon Road. The Navy will also develop and implement a project to monitor for erosion, dust generation, and deposition of dust in adjacent habitats. If the erosion control plan and monitoring project are implemented prior to broader uses of Horse Beach Canyon Road outlined in the proposed action, we do not expect adverse effects to the bush mallow in Horse Beach Canyon from erosion and/or dust.

To reduce the potential for transport of invasive plants to the island, military and non-military personnel will be asked to conduct a brief check and remove any visible plant material, dirt, or mud on equipment and shoes, prior to coming to San Clemente Island. Tactical ground vehicles will be washed of visible plant material, dirt and mud prior to embarkation for San Clemente Island (The washing procedure is not required for amphibious vehicles after 15 minutes of self-propelled travel through salt water prior to coming ashore on San Clemente Island.). The Navy also proposes to brief military units on maneuver area boundaries prior to conducting operations and to conduct assault vehicle travel or maneuvering only within these boundaries.

**Invasive Plant Species**

Invasive plant species are likely to be introduced to San Clemente Island by ongoing and increased training activity on the island and are also likely to be spread by increased movement of people, equipment, and vehicles. In addition, invasive species are frequently found within fuelbreaks (Merriam *et al.* 2006). Invasive species are widely recognized as a leading cause of species loss world-wide, second only to direct habitat loss and fragmentation (Pimm and Gilpin 1989). Island ecosystems and species are especially vulnerable to invasion (Mack *et al.* 2000). Invasive species may affect ecosystem processes. For example, invasion of grasses may alter fire frequency by rapid production of highly flammable fuel, thus leading to more frequent fires and eventual conversion of shrub lands to grasslands (D'Antonio and Vitousek 1992). Non-native invasive species may compete with San Clemente Island bush mallow for nutrients, water, or sunlight. In addition, non-native plants may provide additional flashy fuels that could change the frequency of fires in this area. Since no fire suppression is proposed in Impact Areas, fires could exceed the frequency under which San Clemente Island bush mallow could persist in these areas. Spread of invasive species from inadvertent introductions caused by vehicular or foot traffic could adversely affect San Clemente Island bush mallow, given its occurrence in Impact Areas I, including TAR 21, in Impact Area II.

Invasive species of particular concern for bush mallow include fennel (*Foeniculum vulgare*) because this species is likely to persist in microhabitat similar to bush mallow. Fennel is present on San Clemente Island and may be transported to the vicinity of Horse Beach Canyon by movement of people and vehicles from areas that are currently infested by fennel plants into areas adjacent of Horse Beach Canyon Road. Increased levels of foot traffic may also occur at the mouth of Horse Beach Canyon as a result of proposed increases in NSW Training in TAR 21. Mesic conditions at the mouth of the canyon would facilitate germination of invasive plant seeds that could then move up canyon.

Safety concerns are expected to limit the potential to manage any large scale establishment of invasive plant species that occurs within Horse Beach Canyon. Since a significant portion of the San Clemente Island bush mallow occurs within the canyon, this is of particular concern.

To reduce the potential for invasive plant species establishment and spread in San Clemente Island bush mallow habitat, the Navy will monitor for invasive non-native plant establishment in the following areas: TAR 21 within the vicinity of Horse Beach Canyon; the southern end of Horse Beach Canyon Road and IOA within Impact Area I; and along China Point Road and Horse Beach Canyon Road between Impact Areas I and II. If invasive plant species are identified, the Navy will control them to prevent their spread into Horse Beach Canyon. Specifics of the monitoring and control will be developed in coordination with the Service and initiated prior to the Navy conducting the new activities proposed in the BA. Monitoring and control measures will be in accordance with safety requirements. The Navy will also implement management measures to improve the status of the San Clemente Island bush mallow. The Navy will coordinate with the Service to establish success criteria for the status of San Clemente Island bush mallow that, when met, will allow the Navy to discontinue any required invasive exotic plant control in the Horse Beach Canyon and Tar 21 areas described above.

The Navy has also committed to continue invasive exotic plant species control on an island-wide scale. The focus of the invasive exotic plant control program will continue to be the control of highly invasive exotic plants that have the potential to adversely impact habitat for federally listed species in known locations and the early detection and eradication of new occurrences of such species.

**Access Restrictions and Impact Area Boundary Change**

In 2006, the Navy began to review access policies to range complexes through out the Southwest Region. Due to an increased awareness of the potential safety hazards to personnel associated with the accumulation of Munitions Potentially Possessing Explosive Hazards (MPPEH) and UXO within high explosive impact areas the Navy issued an instruction (COMNAVREGSW Instruction 400.2 dated 18 July 2006 and updated 07 September 2007). The policy directives of this instruction prohibits access to the high explosive impact areas within SHOBA for “any activity associated with archeological or biological monitoring and surveys or recreational (to include hunting) use”. Until this time, Horse Beach Canyon, China Canyon, China Beach, Pyramid Beach, and other areas that lie within Impact Area boundaries had been periodically surveyed for natural resources for over 20 years.

The Navy proposes to continue the policy that excludes Impact Area access for biological monitoring as part of the proposed action. Access policies due to safety concerns will reduce the ability to monitor and manage approximately 46.3 percent of the San Clemente Island bush mallow occurrences on San Clemente Island. These plants lie within Horse Beach Canyon and support a relatively high level of genetic variability (polymorphism). Inability to access the Horse Beach Canyon occurrences will preclude collection of cuttings or seeds of the plant that could be used as a repository of this genetic variability. Inability to access occurrences will also preclude botanists from monitoring the population on foot. However, the Navy proposes to explore the feasibility of remote monitoring to assess the ongoing status of the species within Horse Beach Canyon.

The Navy proposes to include TAR 21 and an area to the west of TAR 21 as part of Impact Area I. Previously, TAR 21 has been recognized as lying between Impact Area I and Impact Area II. TAR 21 supports approximately 21 percent of the baseline San Clemente Island bush mallow occurrences. Tar 21 lies at the mouth of Horse Beach Canyon, which supports the largest number of bush mallow occurrences. This administrative change further affects the Navy’s capability to monitor and manage for this species since the access policy for Impact Areas precludes access for non-military personnel.

The inability to monitor or manage occurrences within the boundaries of TAR 21 would affect occurrences throughout Horse Beach Canyon because of the likelihood of invasive plant species establishment resulting from intensified activities within or adjacent to the TAR. In recognition of the management needs of San Clemente Island bush mallow, however, the Navy proposes to control invasive exotic plant species in TAR 21 within the vicinity of Horse Beach Canyon and in the Infantry Operations Area along Horse Beach Canyon Road in Impact Area I until San Clemente Island bush mallow becomes more abundant and broadly distributed outside of Horse Beach Canyon.

Conclusion

After reviewing the current status of the San Clemente Island bush mallow, the environmental baseline, and the effects of the proposed action, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of this species. We have reached this conclusion for the following reasons:

(1) Approximately 30 percent of the San Clemente Island bush mallow occurrences are not within Impact Areas and are not in areas subject to significant training activities, which will help to ensure survival of this narrowly-restricted island species. More importantly, the Navy through their proposed conservation program will implement monitoring and management actions for bush mallow occurrences outside of the Impact Areas to support recovery of the species;

(2) Increased ordnance use in Impact Area I has the potential to impact the significant San Clemente Island bush mallow population known from within and at the mouth of Horse Beach Canyon; however, the Navy's commitment to locate heavy ordnance targets within Impact Areas I and II away from sensitive resources, including San Clemente Island bush mallow, to the extent feasible while meeting operational needs, will minimize damage or destruction of individual occurrences of this plant. With implementation of these measures, we anticipate no significant change in the distribution of the San Clemente Island bush mallow population in Impact Area I as a result of increased ordnance use. Moreover, the Navy will manage and monitor the San Clemente Island bush mallow population in Impact Area I (*i.e.*, Horse Beach Canyon and TAR 21) in coordination with the Service, to the maximum extent possible given safety constraints in the area. This measure will ensure that the Navy and the Service have the ability to coordinate, assess, and address any effects not anticipated in this analysis. Finally, as part of the Navy's conservation program, some genetic material will be collected, if safety constraints allow, from bush mallow occurrences within TAR 21, again helping to ensure survival, and in support of recovery, of this species;

(3) The Navy will minimize the potential impacts from increased invasive species establishment by controlling invasive exotic plant species in the following areas: TAR 21 within the vicinity of Horse Beach Canyon; the southern end of Horse Beach Canyon Road and IOA within Impact Area I; and along China Point Road and Horse Beach Canyon Road between Impact Areas I and II. With implementation of this measure, we anticipate no significant change in the distribution of the San Clemente

Island bush mallow population in Impact Area I as a result of establishment and spread of invasive species. The Navy will also continue their island-wide invasive exotic plant species control program, which focuses on habitat for federally listed species;

(4) The Navy will minimize the potential impacts from increased fire frequency by implementing a FMP and develop an erosion control plan to address potential effects of erosion and/or dust on the bush mallow occurrences in Horse Beach Canyon as a result of use of Horse Beach Canyon Road by tracked vehicles as a result of use of Horse Beach Canyon Road by tracked vehicles; and

(5) The San Clemente Island bush mallow has increased in numbers and distribution since the time of its listing primarily due to conservation actions supported by the Navy (*e.g.* removal of feral grazing animals, invasive plant management); with continuation of the Navy's conservation program for San Clemente Island, including actions to promote the recovery of listed plants such as the bush mallow, we anticipate effects of the proposed action will be offset and will not result in an appreciable reduction in the numbers, reproduction, or distribution of the San Clemente Island bush mallow.

**San Clemente Island Indian Paintbrush (*Castilleja grisea*)**

*Listing Status*

San Clemente Island Indian paintbrush was listed as endangered on August 11, 1977 (42 FR 40682) and subsequently addressed in the Channel Islands Recovery Plan (Service 1984). Critical habitat has not been designated for this species.

*Species Description*

San Clemente Island Indian paintbrush is a highly branched perennial subshrub in the figwort family (Scrophulariaceae). The species is endemic to San Clemente Island (Chuang and Heckard 1993) and is the only representative of the genus *Castilleja* found on the island (Helenurm *et al*. 2005). San Clemente Island Indian paintbrush is typically 29.2 to 80 cm (11.5 to 31.5 in.) in height and covered with a dense white-wooly felt. Most *Castilleja* species have bisexual flowers disposed in terminal spikes. The flowers of San Clemente Island Indian paintbrush are yellow. Its leaves alternate and are linear, approximately 1.3 to 5.1 cm (0.5 to 2 in) long with 0 to 3 lobes (Chuang and Heckard 1993). The fruit is an ovoid capsule, less than 1.3 cm (0.5 in.) long, containing approximately 150 seeds (Junak and Wilken 1998). San Clemente Island Indian paintbrush seeds are typically brown and less than 0.2 cm (0.06 in.) long. The seed coats are deeply netted, allowing the encapsulation of air, which may aid dispersal via water (Chuang and Heckard 1993; Muller 2005). Under natural conditions, plants typically produce 9 to 14 fruits.

*Habitat Affinity*

Most occurrences of San Clemente Island Indian paintbrush are in steep rocky canyons on both the eastern and western sides of the island. It is also found on coastal bluffs, slopes and flats around the island's perimeter. Some of the largest occurrences are located in bowl-shaped swales on the coastal terraces in the southern portion of the island (Junak and Wilken 1998). San Clemente Island Indian paintbrush is found in both coastal sage scrub and maritime cactus scrub plant communities between 30 and 1,200 ft in elevation. Based on vegetation mapping for the San Clemente Island INRMP, San Clemente Island Indian paintbrush is mainly associated with two habitats on the island: canyon woodland (696.2 ac) and maritime desert scrub/terrace complex (6,228.2 acres) (U.S. Navy 2002). A few scattered occurrences can also be found in maritime desert scrub/grassland habitat and in grassland habitat just east of Pyramid Cove. San Clemente Island Indian paintbrush habitat at Pyramid Cove is further subdivided into shallow, cobbly fine loam on slopes and terraces and maritime sage scrub northeast escarpment. San Clemente Island Indian paintbrush is often associated with the following native plant species California sunflower (*Encelia californica*), saltbush (*Atriplex californica*), golden cereus (*Bergerocactus emoryi*), foxtail brome (*Bromus madritensis rubens*), prickly-pear cactus (*Opuntia* spp.), and lemonade berry (*Rhus integrifolia*).

*Life History*

Both insect and hummingbird pollination of Indian paintbrush have been reported (Grant 1994; Junak and Wilken 1998). Junak and Wilken (1998) found that 67 to 71 percent of San Clemente Island Indian paintbrush flowers produced fruits and significantly more flowers than fruits were produced. These data suggests that San Clemente Island Indian paintbrush may either be self incompatible or strongly dependent on insect or hummingbird visitation for pollination and seed set. San Clemente Island Indian paintbrush seeds typically germinate the spring following seed set as temperatures begin to warm (Muller 2005). All members of the genus *Castilleja* are considered hemiparasitic because their roots tap into the root system of other species to ensure an adequate supply of water and possibly nutrients (Junak and Wilken 1998). Parasitism in *Castilleja* seems to be a generalist phenomenon with taxa parasitizing plants within a wide range of families, including Asteraceae, Fabaceae, Polygonaceae, Poaceae, and Rosaceae (Muller 2005).

*Population Trend*

San Clemente Island Indian paintbrush was considered relatively common in the 1930s but declined steadily over the next 30 years. By 1963 it was reported as rare or occasional, and by the time of listing in 1977, few individuals were observed (Kellogg and Kellogg 1994). Surveys in 1996 and 1997, however, documented a total of 77 occurrences of San Clemente Island Indian paintbrush, collectively comprising more than 3,500 individuals (Junak and Wilken 1998). Occurrences ranged from isolated plants to 600 individuals. San Clemente Island Indian paintbrush was found in steep canyons on both sides of San Clemente Island and on coastal bluffs, slopes, and flats around the island's perimeter. More recent surveys for San Clemente

Island Indian paintbrush were conducted in 2003 and 2004. Surveyors mapped an additional 42 locations and 1,120 individuals (Junak 2006). Occurrences ranged from isolated plants to 200 individuals. These new occurrences were mainly concentrated in steep canyons on the western side of the island, although a few were discovered near previously recorded individuals in the eastern canyons. Taken together, these two surveys documented about 119 locations and up to 4,700 individuals. Additional surveys conducted in support of the San Clemente Island BA have provided additional records of species locations and further increased the estimated distribution and abundance of this species. Based on the most recent estimates, San Clemente Island Indian paintbrush has increased substantially in distribution and abundance since the time of listing so that now about 14,064 San Clemente Island Indian paintbrush individuals may be found at about 335 locations on San Clemente Island (U.S. Navy 2008a).

*Rangewide Distribution and Threats*

Since the entire distribution of San Clemente Island Indian paintbrush is restricted to the action area of San Clemente Island, its island-wide distribution and current threats to the species are discussed in the Environmental Baseline section below.

*Conservation Needs*

A recent 5-year review (Service 2006a) identified the following conservation recommendations for the San Clemente Island Indian paintbrush.

1. Study the range (frequency and intensity) of fire conditions that San Clemente Island Indian paintbrush can withstand. Determine whether there is a fire interval at which this paintbrush best survives and reproduces.

2. Conduct field studies to determine which species are pollinating San Clemente Island Indian paintbrush. Protection of pollinator habitat, dispersal corridors, and other nectar sources may be necessary for the continued recovery of this species.

3. Identify which populations of San Clemente Island Indian paintbrush are subjected to erosion from storm water run-off. Implement erosion control measures and other Best Management Practices in these areas.

4. Conduct greenhouse studies to determine the importance of host species on San Clemente Island Indian paintbrush seedling recruitment and survival.

5. Establish a non-native annual grass removal program in San Clemente Island Indian paintbrush habitats such that percent cover of these species decreases by at least ten percent (a goal identified in the INRMP).

Environmental Baseline

*Distribution*

San Clemente Island Indian paintbrush is endemic to San Clemente Island and was originally described as relatively common (Helenurm *et al*. 2005). The original range and distribution of San Clemente Island Indian paintbrush on San Clemente Island is not known because its decline began before thorough botanical studies were completed. Currently, most occurrences of San Clemente Island Indian paintbrush are in steep rocky canyons on both the eastern and western sides of the island. It is also found on coastal bluffs, slopes and flats around the island's perimeter. Some of the largest occurrences are located in bowl-shaped swales on the coastal terraces in the southern portion of the island (Junak and Wilken 1998).

Based on the most recent estimates, San Clemente Island Indian paintbrush has increased substantially in distribution and abundance since the time of listing so that now about 14,064 San Clemente Island Indian paintbrush individuals may be found at about 335 locations on San Clemente Island (U.S. Navy 2008a). Much of the expansion has been within the steep canyon walls on the western side of the island. Occurrence data for this species spans the southern two-thirds of the island, a distance of approximately 17.5 mi.

*Threats*

With the removal of goats, pigs, and deer in 1992, the vegetation on San Clemente Island has rebounded, and the health of San Clemente Island Indian paintbrush populations has improved substantially (S. Junak pers. comm. 2006). Although the main threat to the recovery of San Clemente Island Indian paintbrush has been eliminated, persistent erosion resulting from historic overgrazing and competition with naturalized invasive non-native plant species still pose a threat to the recovery of this species. Other threats to the species include alteration of its habitat by military training activities and unnaturally high fire frequencies in the southern portion of its range.

The San Clemente Island Indian paintbrush distribution overlaps the boundary of the SHOBA at the southern end of the island, with 40 percent of occurrences inside the SHOBA (Junak and Wilken 1998; Junak 2006). Although the SHOBA contains 40 percent of San Clemente Island Indian paintbrush occurrences, existing impacts associated with use of ordnance and associated fires are concentrated in two Impact Areas (Impact Area I and II) within SHOBA. Impact Area I contains about 15.5 percent of the San Clemente Island Indian paintbrush occurrences and 14.5 percent of the individuals. Impact Area II contains about 0.9 percent of San Clemente Island Indian paintbrush occurrences and 0.3 percent of the individuals. Strip burning and fire retardant are used to maintain fuel breaks around these impact areas and to limit the spread of fires. It is likely that San Clemente Island Indian paintbrush in these areas are occasionally destroyed or damaged by explosives or small arms use.

Periodic fires have occurred in occupied habitat in Horse Beach Canyon in Impact Area I and China Canyon in Impact Area II. Portions of these canyons that are inhabited by San Clemente Island Indian paintbrush have burned one to three times in since 1979, and San Clemente Island Indian paintbrush has persisted and increased under this fire regime in Horse Beach Canyon. Occurrences in China Canyon have not been recently monitored, so effects of the fires on this population are not known.

Fire suppression practices, including maintenance and creation of fuel breaks through vegetation removal or application of herbicide or Phos-Chek fire retardant, may also have affected this species in the past. Creation and maintenance of fuelbreaks could kill or damage San Clemente Island Indian paintbrush. As described in the analysis for San Clemente Island bush mallow Phos-Chek may act as a fertilizer, facilitating the spread of non-native grasses.

San Clemente Island Indian paintbrush occurrences near areas exposed to foot and vehicle traffic include an occurrence near TAR 17 at Eel Point, which may be exposed to occasional foot traffic from small groups of soldiers, and an occurrence within AFP 1. Within AFP 1, the occurrence is approximately 200 feet and upslope from the most heavily impacted area

*Conservation Actions*

The San Clemente Island INRMP includes an objective to "protect, monitor, and restore plants and cryptogams in order to manage for their long-term sustainability on the island" (U.S. Navy 2002). Associated with this objective are a number of proposed management strategies that include the following: consideration of San Clemente Island Indian paintbrush as a "management focus plant" such that it is considered independently from its associated plant community for management; conducting status surveys for this species; ensuring that management focus plants have a network of suitable sites; performing pollination studies on San Clemente Island Indian paintbrush; and continuing to apply genetic research and management approaches to its management. Other INRMP strategies targeted towards the terrace complex of maritime desert scrub, in which San Clemente Island Indian paintbrush occurs, include: accelerating the recovery of shrubs on terrace faces and flats; reducing the percent cover of invasive plants from the 1992-93 baseline of 41 percent on terrace faces and 53 percent on terrace flats; controlling erosion, particularly in association with active and abandoned roads; and establishing a preliminary fire return interval of 5 years in grassy areas and 10 years or longer in shrublands (U.S. Navy 2002).

To date, concerted efforts have been made to control escape of fire from the Impact Areas and to reduce the cover of non-native species (K. O'Connor pers. comm. 2006). The Navy has also funded rare plant surveys that have documented new occurrences of San Clemente Island Indian paintbrush and field studies that have determined some aspects of its reproductive potential.

<u>Effects of the Action</u>

San Clemente Island Indian paintbrush is likely to be exposed to increased fires, fire management and suppression activities, ordnance, foot and vehicle traffic, and erosion as a result of the proposed action. The ability to monitor and manage approximately 16 percent of the species occurrences will be precluded by the boundaries of Impact Areas and access policies. Despite the potential for these adverse effects, most of the San Clemente Island Indian paintbrush population occurs outside the areas that are most likely to be impacted by the proposed action. The Navy will implement significant conservation measures to minimize the effects of their FMP and training activities on the San Clemente Island Indian paintbrush.

**Ordnance Use**

The risk of destroying individual San Clemente Island Indian paintbrush plants within Impact Areas I and II is expected to increase as the use of ordnance in these areas increases. As described above, use of TAR 21, in Impact Area I, is anticipated to increase substantially, and other activities involving use of ordnance in the rest of Impact Areas I and II are anticipated to increase as well. TAR 21 contains only one occurrence of San Clemente Island Indian paintbrush, and Impact Areas I and II contain only 15.5 and 0.9 percent of San Clemente Island Indian paintbrush occurrences, respectively.

Impact Areas I and II sustain significant heavy artillery use under baseline conditions, and the San Clemente Island Indian paintbrush occurrences within these Impact Areas have persisted under recent levels of ordnance use. Persistence of San Clemente Island Indian paintbrush within Impact Areas I and II is likely due to the fact that San Clemente Island Indian paintbrush are concentrated in two canyons (Horse Beach Canyon and China Canyon) whereas impacts from ordnance are concentrated in existing highly disturbed portions of the Impact Area, and plants in the canyon are largely shielded due to topography. For example, San Clemente Island Indian paintbrush occurrences are located approximately 1,150 ft from Impact Area IIA (also known as the bomb box), which receives most of the heavy ordnance used on San Clemente Island. Targets are not currently placed within China Canyon, and topography of the area reduces the potential for a direct hit of these San Clemente Island Indian paintbrush occurrences. Existing patterns of disturbance are expected to continue in this area, which suggests that existing heavily impacted areas continue to be impacted.

The risk of occasional, accidental impacts to San Clemente Island Indian paintbrush from exploding ordnance will increase roughly in proportion to the increase in training activities. While direct hits from ordnance are unlikely, they could damage or destroy individual Indian paintbrush plants. Although the plants within Impact Area I remain at risk due to their proximity to intensive ordnance use, proposed increased use of large ordnance would likely have minimal additional effects on this species based on the observed increase in plants seen in SHOBA during ongoing operations, their adaptation to fire and distance from frequently used target areas, and topographic shielding. The potential for direct impacts to San Clemente Island Indian paintbrush from ordnance will also be minimized through the Navy's commitment to locate heavy ordnance targets within Impact Areas I and II as far away from sensitive resources as feasible while meeting operational needs.

**Fire**

Fire frequency is expected to increase as training exercises become more frequent. There may be some increase of fire in the SHOBA, which contains 40 percent of the San Clemente Island Indian paintbrush occurrences, including those occurrences in Impact Areas I and II and the surrounding area. Fuel breaks and suppression measures outlined within the FDRS should prevent a substantial increase in fire frequency outside of the Impact Areas. Thus, the greatest risk for increased fire will be within Impact Areas I and II, which contain 15.5 and 0.9 percent of San Clemente Island Indian paintbrush occurrences, respectively.

TAR 21 within Impact Area I will experience the 32 percent increase in use associated with training activities (Table 2), but TAR 21 contains only one occurrence of the San Clemente Island Indian paintbrush. Other activities that will increase in the Impact Areas include Naval Surface Fire Support (11 percent), EFEX (33 percent), and Bombing Exercises (23 percent), all of which will increase the potential for fire ignitions (Table 1). New activities that entail munitions use adjacent to, or over Horse Beach Canyon (AA Operations, AAV Operations, EFV Company Assault, and Battalion Sized Landings), will also increase the risk of fire.

Fire could result in mortality to individual San Clemente Island Indian paintbrush plants and to the species' seed bank. Because it may rely on connections to a host plant, repeated fires at short intervals could affect this species by negatively impacting the re-establishment of its host plants. Host plants have not yet been confirmed for the species, although California sunflower, *Opuntia littoralis*, and *Isocoma veneta* are believed to be host plants. However, anecdotal evidence suggests that occasional fire may help promote this species, which exhibits fire-stimulated seedling establishment. A monitored occurrence in Pyramid Cove peaked in 1984 after a 1983 fire and subsequently declined for several years (U.S. Navy 2008a). In addition, numerous individuals have now been documented in Horse Beach Canyon, in areas that have burned one to three times since 1979. Too frequent fires, however, may inhibit San Clemente Island paintbrush recovery and result in habitat type conversion. The Navy's fire management practices are anticipated to minimize ignitions as well as the spread of fires. The proposed action also includes a Navy commitment to conduct an annual review of fire management and fires that will allow adaptive management, if required. These measures should minimize the frequency and spread of fires that could result in type conversion of native habitat.

**Fire Management and Suppression**

Fuelbreak maintenance, using Phos-Chek or herbicides is proposed in the general vicinity of several occurrences of San Clemente Island Indian paintbrush. Any San Clemente Island Indian paintbrush plants within existing fuelbreaks may have been destroyed or damaged by past maintenance activities. However, any remaining individuals could be adversely affected by ongoing application of herbicide or by application of Phos-Chek. Phos-Chek can create a fertilizer effect that favors the establishment and proliferation of weedy plant species that can then out-compete native species. The Navy will minimize the effects of Phos-Chek use on Indian paintbrush plants by conducting preseason briefings for fire fighting personnel addressing guidelines on fire suppression materials and tactics, including limitations associated with Phos-Chek and salt water drops.

The Navy proposes to minimize the potential for effects to listed species associated with future fuelbreak installation by considering the locations of documented occurrences as fuelbreak lines are developed, by studying the effects of Phos-Chek on San Clemente Island vegetation, and avoiding application of Phos-Chek within 300 ft of mapped listed species to the extent consistent with fuelbreak installation. However, since the boundaries of future fuelbreaks have not yet been identified, we anticipate that the Navy will consult with the Service regarding any future plans to establish fuelbreaks with the potential to impact San Clemente Island Indian paintbrush. Thus, the impacts of new fuelbreaks on San Clemente Island Indian paintbrush are not considered in this analysis.

**Vehicle and Foot Traffic**

Locations where increased vehicle and foot traffic may directly affect San Clemente Island Indian paintbrush include TAR 21 in Impact Area I, AFP 1 near the eastern-most point of the island, and the Infantry Operations Area (IOA), which runs through much of the central portion of the island. Increased vehicle and foot traffic could indirectly affect San Clemente Island Indian paintbrush, particularly in Horse Beach Canyon, through increased erosion, dust, and introduction of non-native plants.

Plans for the TAR include construction of temporary plywood targets that would be used for demolition practice and re-constructed as necessary. Frequent foot traffic by small groups and placement of targets could directly affect the lone occurrence that is located within the boundaries of the TAR. Foot traffic is also likely to disturb soils and can increase the potential for spread of invasive plant species.

One occurrence of San Clemente Island Indian paintbrush with 28 individuals lies within the central portion of the AFP near the Ridge Road. The occurrence is located in operationally accessible portions of the site that appear to have been previously unused. Proposed use of this area is likely to result in direct impacts to this occurrence of San Clemente Island Indian paintbrush. Maneuvering of heavy wheeled and tracked vehicles, including tanks, and digging in of recoil spades on howitzers are likely to damage individuals of this occurrence, and spread of invasive species may be facilitated be the activity. Avoidance measures suggested by the Service, and included as potential avoidance measures in the BA, including signage or inclusion of physical features that would discourage vehicle use in the immediate vicinity of the occurrence, were deemed incompatible with the training needs of the Marine Corps, the primary user of this operational area. However, protection of the localized area containing San Clemente Island Indian paintbrush could still potentially be addressed as part of development of the erosion control plan.

The 3,567-ha (8,815-ac) IOA contains approximately 53 of 335 occurrences (15.8 percent of the total occurrences) and 808 of 14,064 individuals (5.75 percent of total individuals) of San

Clemente Island paintbrush. San Clemente Island Indian paintbrush occurrences within the IOA would be exposed to increased foot traffic associated with Battalion Landings under the proposed action. However, San Clemente Island Indian paintbrush is a small shrub and is unlikely to be affected by occasional foot traffic. Any effects of foot traffic on a local occurrence of this species would be dispersed (because the Marines would be spread out), minor (trampled leaves or broken branches), infrequent (up to twice per year, generally less) and temporary. Marines will generally travel in a dispersed pattern during the proposed training activities, and the small and generally temporary direct effect that this dispersed foot travel would have on plants is not expected to have a significant impact on the species. The increased foot traffic could, however, result in increased spread of non-native plant species, discussed in more detail below.

Indirect effects could occur to San Clemente Island Indian paintbrush within Horse Beach Canyon from increased use of Horse Beach Canyon Road. San Clemente Island Indian paintbrush occurrences in Horse Beach Canyon are located downslope of Horse Beach Canyon Road, which is currently a poorly maintained dirt road, but is proposed for significant increases in vehicle use as part of the Assault Vehicle Maneuver Corridor. Based on information provided in the BA, approximately 656 assault vehicle trips up and down Horse Beach Canyon Road could occur, with vehicles entering and exiting at TAR 21, and travelling well inland. Assault vehicles are large vehicles, many of which are tracked. The EFV weighs approximately 76,000 pounds (AAAV EIS). Increased travel along Horse Beach Canyon Road may result in erosion problems or transport of non-native plant material into Horse Beach Canyon, especially since the canyon lies downslope from the road.

One of the most significant ecological effects that vehicular routes have on soils in desert regions involves changes in water runoff patterns. Vehicular routes that run straight up hillslopes can promote soil erosion and the development of rills and gullies. Vehicular routes that run parallel to elevation contours can also alter runoff patterns by redirecting water along roadside ditches to low points along the road, after which water continues on downslope in a more concentrated stream than otherwise would have occurred. This process concentrates channels at higher slope positions (Montgomery 1994), resulting in more elongated first-order drainage basins, and accelerated rates of soil erosion (Forman and Alexander 1998). Vehicular routes with dirt surfaces can also be a significant source of dust, which can have significant effects on plant vigor downwind from vehicle activity. Dust is likely to be generated on Horse Beach Canyon Road during training activities that use heavy assault vehicles. Whether such dust could accumulate on plants in Horse Beach Canyon is unknown, but given the prevailing wind direction, downwind dust deposition appears likely.

The potential effects of erosion on San Clemente Island Indian paintbrush will be minimized through the Navy’s commitment to develop an erosion control plan and finalize AVMA, AMP, and AFP areas based on field review with soil erosion experts and military personnel, such that operational areas minimize inclusion of steep slopes and drainage heads. The erosion control plan will include portions of China Point Road and Horse Beach Canyon Road that are within the IOA. The goals of the plan would be to: (1) minimize soil erosion within each of these operational areas and minimize offsite impacts; (2) prevent soil erosion from adversely affecting federally listed or proposed species or their habitats; (3) prevent soil erosion from significantly impacting other sensitive resources, including sensitive plant and wildlife species and their habitats, jurisdictional wetlands and non-wetland waters, and the Area of Special Biological Significance (ASBS) surrounding the island. The Navy will also develop and implement a project to monitor for erosion, dust generation, and deposition of dust in habitats adjacent to the AVMA, AMP, AFP, and amphibious landing sites. If the erosion control plan and monitoring project are implemented prior to the increased activities outlined in the proposed action, we expect adverse effects to the paintbrush from erosion and/or dust to be minimized in the AVMA, AMP, and AFP areas, and avoided in the Horse Beach Canyon Road area.

To reduce the potential for transport of invasive plants to the island, military and non-military personnel will be asked to conduct a brief check and remove any visible plant material, dirt, or mud on equipment and shoes, prior to coming to San Clemente Island. Tactical ground vehicles will be washed of visible plant material, dirt and mud prior to embarkation for San Clemente Island (The washing procedure is not required for amphibious vehicles after 15 minutes of self-propelled travel through salt water prior to coming ashore on San Clemente Island).

**Invasive Plant Species**

Invasive species, such as non-native grasses, could affect San Clemente Island Indian paintbrush through competition, effects on host plants, or effects on fire frequency. For example, invasion of grasses may alter fire frequency by rapid production of highly flammable fuel, thus leading to more frequent fires and potentially to conversion of shrub lands to grasslands (D'Antonio and Vitousek 1992).

Vehicular routes are a primary pathway for plant invasions into arid and semi-arid ecosystems (Johnson *et al*. 1975; Amor and Stephens 1976; Brooks and Pyke 2001; Gelbard and Belnap 2003). Vehicles serve as dispersal vectors for alien plant propagules (Clifford 1959; Schmidt 1989; Lonsdale and Lane 1994), and disturbances within vehicular route corridors facilitate establishment of invading ruderal plants (Greenberg *et al*. 1997). Increased use of Horse Beach Canyon Road is likely to create conditions that will allow establishment of invasive plant species adjacent to the San Clemente Island Indian paintbrush population in Horse Beach Canyon.

To reduce the potential for invasive plant species establishment and spread in San Clemente Island Indian paintbrush habitat, the Navy will monitor for invasive non-native plant establishment within TAR 21 and along the edges of China Road and Horse Beach Canyon Road, including the IOA. If invasive plant species are identified, the Navy will control them to prevent their spread into Horse Beach Canyon. Specifics of the monitoring and control will be developed in coordination with the Service and initiated prior to the Navy conducting the new activities proposed in the BA. Monitoring and control measures will be in accordance with safety requirements, which are currently under Navy review. Because of access restrictions described below, invasive plant removal within Horse Beach Canyon and China Canyon is not proposed.

The Navy has also committed to continue invasive exotic plant species control on an island-wide scale. The focus of the invasive exotic plant control program will continue to be the control of highly invasive exotic plants that have the potential to adversely impact habitat for federally listed species in known locations and the early detection and eradication of new occurrences of such species.

**Access Restrictions**

In 2006, the Navy began to review access policies within Impact Areas, and initiated restricted access into some areas of San Clemente Island due to elevated safety concerns. Until this time, Horse Beach Canyon, China Canyon, China Beach, Pyramid Beach, and other areas that lie within Impact Area boundaries had been periodically surveyed for natural resources for over 20 years. Initial access restrictions required that surveyors obtain EOD escort or clearance prior to surveys. Policy was signed in 2006 that allowed access into Impact Areas for target placement and range maintenance, but biological monitoring and archaeological monitoring were not allowed within Impact Areas under this policy. The Navy proposes to continue the policy that excludes Impact Area access for biological monitoring as part of the proposed action. Thus, safety concerns and resulting access policies will preclude the ability to monitor and manage approximately 16-17 percent of the San Clemente Island Indian paintbrush occurrences on San Clemente Island (*i.e.*, the occurrences in Impact Areas I and II).

<u>Conclusion</u>

After reviewing the current status of San Clemente Island Indian paintbrush, the environmental baseline, and the effects of the proposed action, it is the Service’s biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of San Clemente Island Indian paintbrush. We have reached this conclusion for the following reasons

(1) About 44 percent of San Clemente Island Indian paintbrush occurrences are outside areas subject to significant training activities, and only 16-17 percent of occurrences are within areas where San Clemente Island Indian paintbrush is likely to be adversely affected (*i.e.*, Impact Areas I and II and AFP 1). The presence of San Clemente Island Indian paintbrush outside the Impact Areas and training areas will help to ensure survival of this narrowly-restricted island species. In addition, the Navy through their proposed conservation program will implement monitoring and management actions for San Clemente Island Indian paintbrush occurrences outside of the Impact Areas to support recovery of the species;

(2) Increased ordnance use in Impact Areas has the potential to impact 16-17 percent of the San Clemente Island Indian paintbrush occurrences; however, the Navy has committed to target placement that will minimize damage or destruction of individual occurrences of this plant. With these measures, we anticipate no significant change in

the distribution of the San Clemente Island Indian paintbrush population in the Impact Areas as a result of increased ordnance use.

(3) The Navy will minimize the potential impacts from increased invasive species establishment by conducting invasive species control along China Road, Horse Beach Canyon Road, the IOA adjacent to these roads, and within TAR 21 to the maximum extent possible given safety constraints in the area;

(4) The Navy will minimize the potential impacts from increased fire frequency by implementing a FMP and develop an erosion control plan to address potential effects of erosion and/or dust on the San Clemente Island paintbrush occurrences near the AVMA, AMP, AFP, and in the Horse Beach Canyon Road area; and

(5) The San Clemente Island Indian paintbrush has substantially increased in numbers and distribution since the time of its listing primarily due to conservation actions supported by the Navy (*e.g.*, removal of feral grazing animals, invasive plant management); with continuation of the Navy's conservation program for San Clemente Island, including actions to promote the recovery of listed plants such as the San Clemente Island Indian paintbrush, we anticipate effects of the proposed action will be offset and will not result in an appreciable reduction in the numbers, reproduction, or distribution of San Clemente Island Indian paintbrush.

**San Clemente Island larkspur** (*Delphinium variegatum var. kinkiense*)

<u>Status of the Species</u>

*Listing Status*

The San Clemente Island larkspur was listed as an endangered species on August 11, 1977, and subsequently addressed in the Channel Islands Recovery Plan (Service 1984). Critical habitat has not been designated for this species.

*Species Description*

San Clemente Island larkspur is an herbaceous perennial in the buttercup family (Ranunculaceae) that flowers from March to April (California Native Plant Society 2001). It grows 14 to 85 cm (6 to 33 in.) in height, but generally is less than 50 cm (20 in.) tall (Warnock 1993). The flowers are light blue to white and are bilateral with five petal-like sepals and four smaller petals. The uppermost sepal is a straight or downcurved spur that is characteristic for the genus. Flowers are borne along branched flower stalks typically bearing less than 12 flowers (Warnock 1993; Junak and Wilken 1998). Leaves are generally found along the lower one-third of the stem and have overlapping lobes that radiate from hairy petioles. The fruit is a follicle (dry, pod-like structure with a single suture), with up to three follicles possible per flower (Junak and Wilken 1998).

Each follicle bears many winged seeds that are likely wind dispersed when the fruit passively splits open (Junak and Wilken 1998).

San Clemente Island larkspur is one of three subspecies of *D. variegatum* and one of two that are found exclusively on San Clemente Island (Dodd and Helenurm 2002). The other subspecies restricted to the island, *D. v. ssp. thornei* (Thorne's larkspur), is the only other taxon within the genus found on San Clemente Island (U.S. Navy 2001). The third subspecies, *D. v. ssp. variegatum* (Royal larkspur), is found exclusively in mainland California and ranges from the coast to the foothills in central and northern California (Dodd and Helenurm 2002).

Three floral characters, sepal color, lateral sepal length, and lower petal blade length, are used to distinguish the subspecies (Dodd and Helenurm 2000). In general, Royal larkspur differs from the two island subspecies by having darker (deep versus bright or light blue) flowers and shorter lower petal blades (Dodd and Helenurm 2000). The island subspecies are distinguished by Thorne's larkspur having bright blue (*i.e.* darker), slightly larger flowers than San Clemente Island larkspur (Dodd and Helenurm 2000; Warnock 1993). Thorne's larkspur also generally occurs in the southern portion of San Clemente Island while San Clemente Island larkspur generally is found in the northern portion of the island (Dodd and Helenurm 2000).

Dodd and Helenurm (2000) found there is broad variation within populations and substantial overlap among the subspecies for the three floral characters, with the two metric characters, lateral sepal length and lower petal blade length, providing no clear distinction between taxa. Of the floral characters, sepal color appears to be the least ambiguous for differentiating the subspecies, but it may still be problematic for the island subspecies where central populations contain both light and dark individuals as well as individuals of intermediate color (Dodd and Helenurm 2000; Dodd and Helenurm 2002). Because natural hybridization has been documented to occur regularly among other taxa in the genus, the intermediate character of central populations suggests there may be hybridization among the subspecies in these populations (Dodd and Helenurm 2002).

*Habitat Affinities*

The San Clemente Island larkspur is endemic to San Clemente Island and is found within mid- to high-elevation grasslands on the east side of the northern and central portions of the island where it occurs in clay, loam and rocky soils. This vegetation community is recovering following a long period of over-grazing by introduced mammalian herbivores but continues to exhibit the legacy of overgrazing in the form of accelerated erosion and the dominance in many areas of naturalized invasive alien species, particularly exotic annual grasses. Although currently not widespread, the colonization of clay grasslands by coyote brush may reduce habitat suitability over the long term in some areas.

*Life History*

Some species of *Delphinium* are self incompatible (Waser and Price 1983 from Junak and Wilken 1998), but the mating system for *D. v. kinkiense* remains poorly understood. Dodd and Helenurm (2002) conclude from their study of genetic variability among populations of *D. variegatum* that the two insular subspecies (*D. v.* ssp. *kinkiense* and *D. v.* ssp. *thornei*) are largely outcrossing with a pattern of near random mating.

Outcrossing rates for the mainland subspecies (*D. v. variegatum*) indicate that it sustains higher levels of inbreeding (Dodd and Helenurm 2002). Pollinators that have been observed on San Clemente Island larkspur include a large black and white solitary bee (Evans and Bohn 1987) and a bumblebee (*Bombus*) (Junak and Wilken 1998).

Junak and Wilken (1998) estimated the number of flowers and fruits per inflorescence in three populations of San Clemente Island larkspur and studied the viability and germination of seeds collected from a single population. They found on average from 64.5 to 78.5 percent of flowers produce fruits, and there were a significantly greater number of flowers than fruits. This is consistent with self-incompatibility and/or a requirement for insect mediated pollination (Junak and Wilken 1998). They also found that that seed germination (43 percent) was not significantly less than viability (53 percent) when analyzed around 20 weeks following collection. They concluded that recruitment does not appear to be limited by fruit production. In contrast with the results of Junak and Wilken (1998), Evans and Bohn (1987) were unsuccessful getting freshly collected seeds to germinate. This may be due to a requirement for seeds to go through a period of dormancy prior to germination (Evans and Bohn 1987; Junak and Wilken 1998).

During efforts to collect seed for the purposes of plant propagation, Evans and Bohn (1987) found seed predation to be heavy in one population of San Clemente Island larkspur. They found holes chewed through the bottom portion of seed capsules, but they were unable to ascertain the identity of the seed eater. During their survey efforts, Junak and Wilken (1998) have not seen evidence of seed predation.

*Rangewide Distribution and Threats*

Since the San Clemente Island larkspur's entire distribution is restricted to the action area of San Clemente Island, its island-wide distribution and current threats to the species are discussed in the Environmental Baseline section below.

*Conservation Needs*

A recent 5-year review of the status of San Clemente Island larkspur (Service 2006b) identified the following conservation needs for this species.

(1) Following the recommendation of Dodd and Helenurm (2002) perform further taxonomic study on *D. v. kinkiense* and *D. v. thornei* to determine whether these taxa have been correctly designated as subspecies.

(2) Develop and implement a species reintroduction program in coordination with San Clemente Island restoration actions to accelerate the recovery of this species. Such a plan should use genetic and geographic information to prevent the loss of genetic integrity, if warranted, between the two island subspecies.

(3) Control erosion within island grasslands, with priority given to locations where erosion may be threatening specific occurrences of San Clemente Island larkspur.

(4) Perform additional ecological studies to determine what species may be eating seeds of San Clemente Island larkspur and whether seed predation is a significant threat to the recovery of this species.

(5) Work with the Navy to develop a program to monitor the status of San Clemente Island larkspur populations to better understand population dynamics and track the recovery of the species. Directed sensitive plant surveys should also continue to be implemented every several years to document new occurrences and further range expansions.

(6) Study the effect of fire on San Clemente Island larkspur and establish appropriate fire management goals for island grasslands that are sensitive to this species.

Environmental Baseline

*Distribution*

The distribution of San Clemente Island larkspur is restricted to San Clemente Island. At the time of listing in 1977, San Clemente Island larkspur was known from only two occurrences. During sensitive plant surveys performed in 1996 and 1997, Junak and Wilken (1998) documented 16 occurrences of San Clemente Island larkspur totaling 5,400 individuals and ranging in size from 7 to 1,450 individuals (median = 200, mean = 337). The majority of occurrences were located east of TARs 14 and 15 where these ranges overlap with the proposed VC-3 AVMA. In 2003, Junak (2006) documented one additional occurrence of San Clemente Island larkspur supporting about 200 individuals. Dodd and Helenurm (2000, 2002), also performed fieldwork in 1996 and documented 10 occurrences of San Clemente Island larkspur (range of individuals = 16 – 2,500, median = 200, mean = 584) and three locations where they suspect there are mixed populations of San Clemente Island and Thorne’s larkspur (range of individuals = 200 – 1,000, median = 350, mean = 517).

Although the precise survey locations of Dodd and Helenurm (2000, 2002) are needed to accurately quantify the number of known occurrences for the species, it appears that, since removal of feral mammalian herbivores, around 9,500 individuals have been documented from 24 locations supporting just San Clemente Island larkspur and an additional 1,550 plants of mixed and possibly hybridizing genealogy occur in three locations where the two island subspecies are suspected to co-occur. Because survey efforts have focused on documenting new occurrences of San Clemente Island larkspur, there is little information for directly inferring population trends. However, the one population that has been tracked has expanded from one plant to several hundred individuals. The discovery of 26 occurrences in 1996-1997 (Junak and Wilken 1998; Dodd and Helenurm 2000), an additional occurrence in 2003 (Junak 2006), and two additional occurrences in 2006-2007 (Tierra Data, Inc. 2008) further suggests that San Clemente Island larkspur has made modest but appreciable gains since the removal of feral goats and pigs from the island in the early 1990's. Although estimates of the number of occurrences vary depending on the criteria used to define them, all current occurrences of San Clemente Island larkspur are estimated to comprise a total of 7,389 individuals (U.S. Navy 2008a).

With the exception of one disjunct southernmost occurrence, all the occurrences are generally continuously scattered from north to south at varying distances along 12 km (7.45 mi.) of the high plateau above the eastern escarpment of the island. Within this area, 17 northern occurrences are approximately 3 km (1.9 mi.) away from 9 occurrences that are focused towards the central portion of the island. The single disjunct occurrence is found about 12.4 km (7.7 mi.) to the south of the closest neighboring occurrence, near the southern tip of the island above Pyramid Head.

Among the nine occurrences in the central portion of the island, three are suspected of supporting mixed populations and possible hybrids of *D.v. kinkiense* and *D.v. thornei* (Dodd and Helenurm 2002). Because the latter species is generally distributed towards the southern portion of San Clemente Island (Dodd and Helenurm 2000, 2002), the southernmost occurrence of *D.v. kinkiense* at Pyramid Head appears somewhat anomalous given the predominance of *D.v. thornei* toward this end of the island. However, historical records suggest San Clemente Island larkspur may also have once been found in another location towards the southern end of the island within Mosquito Canyon (U.S. Navy 2001). Whether this represents a natural portion of the species range or represents an area of possible introduction by animals or man is unknown.

Many of the San Clemente Island larkspur occurrences are clustered in proximity to one another, suggesting that these occurrences may be ecologically and genetically related to one another. The California Natural Diversity Database (CNDDB) attempts to capture this relationship by defining an occurrence as "…any population or group of nearby populations located more than 0.25 miles [400 meters] from any other population" (p. iii, California Department of Fish and Game, Natural Diversity Database, August 2006). While this is an arbitrary mapping standard, in the absence of specific information about seed dispersal and pollinator movement distances, botanists occasionally use it for grouping occurrences mapped at a finer scale to obtain an indication of the number of functional "populations" there may be for a species. The effects analysis below is based on effects to clusters of occurrences as described by the CNDDB rather than individual occurrences documented by biologists. To avoid confusion, the clustered occurrences described by CNDDB will be referred to as "clusters." Using CNDDB's definition, there are 11 clusters of San Clemente Island larkspur on the island as opposed to 29 occurrences.

*Threats*

Several threats exist for San Clemente Island larkspur including erosion, competition with invasive plant species, modification of San Clemente Island habitats by military activities, and unnaturally high fire frequencies. Within the known range of San Clemente Island larkspur, some occupied slopes appear sheetwashed with severe piping and gullying nearby, presenting a threat from erosion (Kellogg and Kellogg 1994).

Competition within grasslands dominated by exotic annual grasses and other introduced plant species may also be a factor limiting the distribution of the species (U.S. Navy 2001). A number of non-native plant taxa have been found in association with San Clemente Island larkspur including: Australian saltbush (*Atriplex semibaccata*), wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), foxtail brome, storks bill (*Erodium moschatum*), smooth colts ear (*Hypochaeris glabra*), common catchfly (*Silene gallica*), common sow thistle (*Sonchus oleraceus*), and sand spurrey (*Spegularia villosa*) (Junak and Wilken 1998). Many of these species, particularly including the exotic annual grasses, are likely to be permanently established within island grasslands (Kellogg and Kellogg 1994).

Periodic foot traffic associated with NSW training may occur within the species habitat in TAR 14 and TAR 15. Baseline levels of foot traffic are infrequent (8 Special Warfare operations at TAR 14 and 15 under baseline conditions) and entail small groups moving across the landscape.

Invasive plant species, established and spread on the island as a result of past and ongoing human uses overlap the range of this species under baseline conditions and may compete with the species for light, nutrients, and moisture under baseline conditions. The Navy is conducting invasive species control efforts on San Clemente Island; however, many of the invasive species that dominate San Clemente Island larkspur habitat, (*e.g. Avena* sp) are not addressed under the current invasive species control efforts.

A number of fires have been recorded since 1979 within the range of San Clemente Island larkspur. High fire frequency, such as is found in particular within the southern portion of the species range in and adjacent to SHOBA, is a potential threat that could limit the distribution of the larkspur by overwhelming its tolerance threshold to fire.

*Conservation Actions*

The appearance of around 25 new occurrences (9 new clusters) of San Clemente Island larkspur since the early 1990s suggest this species is responding favorably to the removal of feral herbivores from San Clemente Island.

The Navy's INRMP contains the following objective relevant to the protection of San Clemente Island larkspur: "[To] protect, monitor, and restore plants and cryptogams in order to manage for their long-term sustainability on the island" (U.S. Navy 2001). Associated with this objective are a number of proposed management strategies that include: consideration of San Clemente Island larkspur as a "management focus plant" such that it is considered independently from its associated plant community for management; conducting status surveys for this species; ensuring that management focus plants have a network of suitable sites; performing pollination studies on San Clemente Island larkspur; and continuing to apply genetic research and management approaches to its management.

Other INRMP strategies targeted towards loam and clay grasslands, in which San Clemente Island larkspur occurs, include: control erosion, with priority given to locations where erosion may be lowering the water table and affecting listed species such as the San Clemente Island larkspur; improve the dominance of needlegrass and other native herbaceous species; reduce exotic plant cover from 1992-1993 baseline levels; manage fire intervals and patch size with a preliminary target of a 5-year minimum return interval and 121-ha (300-ac) patch size; allow patches of coyote brush to fluctuate naturally; and experiment with fire management to improve native plant dominance while protecting sensitive plant populations.

Todate, a number of the INRMP management strategies, or aspects of them, have been implemented. The Navy has implemented rare plant surveys that have documented new occurrences of San Clemente Island larkspur. Genetic research and natural history studies have also been performed. Concerted efforts have been made to control escape of fire from military training activities. However, other objectives have not yet been achieved, such as reducing the percent cover of invasive plants from 1992-93 baseline conditions (K. O'Connor pers. comm. 2006).

Effects of Action

The majority (8 of 11) of San Clemente Island larkspur clusters are located outside any training areas. However, 3 clusters lie within the IOA, and approximately 4 of 11 clusters lie within 0.8 km (0.5 mi.) northeast of TARs 14 and 15 and the proposed VC-3 AVMA. Proposed training and fire management activities may adversely affect this species primarily as a result of fires, fire management and suppression, and vehicle and foot traffic.

**Fires**

Ordnance use is proposed within TAR 14 and 15. While no San Clemente Island larkspur occur within the boundaries of these TARs, four clusters are within about 0.8 km (0.5 mi.) of the boundary to TAR 14 and 15. These TARs are located upwind from larkspur locations under prevailing wind conditions. Ordnance is not used in these areas under baseline conditions, so a historical pattern of fires is not available to provide projections on the number of ignitions or extent of fires that may be expected as a result of proposed use.

The Navy has conducted fire modeling of training use at TARs 14 and 15. Based on the modeling, fires ignited in this area could spread into San Clemente Island larkspur clusters especially during nighttime hours when fire suppression would be more difficult, affecting approximately 3 of the 11 clusters and 5,000 individuals 12 hours after ignition under moderate fire conditions. However, this is anticipated to be unlikely under implementation of the FMP because ignitions would occur in grassland habitat in accessible terrain where fire suppression is most feasible.

Based on the species life history, which includes dormancy during dry conditions, plants may be dormant during drier conditions during which fire is most likely. The California Channel Island Species Recovery Plan (Service 1984) states that “[F]ield observation following fire suggests that this species is adapted to fire during its dormant period” (p. 53). However, not much else is known regarding the tolerance of this species to fire, such as what the mechanism is for regrowth (*e.g.* from resprouts or seed) and what minimum fire return interval the species can tolerate. If underground storage roots survive fires, plants could benefit from added nutrients, canopy opening and other aspects of altered competitive status created by an appropriately timed burn. If fires occur when plants are active, they could affect seed set and kill plants. If fires are intense, they could also affect the viability of underground storage roots.

To address the potential for ignition, the Navy has proposed to align training with vegetation and weather conditions and stage adequate resources to suppress fires as part of a FDRS. In addition, the FMP incorporates a series of increasing precautions and fire suppression measures related to increasing FDRS ratings. These measures include: 1) having a fully equipped and staffed fire truck positioned within line of sight of the TAR and action area and having the ability to be on scene and pumping water within 10 minutes of an ignition report, whenever any type of incendiary ordnance is used; and 2 ) at higher danger ratings, imposing restrictions on the use of demolitions or other flame or heat producing ordnance, including flares, tracers, and pyrotechnics, during daytime hours except under specific conditions.

The Navy’s fire management practices are anticipated to minimize ignitions as well as the spread of fires. The proposed action also includes a Navy commitment to conduct an annual review of fire management and fires that will allow adaptive management, if required. Once live-fire and demolition training commences in TAR 14 and TAR 15, a better understanding of the likely fire patterns associated with range use will emerge. The Navy will also evaluate the potential impacts of fire on the San Clemente larkspur.

**Fire Management and Suppression**

Fire management may entail future creation of fuelbreaks in areas that support San Clemente Island larkspur. No specific fuelbreak locations have been proposed in the vicinity of this species to date. If fuelbreaks are created using Phos-Chek or herbicide, as proposed within the project description, San Clemente Island larkspur individuals that lie within the fuelbreak footprint could be destroyed. The use of Phos-Chek may also favor the expansion of non-native species due to the fertilizing effect of this retardant. Since the boundaries of future fuelbreaks have not yet been identified, we anticipate that the Navy will consult with the Service regarding any future plans to establish fuel breaks with the potential to impact San Clemente Island larkspur. Thus, the impacts of new fuelbreaks on San Clemente Island larkspur are not considered in this analysis.

**Vehicle and Foot Traffic**

Proposed training activities would include new and significant increases in vehicle and foot traffic entering and exiting the IOA and VC-3 AVMA, both from the water and from elsewhere on San Clemente Island. The majority of San Clemente Island larkspur clusters are located outside any training areas. However, three (25 percent of the San Clemente Island total) of the 11 clusters are located within the boundaries of the IOA, and downhill from the proposed VC-3 AVMA. The most intensive use of the IOA would occur two times per year during a 4-day Battalion Sized Landing operation during which 1,500 troops would proceed up the island. Of the personnel involved in the Battalion Sized Landing, approximately half would be traveling in vehicles. The remaining personnel (approximately 750) would travel up the IOA corridor on foot and bivouac at locations en route to SHOBA Impact Areas.

Based on an erosion study by the Navy (2008), the three larkspur clusters in the IOA are within watersheds that could experience erosion as a result of assault vehicle use of the VC-3 AVMA. The erosion study indicates that 251 individuals within one cluster lie within the watershed most likely to receive any offsite impacts associated with erosion. To address erosion problems, the Navy proposes to develop and implement an erosion control plan in coordination with the Service to minimize the potential for erosion problems beyond the AVMA boundaries and reduce the potential for impacts to listed species. The Navy will also develop and implement a project to monitor for erosion, dust generation, and deposition of dust in adjacent habitats. If the erosion control plan and monitoring project are implemented prior to broader uses of the proposed AVMA outlined in the proposed action, we do not expect adverse effects to these 251 individuals.

Vehicular routes are also a primary pathway for plant invasions into arid and semi-arid ecosystems (Johnson *et al.* 1975; Amor and Stephens 1976; Brooks and Pyke 2001; Gelbard and Belnap 2003). Vehicles serve as dispersal vectors for alien plant propagules (Clifford 1959; Schmidt 1989; Lonsdale and Lane 1994), and disturbances within vehicular route corridors facilitate establishment of invading ruderal plants (Greenberg *et al.* 1997). Vehicle use at the VC-3 AVMA and IOA is likely to create conditions that will allow establishment of invasive plant species within the upper watershed of the three downhill three larkspur clusters.

Vehicular routes with dirt surfaces can also be a significant source of dust, which can have significant effects on plant vigor downwind from vehicle activity. Approximately two larkspur clusters within the IOA close to Ridge Road and VC-3 AVMA are likely to experience impacts associated with dust due to vehicle use.

To reduce the potential for transport of invasive plants to the island, military and non-military personnel will be asked to conduct a brief check and remove any visible plant material, dirt, or mud on equipment and shoes, prior to coming to San Clemente Island. Tactical ground vehicles will be washed of visible plant material, dirt and mud prior to embarkation for San Clemente Island. (The washing procedure is not required for amphibious vehicles after 15 minutes of self-propelled travel through salt water prior to coming ashore on San Clemente Island.)

The Navy proposes to implement the following additional measures to avoid and/or minimize impacts to listed species from vehicle use in these areas: 1) surveying for federally listed and sensitive plant species; 2) conducting periodic monitoring of these areas as part of vegetation/ habitat and sensitive species survey updates for the INRMP; 3) briefing military units on maneuver area boundaries prior to conducting operations; and 4) conducting assault vehicle travel or maneuvering only within these boundaries.

Foot traffic associated with Battalion Sized Landing could result in damage to individual larkspur plants if they are trampled; however, personnel participating in this training exercise travel in a dispersed fashion, which would minimize the number of people that would travel over any one spot, and thereby reduce the potential for significant impacts to the larkspur. Damage that could occur would be expected to be minor and would have little potential to affect an entire cluster due to the dispersed nature of the personnel traversing the island. San Clemente Island larkspur could be affected by foot traffic only during its winter-spring season of growth when foliage is above ground. The rest of the year plants would not be directly affected, since they exist as dormant storage roots and dormant seed. Marines will generally travel in a dispersed pattern during the proposed training activities, and the small and generally temporary direct effect that this dispersed foot travel would have on plants is not expected to have a significant impact on the species.

**Invasive Plant Species**

Invasive plant species are likely to be introduced to San Clemente Island by ongoing and increased training activity on the island and are also likely to be spread by increased movement of people, equipment, and vehicles. Vehicular routes are also a primary pathway for plant invasions into arid and semi-arid ecosystems (Johnson *et al.* 1975; Amor and Stephens 1976; Brooks and Pyke 2001; Gelbard and Belnap 2003). Vehicles serve as dispersal vectors for alien plant propagules (Clifford 1959; Schmidt 1989; Lonsdale and Lane 1994), and disturbances within vehicular route corridors facilitate establishment of invading ruderal plants (Greenberg *et al.* 1997). Invasive species are widely recognized as a leading cause of species loss world wide second only to direct habitat loss and fragmentation (Pimm and Gilpin 1989). Island ecosystems and species are especially vulnerable to invasion (Mack *et al.* 2000). Invasive species may affect ecosystem processes. For example, invasion of grasses may alter fire frequency by rapid production of highly flammable fuel, thus leading to more frequent fires and eventual conversion of shrub lands to grasslands (D'Antonio and Vitousek 1992). Non-native invasive species may compete with San Clemente Island larkspur for nutrients, water, or sunlight. Spread of invasive species from inadvertent introductions caused by vehicular or foot traffic could adversely affect this species given its proximity to TAR 15, VC-3 AVMA, and the IOA. San Clemente Island larkspur clusters lie downhill from the proposed VC-3 AVMA and invasive species may become established by the downslope movement of seeds and water into these clusters.

The Navy proposes to monitor for invasive plant species, especially around the AVMC, including AVMA, so we anticipate that monitoring may detect invasions to allow subsequent treatment. In addition, ongoing monitoring of the San Clemente Island larkspur population will allow identification of any emergent weed issues and allow management to occur. The Navy has also committed to continue invasive exotic plant species control on an island-wide scale. The focus of the invasive exotic plant control program will continue to be the control of highly invasive exotic plants that have the potential to adversely impact habitat for federally listed species in known locations and the early detection and eradication of new occurrences of such species.

Conclusion

After reviewing the current status of San Clemente Island larkspur, the environmental baseline, and the effects of the proposed action, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of this species. We have reached this conclusion for the following reasons:

(1) The majority (8 of 11) of San Clemente Island larkspur clusters are located outside any training areas;

(2) Although three of the eleven clusters of San Clemente Island larkspur are located within the boundaries of the IOA, the area would be used by large numbers of people only two times per year, reducing the potential for significant long term direct effects to the clusters within the IOA;

(3) The Navy will minimize the potential impacts from increased invasive species establishment by conducting invasive species control;

(4) San Clemente Island larkspur is likely to withstand low intensity fires when the species is dormant and may benefit from such fires due to reduced competition and canopy opening. In addition, we expect that implementation of the FMP in coordination with the Service will limit the frequency of fires within San Clemente Island larkspur habitat, including the four clusters within 0.8 km (0.5 mi.) of TAR 14 and 15 and the AVMA. We anticipate that through its annual review process, the Navy will identify mechanisms to reduce fire return interval within areas to the east of TAR 14 and TAR 15 if San Clemente Island larkspur clusters experience repeated fires;

(5) One cluster of San Clemente Island larkspur containing 251 of 9,500 individuals on the island may be at increased risk of offsite erosion impacts associated with use of the proposed VC-3 AVMA. We anticipate that erosion-related impacts will be minimized through implementation of an Erosion Control Plan in coordination with the Service;

(6) The San Clemente Island larkspur has increased in numbers and distribution since the time of its listing primarily due to conservation actions supported by the Navy (*e.g.* removal of feral grazing animals, invasive plant management); with continuation of the Navy's conservation program for San Clemente Island, including actions to promote the recovery of listed plants such as the larkspur, we anticipate effects of the proposed action will be offset and will not result in an appreciable reduction in the numbers, reproduction, or distribution of the San Clemente Island larkspur.

**San Clemente Island broom** *(Lotus dendroideus var. traskiae*)

*Listing Status*

San Clemente Island broom was listed as endangered on August 11, 1977 (42 FR 40682) and subsequently addressed in the Channel Islands Recovery Plan (Channel Islands Recovery Plan )(Service 1984). Critical habitat has not been designated for this species.

*Species Description*

San Clemente Island broom is a semi-woody, short-lived (less than 5 years), subshrub in the legume family (Fabacaea). This shrub is typically less than 1.2 m (4 ft) in height with slender, erect green branches (Munz 1974). Its leaves have 3 to 5 leaflets, each approximately 0.64 cm (0.25 in) long. San Clemente Island broom has relatively small, yellow, bisexual flowers that radiate in 1 to 5 flowered groupings from flower stalks that arise from the leaf axils (between the stem and leaf) of terminal shoots (Junak and Wilken 1998). Pistils (female reproductive structures of the flower including an ovary and pollen receiving structure) are initially yellow but, with age, turn orange then red (Service 1984). Flowers are present from March through May, and in several locations, halictid bees, bumblebees, and small beetles have been observed foraging on the flowers (Allan 1999; Junak and Wilken 1998). This variety differs from other varieties of *Lotus dendroideus* in having greatly elongated fruits (Allan 1999). The fruits do not split open to release their seeds at maturity (Isely 1993).

*Habitat Affinities*

San Clemente Island broom is endemic to San Clemente Island (Isely 1993) and is one of five representatives of the genus *Lotus* found on the island (U.S. Navy 2002). The species occurs on north-facing slopes, canyon bottoms, or ridgelines (Junak 2006). It grows somewhat colonially around rock outcrops in grassy areas or along the interface between grassland and maritime sage scrub (Allan 1999; U.S. Navy 2002). It occurs below 396 m (1,300 ft) elevation in well-drained soils, but where more soil moisture is available. Based on vegetation mapping for the San Clemente Island INRMP (U.S. Navy 2002), San Clemente Island broom is associated with canyon woodland and maritime desert scrub along the northeast escarpment.

*Life History*

A study by Junak and Wilken (1998) found that, on average, a single San Clemente Island broom individual can produce approximately 36 to 64 flowering shoots, 118 to 144 flowers per shoot, and 4 to 6 seeds per fruit. These data suggest that under ideal conditions, an individual of this species can produce a high volume of seeds (16,000 or more). Because individual plants have a life span of less than 5 years, it is suspected that populations persist through periodic recruitment from the soil seed bank (M. Wall pers. com. 2006).

Like most legumes, San Clemente Island broom seeds require some sort of scarification or gradual seed coat degradation for germination to take place (M. Wall pers. comm. 2006). Although germination is enhanced by hot water to soften the seed coat, this may not be true for dry heat (*e.g.*, fire). In fact, experiments conducted on other species at the Rancho Santa Ana Botanical Gardens indicate that heat above 93 degrees C (200 degrees F) can be detrimental to seeds (M. Wall pers. comm. 2006).

San Clemente Island broom has been known to hybridize with the more common, native island lotus, *Lotus argophyllus* var. *adsurgens*, but only in disturbed areas in Wilson Cove (Liston *et al*. 1990; Allan 1999). No documented evidence of hybridization has been recorded in either disturbed or undisturbed areas on other portions of the island.

*Rangewide Distribution and Threats*

Since the San Clemente Island broom's entire distribution is restricted to the action area of San Clemente Island, its island-wide distribution and current threats to the species are discussed in the Environmental Baseline section below.

*Conservation Needs*

A recent 5- year review of the status of San Clemente Island broom (Service 2007b) resulted in the following recommendations:

(1) Study the range (frequency and intensity) of fire conditions that San Clemente Island broom individuals and its seed bank can withstand. Determine the fire interval at which San Clemente Island broom best survives and reproduces;

(2) Conduct genetic research island-wide on individuals to determine if this species has high genetic variability among populations;

(3) Follow up on research conducted by Liston *et al*. (1990) to determine if hybridization is a serious threat to the recovery of San Clemente Island broom;

(4) Identify areas where erosion may be threatening San Clemente Island broom individuals and implement erosion control measures; and

(5) Establish a non-native annual grass removal program in San Clemente Island broom habitats such that percent cover of these species decreases by at least 10 percent.

<u>Environmental Baseline</u>

*Distribution*

The distribution of San Clemente Island broom is restricted to San Clemente Island, and since the 1970s, the documented distribution of San Clemente Island broom has included north-facing slopes over most of the eastern and western sides of the island (Service 1984, U.S. Navy 2002, Junak and Wilken 1998, Junak 2006). As with other sensitive plant species on the island, surveys have focused on identifying new occurrences rather than tracking the status of previously recorded occurrences.

The earliest published information regarding population size for *Lotus dendroideus* var. *traskiae* can be found in the San Clemente INRMP, which states that 9 occurrences and 1,340 individuals were present on the island in 1980 (U.S. Navy 2002). The source of these data is unknown, and a distribution map is not provided. According to the Channel Islands Recovery Plan (Service 1984), by 1984 only six populations of San Clemente Island broom were known, and each was generally associated with rocky areas. The largest numbers of individuals were growing in the vicinity of Wilson Cove, which is located on the northwest side of the island. No specific abundance estimates were given.

Later surveys conducted in 1996 and 1997 documented a total of 64 occurrences of San Clemente Island broom, collectively comprising more than 3,000 individuals (Junak and Wilken1998). Approximately 50 percent (1,492 of 3,064) of these individuals were found in Wilson Cove. Island-wide occurrences ranged from isolated plants to populations of 5 to 750 individuals. Individuals were found primarily on north-facing slopes, ridges (Junak 1996), or among large boulders situated in grassland areas (Allan 1999) between 8 m (25 ft) and 427 m (1,400 ft) in elevation. Eighty-three percent (53 of 64) of these occurrences were scattered along the eastern side of the island, where, due to prevailing winds and associated cloud cover and isolation, more humidity is probably available (U.S. Navy 2002). The remaining locations were clustered in the middle, western portion of the island.

More recent surveys for San Clemente Island broom were conducted between 2003 and 2006. Surveyors mapped 69 occurrences comprising approximately 6,570 individuals (Junak 2006). Occurrences ranged from isolated plants to a single population with 2,300 individuals. At a majority of the sites, plants had either flowers or fruits, suggesting that this taxon has adequate resources for reproduction (Junak 2006). New occurrences were mainly concentrated on north-facing slopes along the southern two-thirds of the island on the eastern and western sides. These newer occurrences were sometimes in proximity to individuals detected during the 1996 and 1997 surveys. Additional surveys of the IOA conducted from 2006 through 2007 detected one new occurrence of approximately ten plants above the eastern escarpment in SHOBA (Tierra Data, Inc. 2008).

When combined, the 1996-1997 surveys and the 2003-2007 surveys suggest that San Clemente Island broom can currently be found in 147 locations and numbers approximately 9,674 individuals (U.S. Navy 2008a). This is a significant increase from the original population estimates in 1980 of 9 occurrences and 1,340 individuals. The currently known occurrences for this species now span the entire length of the island, with numerous occurrences documented in and around Wilson Cove, and one occurrence documented approximately 19 miles south near Pyramid Cove at the southern tip of the island (Junak and Wilken 1998, Junak 2006). The majority of the remaining occurrences tend to be clustered on north-facing slopes on the eastern side of the island.

As of 2006, on a broad scale 20 occurrences fell within SHOBA and 85 occurrences fell outside of SHOBA (Junak and Wilken 1998, Junak 2006). As of 2004, approximately 25 percent (2,030 of 7,900) of the San Clemente Island broom individuals could be found in the vicinity of Wilson Cove. Based on modifications made by the Navy during consultation to reduce the potential for impact to this species, of the occurrences near Wilson Cove, only 1 is in Tar 11, but 22 are within 305 m (1,000 ft) of TAR 11(Figure 1). Three occurrences lie within Eagle Canyon, downhill but over 305 m (1,000 ft) from the boundary of proposed AFP 6. Fourteen locations are known from the IOA, and there is the potential for additional locations to be discovered there (U.S. Navy 2008). Thus, only 10 percent of the occurrences (*i.e.*, 15 out of 147) of this species lie in operational boundaries (1 in Tar 11 and 2 in the IOA), and another 17 percent (*i.e.*, 25 out of 147) lie within areas that may experience indirect effect from increased operation as a result of the proposed action.

*Threats*

Despite the improvement in the status of San Clemente Island broom evident by the increase in distribution and abundance of this species, this plant still faces threats including invasive plant species, erosion, military training activities and related fire, and potential hybridization with the more common *Lotus argophyllus* var. *adsurgens*. Invasive plant species may compete with San Clemente Island broom for water, light and nutrients. Non-native annual grasses were found associated with San Clemente Island broom in 69 percent of its locations in 1996 and 1997, and percent cover of these species was over 40 percent in San Clemente Island broom habitats. Non-native annual grasses may alter the prevalence of fire (Brooks 1999) that otherwise could affect the persistence of this species. Another non-native species, ice-plant (*Carpobrotus edulis*), also appears to be hindering the recovery of San Clemente Island broom (Allan 1999). This invasive species occupies large areas of Wilson Cove where it may be out-competing native species such San Clemente Island broom for space, nutrients, and water (Allan 1999). Allan (1999) states that the encroachment by ice-plant contributes to habitat destruction, which may lead to the long-term establishment of hybrid swarms between San Clemente Island broom and the more common *L. a.* var. *adsurgens*.

Erosion is evident on many gradual and steep slopes within and around Wilson Cove, including slopes that support the San Clemente Island broom. Military activities in the vicinity of Wilson Cove have the potential to adversely affect the species due to its proximity to facilities and the general level of human activity in the area. In one recent incident, personnel involved with a clean up project conducted scrap metal removal using heavy equipment within an occurrence of San Clemente Island broom located near Wilson Cove. The Navy is assessing the damage to the site, and level of impact to the species, and intends to remedy the loss to San Clemente Island broom (K. O'Conner pers. comm. 2008), although details pertaining to the extent of the damage to the occurrence and intended remedies have not been provided to the Service.

The San Clemente Island broom occurs in some areas of the island that may experience elevated fire frequency in SHOBA and TAR 11. The relationship between fire and the ecology of San Clemente Island broom has not been studied. Although fire may aid the dispersal of broom individuals (U. S Navy 2002), the most beneficial fire intervals and intensities are unknown. According to the species account provided in the INRMP, members of the genus *Lotus* "seed prolifically following fire" and "some regeneration after fire has been observed in this species" (U.S. Navy 2002). Because this species is short-lived and relies on its seed bank for recruitment, fire may create openings in the vegetation where San Clemente Island broom seedlings can become established. However, in areas that burn on a more frequent basis the seed bank may become depleted if individuals burn before they produce seeds. Although an individual plant has the ability to produce vast amounts of seed (Junak and Wilken 1998), the seed bank must be replenished on a regular basis to ensure the continued survival of this species.

*Conservation Actions*

Surveys conducted since the complete removal of non-native mammalian herbivores from San Clemente Island in 1992 indicate that San Clemente Island broom is increasing in both the number of locations and individuals. This suggests that a principle threat to the species was eliminated with the removal of non-native grazing animals from the island.

The San Clemente Island INRMP proposes an array of management strategies to address identified goals and objectives for specified management units and their natural resources. Of relevance to the protection of San Clemente Island broom, INRMP includes an objective to: "Protect, monitor, and restore plants and cryptogams in order to manage for their long-term sustainability on the island" (U.S. Navy 2002). Associated with this objective are a number of proposed management strategies that include the following: consideration of San Clemente Island broom as a "management focus plant" such that it is considered independently from its associated plant community for management; conducting status surveys for this species; ensuring that management focus plants have a network of suitable sites; performing pollination studies on San Clemente Island broom, and continuing to apply genetic research and management approaches to its management. Other INRMP strategies targeted towards the terrace complex of maritime desert scrub, in which San Clemente Island broom occurs, include: accelerating the recovery of shrubs on terrace faces and flats; reducing the percent cover of invasive plants from the 1992-93 baseline of 41 percent on terrace faces and 53 percent on terrace flats; controlling erosion, particularly in association with active and abandoned roads; and establishing a preliminary fire return interval of 5 years in grassy areas and 10 years or longer in shrublands.

To date, concerted efforts have been made to control escape of fire from the Impact Areas and to reduce the cover of non-native species (K. O'Connor pers. comm. 2006). The Navy has also funded rare plant surveys that have documented new occurrences of San Clemente Island broom occurs and field studies that have determined some aspects of its reproductive potential.

Effects of the Action

The proposed action includes new and/or increased ordnance use in Impact Areas I and II and training in the IOA, AFP 6 and TAR 11. These activities may result in direct or indirect adverse effects to San Clemente Island broom as a result of fires, fire management and suppression, vehicle and foot traffic, erosion and invasive plant species.

**Fire**

The proposed action could affect this species if fire, associated with increased operations in Impact Areas I and II, and TAR 11, is allowed to burn San Clemente Island broom populations. Increased fire frequency resulting from intensified uses could also lead to localized changes in vegetation (type conversion) that could indirectly affect San Clemente Island broom. The potential for elevated fire frequency to many of the occurrences within SHOBA is reduced by their location on the eastern side of the island, away from Impact Areas I and II. In consultation with the Service, the Navy modified the proposed boundaries of TAR 11 to reduce occurrence of this species within the TAR. The original boundaries of the TAR supported approximately 9 of 147 occurrences (6.1 percent of total occurrences) and 878 of 9,674 individuals (9.1 percent of total individuals). Revised boundaries support only one occurrence of the species, reducing the potential impacts to the species from any small fires that could result from flare use in this TAR. Although no live-fire or demolitions would occur, there is the potential for activities on the TAR, which include the use of helicopter operations, smoke generators, flares, pyrotechnics and all types of blanks, to start a fire. As a condition of the FMP (U. S Navy 2005b), standby fire fighting equipment and wildland fire-qualified crew would be available under conditions of moderate or higher fire danger. These conditions and overall implementation of the FMP should minimize the potential for fire to spread into occurrences of this species onsite or nearby.

The response of San Clemente Island broom to fire in is not well known. Burned individuals of this short-lived subshrub are generally killed outright by fire, but seedling establishment is fire-stimulated, and the species also establishes after minor disturbances, as do other members of this genus such as deerweed (*Lotus scoparius*) (U. S Navy 2002). Thus, in the absence of fire or minor disturbance, it is possible that San Clemente Island broom could gradually decline.

The Navy's fire management practices are anticipated to minimize ignitions as well as the spread of fires. The proposed action also includes a Navy commitment to conduct an annual review of fire management and fires that will allow adaptive management, if required. Once live-fire and demolition training commences in TAR 11, a better understanding of the likely fire patterns associated with range use will emerge. These measures should minimize the frequency and spread of fires that could result in type conversion of native habitat.

**Fire Management and Suppression**

Fire management may entail future creation of fuelbreaks in areas that support San Clemente Island broom. No specific fuelbreak locations have been proposed in the vicinity of this species to date. If fuelbreaks are created using Phos-Chek or herbicide, as proposed within the project description, San Clemente Island broom individuals that lie within the fuelbreak footprint could be destroyed. The use of Phos-Chek may also favor the expansion of non-native species due to the fertilizing effect of this retardant. Since the boundaries of future fuelbreaks have not yet been identified, we anticipate that the Navy will consult with the Service regarding any future plans to establish fuel breaks with the potential to impact San Clemente Island broom. Thus, the impacts of new fuelbreaks on San Clemente Island broom are not considered in this analysis.

**Vehicle and Foot Traffic**

Proposed training activities would include new and significant increases in vehicle and/or foot traffic entering and exiting the IOA, TAR 11, and AFP 6. The majority of the 147 San Clemente Island broom occurrences are located outside of any training areas. However, 14 occurrences are in the boundaries of the IOA, and one is in the boundaries of TAR 11. In addition, 22 are within 305 m (1,000 ft) of the IOA, and 3 occurrences are in a canyon downhill from AFP 6.

Erosion caused by vehicle traffic in AFP 6 could affect three San Clemente Island broom occurrences in Eagle Canyon. The head of Eagle Canyon includes a segment of AFP 6 that is located on the eastern side of San Clemente Island Ridge Road and has been identified as having steep slopes. The occurrences, however, are located over 500 m (1,640 ft) from the edge of the AFP deep within the canyon, and the Navy proposes to develop and implement an erosion control plan in coordination with the Service to minimize the potential for offsite erosion to occur. The erosion plan will include using BMPs to reduce the potential for erosion beyond boundaries of operational areas, potentially including setbacks from steep slopes such as those at the eastern edge of the AFP 6. The Navy will also develop and implement a project to monitor for erosion, dust generation, and deposition of dust in adjacent habitats. If the erosion control plan and monitoring project are implemented prior to broader uses of AFP 6 outlined in the proposed action, we do not expect adverse effects to the three broom occurrences in Eagle Canyon.

Proposed training activities would include significant increases in foot traffic in the IOA which supports 14 occurrences of San Clemente Island broom. The most intensive use of the IOA would occur two times per year during a 4-day Battalion Sized Landing operation during which 1,500 troops would proceed up the island. Of the personnel involved in the Battalion Sized Landing, approximately half would be traveling in vehicles. The remaining personnel (approximately 750) would travel up the IOA corridor on foot and bivouac at locations en route to SHOBA Impact Areas. In addition, the occurrence within the boundaries of TAR 11 could be directly affected by foot traffic within TAR boundaries. This occurrence would be exposed to foot traffic during approximately 30 days of use per year (33 NSW Operations and two 4-day Battalion-sized landings).

San Clemente Island broom is a small shrub and is unlikely to be affected by occasional foot traffic. Seedlings of the species could be crushed by foot traffic, if stepped on. Any effects of foot traffic on a local population of this species within the IOA would be dispersed (because the Marines travel in a dispersed manner), infrequent (up to twice per year, generally less) and temporary. The likelihood of direct effects within TAR 11 is reduced by the location of the San Clemente Island broom at the periphery of the TAR. However, the potential for indirect effects associated with introduction or spread of invasive species as a result of foot traffic within the IOA and within and surrounding TAR 11 is anticipated and may extend beyond the boundaries of these operational areas if new invasive species become established and spread. The potential for invasive species is of particular concern at TAR 11, since approximately 22 broom occurrences are located within 305 m (1,000 ft) of this operational area. The Navy proposes to monitor operational areas to detect any new introductions of invasive species and treat any observed introductions to prevent adverse effects to surrounding native plant communities and sensitive species, as discussed below.

**Invasive Plant Species**

Invasive plant species are likely to be introduced to San Clemente Island by ongoing and increased training activity on the island and are also likely to be spread by increased movement of people, equipment, and vehicles. Vehicular routes are a primary pathway for plant invasions into arid and semi-arid ecosystems (Johnson *et al.* 1975, Amor and Stephens 1976, Brooks and Pyke 2001, Gelbard and Belnap 2003). Vehicles serve as dispersal vectors for alien plant propagules (Clifford 1959, Schmidt 1989, Lonsdale and Lane 1994), and disturbances within vehicular route corridors facilitate establishment of invading ruderal plants (Greenberg *et al.* 1997). Spread of invasive species from inadvertent introductions caused by vehicular or foot traffic could adversely affect San Clemente Island broom, given its occurrence in and near the IOA and TAR 11.

Invasive species are widely recognized as a leading cause of species loss world-wide, second only to direct habitat loss and fragmentation (Pimm and Gilpin 1989). Island ecosystems and species are especially vulnerable to invasion (Mack *et al*. 2000). Invasive species may affect ecosystem processes. For example, invasion of grasses may alter fire frequency by rapid production of highly flammable fuel, thus leading to more frequent fires and eventual conversion of shrub lands to grasslands (D'Antonio and Vitousek 1992). Invasive species of particular concern include non native grasses, such as *Avena barbata*, and *Bromus* spp., fennel (*Foeniculum vulgare*), and Sahara mustard (*Brassica tournefortii),* which have already invaded most of the known broom occurrences. Ice-plant is also of particular concern for the broom population in Wilson Cove. Non-native invasive species may compete with San Clemente Island broom for nutrients, water, or sunlight. In addition, non-native plants may provide additional flashy fuels that could change the frequency of fires under which San Clemente Island broom could persist.

To reduce the potential for transport of invasive plants to the island, military and non-military personnel will be asked to conduct a brief check and remove any visible plant material, dirt, or mud on equipment and shoes, prior to coming to San Clemente Island. Tactical ground vehicles will be washed of visible plant material, dirt and mud prior to embarkation for San Clemente Island (The washing procedure is not required for amphibious vehicles after 15 minutes of self-propelled travel through salt water prior to coming ashore on San Clemente Island.).

The Navy has also committed to continue invasive exotic plant species control on an island-wide scale, with an emphasis on particular areas including the IOA, TARs, and Wilson Cove. The focus of the invasive exotic plant control program will continue to be the control of highly invasive exotic plants that have the potential to adversely impact habitat for federally listed species in known locations and the early detection and eradication of new occurrences of such species.

Conclusion

After reviewing the current status of the San Clemente Island broom, the environmental baseline, and the effects of the proposed action, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of this species. We have reached this conclusion for the following reasons:

(1) About 90 percent (*i.e.*, 132 out of 147) of San Clemente Island broom occurrences are outside areas subject to significant training activities, and only 27 percent (*i.e.*, 40 out of 147) of occurrences may be adversely affected because of their locations within or in close proximity to defined training areas (*i.e.*, the IOA, TAR 11 and AFP 6). The presence of San Clemente Island broom outside training areas will help to ensure survival of this narrowly-restricted island species;

(2) The Navy will minimize the potential impacts from increased invasive species establishment by continuing their island-wide invasive exotic plant species control program, with particular emphasis on San Clemente Island broom habitat in the IOA, TAR 11 and Wilson Cove;

(3) The Navy will minimize the potential impacts from increased fire frequency by implementing a FMP and develop an erosion control plan to address potential effects of erosion and/or dust on the San Clemente Island broom occurrences near AFP 6; and

(4) The San Clemente Island broom has substantially increased in numbers and distribution since the time of its listing primarily due to conservation actions supported by the Navy (*e.g*., removal of feral grazing animals, invasive plant management). With continuation of the Navy stewardship for San Clemente Island, including actions to promote the recovery of listed plants, we anticipate impacts of the proposed action will be offset and will not result in an appreciable reduction in the numbers, reproduction, or distribution of the San Clemente Island broom.

**San Clemente Island woodland star** (*Lithophragma maximum*)

*Listing Status*

San Clemente Island woodland star was listed as an endangered species on August 8, 1997 (62 FR 42692). Critical habitat has not been designated for this species.

*Species Description*

San Clemente Island woodland star is a member of the saxifrage family (Saxifragaceae) and flowers from April to June (California Native Plant Society 2001). It is a rhizomatous (bearing horizontal subterranean stems), perennial herb with basal leaves and two or three stout flowering stems from 40 to 60 cm (16-24 in.) high. Each flower bearing stem produces 20 or more white to pinkish, bisexual, bell shaped flowers, each about 1 cm (0.5 in.) in length (Junak and Wilken 1998). The fruit is a 3-valved capsule with numerous seeds. The leaves are palmately compound (with the blade divided into leaflets that radiate from a common point) and arise from the base on slender petioles 15 cm (6 in.) long San Clemente Island woodland star is the only species within its genus known to occur on San Clemente Island (U.S. Navy 2001).

*Habitat Affinities*

San Clemente Island woodland star is restricted to San Clemente Island, where it occurs exclusively in several steep canyons along the eastern escarpment towards the southern end of the island. Plants are generally found in shady conditions on ledges on canyon walls and on gentle north-facing slopes in moist canyon bottoms between elevations of 120 to 366 m (400-1200 ft) (Junak and Wilken 1998; Junak 2006; S. Junak pers. comm. 2006). Soils are usually at least vernally moist and are generally loams of varying depth that are derived from rock of volcanic origin (S. Junak pers. comm. 2006). A number of populations are found downslope from sizable groves of *Lyonothamnus floribundus* ssp. *aspleniifolius* (Santa Cruz Island ironwood), suggesting a possible association with this species (Junak and Wilken 1998; S. Junak pers. comm. 2006).

*Life History*

Little information is available regarding the reproductive ecology of San Clemente Island woodland star. Most of what is known is inferred from studies of other species in the genus.

White, sometimes scented flowers within the *Lithophragma* genus suggest plants may rely on moths for pollination (Taylor 1965; Kellogg and Kellogg 1994). During 3 years of field work, one genus of moth (*Lampronia*) and four genera of bees (*Andrena*, *Apis*, *Osmia* and *Chloralictus*) were collected during a study of several species of *Lithophragma* (Taylor 1965). Researchers have observed visitation by one moth species to *L. parviflorum* in a community where other white-flowered plant species were present, suggesting the possibility of pollinator host specificity (Taylor 1965). Thus, of the pollinators collected on the genus, moths were thought to represent the most important single class of pollinators (Taylor 1965). Based on the apparent scarcity of insect pollinators found on other *Lithophragma* species, it has been suggested that a lack of pollinators on San Clemente Island could be impairing successful sexual reproduction of San Clemente Island woodland star (Kellogg and Kellogg 1994).

Based on its growth habit and knowledge of vegetative reproduction in other *Lithophragma* species, San Clemente Island woodland star is likely capable of vegetative reproduction via rhizomes and bulblets (Bacigalupi 1963; Taylor 1965; U.S. Navy 2001). Studies to characterize sexual reproduction in the genus found that of seven species studied (including two subspecies of one species, for a total of eight taxa), four were entirely self-incompatible and the remaining species were partially so, with just 12-50 percent seed set resulting from self-pollination (Taylor 1965). Random crosses between members of the same population within a species were also unsuccessful for two species (*L. affine* and *L. heterophyllum*), suggesting that individuals in these populations possessed the same self-incompatibility alleles (Taylor 1965). This contrasts with over 90 percent successful crosses among individuals from different populations and suggests that populations of these species may sometimes be derived from one or a few plants that propagate via efficient vegetative reproduction (Taylor 1965). Evidence that a self-incompatibility system operates within the genus suggests that San Clemente Island woodland star may also be partially or completely self-incompatible (Taylor 1965; Junak and Wilken 1998).

Attempts to grow plants from seed have met with mixed, but usually poor, success (Helenurm 1998; Ferguson and Beauchamp 1981). Taylor (1965) reports that a controlling environmental factor for germination of a number of species in the genus is temperature, with optimal germination being found at temperatures that most closely approximate those in their natural environment. Ferguson and Beauchamp (1981) reported that no successful germination was achieved at Rancho Santa Ana Botanic Garden or Pacific Southwest Nursery from San Clemente Island woodland star seed that was collected during 1979 and 1980. Helenurm (1998) found seed germination and seedling survival rates under greenhouse conditions to be very low. He was able to improve seed germination by scarification and treatment with gibberellic acid, but seedling survival remained "…low due to the small size of seedlings and their susceptibility to pathogens" (Helenurm 1998). A 1998 effort at the Rancho Santa Ana Botanic Gardens to grow plants from seed obtained about 3 percent germination success, resulting in the propagation of 6 plants from 350 seeds (C. Ames pers. comm. 2006). Secondary collections of seed from those plants now contribute to the seed bank for this species (S. Jett pers. comm. 2006). A more recent effort to germinate seeds at the same location in 2006 was unsuccessful (C. Ames pers. comm. 2006).

*Rangewide Distribution and Threats*

Since the San Clemente Island woodland star's entire distribution is restricted to the action area of San Clemente Island, its island-wide distribution and current threats to the species are discussed in the Environmental Baseline section below.

*Conservation Needs*

A recent 5-year review (Service 2006c) identified the following conservation needs for San Clemente Island woodland star:

(1) Study the reproductive ecology and mating system of San Clemente Island woodland star to determine whether populations suffer from low pollinator visitation and/or have a self- incompatibility mechanism (*e.g.* have genes that preclude mating among closely related individuals) that limits sexual reproduction in the species.

(2) Perform additional genetic studies using randomly amplified polymorphic DNA RAPDs or other appropriate genetic markers to see if there is any detectable genetic variation in the species that will allow for inferences about relatedness of adjoining individuals, trends in genetic variation, patterns of gene flow, or other evolutionary processes.

(3) Use existing or new seed collections to propagate and establish additional populations of San Clemente Island woodland star in appropriate habitat to help safeguard the species. Results from the prior two recommended actions should be used to select seed from the most genetically diverse source populations and to determine if transplantation into existing populations should be used to improve seed production and fitness of populations.

(4) Work with the Navy to adopt a set of SHOBA access policies to facilitate effective management and monitoring of San Clemente Island woodland star. These policies should allow for greater flexibility in the timing of study and survey efforts and should prioritize providing access during critical times in the life cycle of San Clemente Island woodland star and invasive weeds.

(5) Exclude fire from San Clemente Island woodland star habitat by using back-fires or other appropriate techniques to prevent wildfires from spreading east of Ridge Road.

Environmental Baseline

*Distribution*

San Clemente Island woodland star is restricted to several steep canyons along the eastern escarpment towards the southern end of San Clemente Island. San Clemente Island woodland star was thought to be extinct until two small populations were found in 1979 at the bottom of Bryce Canyon (9 plants) and at the bottom of Eagle Canyon (3 plants) on the southeastern side of San Clemente Island (Bacigalupi 1979; Ferguson and Beauchamp 1981). Since that time, a number of small populations have been discovered in precipitous canyons along the eastern escarpment of the island between Eagle Canyon and the south fork of Matriarch Canyon (M. Elvin *in litt*. 1996; Helenurm 1997; Junak & Wilken 1998; U.S. Navy 2001; Junak 2006).

At the time of listing in 1997, there were 11 known populations from the southeastern portion of San Clemente Island (62 FR 42692). Based on a recent compilation of records in Carlsbad Fish and Wildlife Office (CFWO) files, it appears that around 17 locations have now been documented for the species. However, this may not accurately represent the total number of extant occurrences since multiple records within the same canyon often reflect an accumulation of records made by independent observers using different mapping methods over a span of years. Thus, it is possible that two or more records in proximity to one another within the same canyon could refer to the same population.

Because documented occurrences sometimes fall in proximity to one another (*e.g.* less than 0.4 km (0.25 mi.)), different mapping techniques have been used to document occurrences, and occurrences are often comprised of just a few individuals, the spatial distribution of the species is best described by the canyons where occurrences are concentrated and where ecological processes are likely to operate in common. Thus, while around 17 occurrences appear to have been documented since the rediscovery of the species, there are just five canyon areas where plants are concentrated. These include from north to south: Eagle Canyon; Bryce Canyon; several un-named, closely spaced, branching canyons north of Mosquito Cove; Mosquito Cove Canyon; and Matriarch Canyon.

If one ignores the potential that more than one record could represent the same population and sums the most recent approximate count of individuals per occurrence measured since 1979, then about 641 individuals of San Clemente Island woodland star have been documented throughout its range. The majority of the occurrences (9 of 17 occurrences) and 71 percent of documented individuals (454 of 641 individuals) are concentrated within several closely spaced and sometimes interconnected branching canyons north of Mosquito Cove covering an area of 13.3 ha (32.9 ac). The two northern canyons, Eagle Canyon and Bryce Canyon, and the southernmost canyon, Matriarch Canyon, support very small satellite populations of 20, 34 and 10 plants, respectively. The fifth concentration of plants is comprised of two occurrences of around 60 and 65 plants each, which are found less than 0.4 km (0.25 mi.) apart in adjoining tributary forks of Mosquito Cove Canyon (Ferguson and Beauchamp 1981; M. Elvin *in litt*. 1996; Helenurm 1997; Junak & Wilken 1998; U.S. Navy 2001; Junak 2006).

Overall, the number of individuals counted per occurrence is very small with just 6 of the 17 occurrences having been documented with over 50 individuals. Counts have ranged from 2 to 104 individuals (median = 17, average = 30). Only two of the occurrences documented since the time of listing (Junak 2006) appreciably expand the range of the species. These include an observation of a small population of 7 plants towards the top of Bryce Canyon and an occurrence of 10 plants in Matriarch Canyon (Junak 2006).

Relative to the military use of San Clemente Island, the entire range of San Clemente Island woodland star falls within the SHOBA. There is little information for judging population trends because surveys conducted over the last decade have focused on documenting new occurrences rather than monitoring the status of known occurrences (S. Junak pers. comm. 2006). Because there is no information to indicate that specific occurrences have been lost from activities on San Clemente Island, most occurrences discovered since 1979 are assumed to remain extant.

In contrast to a statement in the final rule that around 200 plants were located during Spring 1996 field surveys (62 FR 42692), CFWO files now suggest that around 365 plants were found in 1996. In either case, these totals represent a compilation of data from several independent survey efforts, and neither should be viewed as a definitive single year population estimate.

The best information regarding population dynamics is obtained from those populations that have been visited more than once. At a population in lower Eagle Canyon, two plants were observed in 1979, with no plants observed during the succeeding 2 years. In upper Eagle Canyon, three visits to a population between 1980 and 1997 documented from 12 to 20 plants. Along the north fork of Mosquito Cove Canyon, 16 plants were recorded in 1991, and around 60 plants were recorded in 1996. At the two other occurrences where there is data for more than one year, population counts have remained fairly constant. This suggests that numbers of San Clemente Island woodland star may remain relatively stable from year to year (*i.e.*, the species is not prone to dramatic population fluctuations).

In summary, San Clemente Island woodland star has an extremely restricted and dissected distribution with one major concentration of plants in the branched canyons north of Mosquito Cove Canyon, a small to moderate sized population in Mosquito Cove Canyon, and three very small peripheral populations in the canyons at the southern and northern limits of its range.

*Threats*

The threats to San Clemente Island woodland star include erosion, invasive plant species, and unnaturally high fire frequencies. Although goats and all other non-native grazing animals had been removed by 1992, the legacy of these animals remains in the form of lost soil and accelerated and concentrated erosion in the steep eastern canyons. Soil loss in groves of oaks and ironwood trees associated with canyons along the eastern escarpment has led to root exposure and death of trees. Gullying and piping along plateau areas may be concentrating runoff to unnatural levels within the canyons below (Kellogg and Kellogg 1994).

Contemporaneous with, and likely aided by, the presence of feral grazing animals, a large number of invasive alien species have naturalized on the island and become a dominant component of many habitats. A 2007 flora compilation for San Clemente Island by the Navy listed 455 taxa (including species, subspecies, and varieties), of which 159 were exotic, 6 were listed as federally endangered, and 8 were believed to be extirpated. Several exotic plant species have been found to co-occur with San Clemente Island woodland star, including ripgut brome, goose grass (*Galium aparine*), common catchfly and common sow thistle (Junak and Wilken 1998).

Frequent fire on the plateau above the eastern canyons and occasional fire within those canyons also represents a source of ongoing disturbance that has potential to trigger erosion events, further facilitate the invasion by non-native plant species, and cause the direct loss of plants and seed. Frequent fires are not, however, expected to occur on the eastern escarpment, due to the steep slopes in this area and distance of the canyons from ignition sources.

*Conservation Actions*

The appearance of around 15 new occurrences of San Clemente Island woodland star since the early 1990s suggest this species is responding favorably to the removal of feral herbivores from San Clemente Island, despite ongoing threats from erosion, fire, and invasive plants.

The Navy’s INRMP for San Clemente Island identifies goals and objectives for 18 management units based on each unit’s ranking for both military and natural resource value. Funding allocations and implementation of tasks identified in the INRMP are based on identified programming and budgeting priorities for conservation programs, with priority given to mission obligations, requirements derived from existing laws and regulations, and objectives for federally listed species and their habitats (U.S. Navy 2001).

Of relevance to the protection of San Clemente Island woodland star, the San Clemente Island INRMP includes an objective to: “Protect, monitor, and restore plants and cryptogams in order to manage for their long-term sustainability on the island” (p. 4-39, U.S. Navy 2001). Associated with this objective are a number of proposed management strategies that include: consideration of San Clemente Island woodland star as a “management focus plant” such that it is considered independently from its associated plant community for management; conducting status surveys for this species; ensuring that management focus plants have a network of suitable sites; performing pollination studies on San Clemente Island woodland star; and continuing to apply genetic research and management approaches to its management. Other management measures that are identified in the INRMP specifically for management units where San Clemente Island woodland star is known to occur (Units 11, 14, and 18) include: managing fire encroachment risk from the west; managing fire size, intervals, and intensity within the management units; and managing invasive species, especially black mustard (*Brassica nigra*), along Ridge Road.

Possibly in conflict with protection and/or recovery of San Clemente Island woodland star is the competing objective included in the INRMP to protect military access to SHOBA firing ranges to the west of San Clemente Island woodland star occurrences due to SHOBA's high military value for ship-to-shore bombardment training (U.S. Navy 2001). To minimize this conflict, the INRMP includes a set of Fire Management Guiding Principles that derive in part from the Navy's consultation with the Service on their fire management practices (Service 1997, 2002).

To date, a number of the INRMP management strategies have been implemented. The Navy has implemented rare plant surveys that have documented new occurrences of San Clemente Island woodland star. Genetic research on this species has also been performed. Concerted efforts have been made to control escape of fire from the SHOBA Impact Areas. However, other objectives have not been achieved, such as pollination studies or applying genetic research to management of the species.

Effects of the Action

San Clemente Island woodland star does not occur within areas proposed for training activities on San Clemente Island. It is found only on the eastern side of the island where it drops off into a steep escarpment and a series of extremely steep canyons The steepness of the terrain in which woodland star occurs and its location in relationship to proposed training activities make it unlikely that vehicle or foot traffic would directly affect the species. No trails or routes extend into the steep canyons where the species occurs so vehicle or foot traffic in the vicinity of the plant is unlikely. However, woodland star does occur in the vicinity of AFP 6 where it could be subject to increased fire frequencies, erosion due to vehicle and foot traffic, and invasive species.

**Fire**

Fire due to training activities is possible in habitat that supports woodland star; however, the species does not appear to be at risk of a high fire frequency. Although the range of the species is within SHOBA, the sites where it is found are on the eastern side of the island, and the potential ignition sources of most concern (*i.e.*, munitions use in Impact Areas I and II) are on the western side of the island. Activities in AFP 6 could also be an ignition source. However, we expect artillery firing activities in AFP 6 to occur on the west side of Ridge Road. The steep slope descending from potential ignition sources, the location of Ridge Road between most ignition sources and plant locations, and the distance between ignition sources and San Clemente Island woodland star occurrences reduces the potential for accidental fires to directly affect this species. Based on the recorded fire history, fires have burned downslope into canyons on the eastern side of the island once. While the increase in training frequency proposed within AFP 6 and Impact Areas I and II increase the potential for ignitions, the Navy's fire management practices are anticipated to minimize ignitions as well as the spread of fires into eastern canyons. The proposed action also includes a Navy commitment to conduct an annual review of fire management and fires that will allow adaptive management, if required

**Vehicle and Foot Traffic**

Erosion caused by vehicle and foot traffic in AFP 6 could affect a small woodland star occurrence (approximately 20 plants) in Eagle Canyon. This occurrence is the northern most of the currently known locations. The head of Eagle Canyon includes a segment of AFP 6 that is located on the eastern side of Ridge Road and has been identified as having steep slopes. The occurrence, however, is located over 500 m (164 ft) from the edge of the AFP deep within the canyon, and the Navy proposes to develop and implement an erosion control plan in coordination with the Service to minimize the potential for offsite erosion to occur. The erosion plan will include using BMPs to reduce the potential for erosion beyond boundaries of operational areas, potentially including setbacks from steep slopes such as those at the eastern edge of the AFP 6.

**Invasive Plant Species**

Invasive plant species are likely to be introduced to San Clemente Island by ongoing and increased training activity on the island and are also likely to be spread by increased movement of people, equipment, and vehicles. Invasive species are widely recognized as a leading cause of species loss world wide second only to direct habitat loss and fragmentation (Pimm and Gilpin 1989). Island ecosystems and species are especially vulnerable to invasion (Mack *et al.* 2000). Invasive species may affect ecosystem processes. For example, invasion of grasses may alter fire frequency by rapid production of highly flammable fuel, thus leading to more frequent fires and eventual conversion of shrub lands to grasslands (D'Antonio and Vitousek 1992). Non-native invasive species may compete with San Clemente Island woodland star for nutrients, water, or sunlight. Although San Clemente Island woodland star occurs deep within canyons, invasive species may become established by the downslope movement of seeds and water into these canyons. Since it occurs within a canyon downslope from AFP 6, the potential for invasive plant species to be spread into San Clemente Island woodland star habitat at this location will be increased.

The Navy proposes to monitor for invasive plant species, especially around the AVMC, including AFPs, so we anticipate that monitoring may detect invasions to allow subsequent treatment. In addition, ongoing monitoring of the San Clemente Island woodland star population will allow identification of any emergent weed issues and allow management to occur. The Navy has also committed to continue invasive exotic plant species control on an island-wide scale. The focus of the invasive exotic plant control program will continue to be the control of highly invasive exotic plants that have the potential to adversely impact habitat for federally listed species in known locations and the early detection and eradication of new occurrences of such species.

<u>Conclusion</u>

After reviewing the current status of San Clemente Island woodland star, the environmental baseline, and the effects of the proposed action, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of this species. We have reached this conclusion for the following reasons:

(1) The proposed action is not expected to directly impact San Clemente Island woodland star. It is also expected that potential indirect impacts from fire, erosion, and invasive species will be controlled to an insignificant level by proposed fire management, erosion control measures, invasive species control, and species monitoring and management that will be implemented in coordination with the Service; Thus, the proposed action will not result in an appreciable reduction in the numbers, reproduction, or distribution of the San Clemente Island woodland star.

(2) Fires, if they occur, are unlikely to burn into habitat occupied by this species;

(3) Foot traffic and vehicle traffic are not expected to occur in the vicinity of the species as a result of training activity;

(4) Although erosion could occur upslope from the occurrence in Eagle Canyon, San Clemente Island woodland star are located over 500 m (164 ft) from the edge of AFP 6. This distance from the AFP 6 boundaries reduces the potential for impacts to this species associated with erosion; and

(5) Continuation of the Navy's conservation program for San Clemente Island will promote the recovery of the San Clemente Island woodland star.

**Santa Cruz Island Rock-Cress** (*Sibara filifolia*)

Status of the Species

*Listing Status*

Santa Cruz Island rock-cress was listed as endangered on August 8, 1997 (62 FR 42692). Critical habitat has not been designated for the Santa Cruz Island rock-cress.

*Species Description*

The Santa Cruz Island rock-cress is a slender annual herb in the mustard family (Brassicaceae) that flowers in April (Munz 1974). It is 13-38 cm (5-15 in.) tall. Pink to purplish flowers with spoon-shaped petals are borne in small terminal unbranched flower stalks. The leaves are 2.5-5cm (1 to 2 in.) long and have a prominent midvein and narrow linear lobes arising along their length.

*Distribution, Abundance, and Habitat Affinity*

Santa Cruz Island rock-cress was historically recorded in coastal scrub habitats on Santa Cruz and Santa Catalina islands. The species was thought to be extinct until it was discovered at the extreme south end of San Clemente Island in 1986. It was re-discovered in one gully on Santa Catalina Island in 2001. It has not been seen on Santa Cruz Island since 1932 (Junak 2006). On Santa Catalina Island, Santa Cruz Island rock-cress occurs in two closely spaced locations within Wild Boar Gully (D. Knapp pers. comm. 2001, D. Knapp *in litt*. 2001). On San Clemente Island, Santa Cruz Island rock-cress occurs in several saddles on three adjacent, open ridgetops and on nearby flats at the southern end of the island near Pyramid Head, at elevations between 91 and 165 m (300 and 540 ft) (Junak 2006).

Described as common by early collectors (Greene 1887; Trask 1901; S. Junak pers. comm. 2006), it appears to have been wide ranging based on historic records from Santa Cruz and Santa Catalina Islands and recent records from San Clemente Island. At the time of listing in 1997, it was only known from San Clemente Island where fewer than 30 plants were found in one location during the 1996 season (62 FR 42692; Junak and Wilken 1998). Since that time, Santa Cruz Island rock-cress has been rediscovered on Santa Catalina Island and 11 additional occurrences have been documented on San Clemente Island. It has yet to be re-observed during various, mostly untargeted, plant surveys on Santa Cruz Island, where the last record of the species is from 1936 (Helenurm 2003; 62 FR 42692; K. Chess pers. comm. 2006).

Contemporary surveys have recorded occurrences with a few to several hundred individual plants each (2 to 500 plants per occurrence) (Beauchamp 1987; D. Knapp pers. comm. 2006; Junak and Wilken 1998; Junak 2006). Monitoring reveals that, as is typical of annual plant species, populations fluctuate in response to seasonal rainfall, and during some years, plants may not be evident (D. Knapp pers. comm. 2006; S. Junak pers. comm. 2006; K. Helenurm pers. comm. 2006). Some of the occurrences are comprised of scattered individuals and are not reliably observed on an annual basis (K. Helenurm pers. comm. 2006).

Historical and extant records suggest that Santa Cruz Island rock-cress can tolerate soils derived from a variety of parent materials including rocks of volcanic and metamorphic origin (S. Junak pers. comm. 2006). On Santa Catalina Island it is found in black sage (*Salvia mellifera*) dominated coastal sage scrub and is associated with foothill needlegrass (*Nassella lepida*), prickly-pear cactus (*Opuntia littoralis*), morning glory (*Calystegia macrostegia*), and dwarf flax (*Hesperolinon micranthum*) (D. Knapp *in litt*. 2001). On San Clemente Island, it is found on volcanic rock scree in association with cholla, spike-moss (*Selaginella bigelovii*) and San Clemente Island birds-foot trefoil (*Lotus argophyllus* var. *adsurgens*) (Beauchamp 1987; Elvin *in litt*. 1996). Characterized as occurring in shady places on the “northward slope” at its type locality (Greene 1887), subsequent collectors have found Santa Cruz Island rock-cress in open areas along dry rocky ridgelines, in saddles, or on nearby flats with thin soils and little surrounding vegetation. Despite the lack of surrounding vegetation, the rock-cress is often described as cryptic and difficult to detect because of its diminutive stature, short life, and tendency to blend in with the surrounding substrate as it ages and dries (J. Dunn pers. comm. 2006; S. Junak pers. comm. 2006).

*Life History*

Based on greenhouse observations, it appears that, reproductively, Santa Cruz Island rock-cress is capable of self-pollination and is self-compatible or, possibly, apomictic (capable of asexual reproduction) (M. Wall pers. comm. 2006; K. Helenurm pers. comm. 2006). Under natural conditions plants typically produce 2-10 fruits (K. Helenurm pers. comm. 2006).

Greenhouse-grown plants of Santa Cruz Island rock-cress are strikingly more robust than individuals observed in the wild (K. Helenurm pers. comm. 2006). At its type locality Santa Cruz Island rock-cress was described as occurring in shady places on the "northward slope" (Greene 1887). All other verified records and extant occurrences are from dry, open, rocky areas with thin soils and sparse vegetation. This suggests that although Santa Cruz Island rock-cress may have once been more broadly distributed among a range of habitats, it now persists in marginal conditions where it can escape competition from non-native exotic plants that have naturalized on the Channel Islands.

Genetic variation of three Santa Cruz Island rock-cress populations found on three adjoining ridges on San Clemente Island has been studied using two methods, allozyme analysis and RAPD analysis (Helenurm 1999, 2003). The allozyme study detected only two polymorphic loci out of 29 that were studied, indicating there is low genetic variation at both the species and population levels (Helenurm 2003). All of the polymorphism was detected within a single population indicating that most of the genetic variation is found within rather than among populations (Helenurm 2003). Populations that are as little as 150 m (492 ft) apart from one another were also found to be genetically distinct, suggesting there is little gene flow among them (Helenurm 2003). Thus, this study concluded that the low level of genetic variation, differentiation of populations, and low level of gene flow could allow genetic drift to act as a potent force to further reduce genetic variation in the species (Helenurm 2003).

The RAPD study provided an independent method for corroborating the results of the allozyme analysis (Helenurm 1999). Using 11 RAPD primers, a total of 69 loci were detected of which 64 were polymorphic (92.8 percent). Thus, the RAPD study revealed more genetic variation than was detectable using allozymes. It also detected genetic variation within all of the populations studied, whereas the allozyme study only found one population that contained genetic variation. However, the RAPD analysis fully corroborated the conclusion of the allozyme study, that a high level of genetic differentiation exists among closely adjacent populations, and gene flow is extremely limited in the species. Interestingly, the large proportion of unique genotypes in each of the populations suggests the species reproduces primarily through outcrossing (Helenurm 1999). Still, extremely limited gene flow suggests that genetic variation can only be protected through the protection of all populations (Helenurm 1999). Loss of genetic variation could impair the ability of this species to adapt to a changing environment (Helenurm 1999).

*Threats*

Santa Cruz Island rock-cress is threatened by grazing, competition with exotic plant species, and fire. The direct impact of grazing on Santa Cruz Island rock-cress has likely been much reduced through the removal of feral goats and pigs from Santa Catalina Island and San Clemente Island, and the complete removal of feral sheep and substantial removal of feral pigs from Santa Cruz Island. However, the effect that mammalian herbivores have had (*e.g.*, destruction of habitat and introduction of non-natives) probably still affects this species, particularly due to the retention of bison and mule deer on Catalina Island. Wild Boar Gully (45 ha (112 ac)), the location of Santa Cruz Island rock-cress occurrences on Santa Catalina Island, was fenced in 1999 prior to the re-discovery of the species. The threat associated with bison has been reduced by this action.

One of the chief threats to Santa Cruz Island rock-cress is the spread of invasive (non-native) plants into its habitat. Invasive species may compete with Santa Cruz Island rock-cress for space or other resources such as light, water, and nutrients. Invasive plants can also alter ecological processes such as nutrient cycling (Zink *et al*. 1995) or the prevalence of fire (Brooks 1999) that otherwise could affect the persistence of this species. Presently, invasive species are not abundant on the thin rocky soils where extant occurrences of Santa Cruz Island rock-cress are found, but they are dominant in areas that were likely part of its historic range. Invasion of the Channel Islands by several species of annual non-native grasses is of particular concern due to the ability of these species to invade thin rocky soils and because, once established, they are unlikely to be eradicated.

Fire may threaten Santa Cruz Island rock-cress due to its unknown response to fire and potential for wildfires to burn a significant percentage of the population, should they occur. Fire may not have previously been an important evolutionary force for this species, so a change in fire regime may have adverse effects on Santa Cruz Island rock-cress. While it is anticipated that some proportion of Santa Cruz Island rock-cress populations could persist as dormant seed in the soil following a fire, the small, thin coated seeds of this species do not appear to be well adapted to withstand fire.

Recent, small-scale germination trials at the Rancho Santa Ana Botanic Garden obtained about 33 percent germination success for untreated seeds, 26 percent germination success for seeds exposed to cool smoke treatment, and zero percent success for seeds exposed to heat and smoke treatment (C. Ames pers. comm. 2006). In the absence of insulation by soil, investigators found that the thin coated seeds were killed by 5 minutes of exposure to hot smoke in a chamber that reached about 93° C (200° F) (M. Wall pers. comm. 2006). Further suggesting the species may be poorly adapted to fire, a fire in 1995 is reported to have impacted a known occurrence of Santa Cruz Island rock-cress, with subsequent surveys in 1996 unable to detect plants at this location (Service 1997; M. Elvin pers. comm. 1996). Certainly, any loss of plants from fire prior to setting seed would be a threat to the small populations of this species. A change to an increased fire regime associated with the invasion of non-native grasses would likely exacerbate this threat.

On Catalina, fire is of concern due to the potential for naturally caused ignitions that may result in larger fires, combined with the restricted distribution of the rock-cress. On San Clemente Island, the threat of fire is elevated due to the proximity of the rock-cress occurrences to ignition sources. Likely exacerbating this threat is the invasion of annual grasses and other non-native species into Santa Cruz Island rock-cress habitat due to the increased fuel load they provide for fire. Invasion and proliferation of various brome grasses and Mediterranean grass in the Mojave Desert has been implicated as a major factor responsible for reduced fire intervals and increased fire intensity in this formerly sparsely vegetated biome (Brooks 1999; USGS Website http://www.werc.usgs.gov/invasivespecies/mojavegrassfire.html). Grasses exploit many different microhabitats and create a continuous and persistent fuel bed by filling in what was once plant free space with living plants and thatch (Brooks 1999). Because annual grasses vary in density with rainfall they have potential to significantly alter the fuel condition in wet years. Grasses also provide a “flashy” fuel that is easily ignitable due to the short time needed for fuel moisture to drop to low levels, even during a diurnal cycle.

*Conservation Needs*

A recent 5-year review of the status of Santa Cruz Island rock-cress (Service 2006d) resulted in the following recommendations:

(1) Because Mediterranean grass is thought to be restricted to a few locations at the southern end of San Clemente Island, take prompt action to eradicate this alien plant from the island.

(2) Work with the military to adopt a set of access policies for the shore bombardment area on San Clemente Island to facilitate effective management and monitoring of rock-cress. These policies should include adoption of early warning mechanisms for the detection and eradication of new invasive species as well as allow for greater flexibility in the timing of surveys and invasive species control measures.

(3) Use information from genetic research and existing or new seed collections to propagate and establish additional populations of Santa Cruz Island rock-cress on San Clemente and Santa Catalina Islands. Because there remains potential to rediscover rock-cress on Santa Cruz Island, reintroduction efforts should await the results of directed surveys for the species within appropriate habitat on that island.

(4) Study the distribution and feeding habits of chukar on San Clemente Island to help determine whether it poses a threat to rock-cress populations.

(5) Study the reproductive ecology of the Santa Cruz Island rock-cress on San Clemente and Catalina Islands to determine the processes that may be responsible for the low rate of gene flow apparent on San Clemente.

Environmental Baseline

Like the other Channel Islands, San Clemente Island has experienced a history of ongoing habitat modification due to grazing and browsing of non-native goats, sheep, deer, pigs, and cattle introduced by people. Erosion, reduced shrub cover, and changes in soil composition are evidence of this overgrazing (Schwartz 1994, Halvorson 1994, U.S. Navy 2002), as is the vegetation recovery that is occurring following the removal of these animals (Tierra Data Systems 2004, 2005).

*Distribution*

On San Clemente Island, the distribution of Santa Cruz Island rock-cress is restricted to the southern tip of the island above Pyramid Head where it occurs in several saddles on adjoining open ridgetops and on nearby flats (Junak and Wilken 1998; Junak 2006). Surveys conducted by Junak and Wilken in 1996 and 1997 found a total of five populations comprising a total of 758 individuals (Junak and Wilken 1998). Three additional occurrences with a total of 67 individuals of this inconspicuous plant have since been reported in the same general area (Junak 2006). Current estimates based on surveys through 2007 (including unpublished 2007 data) are 12 San Clemente Island occurrences with 905 individuals (U.S. Navy 2008a). All of the these occurrences are found within around 195 ha (0.75 square mile) (S. Junak pers. comm. 2006.) but are genetically differentiated (Helenurm 2003), suggesting their mutual conservation is important to retention of genetic diversity. The twelve occurrences are distributed in three locations, two at the southern end of San Clemente Island Ridge Road and one downslope from AFP 1 (U.S. Navy 2008).

*Threats*

All occurrences of Santa Cruz Island rock-cress on San Clemente Island lie within proximity to each other and are within the boundaries of SHOBA. Occurrences currently face risk associated with baseline levels of operational use on San Clemente Island. Baseline levels of use may result in fires and contribute to the potential for expanded abundance and distribution of invasive plant species on this island. The recent discovery of Mediterranean grass (*Schismus arabicus*) on the southern end of San Clemente Island along with the existing distribution of wild oats and foxtail chess have been highlighted as particularly important threats on San Clemente Island (S. Junak pers. comm. 2006; L. Kellogg pers. comm. 2006; and K. O'Connor pers. comm. 2006).

One of the locations that support occurrences of this species is downhill from and within 76 m (250 ft) of the existing AFP 1. Based on the Navy's recent erosion study (U.S. Navy 2008), the plants do not occupy the same watershed as AFP 1, but they are downhill in the adjacent watershed. AFP 1 supports artillery maneuvering and use under baseline conditions, although the Service has not specifically addressed this use in previous consultation. The area downhill from AFP is not subject to significant erosion under baseline conditions because only a small portion of the mapped AFP 1 is used. Erosion has not affected the mapped occurrences of Santa Cruz Island rock-cress because the plants, though downhill, are in the adjacent watershed.

Mustard (*Brassica tourneforti*) and grasses (*e.g.*, *Shismus arabicus*) are of particular concern for Santa Cruz Island rock-cress because they can spread in the dry conditions that characterize the sites where the Santa Cruz Island rock-cress is located. These species can increase fuel loads in habitat that has little existing fuel and increase the risk of fire burning through the area. Use of the AFP may be facilitating the establishment of invasive plants because both of these species have been documented in the area, and *Brassica tourneforti* was treated in 2005 in proximity to the AFP (U.S. Navy 2005a).

Two occurrences of this species are also within 40 m (125 ft) of the turnaround at the end of San Clemente Island Ridge Road near Pyramid Head (U.S. Navy 2008). Under baseline conditions, this area could be exposed to foot traffic due to its proximity to the end of the road.

All occurrences of Santa Cruz Island rock-cress are within approximately 3 km (1.9 mi.) of Impact Area I and are therefore are at risk of fire under baseline conditions due to their proximity to the Impact Area. The sparse vegetation in the immediate vicinity of the occurrences, however, currently reduces the risk of fires burning these plants. The occurrences lie east of the Impact Area, and based on fire mapping, one fire has burned close to the known occurrences of Santa Cruz Island rock-cress since 1979.

*Conservation Actions*

Santa Cruz Island rock cress is among the sensitive plant species periodically monitored and subject to invasive species control by the U.S. Navy on San Clemente Island (Junak and Wilken 1998; Junak 2006). Research pertaining to the genetics of this plant is also underway (Helenurm 1999, Helkenurm 2003).

The San Clemente Island INRMP proposes an array of management strategies to address identified goals and objectives for specified management units and their natural resources. Of relevance to the protection of the San Cruz Island rock-cress, the INRMP includes an objective to: "Protect, monitor, and restore plants and cryptogams in order to manage for their long-term sustainability on the island" (U.S. Navy 2002). Associated with this objective are a number of proposed management strategies that include the following: consideration of San Cruz Island rock-cress as a "management focus plant" such that it is considered independently from its associated plant community for management; conducting status surveys for this species; ensuring that management-focus plants have a network of suitable sites; performing pollination studies on San Cruz Island rock-cress; and continuing to conduct genetics research.

Possibly in conflict with protection and/or recovery of San Cruz Island rock-cress is the competing objective included in the INRMP to protect military access to the SHOBA firing ranges due to SHOBA's high military value for ship-to-shore bombardment training (U.S. Navy 2002). To date, a number of the INRMP management strategies, or aspects of them, have been implemented. The Navy has implemented rare plant surveys that have documented several occurrences of San Cruz Island rock-cress. Genetic research and pollination studies have also been performed. The Navy has recognized and addressed, to some extent, the potential for invasive species establishment and spread into this area by monitoring for invasive plant species and treating them when possible. Concerted efforts have been made to control escape of fire from the SHOBA Impact Areas. However, other objectives have not been achieved, such as ensuring a network of suitable sites; controlling erosion in some areas; and the community goal of reducing the percent cover of invasive plants from 1992-93 baseline conditions (K. O'Connor pers. comm. 2006.).

Effects of the Action

All occurrences of Santa Cruz Island rock-cress lie outside of operational boundaries described within the proposed action, thus direct effects to Santa Cruz Island rock-cress are not expected. Potential effects to Santa Cruz Island rock include an increase in the frequency of operations at the IOA, AFP 1, and San Clemente Island Ridge Road that may increase exposure of Santa Cruz Island rock-cress occurrences to fire, fire management and suppression activities, erosion from vehicle traffic, foot traffic, and invasive species. The Navy will implement significant conservation measures to minimize the effects of their FMP and training activities on the Santa Cruz Island rock-cress.

**Fire**

All occurrences of Santa Cruz Island rock-cress are within approximately 3,000 m of Impact Area I. Increased training frequency as described in the proposed action increases the risks associated with fires and could affect this species if fires are ignited and spread into occupied habitat. The species is distributed adjacent and uphill from Impact Area I and close to AFP 1; however, the sparse vegetation and resulting fuel where the species is present, combined with the relative infrequency of baseline training events, has resulted in an absence of fires from the specific locations that support Santa Cruz Island rock-cress. Operations proposed within Impact Area I (downhill from Santa Cruz Island rock-cress occurrences) and at AFP 1 (uphill from Santa Cruz Island rock-cress occurrences) could increase the fire frequencies at these sites. Increased fire frequency resulting from intensified uses could also lead to localized changes in vegetation (type conversion) that could indirectly affect Santa Cruz Island rock cress.

The response of Santa Cruz Island rock-cress to fires, should they occur, is not known. This species flowers and sets seed very early in the year (April), making plants less likely to burn, since fires are more likely when dry conditions prevail later in the spring. Seeds on the ground surface, however, would be vulnerable to fire, which appears to adversely affect seed survival and germination (C. Ames pers. comm. 2006, M. Wall pers. comm. 2006). If invasive grasses become more abundant in the areas that currently support Santa Cruz Island rock cress, the potential for fires is likely to increase.

Implementation of the FMP includes implementation of the FDRS and appropriate timing of operations to minimize the potential for ignitions and spread of fires, as well as presence of suppression resources to prevent the spread of fires. Fuelbreaks and suppression measures outlined within the FDRS should prevent fire frequency outside Impact Areas (*e.g.* Santa Cruz Island rock-cress occurrences adjacent and uphill from Impact Area I and close to AFP 1) from increasing to levels incompatible with the persistence of this species.

The proposed action also includes a Navy commitment to evaluate the potential impacts of fire on Santa Cruz Island rock cress and conduct an annual review of fire management and fires that will allow adaptive management. These measures should minimize the frequency and spread of fires that could result in type conversion of native habitat.

**Fire Management and Suppression**

Future fire management practices, including development of fuelbreaks as well as fire suppression, may adversely affect Santa Cruz Island rock-cress due to the proximity of Santa Cruz rock-cress occurrences to Impact Area I and AFP 1. Fuelbreak development and maintenance would entail herbicide or retardant use, as well as controlled burns. Herbicide or Phos-Chek retardant could directly affect Santa Cruz Island rock-cress if applied to areas supporting occurrences, although the response of this species to these materials has not been studied. Phos-Chek would likely facilitate growth of annual grass species, which are currently considered a threat to Santa Cruz Island rock-cress. Controlled burns have been used in the past, on the edges of San Clemente Island Ridge Road and within the Impact Areas. Controlled burns have exceeded the intended burn boundaries on several occasions and point to at least the potential for controlled burns to impact the resources they are intended to protect.

The Navy proposes to minimize the potential for effects to listed species associated with future fuelbreak installation by considering the locations of documented occurrences as fuelbreak lines are developed, by studying the effects of Phos-Chek on San Clemente Island vegetation, and avoiding application of Phos-Chek within 91 m (300 ft) of mapped listed species to the extent consistent with fuelbreak installation. The Navy also proposes to conduct an annual review of fires and fire management practices, which will aid in assuring that fuelbreaks benefit, rather than adversely affect the Santa Cruz Island rock-cress.

Since the boundaries of future fuelbreaks have not yet been identified, we anticipate that the Navy will consult with the Service regarding any future plans to establish fuel breaks with the potential to impact Santa Cruz Island rock-cress. Thus, the impacts of new fuelbreaks on Santa Cruz Island rock-cress are not considered in this analysis.

**Vehicle and Foot Traffic**

Vehicle traffic is not planned to occur within Santa Cruz Island rock-cress habitat, so direct effects of vehicle traffic are not anticipated. However, indirect impacts from vehicle and foot traffic may occur to two occurrences of rock-cress within 40 m (125 feet) of San Clemente Island Ridge Road Ridge Road and two other occurrences within 75 m (250 ft) of AFP 1.

Based on a Navy erosion study (2008), the two Santa Cruz Island rock-cress occurrences near AFP 1 are in the canyon directly downslope from AFP 1. Currently, only a small portion of the mapped AFP 1 is used. A significant increase in vehicle use within AFP 1 is anticipated as part of the proposed action, which will increase the potential for areas downslope to erode (although the soils at the site may reduce the erosion potential) and for invasive species to become established in the vicinity of Santa Cruz Island rock-cress occurrences.

Vehicular routes are a primary pathway for plant invasions into arid and semi-arid ecosystems (Johnson *et al.* 1975, Amor and Stephens 1976, Brooks and Pyke 2001, Gelbard and Belnap 2003). Vehicles serve as dispersal vectors for alien plant propagules (Clifford 1959, Schmidt 1989, Lonsdale and Lane 1994), and disturbances within vehicular route corridors facilitate establishment of invading ruderal plants (Greenberg *et al.* 1997). San Clemente Island Ridge Road and the portions of AFP 1 that are used by vehicles as part of the proposed action are likely to support conditions that will allow establishment of invasive plant species adjacent to the four nearby Santa Cruz Island rock-cress occurrences.

Vehicular routes with dirt surfaces can also be a significant source of dust, which can have significant effects on plant vigor downwind from vehicle activity. Dust is likely to be generated at San Clemente Island Ridge Road and AFP 1 during training activities that use heavy assault vehicles. Whether such dust could accumulate on plants near these areas is unknown; however, given the prevailing wind direction, downwind dust deposition appears likely to occur up to an undetermined distance from this road.

The habitat of the Santa Cruz Island rock cress is outside training area boundaries and is unlikely to be subject to operational foot traffic. The location of the species in proximity to the unmarked terminus of the IOA and San Clemente Island Ridge Road, however, makes it subject to some degree of incidental foot traffic as overall use of the IOA and road increases.

The Navy proposes to develop and implement an erosion control plan in coordination with the Service to minimize the potential for erosion problems beyond the AFP 1 boundaries and to reduce the potential for impacts to listed species. The erosion plan will include using BMPs to the reduce potential for erosion beyond boundaries of operational areas, potentially including setbacks from steep slopes. The Navy will also develop and implement a project to monitor for erosion, dust generation, and deposition of dust in adjacent habitats. If the erosion control plan and monitoring project are implemented prior the expansion of AFP 1 and increased operational use outlined in the proposed action, we do not expect adverse effects to the rock-cress from erosion and/or dust.

To reduce the potential for transport of invasive plants to the island, military and non-military personnel will be asked to conduct a brief check and remove any visible plant material, dirt, or mud on equipment and shoes, prior to coming to San Clemente Island. Tactical ground vehicles will be washed of visible plant material, dirt and mud prior to embarkation for San Clemente Island (The washing procedure is not required for amphibious vehicles after 15 minutes of self-propelled travel through salt water prior to coming ashore on San Clemente Island.). The Navy also proposes to brief military units on maneuver area boundaries prior to conducting operations and to conduct assault vehicle travel or maneuvering only within these boundaries.

The Navy also proposes to brief military units on maneuver area boundaries prior to conducting operations to minimize the potential of incidental foot traffic in Santa Cruz Island rock cress habitat; however, providing markers to aid in identification of range boundaries or sensitive areas is considered incompatible with training (D. Lee, pers. comm. 2008).

**Invasive Species**

A significant increase in the operational use of the IOA, AFP 1 and San Clemente Island Ridge Road is anticipated as part of the proposed action. Travel of vehicles from other areas (*e.g.* Camp Pendleton) and between different parts of San Clemente Island is likely to result in increases in the distribution and abundance of invasive plant species on the island. Because of its proximity to the IOA, AFP 1, and San Clemente Island Ridge Road, the Santa Cruz Island rock-cress could be affected by invasive species introduced or spread by foot and vehicle traffic within the operations areas. Invasive species are widely recognized as a leading cause of species loss world wide second only to direct habitat loss and fragmentation (Pimm and Gilpin 1989). Island ecosystems and species are especially vulnerable to invasion (Mack *et al.* 2000). Invasive species may affect ecosystem processes. For example, invasion of grasses may alter fire frequency by rapid production of highly flammable fuel, thus leading to more frequent fires and eventual conversion of shrub lands to grasslands (D'Antonio and Vitousek 1992). Non-native invasive species may compete with San Cruz Island rock-cress for nutrients, water, or sunlight. In addition, non-native plants may provide additional flashy fuels that could change the frequency of fires in this area. Of particular concern for Santa Cruz Island rock cress habitat is Mediterranean grass (*Schismus arabicus*), which has established and is starting to spread in the SHOBA area and has been documented at or very near AFP 1 (Junak 2003). This species, which has spread rapidly through the California deserts, is tolerant of arid habitats and could eventually carry fire into the habitat of the rock cress (Junak, pers. comm..2005) if it were to spread into that habitat.

To reduce the potential for invasive plant species establishment and spread in Santa Cruz Island rock cress habitat, the Navy will prioritize areas surrounding Santa Cruz Island rock-cress occurrences as primary targets for weed eradication to the extent practicable and as appropriate based on potential impacts. In addition, to maintain or improve the status of Santa Cruz Island rock-cress, the Navy will investigate feasibility of establishing additional colonies in suitable habitat farther away from the IOA and AFP 1 using the on-island nursery to propagate from local seed.

<u>Conclusion</u>

After reviewing the current status of the Santa Cruz Island rock-cress, the environmental baseline, and the effects of the proposed action, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of this species. We have reached this conclusion for the following reasons:

(1) All occurrences of Santa Cruz Island rock-cress lie outside of operational boundaries described within the proposed action;

(2) The Navy will prioritize areas surrounding Santa Cruz Island rock-cress occurrences as primary targets for weed eradication to the extent practicable and as appropriate based on potential impacts;

(3) The Navy will minimize the potential impacts from increased fire frequency by implementing a FMP and develop an erosion control plan to address potential effects of erosion and/or dust on the Santa Cruz Island rock-cress occurrences near the IOA, AFP 1 and San Clemente Island Ridge Road area;

(4) The Navy will assure that application of retardant and/or herbicide will not occur within 91 m (300 ft) of mapped locations of Santa Cruz Island rock-cress;

(5) The Navy will investigate feasibility of establishing additional colonies in suitable habitat farther away from the IOA and AFP 1 using the on-island nursery to propagate from local seed.

(6) Santa Cruz Island rock-cress has increased in numbers and distribution since the time of its listing primarily due to conservation actions supported by the Navy. With continuation of the Navy's stewardship on San Clemente Island, including actions to promote the recovery of listed plants such as the rock-cress, we anticipate impacts of the proposed action will be offset and will not result in an appreciable reduction in the numbers, reproduction, or distribution of this species.

## Birds

**Brown pelican** (*Pelecanus occidentalis*)

Status of the Species

*Listing status*

Due to population declines, the brown pelican (*Pelecanus occidentalis)* was listed on October 13, 1970 (35 FR 16047). The species *Pelecanus occidentalis* is generally recognized as consisting of six subspecies. The California brown pelican (*P. o. californicus*) ranges from California south to Colima, Mexico, including the Gulf of California. The Service issued a recovery plan for the California brown pelican in 1983 (Service 1983).

On February 4, 1985, the Service delisted the brown pelican in Alabama, Florida, Georgia, South Carolina, North Carolina, and points northward along the Atlantic Coast (50 FR 4938). However, the brown pelican continued to be listed as endangered throughout the remainder of its range, including Mississippi, Louisiana, Texas, California, Mexico, Central and South America, and the West Indies.

On July 5, 1994, the Service received a petition from the State of Louisiana requesting that we remove the brown pelican in Louisiana from the Federal List of Threatened and Endangered Wildlife (List). We did not act on this petition due to other higher priority actions. On December 14, 2005, we received a petition from the Endangered Species Recovery Council to remove the California brown pelican subspecies (*P. o. californicus*) from the List.

On May 24, 2006 (71 FR 29908), we published a notice announcing our 90-day finding for the petition, in which we concluded that the petition presented substantial scientific or commercial information indicating that the petitioned action may be warranted. We then initiated a 12-month status review on the rangewide status of the brown pelican (71 FR 29908). On February 20, 2008, we published our 12-month finding on the petition to delist the California brown pelican and a proposed rule to delist the brown pelican in its entirety, based on recovery (73 FR 9408).

*Species Description*

Two subspecies of brown pelican primarily inhabit North America, the California brown pelican and the eastern brown pelican (*P. o. carolinensis*), although *P. o. occidentalis,* a subspecies found in the West Indies and along the Caribbean Coast of South America, occasionally wanders to the coasts of Mexico and Florida. The California brown pelican is a large marine bird weighing up to 3.6 kg (8 lb) that is recognized by its large bill, a prominent, unfeathered throat pouch, and a wingspread up to 2 m (7 ft) (Sykes 1983). Adults in non-breeding plumage have a white head and neck. During the breeding season, the hindneck and nape are dark brown. The body and wings are grayish brown, and the primaries and secondaries are dark brown. The bill is gray, and the throat pouch is black. Immature brown pelicans are mostly brown with a dark neck and head and white belly (Sykes 1983). The California brown pelican can be distinguished from the eastern brown pelican by having a larger size and darker hindneck while in breeding plumage (Wetmore 1945) and a bright red gular pouch during courtship and egg-laying period. They are rather clumsy on land and fly with their necks folded, heads resting on their backs, using slow, powerful wingbeats.

*Distribution and Abundance Affinity*

Currently-listed brown pelican populations occur primarily in coastal marine and estuarine (where fresh and salt water intermingle) environments along the coast of the Gulf of Mexico from Mississippi to Texas; along the Pacific Coast from British Columbia, Canada, south through Mexico into Central and South America; and in the West Indies, but are occasionally sighted throughout the U.S. (Shields 2002). Because the brown pelican is a wide-ranging, mobile species, is migratory throughout much of its range, may shift its breeding or wintering areas in response to local conditions, and many of the birds in populations consist of subadults and non-breeding adults that do not return to nesting sites, it is difficult to provide specific numbers of breeding pairs for individual populations or an accurate range-wide assessment of current numbers of pelicans. However, the brown pelican is currently broadly distributed and is found throughout most of its historic range. The global population of the listed entity, which does not include birds along the Atlantic Coast of the U.S., Florida, or Alabama, is estimated to be over 620,000 birds (Service 2007c).

1. Distribution and Abundance of California Brown Pelican

The most recent population estimate of the brown pelican subspecies that ranges from California to Mexico along the Pacific Coast is approximately 71,200 nesting pairs, which equates to about 142,000 breeding birds (Henny and Anderson 2007). They nest in four distinct geographic areas: (1) The SCB, which includes southern California and northern Baja California, Mexico; (2) southwest Baja California; (3) the Gulf of California, which includes coastlines of both Baja California and Sonora, Mexico; and (4) mainland Mexico further south along the Pacific coastline (including Sinaloa and Nayarit) (Service 1983).

During the late 1960s and early 1970s, the SCB population declined to fewer than 1,000 pairs and reproductive success was nearly zero (Anderson *et al*. 1975). In 2006, approximately 11,695 breeding pairs were documented at 10 locations in the SCB: three locations on Anacapa Island, one on Prince Island, and one on Santa Barbara Island in California; three on Coronados Islands, one on Islas Todos Santos, and one on Isla San Martin in Mexico within the SCB (Henny and Anderson 2007). The populations on Todos Santos and San Martin islands were previously extirpated in 1923 and 1974, respectively; however, these were recently found to be occupied (Gress *et al*. 2005). Todos Santos Island had about 65 nests in 2004, but there were no nests in 2005. This colony is currently considered to be ephemeral, occurring some years and then not others (Gress *et al*. 2005). At San Martin Island, 35 pairs were reported in 1999, a small colony was noted in 2000, and 125-200 pairs were seen in 2002, 2003, and 2004 (Gress *et al*. 2005).

The southwest Baja California coastal population has about 3,650 breeding pairs, the Gulf of California population is estimated at 42,970 breeding pairs, and the mainland Mexico population has about 12,880 breeding pairs (Henny and Anderson 2007). The Gulf of California population remained essentially the same from 1970 to 1988 (Everett and Anderson 1991). It is thought that populations in Mexico have been stable since the early 1970s (when long-term studies began) because of their lower exposure to DDT, although annual numbers at individual colonies fluctuate widely due to prey availability and human disturbance at colonies (Everett and Anderson 1991). In summary, preliminary estimates of nesting pairs in 2006 suggest a large and healthy total breeding population for California and the Pacific coast of Mexico (Henny and Anderson 2007).

2. Distribution and Abundance of Southern California Bight (SCB) Pelican Population

As described above, the SCB brown pelican population was estimated to be about 11,695 pairs in 2006, which was a non-El Nino year and, therefore, provided near optimal conditions for breeding (Henny and Anderson 2007). These near optimal conditions likely induced much of the adult population to attempt to breed and may explain why the 2006 estimate is substantially higher than the estimate of 6,000 pairs based on surveys through 2003 (Gress *et al*. 2005).

The SCB pelican population declined to fewer than 1,000 pairs, and reproductive success was nearly zero, during the late 1960s and early 1970s (Service 1983). Reproductive success and population numbers began recovering in the late 1970s, although the Coronados Islands colony in the SCB declined and experienced low productivity from the late 1970s to the late 1980s due to chronic human disturbance from fishermen visiting the islands and possible overfishing (Anderson 1988). It is thought that many of these pelicans went to Anacapa and Santa Barbara Islands because a colony was established at Santa Barbara Island in the early 1980s after a 50-year or longer absence and the Anacapa Island colony increased dramatically during this time (Service 1983; Gress *et al*. 2005). The largest colony in the SCB occurs at West Anacapa Island, with a mean of 4,500 nesting pairs and a mean of 0.67 young fledged per nest attempt from 1985 to 2005 (Service 2007c; Gress *in litt*. 2005). The Santa Barbara Island colony has continued as the second-largest colony in the SCB since the 1980s, with a mean of 825 pairs from 1985-2005. The Coronados Islands had a mean of 630 pairs from 1985 to 2005 (Gress *in litt*. 2005); however, this colony has improved in recent years and there were about 830 pairs per year from 2002 to 2004 (Gress *et al.* 2005; Gress *in litt*. 2005). San Clemente Island does not support a breeding colony of the California brown pelican.

*Habitat Affinity*

Brown pelicans nest in colonies on offshore islands with limited mammalian predators and human disturbance, are of sufficient elevation to prevent flooding of nests, and are associated with an adequate and consistent food supply. During the non-breeding season, which varies between colonies, but typically extends from July to January, brown pelicans roost communally. Roosting sites and loafing areas are essential habitat for breeding brown pelicans and non-breeding local and migrants from Mexico. Brown pelicans are tropically-derived seabirds that have wettable plumage so they must have terrestrial roost sites to dry their plumage after feeding or swimming (Jaques and Anderson 1987). Roost sites are also important for resting and preening. The essential characteristics of roosts include: nearness to adequate food supplies, presence of physical barriers to predation and disturbance, sufficient surface space for individuals to interact normally, and adequate protection from adverse environmental factors such as wind and surf (Jaques and Anderson 1987). Offshore rocks and islands; river mouths with sand bars; and breakwaters, pilings, and jetties are important roosting sites. Adult brown pelicans are efficient predators, and therefore many individuals spend a considerable portion of the day on land, and all congregate at night roosts during the dark hours (Jaques and Anderson 1987). Pelican concentrations shift in response to prey distributions. The dispersion of suitable roost sites influences bio-energetic considerations, not only for shelter, thermoregulation, and plumage maintenance, but for efficient travel time to food resources (Jaques and Anderson 1987). Communal roosts may also provide increased protection from potential predators, act as centers for social facilitation of food finding, and other functions yet to be identified.

Offshore habitat associated with island colony sites is also essential habitat for California brown pelicans. Brown pelicans are dependent on food resources near the colony site during the breeding season. The offshore zone within 29 to 48 km (18 to 30 mi) of the colony is critical to pelican food supplies, especially when young are being fed (Anderson and Gress 1984). Waters near colony sites are also important for wintering migratory birds and for newly-fledged young when they begin feeding for themselves. Offshore aquatic habitat, including the abundance and availability of brown pelican food resources, is a major factor in determining the population status of brown pelicans and the degree of breeding success (Service 1983).

*Life History*

The nesting season for the brown pelican occurs in summer and autumn. Adult pairs congregate in densely populated nesting colonies on offshore islands. Adults fly out to sea to forage by plunge diving into fish schools near the surface of the water. Juveniles grow rapidly during years when fish are abundant but substantial juvenile mortality may occur during years when populations of prey species decline. Pelican require several years to reach sexual maturity, during which they wander along the coast from Central America to southwestern British Colombia. Northerly movements are generally restricted to warmer seasons of the year, most commonly June through October.

Adult brown pelicans are primarily fish eaters and consume up to 2 kg (4 lbs) of fish per day. Their diet consists mainly of northern anchovy, Pacific sardine (*Sardinopus sagax*), and other surface-schooling fish (Anderson *et al*. 1980, 1982; Anderson and Gress 1984). To catch fish, they dive steeply into the water from as high as 18 to 21 m (60 to 70 ft) above the surface, where they may submerge completely or only partly depending on the height of the dive, and surface with a mouthful of fish. California brown pelicans are rarely found away from salt water and do not normally venture more than 32 km (20 mi) out to sea.

*Threats*

Brown pelicans experienced widespread reproductive failures in the 1960s and early 1970s. Much of the failure was attributed to eggshell thinning caused by high concentrations of dichlorodiphenylethylene (DDE), a metabolite of dichlorodiphenyltrichloroethane (DDT). Other factors implicated in the decline of this species include human disturbance at nesting colonies and food shortages. In 1972, the U.S. Environmental Protection Agency banned the use of DDT in the United States and placed restrictions on the use of other pesticides. Since then, the level of chemical contaminants in pelican eggs has decreased, and brown pelican nesting success has subsequently increased.

Current threats facing the endangered brown pelican include the following: nesting and roosting habitat destruction from coastal development; storm effects to habitat, particularly along the U.S. Gulf Coast; human disturbance of nesting and roosting pelicans; fluctuations in prey abundance due to changes in weather patterns (*i.e*., frequency of El Nino events) or overfishing; and persistence of DDT and other pesticides in the marine environment (Service 2008). Despite the potential threats identified above, brown pelican numbers rangewide have generally been stable or increased in recent years. Almost all of the U.S. nesting sites are protected from habitat destruction and human disturbance, and a significant number of nesting sites outside the U.S. are also protected. Large hurricanes have degraded nesting and roosting habitat along the U.S. Gulf Coast in recent years, but the great majority of nesting and roosting habitat remains, and pelicans have shown that they are capable of dispersing from damaged nesting sites to use new sites. In addition, Federal and State agencies are anticipated to continue active maintenance and restoration of barrier islands that may serve as nesting and roosting habitat for pelicans. Fishing along the west coast of the U.S. for northern anchovies, a primary food source for brown pelicans, has been very limited in recent years due to a depressed market, which is thought to be a long-term or possibly permanent condition. DDT and other pesticides persist in the marine environment, particularly in southern California, and may be continuing to suppress productivity. However, DDT levels in the environment continue to drop, and population numbers of brown pelicans in affected environments continue to remain steady or increase (Service 2008).

1. Threats to SCB Pelican Population

Although food availability, human disturbance at breeding and roosting sites, and chronic levels of DDT in the marine environment may still be suppressing productivity, brown pelican population numbers have increased steadily in the SCB. After experiencing nearly complete reproductive failure during the late 1960s, with nesting attempts often numbering less than 1,000 per year until the late 1970s, brown pelican productivity started to improve following the ban on DDT, although the Coronados Islands colony in the SCB declined and experienced low productivity from the late 1970s to the late 1980s due to chronic human disturbance from fishermen visiting the islands and possible overfishing (Anderson 1988). The increase in productivity that started in 1974 was correlated with an increase in eggshell thickness. Since 1974, food availability has become the most important limiting factor influencing brown pelican breeding success within the SCB, and both nesting attempts and productivity can fluctuate greatly year-to-year based on the availability of small surface-schooling fishes. The brown pelican was the first federally listed seabird to apparently recover from the effects of pesticides.

<u>Environmental Baseline</u>

San Clemente Island is not used as a breeding site by California brown pelicans, although islands to the north and south of San Clemente Island (Los Coronados, Santa Barbara Island) do support nesting colonies of the California brown pelican. Pelicans do, however, frequent the nearshore and offshore waters surrounding San Clemente Island, and beaches, shoreline, and offshore rocks are used as onshore roosting sites. Aerial surveys of the island in 1992 and 1993 detected 92 and 348 pelicans, respectively (U.S. Navy 2002) concentrated in two roosting areas: Castle Rock, a rock cluster that lies about 900 m (2,953 ft) from shore at the northern end of the island and Bird Rock, which also lies off the northern end of the island, about 1.0 km (0.6 m) east of Castle Rock. Post-1993 aerial survey information is not available. However, brown pelicans were commonly seen by Science Applications International Corporation (SAIC) personnel in November 1998 at Wilson Cove and other northern San Clemente Island locations, as well as flying over the water on the eastern side of the island, but none were observed resting or roosting on beaches or cliffs on the island itself. Brown pelicans were seen in large numbers on Bird Rock during SAIC surveys in May 2000, mixed in with double-crested cormorants (*Phalacrocorax auritus*) and western gulls (*Larus occidentalis*), and in May 2005 at Wilson Cove. A few small groups and individuals were also seen at that time in Horse, China, and Pyramid Coves, flying offshore of SHOBA.

Existing activities potentially affecting California brown pelicans include NSW training activities, heavy ordnance use, and underwater demolitions that occur in the vicinity of offshore rocks and beaches surrounding San Clemente Island where pelicans may be roosting. The potential effects of NSW development and use of the small arms range (also called the "Steel Ranges") were addressed in a Biological Opinion dated January 17, 2001 (FWS 1-6-00-F-19) regarding the development of TARs on San Clemente Island; however, we have not previously consulted on the effects of ongoing underwater demolitions. The January 17, 2001 Biological Opinion anticipated that up to three brown pelicans that use Castle Rock as a roosting area could be injured or killed each year due to use of the rifle range at TAR 4. However, in coordination with the Service, NSW planners oriented the range in a manner that is expected to reduce the potential for a direct hit to the brown pelicans that inhabit the vicinity of Castle Rock. Therefore, although a stray bullet may occasionally kill or injure a pelican, the number is anticipated to be significantly lower than the three pelicans per year described in our previous biological opinion. Occasional disturbance of roosting pelicans was also anticipated as a result of using the rifle range. However, the rifle range was built near the maximum limits of where one might expect disturbance of pelicans due to small arms fire, and there is a reasonable likelihood that pelicans exposed to the sound of distant gunfire for 300 days per year have become acclimated to the noise (Service 2001a).

Effects of the Action

The proposed action includes a variety of activities that will likely disturb or temporarily displace California brown pelicans that are using offshore waters and onshore roosting sites and, in a few rare cases, kill or injure individual birds. Activities with the potential to affect pelicans include: increased frequency in ship-shore training activities within Impact Areas I and II; continued use of the rifle range in TAR 4 north of the San Clemente Island runway; increased underwater demolitions training within TAR 2, TAR 3, TAR 21, and the newly designated TAR 8; increased transportation to and from the island using boats, planes, and helicopters; and increased amphibious landings at Northwest Harbor (TAR 2 and 3), West Cove (TAR 5), Horse Beach (TAR 21), and Wilson Cove (no TAR). However, as described below, these disturbances are anticipated to be temporary, and most of the training activities using heavy ordnance, which has the greatest potential to disturb pelicans, will be concentrated in the Impact Areas in the southern portion of the island, away from the Castle Rock and Bird Rock roosting sites off the northern tip of the island. In addition, the Navy will implement measures to minimize death or injury to pelicans and disturbance of the Castle Rock and Bird Rock roosting sites. Therefore, the proposed activities are not anticipated to substantially impair pelicans' essential foraging and roosting behaviors.

The use of heavy ordnance during ship-shore training will be concentrated in Impact Area I and II in the SHOBA on the southern end of the island. A few pelicans may be loafing on the beaches (China Beach or Horse Beach) or foraging in the near-shore water in the vicinity of Impact Areas I and II at the start of a training exercise, and these individuals are likely to move to other areas to forage or loaf due to the noise from ordnance landing and exploding in the Impact Areas. There is a possibility that an individual or individuals may be injured or killed by a round if it lands in the vicinity of pelicans; however, all of the targets are onshore above the beaches, and pelicans will likely move out of the vicinity of the training exercise after it begins, so the possibility of a direct hit is unlikely. Due to their low density in open waters, particularly with increasing distance from shore (Bonnell 1994), and the likelihood that any pelicans in the vicinity would relocate to less disturbed areas during the proposed operations, the risk of a brown pelican in the air being hit by a projectile fired from a ship is also unlikely.

Small arms exercises are conducted onshore; however, the range of munitions extends almost a mile offshore. During use of the rifle range, nearshore waters are cleared of boating activity due to the safety risk. Castle Rock lies offshore north of San Clemente Island within the range of small arms used in the range adjacent to TAR 4. In our January 17, 2001, Biological Opinion addressing the development of TAR 4 and use of the rifle range, we anticipated that up to three pelicans per year could be injured or killed by stray bullets from the rifle range. However, in coordination with the Service, Naval Special Warfare planners oriented the range in a manner that is expected to reduce the potential for a direct hit to the brown pelicans that inhabit the vicinity of Castle Rock.

Underwater demolition, to teach the safe use of explosives for beach clearance, is conducted in the nearshore areas of the Northwest Harbor area, including TAR 2 and 3 (BUD/S Beach and Graduation Beach), and TAR 21 (Horse Beach) and SOAR, and SWAT offshore waters. Underwater demolition exercises may entail a single explosion, or a series of explosions (multiple charges). The largest of the underwater demolitions is a Mat Weave, which is comprised of 6 charges of 8 m (25 ft) demolition tubing. During any given exercise there may be a few pelicans foraging in the area or resting on the water nearby. Underwater demolition exercises may disturb pelicans if they are present within the vicinity of training exercises. Pelicans may also prey upon the stunned or dead fish that are present in the water column after an underwater demolition exercise. If multiple charges are used, pelicans may be attracted to fish that have been stunned or killed by an initial charge, then suffer injury or fatality by a subsequent charge.

To reduce the possibility of harming or killing a pelican, the NSW personnel currently refrain from conducting demolition exercises until birds are out of the area. The Navy will continue this measure to ensure that California brown pelicans are not in proximity to over-blast pressure prior to underwater demolition activities. In addition, sequential underwater detonations will be conducted either less than 10 seconds apart or greater than 30 minutes apart to avoid impacts to birds attracted by fish kill. It is important to note that no instances of harm or mortality to brown pelicans have been recorded under baseline levels of this training activity.

Fish, the primary prey item of California brown pelicans, may be injured or killed from the detonations; however, limited nearshore and offshore areas would be affected, and the potential loss of this food source to pelicans is insignificant. Pelicans may take advantage of the foraging opportunity provided by fish affected by underwater detonations.

Boats, helicopters, and airplanes are used to transport people and equipment to and from the island. These activities have the potential to disturb pelicans in proximity to the boats and aircraft and possibly to kill or injure a pelican as a result of an airstrike. Fixed-wing aircraft departing NALF San Clemente Island will occasionally fly over Castle Rock. However, departing aircraft are in a climbing pattern and would be more than 152 m (500 ft) above Castle Rock and would not disturb pelicans. UAVs operating in their normal altitudinal ranges are not expected to disturb pelicans because of their small size and quiet operation. In addition, the Navy will implement the following measures to reduce the potential for roosting pelicans to be disturbed and for pelicans to be struck by vehicles: helicopters and boats will be routed away from Castle Rock to the maximum extent practicable when transporting people to and from TAR 4, and a minimum distance of 100 m (328 ft) for helicopters and 25 m (82 ft) for vessels from Castle Rock will be maintained when transporting people from shore. These avoidance and minimization measures were committed to in association with our January 17, 2001, Biological Opinion addressing the development of TARs on the island and will continue to be implemented in association with the proposed project. The potential for pelicans to be struck by aircraft is low. Based on information within the BA, the lowest flight level that is allowed for aircraft during offshore Mine Laying Exercises at San Clemente Island Range Complex (SCIRC) is 61 m (200 ft) above sea level during daytime. Since pelicans typically fly less than 18 m (60 ft) above sea level, the potential for airstrike is unlikely.

In summary, with the proposed avoidance and minimization measures, the training activities are anticipated only to displace a few pelicans at a time and minimize disturbance of the identified roosting sites at Castle Rock and Bird Rock. Displaced pelicans are anticipated to move from the area where training activities are taking place and forage or roost at another location. This disturbance is not anticipated to substantially impair the pelicans' ability to conduct essential foraging and roosting behaviors. The likelihood of a pelican being injured or killed during any particular training activity is low, but with a wide variety of training activities, including ship-shore bombardment and use of the rifle range, taking place in areas where pelicans forage and roost, it is likely that a few individual pelicans will be killed or injured, although such events are anticipated to be rare. The previous biological opinion estimated that three pelicans per year would be injured or killed by stray bullets from the rifle range, but this number is anticipated to be substantially lower as a result of the reorientation of the range. With reorientation of the range, we estimate up to one pelican per year will be impacted through use of the rifle range, and two pelicans per year will be impacted by all other training activities on the island, for a total of three pelicans per year that may be killed or injured as a result of the existing and proposed increase in training activities.

Conclusion

After reviewing the current status of the brown pelican, the environmental baseline, and the effects of the proposed action, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the brown pelican. We have reached this conclusion for the following reasons:

(1) Currently-listed brown pelican populations are very widely distributed along the coast of the Gulf of Mexico from Mississippi to Texas; along the Pacific Coast from British Columbia, Canada, south through Mexico into Central and South America; and in the West Indies. The global population of the listed entity, which does not include birds along the Atlantic Coast of the U.S., Florida, or Alabama, is estimated to be over 620,000 birds. The status of brown pelicans, including the California brown pelican and the SCB population (estimated to be 11,695 pairs in 2006), has significantly improved since its listing in 1970 to the point that the Service in 2008 proposed the entire species for delisting;

(2) The death or injury of up to three pelicans per year in association with the proposed training would remove about 0.01 percent of the SCB population and a tiny fraction of the listed entity each year; the Navy has committed to conservation measures that will minimize this impact;

(3) The disturbance of foraging and roosting pelicans on San Clemente Island is not anticipated to substantially impair their ability to conduct essential foraging and roosting behaviors; and

(4) San Clemente Island does not support a breeding colony of brown pelicans, so the proposed action will not affect the species' reproduction.

**San Clemente Loggerhead Shrike** (*Lanius ludovicianus mearnsi*)

Status of the Species

*Listing Status*

The San Clemente loggerhead shrike was listed as endangered on August 11, 1977 (42 *Federal Register* 40682) due to its declining population size from past habitat degradation, feral predators, and anthropogenic threats. The San Clemente loggerhead shrike is addressed in the Channel Islands Recovery Plan (1984). Critical habitat has not been designated for this species.

*Species Description*

The San Clemente loggerhead shrike is one of eleven subspecies of loggerhead shrike and occurs only on San Clemente Island. The San Clemente loggerhead shrike is a medium-sized (45-50 grams (g) (1.6-1.8 ounces (oz)) passerine that resembles the mockingbird (*Mimus polyglottus*) in its striking black, white, and gray plumage. Like other subspecies of loggerhead shrike, the San Clemente shrikes have gray backs, light breasts, black wings with prominent white patches at the base of the inner primaries, and black tails with white bars and outer edgings. Tail and wings are often flashed in various displays that emphasize the contrasting white and dark features (Cade 1962). These shrikes have large heads, as the common name implies, with black facial marks around the eyes, and powerful, black, hooked bills with a subterminal maxillary tooth on each side enabling these predators to kill vertebrate prey their own size and larger by biting the neck and disarticulating the vertebrae (Cade 1967; Smith 1973).

*Habitat Affinities*

During the past 30 years the shrikes on San Clemente Island have been restricted to nesting predominantly in sparse wooded habitats that have undergone severe degradation from over-browsing by goats and pigs (Scott and Morrison 1990; Kellogg and Kellogg 1994; Juola *et al*. 1997). Shrubs and trees suitable for shrike nesting are predominantly restricted to steep canyons on the southern third of the island and along the eastern escarpment and occupy only two percent of the landscape (Kellogg and Kellogg 1994). The distribution of appropriate nesting substrate has begun to increase as shrub cover has expanded on the island in response to the removal of goats and pigs. Nests have been found at several sites on the San Clemente Island plateau in recent years in addition to well-established sites within canyons. Nests have occurred most frequently in isolated or small stands of lemonade berry, island cherry (*Prunus lyonii*), and toyon (*Heteromoles arbutifolia* and *H. macrocarpa*) (Scott and Morrison 1990), but also occasionally in island oak (*Quercus tomentella*), California sagebrush, California lilac (*Ceanothus* spp.), coyote bush, and cholla (*Opuntia prolifera)* (Mader and Warnock 1999). Nests have also occurred within human structures, including buildings, fencelines, and junk piles. Juola *et al.* (1997c) compared vegetation community abundance island-wide to the amount of each community found in breeding territories. Canyon shrub/woodland and maritime desert scrub cholla phase were used disproportionately to their percent cover on the island, a fact likely due to the presence of suitable shrubs for nest sites and cover in these plant communities.

Canyon/shrub woodland and maritime desert scrub cholla phase, combined, are currently found on approximately 16 percent of the island or 2,282.18 ha (5,637 ac). Thus, the nesting habitat on San Clemente Island remains very limited owing to the absence, in many areas, of trees and shrubs suitable for nesting. Numerous areas on the island show evidence of shrub and tree regeneration since the removal of goats and pigs in the early 1990's, and active restoration efforts may also accelerate regeneration of shrub and canyon woodland communities.

Loggerhead shrikes generally occupy open, xeric to mesic grasslands interspersed with widely spaced trees and shrubs, preferably with some bare ground (Yosef 1996). Components of habitat that are important to shrikes include: a) sufficiently spaced, exposed hunting perches (1-2 m (3.3-6.6 ft) high) for observing prey, b) impaling structures for holding and storing prey, c) prey abundance and availability (facilitated by short grass and bare ground), and d) densely foliaged shrubs or small trees (preferably thorny ones) with suitable nest sites l.0-3.0 m (3.3-9.9 ft) above ground (Yosef 1996). These components are often found in natural scrub desert, shrub-steppe, western oak savanna, and southern savanna vegetation types, but also in a variety of agricultural landscapes, especially well-grazed pastures separated by hedgerows or trees planted as wind breaks and ornamentals, as well as in some suburban and lightly industrialized areas (Cade and Woods 1997).

*Life History*

San Clemente loggerhead shrikes feed on a wide variety of vertebrate and invertebrate prey (Scott and Morrison 1990), including small arthropods, small birds, small mammals, and lizards. Primarily sit and wait foragers, shrikes typically take a stand on a favorite perch and make attacks out and back from there. Shrikes catch and carry only one item per foray, but they are capable of flying with prey equal in size to their own body mass. They process and tear apart large prey by impaling it on thorns or other sharp objects or by wedging it tightly into the fork of a branch. Smaller prey (less than about 12 mm/0.5 in) is usually consumed whole.

On San Clemente Island, shrikes forage in canyons where nesting occurs and also on the plateaus and shoreline strands. They typically hunt from perches such as snags, shrubs, dead cholla stalks, and rock outcrops in sparsely vegetated areas, but they may also be seen using fence posts, wires, and utility poles and lines along roadways.

Loggerhead shrikes show a high degree of intraspecific aggression and occupy all-purpose territories (Yosef 1996). In some southern populations (*e.g.*, Florida), mated birds remain together in the same territory all year (Yosef 1996), while in other areas the male holds a permanent territory and the female leaves after breeding and takes up residence in separate adjoining territory. On San Clemente Island, male shrikes typically remain on the nesting territory throughout the winter months, and individuals seen during the winter months away from known breeding territories typically include females, local birds of the year, and wintering birds from off-island (see Mundy *et al.* 1997a and b; Mader and Warnock 1999; Heath *et al*. 2007).

San Clemente loggerhead shrikes begin forming pair-bonds as early as December, but January is the main period for early breeding behavior. Pair-bonds often form between the same individuals if both mates have survived the winter, but some individuals switch mates, even in the same season (Warnock and Mader 1999). Females do most of the nest-building, with males bringing some nest materials and food to females as they construct. Loggerhead shrikes often build more than one nest before starting to lay eggs. Courtship feeding and copulation precede laying by a week or more. Clutch completion usually occurs in mid-March. Second and other breeding attempts may extend the laying season into June. San Clemente loggerhead shrikes lay 4-6 eggs (mean 5.1 +/-0.8 SD). Incubation ranges from 15 to 18 days (Cade 1992; Yosef 1996). Only females incubate and develop brood patches. Males feed their mates at the nest. Young loggerheads stay in their nests for 16-20 days, typically 17 days (Yosef 1996). Young often remain on branches close to their nests for 4-5 days after departure. Disturbance of the nest can cause premature departure even before 16 days of age. Wing and tail feathers are still growing at the time of departure, and their growth is not completed until some 30 days after hatching. Consequently, fledglings are extremely vulnerable to predators.

On San Clemente Island, parental care (feeding and protection) of fledglings lasts from 25 to 95 (mean 50 +/-11.9 SD) days (Scott and Morrison 1990). Young begin foraging for themselves at approximately 30 days of age, but hunting skills develop gradually, and the parents continue to feed the young for 25 days after they leave the nest. During this fledgling period, young shrikes disappear from family groups at different periods, but it is usually not possible to tell whether these disappearances result from fatalities or from individual differences in juvenile dispersal times. Also, in some families the adult female abandons her mate and young during the fledgling period to nest again, leaving the male to complete parental duties (Yosef 1996).

Juvenile shrikes remain sociable after leaving the nest during the fledgling period when they are still dependent on their parents for food and protection. Around the time that fledglings disperse from their natal territory, they become increasingly intolerant of each other and display intraspecific aggressiveness. The parent shrikes also display aggression towards the fledglings during this period. After dispersal from the natal territory the young of the year take up a single, independent existence and become territorial, presumably by early winter.

*Rangewide Distribution and Threats*

Since the entire distribution of the San Clemente loggerhead shrike is restricted to the action area of San Clemente Island, its island-wide distribution and current threats to the species are discussed in the Environmental Baseline section below.

*Conservation Needs*

The 2006 Population Monitoring Report for the San Clemente loggerhead shrike (Heath et al. 2007) includes the following recommendations for this species:

(1) Further efforts are needed to reduce San Clemente loggerhead shrike mortality associated with human activities, particularly impacts with moving vehicles. The approved plan to pave San Clemente Island Ridge Road may increase overall traffic speed through shrike habitat, which is likely to reduce driver ability to respond to wildlife in the roadway. Methods of decreasing vehicle speed should be explored, including movable speed bumps, warning signs, and more stringent enforcement of existing speed limits. Education of island residents could also help reduce the number of shrikes that are adversely affected by hazards such as sticky rodent traps, waste oil canisters, water buckets, etc.

(2) Habitat restoration efforts should be continued to improve nesting habitat, provide protective cover, and mitigate the deterioration of habitat quality caused by anthropogenic disturbances such as military activities and consequent invasion by non-native plant species.

(3) A population model should be developed to aid in the management of the species and the development of a Recovery Plan.

Environmental Baseline

*Distribution*

The San Clemente loggerhead shrike is distributed primarily within the southern 2/3 of San Clemente Island. During the early 1990's, distribution was restricted to several canyons at the southern end of the island, and most of these were in the immediate vicinity of Impact Areas I and II. Since that time, the distribution on the island has increased to include additional habitat on the east side and west side of the island. Significantly, an increasing proportion of the shrike population is distributed away from Impact Areas I and II and the potential effects of heavy ordnance training and operations. While shrikes are more broadly distributed away from Impact Areas I and II, they remain well distributed throughout SHOBA. Although relatively fewer shrikes are present in SHOBA at the present time compared to the early 1990's, between 30 and 36 percent of the shrike population used breeding habitat in SHOBA between 2004 and 2006 (Bradley *et al.* 2007).

Shrikes are often distributed in a linear fashion, using habitat found within and adjacent to deeply incised canyons. The mean linear abundance of nesting loggerhead shrikes reported from selected canyons between 1994-2000 (Table 9) was the same as the mean linear density reported in 1990 (Scott and Morrison 1990). Since 2001, however, the mean linear density of nesting shrikes has increased in all canyons with the exception of China Canyon (where mean linear density was already high), located adjacent to Impact Area II (Table 9). Increases were generally greater for canyons outside SHOBA than those inside SHOBA, likely because initial densities were lower outside the SHOBA, and release of captive-reared shrikes was focused in areas outside the SHOBA.

Table 9. Linear abundance of nesting loggerhead shrikes on San Clemente Island from selected canyons (1994-2004)

| Canyon Name | Mean number of shrike pairs/km 1994-2000[a] | Mean number of shrike pairs/km 2001-2004 |
|---|---|---|
| Cave[c] | 0.2 | 0.5 |
| Horse[c] | 0.1 | 0.7 |
| Box | 0.2 | 1.3 |
| Norton | 0.2 | 1.0 |
| Middle Ranch | 0.1 | 0.5 |
| Wallrock | 0 | 0 |
| China[c] | 0.7 | 0.8 |
| Horse Beach[c] | 0.1 | 0.2 |
| Average | 0.2[b] | 0.6 |

[a] The shrike population remained relatively static up to the year 2000 and began sharply increasing in the year 2001.

[b] The same average density reported by Scott & Morrison 1990.

[c] Canyon located within the SHOBA boundary

Around the turn of the century, the loggerhead shrike was considered “tolerably common” and well distributed on San Clemente Island (U.S. Navy 2002). However, early field ornithologists, such as Grinnell, did not quantify their narrative assessments of species abundance, so it is not possible to make a numerical interpretation of the phrase “tolerably common.” Between 1985 and 1998 the population estimates ranged from 6 (1988) to 16 pairs (1994) (U.S. Navy 2002). After 1998, efforts to increase the distribution and abundance of the loggerhead shrike were intensified and the San Clemente Recovery Program began to play an important role in improving the status of the San Clemente loggerhead shrike. The shrike population increased from four breeding pairs in 1991 to over 40 breeding pairs in 2005 (Lynn *et al.* 2006). In 2006 and 2007, the numbers of breeding pairs were 50 (Bradley et al. 2007) and 48 (Bradley et al. 2008), respectively (Table 10).

Table 10. San Clemente Island Loggerhead Shrike Breeding Pairs from 1994 to 2007

| Year | 1994 | 95 | 96 | 97 | 98 | 99 | 2000 | 01 | 02 | 03 | 04 | 05 | 06 | 07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pair Estimate | 32 | 29 | 16 | 20 | 14 | 22 | 22 | 49 | 40 | 40 | 55 | 40 | 50 | 48 |

The number of geographically distinct breeding sites that have recorded use by shrikes on San Clemente Island is approximately 106, if all sites are compiled through 2007 (U.S. Navy, unpublished data 2008c). Since sites appear to be used repeatedly, sites that have been used in the past are likely to be used in the future. The location of both currently used and formerly used nest sites relative to training areas provides information regarding the anticipated future impacts of training activities on the island.

The most recently used sites reflect the current distribution of San Clemente loggerhead shrikes; however, we anticipate the distribution and abundance of this species to continue to increase in response to the active recovery program that includes release of shrikes hatched in captivity. As distribution and abundance increase, it is likely that shrikes will most often use territories that are currently, or have recently, been used. Table 11 outlines the distribution of shrikes in or within 305 m (1,000 ft) of operational areas of the island.

**Note** that the operational areas are largely overlapping (*i.e.*, Impact Areas I and II are fully contained within the SHOBA.).

Table 11. Distribution of shrike nest sites in and within 305 m (1,000 ft) of operational areas.

| Operational Area | Nest sites within operational area, including current and former sites (% total nest sites) | Nest sites within 1,000 ft of operational area (% total nest sites) | 2007 Nest sites within operational area (% 2007 total sites) | 2007 Nest Sites within 1000 ft of operational area (% total 2007 sites) |
|---|---|---|---|---|
| SHOBA | 66 (62) | n/a | 27 (56) | n/a |
| Impact Areas I and II a,b | 9 (8) | 8 (8) | unknown | 3(6) |
| AFP 6 | 0 (0) | 1 (1) | 0 (0) | 0 (0) |
| IOA/AVMA | 6 (6) | n/a | 0 (0) | n/a |

a Sixteen percent of the current and former shrike nest sites are in, or within 305 m (1,000 ft) of Impact Areas I and II (combining first two columns in table).

b Six percent of the known nest sites active in 2007 are in or within 305 m (1000 ft) of Impact Areas I and II. The actual number of active nest sites may be higher, since the area within Impact Area boundaries were not monitored in 2007.

*Threats*

A number of threats exist for San Clemente Island Clemente loggerhead shrike, including baseline levels of ordnance use, fires, fire management activities, air traffic, and vehicle use (Biological Opinions FWS 1-6-97-F-21, FWS-2808, FWS 1-6-04-F-3934.1). Most of the baseline threats to this species associated with human activities are concentrated in the area surrounding Impact Areas I and II. Baseline operations at Impact Areas I and II include extreme levels of noise and vibration during ordnance use and elevated fire frequency predominantly on the plateaus surrounding China, Horse Beach, Red, and Kinkipar Canyons. Fires, fire management, and air traffic are also most likely to occur in this area. The percentage of the island-wide shrike population that inhabits the immediate vicinity of Impact Areas I and II has declined since 1998, when 40 percent of the known breeding population was within 305 m (1,000 ft) of Impact Area boundaries. Currently, 16 percent of the total documented nest sites occur in or within 305 m (1000 ft) of Impact Areas I and II. This change reflects the increasing abundance and distribution of shrikes on other parts of the island.

Baseline levels of ordnance use present a threat to San Clemente loggerhead shrikes because of the proximity of current nesting locations and available nesting habitat to Impact Areas I and II. Ordnance currently exposes shrikes nesting in proximity to Impact Areas to increased risk of being directly hit, or being disturbed by noise associated with heavy ordnance use to a level that would affect their feeding, breeding, or sheltering behaviors. There is no conclusive information linking nest failure or shrike disappearance at any of the nests in canyons close to Impact Areas I and II to ordnance use in the vicinity. It is possible that such losses have occurred, but access limitations preclude monitoring within the Impact Areas where losses are more likely. Access limitations (due to the volume of operations being conducted within SHOBA during which monitoring cannot be conducted for safety reasons) also reduce the frequency of monitoring in areas adjacent to Impact Areas. Shrikes are not currently nesting at several previously occupied nest sites within or in proximity to the Impact Areas (*e.g.*, Red 1), which may indicate that disturbance at these sites is too great to sustain ongoing habitation by shrikes. However, shrikes have used many sites intermittently on the island and continue to use some sites in close proximity to the Impact Areas (*e.g.*, China 3), so the absence of shrikes at sites could also be due to other variables unrelated to ordnance impacts.

Depending on their location, timing, and severity, fires may present a threat to the San Clemente loggerhead shrike population due to the proximity of shrike nests to ignition sources. The baseline fire history, including repeated instances in which fires have burned to canyon edges, but not affected nesting habitat in canyon bottoms, has not resulted in a demonstrable decrease in shrikes in the portions of SHOBA that have experienced repeated burns. In addition, there is no conclusive information linking nest failure or shrike disappearance at any of the nests in canyons close to Impact Areas I and II to fires that have occurred in the vicinity. It is possible that such losses have occurred, however access limitations preclude monitoring within the Impact Areas where losses are more likely, and reduce the frequency of monitoring in adjacent areas.

Invasive, non-native plants have exacerbated fire danger to maritime scrub plant communities on San Clemente Island by creating micro-climates that increase the risk of fire during more of the year. Fire can severely impact or eliminate plant populations by killing individual plants, their underground rhizomes, and the soil seed bank, and leave the soil under hydrophobic conditions (Agee 1993; Keane *et al.* 2002; Keeley 2002; Arno and Fiedler 2005). Under baseline conditions, the Navy has significantly reduced the potential for wildfires to occur outside of the Impact Area boundaries by implementation of timing restrictions on training activities that use incendiary devices, maintenance of fuelbreaks around Impact Areas, and providing on-island fire suppression during the fire season. The existing program has resulted in a significant decrease in the number and extent of fires associated with training over the last 7 years.

Baseline fire management activities include maintenance of previously developed fuelbreaks using herbicides, Phos-Chek, and strip burns. The Navy currently coordinates with personnel that monitor shrike nests to reduce the potential for disturbance associated with fuelbreak maintenance. There have been several instances, however, when burns conducted to maintain fuelbreaks have escaped, with potential to adversely affect shrikes.

Vehicle use presents a threat to San Clemente loggerhead shrikes under baseline conditions because shrikes may forage or nest in the vicinity of roads and may be struck by vehicles if they fly across the road when a vehicle approaches. Approximately one shrike per year is killed as a result of collisions with vehicles under baseline conditions.

The San Clemente loggerhead shrike is also threatened by demographic and environmental stochasticity due to its small population size. For example, in 2006, the ratio of males to females observed in the wild was skewed, with more males present. This resulted in disruption of breeding activities of paired individuals and compromised planned releases associated with the recovery porgram (Heath *et al.* 2007).

Predation threatens the San Clemente loggerhead shrike under baseline conditions. Low reproductive success has been observed in some years that may be caused by non-native predators (feral cats and rats). The Navy is addressing this threat under baseline conditions by implementing an aggressive non-native predator control program.

*Conservation Actions*

**San Clemente Loggerhead Shrike Recovery Program**

In the mid-1990’s, the Navy initiated an ambitious program to protect and recover the San Clemente loggerhead shrike, which includes: (1) year-round monitoring, (2) year-round predator management, (3) periodic supplemental feeding, (4) ongoing genetic analyses, (5) on-island captive propagation of shrikes, and (6) annual releases. The program has made a significant contribution to the improved status of this species over the last 10 years. Monitoring has provided important demographic data needed to assess the status of the population, facilitated predator management, provided information necessary for genetic analyses of the population, and allowed the Navy to implement measures to reduce the potential for impacts to individual nesting pairs. Based on an assessment conducted in 2006, predator management and supplemental feeding activities have improved the reproductive success of wild loggerhead shrikes (Heath *et al.* 2006). The captive propagation program has allowed genetic management of the shrike population to maximize the genetic heterozygosity of the population, provided a mechanism for the Navy to address potential impacts to individual nests that cannot be avoided, and provided shrikes for re-introduction into the wild. The shrike recovery program has resulted in the release of 255 San Clemente loggerhead shrikes between 1999 and 2005, of which 87 (34 percent) bred in the wild (defined as laying at least one egg), and 69 (79 percent of the 87 breeders) successfully fledged at least one young. The Navy proposes to continue the program as part of the proposed action.

The Navy’s INRMP outlines the successful recovery program that has contributed to the improved status of the San Clemente loggerhead shrike and also includes other conservation actions that likely benefit the San Clemente loggerhead shrike such as ongoing efforts at invasive plant species control and native plant restoration.

**Population Viability Analysis**

The Zoological Society of San Diego, with support from the U.S. Navy conducted a population viability analysis (PVA) of the shrike population, using the program VORTEX. Based on the initial assessment of the population demographic variables, the report states that the releases currently conducted as part of the shrike recovery program are a significant factor in ensuring the survival of this population. With increased population size or increased carrying capacity (from habitat restoration), the shrike may be able to maintain viability without the release effort; however, at this time, too little data are available to predict when this might occur.

The purpose of the analysis was to understand the potential effect of shrike incidental take anticipated as a result of the proposed increases in training operations on the island. The analysis assumes that releases will continue at current levels and that the majority of the operational impacts to the shrike at a population level will be in the form of reduced productivity rather than decreases in adult or juvenile survivorship. With these assumptions, the PVA suggested that if operational use results in a 10 percent reduction in reproduction island-wide, extinction risk would increase slightly relative to a scenario without operations.

Effects of the Action

Shrikes on San Clemente Island are likely to be exposed to increased ordnance use, fires, fire management and suppression, vehicle traffic, foot traffic, and invasive species establishment and spread as a result of proposed new and increased training intensity on San Clemente Island in the IOA, Impact Areas I and II, VC-3 AVMA, AFP 6, and TAR 16. The proposed action also includes significant conservation measures that are expected to contribute to the recovery of this species. The proposed action includes increases in use that have the potential to limit the ability of the Navy to implement certain aspects of the San Clemente loggerhead shrike recovery program.

**Ordnance Use**

An estimated 16 percent of existing and historical nesting sites are in or within 305 m (1,000 ft) of areas that may be subject to heavy ordnance use (Impact Areas I and II). Heavy ship-to-shore ordnance use occurs within Impact Areas I and II under baseline conditions. Shrikes have shown a remarkable ability to persist and successfully reproduce adjacent to this training activity at baseline levels. Shrikes have continued to inhabit and reproduce in areas adjacent to and within the Impact Areas, despite the baseline levels of disturbance associated with training activities. However, the overall percentage of the shrike population that inhabits the area adjacent to the Impact Areas has been reduced as the island-wide abundance and distribution of this species has increased. While the linear abundance of shrikes observed in China Canyon has increased slightly, the linear abundance of shrikes in other canyons away from the Impact Areas (*e.g.*, Box and Norton Canyons) has increased substantially, likely in response to targeted release of captive-reared shrikes and non-native predator control (Table 9). The frequency and duration of training exercises that include heavy ordnance use are expected to increase as part of the proposed action, which will increase the frequency of disturbances and the risks associated with ordnance use in the vicinity of Impact Areas I and II.

The use of heavy ordnance in proximity (*i.e.*, 305 m or 1,000 ft) to shrikes and/or shrike nests places them at risk from direct impacts (*i.e.*, direct hit, flying debris, pressure blast, and exposure to extreme levels of noise and vibration). In addition, ordnance use may start fires that could affect shrikes, nests, or habitat, as discussed below. The response of shrikes to the disturbance associated with ordnance use has not been observed, but as with any disturbance, shrikes may react by taking flight, seeking shelter, or altering foraging or breeding behavior. The use of howitzers, proposed for AFP 6 will result in noise levels that are also likely to disturb shrikes. The Navy will evaluate nest success data for San Clemente loggerhead shrike in sites nearest AFP 6, including those in Eagle and Cave Canyons, and compare it to other sites in and out of SHOBA with the objective of determining whether or not nest success rates adjacent to AFP 6 are typical for the species.

Operations that combine various exercises are expected to have greater effects on shrikes because of the noise and level of activity. Because operations involving ordnance use in Impact Area I and II happen routinely, shrikes not in the immediate vicinity of target areas are likely to acclimate to the noise and show little or no behavioral response (VanderWerf *et al.* 2000). The sound levels associated with ordnance use may impair shrike communication and associated behavior by making it hard for them to hear vocalizations of other shrikes in the vicinity. Inability to hear vocalizations may affect detection of potential mates or territorial defense. Shrikes, however, have continued to use China Canyon and Red Canyon for nesting, including some territories in or within 305 m (1,000 ft) of Impact Areas. Approximately 16 percent of all former and current nesting sites are in or within 305 m (1,000 ft) of Impact Areas I and II (Table 11). Some territories that have been previously used are no longer used by shrikes, so at some level ordnance use and associated disturbance may affect shrike use of particular areas. To help minimize potential impacts, the Navy has committed to place heavy ordnance targets within Impact Area I and II away from sensitive resources, including San Clemente loggerhead to the extent feasible while meeting operational needs. The Navy's range schedulers will also be provided the location of shrike nests within operational boundaries.

The proposed action includes significant increases in training intensity within Impact Areas I and II, which will increase the frequency and duration of ordnance use in the vicinity of shrike nests within Red Canyon, China Canyon, and Horse Beach Canyon. The lack of occupancy (when most recently monitored) of some previously occupied territories in lower China Canyon and Horse Beach Canyon suggest that at some point, the frequency of operations or duration of operations may reach levels inconsistent with continued occupation by loggerhead shrikes. However, some sites within lower China and Red Canyons (just outside the Impact Areas) remain occupied; thus, occupation of the sites within the vicinity of the Impact Areas may be driven by factors other than frequency of operations. Monitoring in these areas (Red Canyon, lower China Canyon, and Horse Beach Canyon) has been largely reduced due to safety concerns over the last 4 years, so it is not known whether shrikes have re-occupied these areas. We anticipate that disturbances associated with increased use of ordnance could result in lowered reproductive success or death of 1 pair of shrikes per year.

**Fires**

Proposed training activities in and around Impact Areas I and II and AFP 6 are likely to result in fires within occupied shrike habitat; however, fires are expected to occur primarily in foraging, rather than breeding, habitat. An estimated 17 percent of existing and historical shrike territories occur in or within 305 m (1,000 ft) of Impact Areas I and II and AFP 6. Fires may be ignited incidental to training operations, and the chances of ignition increase as the number of operations using pyrotechnics, incendiary devices, illumination rounds, and heavy artillery increase, especially if such use occurs during drier conditions. The Navy's FMP is expected to limit the number and extent of fires that burn outside the fuelbreak boundaries. In addition, historical fire patterns are evident from previous fires that have occurred in this area, and they indicate that fires are most likely to burn on terraces and plateaus outside canyons that support most of the shrike nesting habitat. However, fires occasionally burn within the canyons as well. Since 1979, an estimated three fires have burned within China Canyon and Horse Beach Canyon.

Fires that burn through occupied shrike nesting habitat may destroy nests or cause shrikes to abandon active nests. Fires could also kill or injure adult loggerhead shrikes due to smoke or heat in advance of flames. A fire in shrike nesting habitat, or heat and smoke in advance of a fire, could cause nest abandonment and possible loss of eggs or young. Fires that burn through shrike habitat may also cause damage to or loss of trees or shrubs that provide nesting substrate, hunting perches, and cover for shrikes. If fires occur repeatedly in the same area, they could prevent the establishment or re-establishment of trees and shrubs. Loss of trees and large shrubs would have a long-term negative impact for shrikes, because they use trees and shrubs for foraging perches, cover, and nesting.

The recent distribution of breeding shrikes on San Clemente Island has been predominantly in canyons, where trees and shrubs are now distributed. Since fires frequently skip over the canyons rather than burning down into the canyons, recent fires have rarely approached active shrike nests, but they have burned terraces and habitat outside of canyons. Despite the risks associated with fires, no specific losses of shrikes or shrike nests have been definitively attributable to fires. This pattern is expected to continue, although it remains possible that some shrikes or shrike nests within canyons could be lost to fires. The Navy will evaluate nest success data for San Clemente loggerhead shrike in sites nearest AFP 6, including those in Eagle and Cave Canyons, and compare it to other sites in and out of SHOBA with the objective of determining whether or not nest success rates adjacent to AFP 6 are typical for the species

In some areas in the southern portions of the island, plant communities are recovering from over a century of overgrazing, and trees and shrubs are increasing in distribution to include terraces that are not afforded protection from fires associated with canyon topography. In addition, changes in vegetation, including increased distribution of non-native invasive plant species, may result in unforeseen changes in fire patterns or frequency. If fires burn into shrike nesting habitat, impacts would be most likely be to nests and young, resulting in local decreases in loggerhead shrike productivity, and indirect effects associated with habitat modification.

Most fires that have occurred within the distribution of shrikes on San Clemente Island have burned within shrike foraging habitat. Such fires can have short term beneficial effects to shrikes because they remove heavy thatch associated with non-native annual grasses and expose prey items, increasing prey availability. The longer term effects of such fires, however, may be to preclude shrub re-establishment on the island plateaus, thereby limiting expansion of shrike nesting habitat on the island.

Measures to prevent and reduce adverse effects on shrikes, particularly from fire, are proposed by the Navy. These measures include development and implementation of the FMP; including an annual review of the placement of firebreaks; maintenance of fuelbreaks, creation of a tiered system of increasing prevention measures and increasing on site and quick response fire fighting capabilities related to increasing fire danger (using an agreed-upon FDRS), maintening an on-island firefighting helicopter on standby (during fire season when the Fire Danger Rating is above Moderate); post-exercise surveillance to detect incipient fires; and stepwise operational restrictions under increasingly high fire danger ratings. The Navy has also developed and maintains fuelbreaks around Impact Areas I and II to reduce the potential for ignitions that occur within the Impact Areas to burn outside impact Area boundaries and into adjacent habitat.

In summary, while periodic fires are believed to have been a natural occurrence on San Clemente Island and have ecological benefits, fires burning too frequently could have long-term deleterious effects on shrikes by reducing vegetation and viable nesting habitat. One of the focal points of the FMP (U.S. Navy 2005b) is to avoid conditions that could lead to type conversion, such as repeated fires with short intervals that preclude regeneration of woody plants. Based on the fire history, anticipated increases in training, implementation of the fire management plan, we anticipate that few fires will consume canyon woodland habitat and result in direct or indirect adverse effect to San Clemente loggerhead shrikes.

The FMP is proposed as 5-year plan that will be reviewed and revised, if necessary. In addition, annual reviews of fire management activities will allow assessment of impacts and identification of additional measures that may be needed to protect resources. The Navy has identified thresholds that would trigger accelerated review of management. Within canyon woodland habitat, the Navy threshold that would trigger accelerated review is 12 ha (30 ac) over the next 5 years. This acreage exceeds the acreage of canyon woodland habitat identified in upper China Canyon (9 ha (22 ac)) that supports numerous shrike territories. The acreage is more than half of the acreage identified within Horse Beach Canyon (approximately 21.5 ha (53 ac)). Based on fire modeling exercises and historical fire patterns, we anticipate the acreage of fires within canyons will be less than the threshold identified by the Navy. Based on records, which include extensive monitoring of the San Clemente loggerhead shrike population over the last 10 years, no fires have resulted in recorded nest loss; however, we anticipate that increased risk of fires associated with increased activities is likely to increase the potential for nest loss. We anticipate that operational activities and resulting fires, as managed under the FMP, could result in loss of 1 active shrike nest and 2 adults per year.

**Fire Management and Suppression**

Fire management and suppression will include maintenance of fuelbreaks that surround Impact Areas I and II and are located within San Clemente loggerhead shrike habitat. Maintenance of existing fuelbreaks in this area entails aerial application of Phos-Chek or herbicide using a low-altitude aircraft and periodic controlled burns along roadways or adjacent to the Impact Areas. These activities have the potential to disturb shrikes and result in the loss of active nests and territories within the footprint of the fuelbreak or proposed burn. In addition, the use of Phos-Chek warrants further study to determine whether this retardant will achieve the desired goals for fire control or cause impacts to the shrike and to determine whether the use of this retardant will facilitate the spread of non-native annual grasses around the Impact Areas. The Navy will minimize impacts to listed species and occupied habitat associated with Phos-Chek application by considering the locations of federally-listed species in advance of fuel break installation, including avoiding application of Phos-Chek within 91 m (300 ft) of mapped listed species to the extent consistent with fuelbreak installation. Under baseline conditions, the Navy coordinates with the Service on a project level when conducting these activities, and we anticipate that this level of coordination will continue under the Navy's annual review process for fires and fire management (U.S. Navy 2005b). This will allow the Navy to avoid impacts to San Clemente loggerhead shrike associated with maintenance of existing fuelbreaks.

Since the boundaries of future fuelbreaks have not yet been identified, we anticipate that the Navy will consult with the Service regarding any future plans to establish fuel breaks with the potential to impact San Clemente loggerhead shrike. Thus, the impacts of new fuelbreaks on San Clemente loggerhead shrike are not considered in this analysis.

**Vehicle Traffic**

Potential effects from vehicle traffic include disturbance, injury, or mortality to individuals and a chance of damage to nest sites or possible nest abandonment. Vehicle traffic is expected to increase with implementation of the proposed action in VC-3 AVMA, AFP 6, AVMR, and on San Clemente Island Ridge Road and Horse Beach Canyon Road. The Navy has reduced the speed limit on San Clemente Island Ridge Road to 56 km/h (35 mph) in an effort to reduce the potential for collisions with wildlife and has periodically erected temporary signs in some areas to advise travelers of the presence of loggerhead shrikes. Speed limit reductions have proven difficult to enforce, and vehicles are routinely observed by Navy Natural Resources personnel traveling in excess of the posted 56 km/h (35 mph) speed limit (Kelly Brock pers. comm. 2006). Vehicle speed may increase further when the San Clemente Island Ridge Road resurfacing project is complete. Combined with the increased use of the road, it is likely that the potential for vehicle strikes will increase.

We anticipate that the number of vehicle strikes will also increase as shrike abundance increases. Based on the observed mortalities to date, juvenile shrikes are most likely to be hit by vehicles, but it happens only rarely. Thus, based on the recorded frequency of vehicle collisions, the expanding shrike population, and the proposed increase in vehicle travel, we expect shrike deaths from vehicle collisions to increase to two juvenile shrikes per year.

Vehicle traffic within the AVMAs and along the AVMR is also likely to degrade shrike habitat in some areas by soil disturbance, erosion, and spread of invasive plant species. This is expected to occur within the VC-3 AVMA, AFP 6, and on Horse Beach Canyon Road.

**Foot Traffic**

Because most foot travel does not occur in the canyons and areas where shrikes are known to nest, operations that involve off road foot travel are unlikely to encounter nesting or foraging shrikes. Although small (platoon-sized) groups can patrol on foot in a wide variety of locations on the island, most of their activity would be within TARs or between TARs and not in southern canyons where shrikes have nested in recent years.

All off-road foot traffic involving larger groups of personnel is expected to be confined to the IOA. Since 2001, individual shrike pairs have adopted habitats on the plateau south of TAR 16 for nesting using low shrubs such as coyote brush for the nest sites. Three recent shrike nest sites have been located in coyote brush in proximity to Ridge Road and the AVMR within the IOA. Nests in these sites have the potential to be adversely affected by foot traffic. Shrikes that use habitat within the IOA are likely to experience disturbance associated with troop movements, particularly during the Battalion-Sized Landing, which is proposed 2 times per year as a 4-day event. Troops that move through the IOA would be on foot and would be walking abreast, spaced approximately 5 m (15 ft) apart. During the Battalion-Sized Landing, approximately 1,500 troops will be training, and approximately half will be on foot, moving the length of San Clemente Island toward SHOBA. Troops may also bivouac within the IOA; however, most bivouac activities are expected to occur adjacent to the AVMAs and AFP rather than throughout the IOA.

A shrike in the vicinity of advancing Marines in the IOA would be expected to avoid the approaching troops. However, since Marines would be crossing the landscape abreast of each other at approximately 5-m (15-ft) intervals, shrikes may be temporarily disturbed by their movements and continue to fly in front of the advancing troops. This behavior may disorient the birds and place them in the path of vehicles. For adult shrikes, collisions with vehicles are considered unlikely to occur, particularly on a routine basis. As noted above, juvenile shrikes have collided with vehicles, but the instances of such collisions are rare.

During the breeding season, approaching Marines are likely to cause any shrikes nesting within the IOA in the path of advancing troops to disperse from their nest. If shrikes are flushed in advance of troops and displaced, it is likely that they would return to the nest after the troops have passed. Exposure to passing troops is expected to be brief, since Marines would normally be spaced apart in formation perpendicular to the direction of travel. However, the number of "waves" of infantry that could be passing through an area has not been determined, so whether there would be repeated exposure to passing groups is not known. Again, direct injury of adults is unlikely, but the potential for injury or death to eggs or nestlings is possible, particularly if adult response results in inadequate attention to the nest and therefore exposes the nests to increased predation risk. It is possible that individuals moving through the IOA could step on, or otherwise physically disturb nests, but we anticipate this risk to be low (*i.e.*, one active nest per year). Thus, the frequency of disturbance from troop movements that results in reproductive losses to shrikes is expected to be low and largely undetectable. Ongoing monitoring of the shrike population is expected to allow some capability of assessing this reproductive loss, since unexpected nest losses subsequent to training activities would be noted.

The future condition of vegetation within the IOA will affect the suitability of this area for loggerhead shrike nesting and foraging. Foot traffic through the area is likely to result in increased distribution and abundance of invasive non-native plants on San Clemente Island. Since large numbers of people will be moving across the landscape, it is likely that they will transport seed and plant propagules within the path of the IOA. The Navy proposes to minimize the potential spread of invasive species by implementing an Invasive Species Control Program. Portions of the IOA already support extensive non-native annual grasslands, which under existing conditions reduce shrike foraging capability by obscuring prey items.

The shrike population is increasing in numbers and distribution, and it is likely that the number of shrikes nesting within the IOA will increase with time as observed shrub re-establishment continues and additional nest sites become available within the IOA. No shrikes used the IOA during the 2007 breeding season, but based on former and current potential nesting sites, up to six sites are present that could be occupied in the future. Additional sites could be occupied as habitat improves. The Navy proposes to reduce the potential for adverse effects to the loggerhead shrike associated with foot traffic by monitoring the locations of shrike nests and giving troops the GPS coordinates of up to four nests (at any one time), which would be identified as a sensitive natural resource during the training operation. This is expected to reduce the potential direct effects associated with the proposed operational increases. With incorporation of the Navy's proposed avoidance measure to reduce the potential for disturbance, we anticipate that shrikes and their nests will rarely be impacted by training conducted in the IOA (about 1 active nest per year).

**Access Restrictions**

The proposed action includes safety-driven access restrictions to Impact Areas I and II that will preclude further monitoring of the shrike population within these areas. Nonetheless, the ongoing monitoring that has occurred over the past 20 years provides valuable information regarding successful shrike use of these areas. Active management at shrike nesting territories within Impact Areas has not occurred in recent years under baseline conditions. Predator management along roadways, however, is an important component of the shrike recovery program that could be compromised if not conducted on China Point Road and Horse Beach

Canyon Road (outside the Impact Areas). However, we anticipate that feral cat removal will continue along China Point Road and the majority of Horse Beach Canyon Road. Since management activities that could benefit the shrike are anticipated to continue, we do not anticipate that the inability to monitor the shrikes that inhabit territories within the Impact Areas will preclude recovery of this species.

The number of training operations on San Clemente Island has increased over the past ten years, making it more difficult to accommodate management requirements of the Navy's shrike recovery program. The proposed increases in operational use outlined in the Navy's proposed action are likely to further complicate the Navy's efforts to accommodate these competing interests. However, the Navy has committed to continue the currently successful program of habitat restoration, predator management, monitoring, captive breeding, and re-introduction to benefit the San Clemente loggerhead shrike until such time that recovery objectives are identified and achieved.

In summary, the most likely adverse effects of Navy training activities on shrikes would be a small number of fatalities associated with operations or vehicle use, diminished reproduction or production of offspring (rather than population effects on adult survivorship), potential modification of habitat in areas that experience invasive plant species establishment and fires, and increasing challenges for access to allow management activities within Impact Areas. The Navy's proposed conservation measures reduce the potential for adverse effects by controlling the speed of vehicles, notifying infantry of shrike nest locations (up to 4), managing invasive plant species, and managing fire frequency. We anticipate that the concerted effort to recover the San Clemente loggerhead shrike will continue, as proposed, and will offset the anticipated losses to the shrike population and allow the species to continue on a trajectory towards recovery.

**Conservation Actions**

Despite the potential impacts to shrikes that nest adjacent to Impact Areas and occasional death or injury of individuals in other operational areas, continued increases in shrike distribution and abundance in other areas of the island is anticipated as a result of continued implementation of the Navy's successful shrike recovery program.

<u>Conclusion</u>

After reviewing the current status of San Clemente loggerhead shrike, the environmental baseline, and the effects of the proposed action, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of San Clemente loggerhead shrike. We have reached this conclusion for the following reasons:

(1) Eighty-four percent of the current or former territories of the loggerhead shrike on San Clemente Island occur in areas that are located more than 305 m (1,000 ft) from

Impact Areas I and II, and AFP 6 where most impacts from training and fires are expected;

(2) Shrikes have continued to successfully nest within some areas included within the Impact Areas, and it is likely that despite the increases in disturbance and risk associated with the proposed action, that a subset of the shrikes that occur within this area will continue to successfully inhabit the area into the future;

(3) A small number of shrikes and active nests may be harmed, killed, injured, or destroyed per year in association with the proposed action; we expect that this impact will be fully offset by the Navy's proposed continuation of the San Clemente loggerhead shrike recovery program; thus, this low level impact is not expected to result in an appreciable reduction in the numbers, reproduction, or distribution of the San Clemente loggerhead shrike population; and

(4) Active recovery efforts that are included as part of the Navy's proposed action are expected to result in further increases in the population in areas relatively unaffected by training activities and promote the overall recovery of the species.

**San Clemente Sage Sparrow** (*Amphispiza belli clementeae*)

<u>Status of the Species</u>

*Listing Status*

The San Clemente sage sparrow was listed as a threatened species on August 11, 1977 (42 FR 40682), primarily because of its limited distribution and ongoing habitat destruction caused by overgrazing. The San Clemente sage sparrow is one of the seven species addressed in the (Channel Islands Recovery Plan) (Service 1984). Critical habitat for the sage sparrow has not been designated.

*Species Description*

The San Clemente sage sparrow, one of five subspecies of sage sparrows from North America, is endemic to San Clemente Island. It is a small songbird (15 cm (6 in) from beak tip to tail tip) with a brownish-gray back, light buffy underparts, and a small dark breast spot. Sage sparrows have a complete white eye ring and distinctive white and black malar stripes.

*Habitat Affinity*

The San Clemente sage sparrow uses a xerophytic scrub community. Maritime desert scrub (MDS) dominated by California boxthorn characterizes San Clemente sage sparrow habitat. San Clemente sage sparrow distribution appears to be primarily determined by the distribution of California boxthorn on San Clemente Island, and sage sparrow density has consistently been positively correlated with the abundance of this plant species at the landscape scale (Hyde 1985; KEA 1997; Munkwitz *et al*. 2002; Beaudry *et al*. 2003, 2004; Turner *et al*. 2005, 2006; Kaiser *et al*. 2007a).

Sage sparrows use California boxthorn shrubs for nesting substrate, cover, and food resources. California boxthorn is a low growing shrub, which typically reaches a maximum height of 75 cm (29 in). Boxthorn branches are stiff and well armed with sharp, thorn-like tips. In areas where boxthorn forms extensive thickets, it provides excellent protection from avian and mammalian predators. Shrub height and structure are believed to be important characteristics that affect nest site selection. Sage sparrows prefer taller shrubs with larger canopies (Chase and Carlson 2002). On San Clemente Island, nest sites are characterized by relatively tall boxthorn shrubs (mean 45 cm (18 in)), greater and more evenly distributed boxthorn, less bare ground and litter, less grass, and a higher percent of cactus and forbs than in surrounding unoccupied habitat (Willey 1997; Hyde 1980).

Since 1999, researchers have recorded nesting in several other plant species, but they note that boxthorn remains the primary nesting substrate shrub species characteristic of San Clemente sage sparrow habitat (Kaiser *et al*. 2007). Boxthorn shrubs selected as nest sites have a high percentage of live foliage; nest shrubs observed by Willey (1997) were usually greater than 75 percent living; and no sage sparrow nests were found in shrubs that had less than 50 percent living foliage. Nests appear to be preferentially placed on the leeward side of shrubs. Work conducted by Hyde (1980) indicated that habitat supporting a high density of sage sparrows (*i.e*., high density sage sparrow habitat) is characterized by more California boxthorn plants, generally higher plants, more cactus, and less grass cover and less bare ground when compared to habitat supporting a moderate density of sage sparrows (*i.e*. moderate density sage sparrow habitat).

Work conducted by KEA (1997) did not identify different boxthorn density in “high quality” when compared to “medium” or “low quality” sage sparrow habitat. However, they did observe higher boxthorn density at 20 cm (8 in), the typical height of sage sparrow nests [20 cm (8 in) (Willey 1990), 35 cm (14 in) (Hyde 1980), 23 cm (9 in) (Munkwitz *et al.* 2000)]. Hyde (1980) also found that nest shrubs are denser both vertically and horizontally at medium heights (20-45 cm) (8-18 in.) and less dense at ground level than other shrubs measured. In some years, primarily drought years, sage sparrow density appears to be influenced by other vegetation characteristics as well, such as cactus cover (Hyde 1985; Munkwitz *et al*. 2002; Turner *et al.* 2005), forb cover (Munkwitz *et al*. 2002, Turner *et al*. 2005), total plant species diversity (KEA 1997), vegetation height and density (Turner *et al*. 2005), and bare ground (Beaudry *et al*. 2003, 2004).

*Life History*

Sage sparrow breeding activity typically begins in late January or February, but has been recorded in early January (Melissa Booker, pers comm. 2008). The initiation of breeding activity appears to be tied to precipitation patterns. Breeding activity usually peaks in March and April and lasts through late June. San Clemente sage sparrows primarily nest in dense boxthorn.

The nest cup is made of grass, small twigs and forb stems and is lined with soft grasses, feathers, flower heads or fur. Nests are typically placed 20-35 cm (8-14 in) from the ground with at least an additional 20 cm (8 in) of canopy above the nest. Dense shrubs provide cover from prevailing winds and from predators (Willey 1997). Sage sparrows are able to successfully reproduce in their first year. Clutch size is usually 2-4 eggs, and in most years, 1-3 clutches are produced. During drought years, sage sparrows may not reproduce at all. Incubation typically lasts 11-14 days, and fledging occurs 10-14 days after hatching. The female incubates the eggs, and both parents feed the chicks. In some years, the reproductive rate has been notably high (*e.g.*, 90 percent in 1986, 97 percent in 1999), while in others, virtually no reproduction has occurred (*e.g.*, 2007).

Sage sparrows do not migrate, but juveniles move from natal/breeding territories during the winter months. Hyde (1980) found that adult sage sparrows exhibited little movement, and he observed that adult pairs remain on territory as late as October, when his study concluded. Willey (1986) measured an average breeding territory size of 3.1+/-0.42 ha (7.75+/-1.03 ac), and recent studies indicate that territory size may fluctuate in response to resource availability. Male sage sparrows aggressively defend territory boundaries with little overlap between adjacent pairs (Willey 1990). Territory size is lower in areas that have higher density of boxthorn shrubs (Beaudry *et al*. 2003, 2004; Kaiser *et al*. 2007).

Sage sparrows glean insects, spiders, fruits and seeds from the vegetation, and they also forage on the ground, often in openings beneath large boxthorn shrubs (Hyde 1980). While nestlings are primarily fed arthropods, Hyde (1985) found cactus fruit, boxthorn berries, and saltbush fruit to be particularly important food resources at different times of the year.

In most years, boxthorn flowers and fruits from March through May (Beaudry *et al*. 2004), providing foraging opportunities on insects attracted to the leaves, flowers and berries and on the berries and seeds themselves during the peak of the breeding season. However, in years with severe drought, such as 2002 and 2007, boxthorn did not flower and vegetative growth was minimal (Beaudry *et al*. 2003; Kaiser *et al*. 2007). Consequently, there were greater foraging opportunities for sage sparrows on other species that continued to produce flowers and berries during drought (Beaudry *et al*. 2003).

*Population Trend*

The size of the San Clemente sage sparrow population fluctuates significantly from year to year, appearing to respond to precipitation and resulting resource availability. During favorable environmental conditions, sage sparrow pairs can produce up to three successful broods in a single season, and if drought conditions exist, few individuals will attempt to breed. Consequently, the population has declined significantly after droughts, but it has rebounded rapidly when adequate rainfall has occurred.

Population estimates derived since the 1980’s range from a low of 38 individuals (1984) to a high of 1,519 adults (2002) (Table 12). The years between 1999 and 2008 represent a range of years where data was collected using the same methodology. Decreases are noted in the last 2 years (2007 and 2008). Low rainfall in 2007 likely contributed to this observed decline. The population estimates for the last 2 years fall within the normal variation seen for the population estimates derived over the past 10 years and should not be interpreted as a declining trend in the species. Nonetheless, it will be important to continue monitoring and assessing the status of the sage sparrow population on San Clemente Island.

Table 12. Sage sparrow adult population estimates 1976-2008 (from Kaiser *et al.* 2008)

| Year | Area (ha) | Adult Population Estimate | Author(s) |
|---|---|---|---|
| 1976 | 740 | 93 | Byers 1976 |
| 1980 | 502 | 176 | Hyde 1985 |
| 1981 | 502 | 360 | Hyde 1985 |
| 1982 | 502 | 205 | Hyde 1985 |
| 1983 | 502 | 198 | Hyde 1985 |
| 1984 | 502 | 38 | Hyde 1985 |
| 1985 | 502 | 91 | Hyde 1985 |
| 1997 | 1821 | 294 | KEA 1997 |
| 1999 | 2098 | 578 | Munkwitz *et al.* 2000 |
| 2000 | 2098 | 452 | Munkwitz *et al.* 2002a |
| 2001 | 2098 | 578 | Munkwitz *et al.* 2002b |
| 2002 | 2098 | 1519 | Beaudry *et al.* 2003 |
| 2003 | 2098 | 544 | Beaudry *et al.* 2004 |
| 2004 | 2098 | 980 | Turner *et al.* 2005 |
| 2005 | 2098 | 729 | Turner *et al.* 2006 |
| 2006 | 2098 | 1216 | Kaiser *et al.* 2007 |
| 2007 | 2098 | 716 | Kaiser *et al.* 2008 |
| 2008 | 2098 | 539 | Prelim unpub. # |

*Population viability analyses*

Two population viability analyses (PVA) have been developed to evaluate threats such as low juvenile survival, increased drought frequency, and habitat loss. Beaudry (2004) used demographic data collected between 2000-2003 and modeled the sage sparrow population using the program VORTEX. Kaiser *et al.* (2008) built upon Beaudry's 2004 PVA and used the program VORTEX to model the population based on demographic data collected between 2000 and 2007. Both PVAs conducted sensitivity analyses to ascertain the relative effects of different variables to sage sparrow extinction risk.

While the most recent modeling effort predicted high quasi-extinction probabilities for the San Clemente sage sparrow, reviewers and the model's authors point out that the value of the PVA is in assessing the relative sensitivity of the population to variables rather than an assessment of extinction probability (Brian Hudgens pers. comm. 2008). The primary demographic variable that contributed to modeled extinction risk was juvenile mortality. The modeled population responded significantly to changes in this demographic variable. Based on current monitoring techniques, juvenile sage sparrows appear to experience a high mortality rate on San Clemente Island, and since 2001, apparent juvenile survivorship has declined. Apparent juvenile survivorship estimates are based on complete band re-sight data, and it is possible that dispersal of juveniles to unsampled areas or failure to re-sight complete band combinations could contribute to the low numbers of banded birds that are re-sighted. Low re-sighting data results in low survivorship estimates. Sampling on San Clemente Island is mostly limited to the study plots and transects, which increases the potential that banded juveniles could be missed, thereby contributing to overestimates of juvenile mortality. Additional surveys conducted in 2007, however, did not reveal additional juveniles in other areas of the island that would indicate that survivorship is underestimated. To provide clarity to some of these issues, the Navy proposes to implement a recommendation contained within the Sage Sparrow Management Plan to conduct a radio telemetry study to provide additional information regarding survivorship and juvenile movement patterns on San Clemente Island.

Drought frequency was a second important factor influencing modeled extinction risk, and slight increases in drought frequency increased extinction risk. Simulated sage sparrow populations exhibited large annual fluctuations, which were correlated to year-to-year fluctuations in the amount of rainfall and may be connected to the seasonal pattern (distribution) of rainfall. Intensity and distribution of rainfall affects the timing and extent of vegetation growth and flowering. Sage sparrows generally respond to low rainfall by reducing reproductive effort, which results in depressed populations following drought years. Sage sparrows respond to favorable precipitation patterns and resulting conditions by producing multiple clutches, which then drive numbers back up in years that follow “good” precipitation years.

The modeled extinction risk appeared relatively insensitive to habitat loss or gain. Based on the model, under baseline conditions, the San Clemente sage sparrow could lose up to 90 percent of the available habitat with only a slight increase in extinction risk. This extreme result points to the inherent insensitivity of the model to habitat loss, due to the high baseline extinction risk that is derived primarily from the low apparent juvenile survival rate incorporated into the model under baseline conditions. If higher rates of juvenile survivorship are incorporated into the model to produce a lower baseline of extinction risk, the sensitivity of the modeled population to habitat loss increases. The relationship between habitat loss and survivorship is not known, and the PVA authors qualify the results of their modeling effort to predict that the San Clemente sage sparrow population may withstand low levels of habitat loss without deleterious effects to the overall population (B. Hudgens pers comm.. 2008). Based on the results of the PVA, the persistence of the San Clemente sage sparrow population is not likely to be significantly reduced by a limited loss of habitat. The population would, however, be affected by a reduction in juvenile survivorship.

*Rangewide Distribution and Threats*

Since the San Clemente Island sage sparrow's entire distribution is restricted to the action area of San Clemente Island, its island-wide distribution and current threats to the species are discussed in the Environmental Baseline section below.

*Conservation Needs*

The San Clemente sage sparrow needs continued habitat protection, protection from disturbance, and protection from predators. Based on results of the PVA, an increase in juvenile survivorship is necessary to improve the status of the population and decrease the apparent extinction risk. Since the cause(s) of juvenile and adult mortality have not been determined, further examination of these should be a priority. Concurrent with the proposed action to intensify training, the San Clemente sage sparrow population warrants additional monitoring to better understand the impact of increased training on the population and assure that management actions will be taken if the population status worsens.

Environmental Baseline

*Distribution*

The San Clemente sage sparrow, endemic to San Clemente Island, is found primarily along the lower marine terraces on the western and northern parts of the island. The band of habitat that supports higher densities of sparrows has received little disturbance in the recent past.

Based on monitoring activities conducted between 1999 and 2008 and on plant community mapping (1994), San Clemente sage sparrow habitat includes approximately 2,098 ha (5,145 ac) (Kaiser *et al.* 2007) of maritime desert scrub habitat on San Clemente Island. A subset of the area mapped as sage sparrow habitat supports most of the sage sparrow population. The island-wide sage sparrow population varies from year to year based on environmental conditions but has ranged between 452 and 1,519 adult sparrows over the last 10 years (1999 -2008) for which data has been collected using the same methodology (Table 12).

The distribution of sage sparrows within different habitat categories differs from year to year, with high density habitat generally supporting the highest percentage of sage sparrows, followed by medium and low density habitat (Table 13). Approximately half of the sage sparrow habitat, including habitat categorized as "high density" and "medium density", supports an average 73 percent of the population. High density habitat appears important to sage sparrows during years associated with high productivity, but medium density habitat is also important to species persistence, especially in drought years, when few birds breed and a higher percentage of the population inhabits medium quality habitat (Brian Hudgens pers. comm. 2008).

Table 13. Percentage of Estimated Population (Density–based estimate) Within Density Categories

| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|
| High | 43.9 | 44.6 | 39.4 | 42.1 | 30.8 | 24.4 | 33.7 | 35.9 |
| Medium | 37.4 | 39.4 | 35.6 | 33.1 | 43.4 | 36.7 | 32.6 | 34.7 |
| Low | 19 | 15.9 | 24.9 | 24.7 | 25.7 | 38.9 | 33.4 | 29.4 |

*Threats*

Current threats to San Clemente sage sparrow may include: 1) small population size and limited distribution; 2) habitat degradation associated with non-native plant proliferation; 3) predation by island foxes, feral cats, and rats; 4) mortality and/or habitat modification due to increased fire frequency and size and fire suppression activities; 5) human disturbance resulting from military training activities/harassment; and 6) mortality and/or modification of habitat due to human activities (Kaiser *et al*. 2007). In addition, rainfall patterns appear to contribute significantly to sage sparrow viability and resulting population size. Climate change would threaten the sage sparrow population if such change results in increased frequency of drought conditions on San Clemente Island.

Specific human activities that have and/or still represent potential adverse effects to sage sparrows and/or its habitat include: 1) development of the Sand Clemente Island runway that fragmented the island's sage sparrow habitat and continues to serve as a source of noise and potential disturbance to the sage sparrow; (2) existing recreational activities and associated disturbance along the West Shore, including low intensity foot and vehicle traffic associated primarily with fishing; (3) current training and associated impacts in training areas north of the runway, as addressed in Biological Opinion FWS 1-00-F-19, including fires, ordnance explosion-related disturbance and/or harm, foot traffic, and construction noise; (4) current training, ordnance disturbances and elevated fire frequency, as addressed in Biological Opinion FWS-2808; and (5) low-intensity training use of the West Shore, including periodic low intensity foot traffic.

*Conservation Actions*

The Navy has implemented activities to preserve the endemic flora and fauna of San Clemente Island. All feral goats and pigs were removed from the island by the Navy by 1992 (Kellogg and Kellogg 1994). The Navy also initiated a long term-vegetation monitoring program in 1992-1993 to track the status of sensitive plant species and to document vegetation changes on the island following animal removals (Tierra Data, Inc. 1998). Positive effects of vegetation recovery on sage sparrow habitat have been documented as a result of this effort. The Navy has also implemented predator management activities to reduce cat abundance throughout the island. The Navy has supported research activities for the sage sparrow by allowing biologists access to the island and by funding monitoring and management activities for sage sparrow and its habitat.

These activities have had positive effects on the sage sparrow and helped to support its continued existence on the island.

Effects of the Action

Approximately 169 ha (418 ac) of sage sparrow habitat (Table 14) and between 27 and 93 sage sparrows (Table 15) are supported within the boundaries of existing and proposed operational areas, respectively. The number of sage sparrows within operational boundaries is dependent upon the size of the population, which varies significantly from year to year, but an average of about seven percent of the population is estimated to occur within operational boundaries based on the last 10 years of survey data. San Clemente sage sparrows may be adversely affected in habitat within and surrounding operational areas by ordnance use, accidental fire, fire containment and suppression, air traffic, foot traffic and vehicle traffic. These adverse effects include modification and degradation of sage sparrow habitat; disturbance, death, and injury of individual sage sparrows, and loss of active sage sparrow nests. However, during any given year, we expect that some areas of suitable sage sparrow habitat within operational boundaries will remain and sage sparrows will continue to occupy these areas.

As part of the proposed action, the Navy will continue surveys and population analysis for the San Clemente sage sparrow and develop additional surveys to assess sage sparrow juvenile survivorship and habitat use. These surveys will be developed and scheduled such that access to training areas is not restricted when training is needed/requested.

Table 14. Sage Sparrow Habitat Within Operational Boundaries

| Operations Area | Sage sparrow habitat in operational boundaries (acres) | | |
|---|---|---|---|
| | High Density | Medium Density | Low Density |
| TAR 4 | 0 | 0 | 0 |
| TAR 10 | 43.6 | 11.3 | 0 |
| TAR 15 | 0 | 0 | 5.0 |
| TAR 17 | 11.9 | 0 | 0 |
| IMPACT AREA II (incl TAR 22) | 0 | 0 | 176.9 |
| Old Rifle Range AVMA (incl IOA and AMP) | 0 | 0 | 142.5 |
| IOA (outside of ORR AVMA) | 0 | 0 | 23.0 |
| BTS 2 | 0.5 | 0 | 0 |
| BTS 3 | 0.9 | 0 | 0 |
| BTS 4 | 0 | 0 | 2.1 |
| Totals | 56.9 | 11.3 | 349.5 |

Table 15. Number of Sage Sparrows Within Operational Boundaries Based on Density Category Estimates, 1999-2006

| Operations Area | Estimate of Sage Sparrows in Operational Boundaries | |
|---|---|---|
| | Max | Min |
| TAR 4 | 0 | 0 |
| TAR 10 | 33 | 12 |
| TAR 15 | 1 | 0 |
| TAR 17 | 8 | 3 |
| Impact Area II (including TAR 22) | 25 | 6 |
| Old Rifle Range AVMA | 20 | 5 |
| IOA (outside of ORR AVMA) | 3 | 1 |
| BTS 2 | 1 | 0 |
| BTS 3 | 1 | 0 |
| BTS 4 | 1 | 0 |
| Total | 93 | 27 |

**Construction of New Facilities**

Construction of new buildings and parking is proposed to occur on 2 ha (5 ac) within TAR 10. However, these facilities will be located within an existing 2-ha (5-ac) area in TAR 10 that is already degraded and not likely used by sage sparrows. Further, construction activities will occur outside of the sage sparrow breeding season; thus, we do not anticipate that any individual sage sparrows or active nests will be impacted by this activity.

**Ordnance and Demolition Use**

The proposed action includes significant increases in the frequency and distribution of ordnance and demolition use within sage sparrow habitat on San Clemente Island. Broadly defined, “ordnance” and “demolition use” refers to a wide variety of weaponry and explosives, ranging from small automatic weapons and demolition charges to extremely large bombs. Ordnance proposed for use within sage sparrow habitat includes predominantly small arms and demolition charges. Increased frequency of heavy artillery use is proposed in and adjacent to low density sage sparrow habitat at one range. Live fire and demolition charge training activities are proposed in six areas within sage sparrow habitat where such training does not currently occur (*i.e.*, TAR 10, TAR 17, BTS 2, BTS 3, BTS 4, BTS 5, Figure 2). Additional sites with increased frequency of live-fire and demolition charges include five training areas in or adjacent to sage sparrow habitat (*i.e.*, TAR 4, TAR 15, BTS 1, BTS 8, and Impact Area II, Figure 2).

Ordnance and demolition use may disturb, injure, or kill adult sage sparrows, nestlings and/or eggs if sage sparrows occupy habitat in the area of munitions use, especially during the breeding season. The response of sage sparrows to use of munitions is likely dependent upon the type used and the resulting disturbance (noise, ground disturbance, fire etc.), as well as the frequency and timing of operations. The small size of the sage sparrows and the relatively low density of occurrence (*i.e.*, a maximum density of less than one per acre in high density habitat) reduce the potential for a direct hit with munitions. However, because of the high number of rounds that are anticipated to be used at ranges on San Clemente Island, we foresee that a small number of sparrows will be directly hit with projectiles. Craters made by demolition charges may disturb a larger area and therefore are more likely to harm sage sparrows. Ordnance use can also result in ignition of accidental fires, and the potential for ignitions depends on the specific attributes of the munitions used, as discussed under the effects of fire below.

Ordnance use occurs within or adjacent to sage sparrow habitat in several areas of San Clemente Island under baseline conditions. For example, Impact Area II contains 72 ha (177 ac) of low density habitat within its boundary, which is approximately 7 percent of the mapped low density sage sparrow habitat on San Clemente Island, and supports an estimated 3-25 sage sparrows (approximately 1.6 percent of the island-wide population). However, Impact Area II has been a consistently used target area for the last 20 years. We expect that the area mapped as low density habitat in Impact Area II is likely degraded relative to low density habitat mapped elsewhere. Thus, we project that fewer than 3-25 sage sparrows will be killed in Impact Area II over time. The infrequency of sage sparrow sightings within habitat adjacent to Impact Area II, where heavy artillery is frequently used under baseline conditions, suggests that the frequent use of heavy artillery may reduce habitat use by sage sparrows. The density of sparrows, however, is lower in the southern portion of the island beyond the immediate vicinity of the Impact Areas, so the observed low densities could be due to factors other than ordnance use.

Frequent use of small arms and demolition training occurs under baseline conditions within training areas in sage sparrow habitat north of the San Clemente Island runway, including TAR 4, steel ranges, grenade range, and BTS sites. These areas are characterized by low densities of sage sparrows, and it is unknown whether or not human activities, including ordnance use, affect observed densities.

Sage sparrows do not occur within the boundary of TAR 4, but they continue to use and reproduce successfully in the habitat surrounding TAR 4. The observation of periodic demolition craters and other signs of munitions use could be related to the disappearance of individual sage sparrows that have been observed within the area surrounding TAR 4; however, a causal relationship has not been established, and the demographic parameters remain within the range of those observed outside the area surrounding TAR 4. It is likely that sage sparrows are periodically injured or killed and their nests disturbed or destroyed in the area surrounding TAR 4 by the human activity and use of live fire and demolitions that occur within TAR 4, though this impact is largely undetected. Based on observations adjacent to TAR 4, it appears that sage sparrows may be able to acclimate to noise and other human disturbances associated with some level of small arms use. The number of sage sparrows that are harmed or killed as a result of proximity to this training area has not been determined; however, based on information presented in monitoring reports, including birds that have disappeared and nests that have failed, it appears that sage sparrows are irregularly harmed adjacent to TAR 4 by training within TAR 4 and in BTS 1 and BTS 8.

**Fire**

The proposed action includes training activities that are likely to result in fires. Accidental fires that could impact sage sparrows are most likely to result from use of grenades, small arms, detonation pyrotechnics, and from EOD ordnance detonation. The Navy proposes to implement a FMP that includes precautionary measures to reduce the potential for ignitions; however, fires are still likely to occur due to the types of training and frequency of use proposed. Implementation of the FMP is anticipated to align training exercises, weather conditions, vegetation conditions, and suppression assets in a manner that reduces the chance for a large fire, or repeated fires, that could result in type conversion.

The effects of accidental fire(s) on sage sparrows depend upon fire location, size, timing, and intensity. It is likely, based on examination of fire records where ordnance is used in existing TARs, that fires may occur during the breeding season of the San Clemente sage sparrow because some fires adjacent to existing training at TAR 4 and the steel ranges have occurred during the months of March, April, and June (U.S. Navy, unpublished analysis 2008b). If precautionary measures are implemented as outlined within the draft FMP, fire modeling and quick suppression response time suggests that fires within sage sparrow habitat are likely to be small and should occur within TAR boundaries or immediately adjacent to TARs.

Very few fires have occurred in sage sparrow habitat outside of the Whale Point area, so the actual extent and frequency of fires and fire pattern that will result from expanded incendiary/ordnance use within sage sparrow habitat will only be known once live fire and demolition training in TARs 10, 17 and BTS 2, 3, and 4 commences. The uncertainty, associated with the size and intensity of future fires and the effects of fires within occupied sage sparrow habitat, has been a source of ongoing concern due to the lack of fire history throughout the optimum sage sparrow habitat and the limited distribution of this habitat.

Fire in nesting habitat during the breeding season may cause adult or chick mortality, nest abandonment or failure, or reduce availability of food or other resources in a breeding territory, affecting nest success. Monitoring reports on the Whale Point population, which includes TAR 4, have documented eight fires in 2004 and 2005 (Turner *et al.* 2006, Turner *et al.* 2005). Based on monitoring of the vegetation and the sage sparrow population, nest success in habitat adjacent to TAR 4 that had periodic small fires remained comparable to nest success on other plots in habitat categorized as “medium density” habitat on San Clemente Island. Based on GIS analysis, sage sparrows also incorporated areas burned before the breeding season into breeding territories, providing additional information that sage sparrow populations may continue to use areas prone to small fires (U.S. Navy, unpublished analysis 2008b). This information suggests that if small fires occur within sage sparrow habitat, as is expected within and around TARs proposed within sage sparrow habitat, the habitat may still be successfully used by sage sparrows. Research on sage sparrow populations in other parts of the country provides some support for this conclusion. In sagebrush grasslands in Idaho, male sage sparrows spend significantly more time in territorial maintenance after a fall burn than before (Winter 1984).

Frequent fires could be facilitated by operations-related ignition sources and abundant annual grasses. Scant information regarding the effect of increased fire frequency on the plant communities that constitute San Clemente sage sparrow habitat is available; however, fire is likely to affect the vegetation structure and could alter the plant community, if the fire return interval is short. Although fire is a natural process and can increase vegetative productivity (Carroll *et al.* 1993), repeated burning of the same area within a short period of time (1-2 years) could overwhelm the ability of some native plant species to recover from fire and result in habitat type conversion (*e.g.*, from shrubland to grassland).

Alteration of California boxthorn structure (reduction in height or amount of living foliage) may decrease nesting suitability and success, as sage sparrows show a preference for larger shrubs and shrubs with a high percentage of living foliage (Willey 1997). The available literature pertaining to California boxthorn portrays this boxthorn species as not being adapted to fire, nor expected to survive an intense fire. However, recent vegetation monitoring data along transects adjacent to TAR 4 (U.S. Navy, unpublished analysis 2008b) show California boxthorn survived burns in this area. The structure of boxthorn plants that appear to have survived is not noted within the transect data, so whether these plants retained suitability as sage sparrow nesting habitat is not known.

The Navy plans to reduce the potential for ignitions within sage sparrow habitat by adhering to a set of precautionary measures imbedded within a FDRS for the island. Precautionary measures include: 1) awareness of weather and vegetation conditions and use of ordnance during periods that are less likely to result in ignitions and 2) deployment of onsite fire-fighting equipment to reduce response times needed to suppress fires that do occur. In addition, NSW personnel will be trained to use onsite fire suppression resources that will be deployed in TARs and BTS sites if training is conducted during periods with higher ignition potential. It is likely that most fires would be extinguished while fires were still small and within the boundaries of the TAR or BTS site. Based on monitoring conducted north of the San Clemente Island runway, sage sparrows may continue to use habitat prone to small fires (U.S. Navy unpublished analysis 2008).

The Navy plans to re-evaluate the success of their fire management activities and the effects of fires in relationship to the status of the sage sparrow on an annual basis due to the uncertainty associated with the amount of habitat that could burn as a result of proposed training activities and the potential for fires to negatively impact the San Clemente sage sparrow population. To accomplish this, the Navy has proposed sage sparrow habitat impact thresholds that would trigger expedited review and potential application of adaptive management strategies. Fire thresholds would identify impact limits that the Navy would strive not to exceed within high density and medium density sage sparrow habitat. However, the response of sage sparrows to increased fire frequency in high density and medium density habitat has not been determined, so adaptive management prescriptions have not been defined.

Based on the FMP thresholds, a maximum of 18 ha (45 ac) of high density sage sparrow habitat could burn over the initial five-year duration of the FMP. If the acreage of moderate or higher fires (Score 3 or higher, National Park Service Scale) that occur in mapped high density habitat for the San Clemente sage sparrow exceeds 18 ha (45 ac), the Navy plans to accelerate review of the fire history and fire management to determine whether additional measures to reduce the amount of fire within sage sparrow habitat are warranted. Based upon these figures, approximately 5 percent of the high density habitat could be burned over the initial 5-year duration of the FMP before expedited review and potential application of adaptive management would be triggered. We anticipate, however, that with implementation of the FMP, the maximum limit of 18 ha (45 ac) burned over the first 5-year period will not be reached. Based upon the densities of sage sparrows recorded since 1999, 5 percent of the high density habitat is likely to support approximately 2-3 percent of the sage sparrow population, or 9 to 32 adult individuals.

No acreage threshold has been identified within the FMP for medium density or low density sage sparrow habitat. However, a target maximum fire "patch size" of 8 ha (20 ac) for medium density and 16 ha (40 ac) for low density sage sparrow habitat has been established by the Navy, which would apply everywhere except north of the runway. Habitat north of the runway and within Impact Area II is excluded from consideration because it lies within a Land *MU* with "highest military value," as defined in the INRMP. The target maximum fire "patch size" for high density habitat established by the Navy is 2 ha (5 ac). Because no acreage threshold was established for low and medium density habitats and because we anticipate no large fires occurring with proper implementation of the FMP, we are making the assumption that no more than 8 ha (20 ac) of low density habitat and no more than 16 ha (40 ac) of medium density habitat will be burned over the first 5 years. Based upon these figures, approximately 2 percent of the low density habitat could be burned over the initial five-year duration of the FMP before expedited review and potential application of adaptive management would be triggered. Similarly, approximately 1.2 percent of the medium density habitat could be burned over the initial five-year duration of the FMP before expedited review and potential application of adaptive management would be triggered.

Based upon the densities of sage sparrows recorded since 1999, 2 percent of the low density habitat is likely to support approximately less than 1 percent of the sage sparrow population or 1-6 adult individuals. Similarly, 1 percent of the medium density habitat is likely to support approximately less than 1 percent of the sage sparrow population or 2-6 adult individuals.

We anticipate that the frequency and size of fires that occur in areas north of the runway adjacent to TAR 4 that were already authorized under Biological Opinion FWS 1-6-00-F-19 will be reduced by implementation of the precautionary measures contained in the FDRS and availability of onsite suppression resources. We anticipate that the pattern of observed fires (predominantly small fires on the lower terrace that supports the best sage sparrow habitat, and larger fires on the slopes) will continue. Based on historical fire patterns, we anticipate that no more than 10 ha (25 ac) of the medium quality sage sparrow habitat north of the runway will burn over the 5-year duration of the FMP. This area supports approximately 1-8 sage sparrows, which represent less than 1 percent of the population. Low density habitat north of the runway has recently been documented as unoccupied by the sage sparrow; therefore, we don't expect sage sparrows to be harmed by fires in this area.

Sage sparrows occurring in areas that are burned could be killed or injured. If fires occur during the breeding season active nests could be destroyed or fail due to abandonment or loss of food resources. Adults that escape the fires could die or be injured due to increased predation risks and a shortage of available sheltering and foraging habitat. However, as noted above, sage sparrows that survive the fire could also re-occupy and defend territories within the burned habitat. Thus, even though some loss of individual birds and reduced reproduction in some years may occur, based on the observed patterns of sage sparrow habitat use north of the San Clemente Island runway, we anticipate that the demographic variables of sage sparrows that inhabit areas that have experienced patchy fires will remain comparable to that observed within areas that do not experience fires, and sage sparrow populations in areas subject to increased training activities will maintain their distribution on San Clemente Island.

Given the limited data available, the importance of the sage sparrow habitat in TARs 10, 17, and BTS 2, 3, and 4, and the uncertainty of future fire patterns within sage sparrow habitat on San Clemente Island, ongoing assessment of the effects of fires and the status of the sage sparrow population will be necessary to assure that our assumptions regarding fire frequency/patterns and conclusions regarding effects of small fires are correct. As part of their proposed action, the Navy has committed to develop and implement a monitoring plan to assess the incidental take of San Clemente sage sparrows within and adjacent to TARs 10 and 17 and incorporate the findings into the San Clemente Sage Sparrow Management Plan as recommendations for minimizing and avoiding incidental take of sage sparrows, to the extent practicable. The Navy will also address issues associated with habitat and sage sparrow survivorship as part of their INRMP update process with focus on habitat areas near Tars 10 and 17. These efforts should increase our knowledge and understanding of the impacts of fire and training activities on the sage sparrow.

The indirect effects of fires within sage sparrow habitat include the possibility of type conversion, from maritime desert scrubland to grassland, if fires occur repeatedly in the same area. One of the primary goals of the FMP is to prevent such type conversion by preventing ignitions and quickly suppressing fires. The highest likelihood for type conversion due to shortened fire return interval is within the boundaries of operational areas that sustain live fire and are subject to ignition. The Navy proposes to monitor these areas for invasive plant species and treat as necessary to promote recovery of native shrubs (outside of Impact Area II). We anticipate that ongoing operational use and resulting smaller more frequent fires within operational boundaries are likely to result in patchy habitat degradation within the boundaries of TAR 10, Tar 17, and BTS sites. However, we also expect that sage sparrows will continue to occur in these areas where suitable habitat remains.

**Fire Containment and Suppression**

The San Clemente FMP includes proposals to: (1) maintain existing roads to function as fuel breaks; (2) install fuel breaks using herbicides, retardants, or strip burns; and (3) suppress fires that occur using aerial or ground resources. While fire containment and suppression may protect sage sparrows and their habitat from escaped wild fires, these activities could adversely affect sage sparrows in the short term depending on the location of activities.

Several roads that lie within sage sparrow habitat are proposed for maintenance as fuel breaks. West Shore Road has historically been a poorly maintained route that was frequently not passable, resulting in very little traffic along the West Shore through contiguous high density sage sparrow habitat. With implementation of the Fire Management Plan, this road would be maintained in drivable condition to facilitate movement of fire fighting crews and to function as a fuel break. Maintenance of the road is expected to entail grading approximately once per year. This maintenance would not result in any direct impacts to sage sparrow habitat, but the increased noise and human activity along the road could disturb sage sparrows, particularly if maintenance occurred during the breeding season. The type of equipment proposed for use is comparable to small trucks on the island and would be passing over the road relatively quickly, which would limit the amount of time that individual sage sparrows were exposed to the noise/disturbance. Thus, we believe that nest abandonment or failure from annual maintenance of West Shore Road is unlikely.

Indirect effects of road maintenance that could affect sage sparrows include potential for establishment and spread of invasive plant species into high density sage sparrow habitat. Invasive plant species introduced or spread along the roadway could expand into sage sparrow habitat and result in eventual modification of habitat if unmanaged. The Navy has proposed to intensify control of invasive plant species on San Clemente Island, which is expected to reduce the potential for weed establishment along West Shore Road.

An improved roadway could also indirectly affect San Clemente sage sparrows if it results in a higher frequency and speed of general travel along this road. Sage sparrows fly low, from shrub to shrub if disturbed, and could easily be hit by passing vehicles along West Shore Road. Although no vehicle collisions with this species have been recorded to date with the baseline low level of use on this road or anywhere on the Island, they could occur if road use within high density sage sparrow habitat increases. Several spur roads lie perpendicular to West Shore Road and have been used predominantly for off-duty recreation in recent years. Four of these roads are identified as “roads to be maintained but not necessarily drivable” in the FMP. These sites had previously been identified as future sage sparrow and island night lizard habitat restoration sites. The proposal to keep these areas free from vegetation will preclude habitat restoration at these sites.

Fuelbreak installation is proposed in areas that include low density sage sparrow habitat within Impact Area II, and in low density sage sparrow habitat that lies uphill from Eel Point. Within Impact Area II, fuel breaks would be created through the use of Phos-Chek, herbicides, or controlled burns. The use of Phos-Chek may result in a fertilizer effect that can favor non-native plant species over those native species adapted to nutrient poor soils. A strip burn is proposed uphill from Eel Point along a road segment "to be maintained but not necessarily drivable." Since the boundaries of future fuel breaks have not yet been identified, we anticipate that the Navy will consult with the Service regarding any future plans to establish fuel breaks with the potential to impact sage sparrow. Thus, the impacts of new fuelbreaks on San Clemente sage sparrow are not considered in this analysis.

Fire suppression activities from air and ground support could impact nesting sage sparrows. Water dumped from helicopters or sprayed from trucks with high powered nozzles may knock nestlings or eggs out of the nest resulting in death or injury. The Navy intends to instruct firefighters in MIST techniques on an annual basis, which should minimize unnecessary impacts to sage sparrows and their habitat.

**Air Traffic**

Air traffic that occurs on the San Clemente Island airfield and air traffic that flies over sage sparrow habitat may affect sage sparrows. Air traffic on the airfield includes numerous touch and go operations to simulate carrier landing. Biological monitoring reports mention observations of sage sparrows disturbed by air traffic noise, but provide no explanation as to how this "disturbance" was assessed or correlated to the noised (Kaiser *et al.* 2007). UAVs and helicopters proposed for use on San Clemente Island may travel over sage sparrow habitat, although their travel routes are not specific. UAVs that travel over sage sparrow habitat are expected to produce little or no noise. Although sage sparrows may alter behavior in response to a UAV, the level of disturbance is not expected to result in a measurable effect to the species.

Helicopters may fly over San Clemente Island as they approach landing areas within VC-3, TARs, or BTS areas for fire suppression practice. Helicopters may also hover over sage sparrow habitat during insertion exercises into TARs or BTS sites. Low flying or hovering helicopters are expected to elicit a response from sage sparrows. Sage sparrows are likely to disperse by flying low to the ground and between shrubs to seek refuge. Rotorwash from helicopters can also produce significant turbulence, which could cause sage sparrows to react, particularly during nesting. Birds could flush from nests or otherwise react by temporarily altering their normal feeding and sheltering behaviors. The turbulence caused by rotorwash during the nesting season could damage nests or result in chick/egg displacement from nests.

Whether disturbance associated with air traffic would reach a level expected to harm sage sparrows, depends on the timing, location, and frequency of activities. Explicit information regarding anticipated air traffic patterns associated with proposed operations is unavailable, and no altitude restrictions over sage sparrow habitat are proposed. Based on the operations described, helicopter activity is likely to significantly increase on the island; however, most activity is expected to parallel Ridge Road as helicopters provide support and travel in conjunction with assault vehicles along the AVMA. Thus, we believe the potential effects of increased air traffic on San Clemente Island sage sparrow could result in the direct loss of eggs or chicks from the rotorwash, but these instances will be rare.

**Foot Traffic**

The proposed action includes training activities that involve groups moving through sage sparrow habitat on foot. Foot traffic may result in disturbance or harm to sage sparrows, especially if conducted during the breeding season, and could also exacerbate soil compaction, erosion, or invasive plant proliferation in sage sparrow habitat depending on the intensity and timing of activities.

Many operations, such as land navigation, search and rescue, EOD sweeps, and activities at the TARs could occur in sage sparrow habitat and involve off-road foot traffic with up to 20-25 people walking over an area, sometimes more than once in a given operation. While they may move in response to foot traffic, impacts to the sage sparrow from this small number of personnel on foot are expected to be negligible outside of the breeding season.

No seasonal restrictions on operations are proposed, so operations could occur in sage sparrow habitat during the breeding season. Sage sparrows often place their nests in low brush or directly on the ground. Foot traffic through occupied sage sparrow habitat could result in trampling of nest shrubs or nests if such activity occurs during the breeding season. The maximum estimated density of sage sparrows in high density habitat is approximately one individual per acre. If up to 20-25 people travel through a sage sparrow territory off of existing roads and trails, the possibility of nest trampling exists, but it would likely occur infrequently. Disturbance associated with foot traffic could also cause adults to react and move, possibly alerting predators to their presence or the presence of their nests. Movement of sage sparrows in response to passing foot traffic would be more likely during daytime than at night; however, deleterious effects of sparrow movement would be more likely if birds were flushed from nests in the darkness. The presence of abundant cactus within sage sparrow habitat is expected to affect the ability of troops to move stealthily through habitat if travel occurs off of existing roads or trails. Consequently, it is likely that troops will adhere to existing roads or trails or be forced to step directly on the vegetation to avoid cactus spines. Since mission requirements reportedly necessitate stealthy travel that does not leave evidence, such as broken branches, it is expected that the majority of travel through sage sparrow habitat will occur on existing trails and roads and therefore result in little direct impacts to sage sparrows and their nests.

Larger scale foot traffic in sage sparrow habitat is anticipated during Battalion Sized Landings within the Infantry Operations Area, where it overlaps with the Old Rifle Range AVM Area and Old Rifle Range AMP within approximately 57 ha (142 ac) of low density sage sparrow habitat. This area is likely to be highly disturbed as a result of proposed off road vehicle activity, and additional disturbance associated with more intensive foot traffic would likely contribute to the degradation of an already degraded area. Thus, any harm to individual sparrows associated with foot traffic in these areas is expected to be rare.

**Vehicle Traffic**

The proposed action is likely to result in increased vehicle traffic on roads within sage sparrow habitat to support access to and fire management at proposed TARs and BTS sites. Proposed road maintenance of West Shore Road may result in disturbance, if conducted during the breeding season, and could lead to increased traffic or vehicle speed along this route. As a result, we anticipate that small number of sparrows will be hit with vehicles along this road at a rate of about 1 per year (also see Fire Containment and Suppression above).

The proposed action also includes off-road assault vehicle use within approximately 57 ha (142 ac) of low density sage sparrow habitat that lies within the boundaries of the proposed Old Rifle Range AVMA and the Old Rifle Range AMP. Off-road vehicles could crush active nests injuring or killing eggs and/nestlings. Off-road vehicle use, such as that proposed within the AVMA is expected to significantly modify vegetation structure to the extent that it would no longer support sage sparrows. Off-road vehicle use is also expected to result in erosion and spread of invasive plants, which could degrade sage sparrow habitat downslope from the AVMA. Based upon the densities of sage sparrows recorded since 1999, about 1 percent of the low density habitat is likely to support approximately 2-20 adult individuals or about 1 percent of the population. However, because the low density habitat quality in the AVMA is more degraded than the surrounding low density habitat areas under baseline conditions, we expect that there is an even lower density of sage sparrows here that would be vulnerable to these impacts.

Conclusion

After reviewing the current status of San Clemente sage sparrow, the environmental baseline, and the effects of the proposed action, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of San Clemente sage sparrow. We have reached this conclusion for the following reasons:

(1) A significant percentage (*i.e.*, 84-93 percent) of the San Clemente sage sparrow population inhabits areas that are located outside of training operational areas;

(2) Less than 10 percent of the available San Clemente sage sparrow habitat will be significantly modified due to direct and indirect effects of the proposed action;

(3) Despite the potential for accidental fires to occur within sage sparrow habitat in and around training operational areas, analysis of sage sparrow use adjacent to training areas north of the San Clemente Island runway indicates that sage sparrows are likely to continue to use habitat that experiences small, patchy fires. Measures included within the FMP include onsite suppression resources that are likely to allow Naval Special Warfare personnel to extinguish fires immediately. The resulting pattern of burned areas is likely to include primarily small patchy fires similar to those observed in the area around TAR 4.

(4) The number of sage sparrows, including adults, juveniles, eggs and nestlings, injured or killed will occur over time and not all actions that impact sparrows will occur every year; thus, the overall number of sparrows harmed, injured, or killed by the proposed action is expected to be low; this low level impact is not expected to result in an appreciable reduction in the numbers, reproduction, or distribution of the San Clemente sage sparrow population; and

(5) We expect that the impacts anticipated as a result of operational activities will be offset by the Navy's ongoing efforts to promote recovery of the sage sparrow, which are included in their proposed action and/or identified in the San Clemente Sage Sparrow Management Plan.

**Western Snowy Plover** (*Charadrius alexandrinus nivosis*)

Status of the Species

*Listing Status*

The Pacific coast population of the western snowy plover (*Charadrius alexandrinus nivosus*) was listed as threatened under the Act on March 5, 1993 (58 FR 12864). At the time of listing the portion of the population in California was estimated to be approximately 1,386 based on a 1989 survey, with 30 adults reported in Oregon in 1992, and fewer than 30 nesting birds in Washington (58 FR 12870). Threats to the species identified at the time of listing included loss and modification of nesting habitat resulting from encroachment of European beachgrass, extensive human recreational use of nesting areas, and human development of the coast, with predation also cited as a significant threat to a number of nesting colonies (58 FR 12872).

Critical habitat was first designated for this population of western snowy plover on December 7, 1999 (64 FR 68508). Following a lawsuit filed against the Service by the Coos County Board of County Commissioners and others, the 1999 critical habitat designation was remanded and partially vacated (Coos County Board of County Commissioners *et al*. v. Department of the Interior *et al*. CV 02-6128). A revised final critical habitat designation was published in the *Federal Register* on September 29, 2005 (70 FR 56969). The 2005 revised final critical habitat designation does not include lands owned or managed by the Department of Defense on San Clemente Island.

On July 29, 2002, we received a petition from the Surf-Ocean Beach Commission of Lompoc, California to delist the Pacific coast population of the western snowy plover. A similar petition dated May 30, 2003, was received by us from the City of Morro Bay, California. In accordance with our 1996 Petition Management Guidance (61 FR 36075), we treated the two petitions as a single petition because the second petition was neither greater in scope nor did it broaden the area of review of the first petition. We published a 90-Day Finding on the 2002 petition on March 22, 2004 (69 FR 13326), indicating the petition presented substantial information the petitioned action may be warranted.

We completed our 12-Month Finding on the petition to delist the Pacific coast population of the western snowy plover on April 21, 2006 (71 FR 20607). In our 12-Month Finding we determined the Pacific coast population of the western snowy plover met the criteria for discreteness and significance as outlined in the Service's and National Marine Fisheries Service's 1996 Joint Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act (61 FR 4722). At the time the 12-Month Finding was published in the *Federal Register*, the United States' portion of the Pacific Coast Distinct Population Segment (DPS) of the western snowy plover was estimated to be 2,300 (71 FR 20625). Furthermore, while we determined the DPS of the western snowy plover should remain classified as threatened under the Act, we also concluded that significant progress has been made toward recovery; therefore, concurrent with the publication of the 12-month finding we also published a proposed Special Rule Pursuant to Section 4(d) of the Act for the Pacific Coast DPS of the western snowy plover (71 FR 20625). The proposed 4(d) rule would remove the section 9 prohibitions of the Act for activities that occur in counties where a particular county has met its Breeding Bird Management Goal, as specified in Table 1 of the April 2006 proposed rule (71 FR 20631). A Notice extending the comment period on the proposed 4(d) rule was published in the *Federal Register* on August 21, 2006 (71 FR 35406). A final rule is still in development.

The Service completed a 5-Year Review of the Pacific coast DPS of the western snowy plover in May 2006 and published a notice announcing the completion of the review in the *Federal Register* on February 14, 2007 (72 FR 7064). The 5-Year Review, which used the 2006 12-Month Finding as the basis for the review, recommended no change in the status of the Pacific coast DPS of the western snowy plover.

A Notice Announcing the Availability of a *Final Recovery Plan for the Pacific Coast Population of the Western Snowy Plover* was published in the *Federal Register* on September 24, 2007 (72 FR 54279).

*Species Description*

The western snowy plover is a small shorebird in the family Charadriidae. Adults weigh from 34 to 58 g (1.2 to 2 oz) and range in length from 15 to 17 cm (6 to 7 in) (Page *et al.* 1995). Western snowy plovers are pale gray-brown above and white below, with a white hind neck collar and dark lateral breast patches, forehead bar, and eye patches. The bill and legs are black.

*Distribution, Abundance and Habitat Affinity*

The breeding range of the Pacific coast western snowy plover population extends along coastal beaches from the southern portion of Washington State to southern Baja California, Mexico. The Recovery Plan (Service 2007d) identified 159 current or historical western snowy plover breeding or wintering locations on the U.S. Pacific coast. These localities include 6 in Washington, 19 in Oregon, and 134 in California. In Baja California, breeding western snowy plovers concentrate at coastal wetland complexes as far south as Bahia Magdalena, Mexico

(Palacios *et al.* 1994). Western snowy plovers concentrate in suitable habitat, with the number of adults at coastal breeding locations ranging from 1 to 315, depending in part, on the size of the area. The largest number of breeding birds occurs from south San Francisco Bay to southern Baja California suggesting that the center of the plovers' coastal distribution lies closer to the southern boundary of California (Page and Stenzel 1981; Palacios *et al.* 1994).

The United States' portion of the Pacific coast population of western snowy plovers was estimated at 2,300 birds in 2005, and the estimated rangewide population estimate was 4,800 birds (71 FR 20610). Based on survey information between 2006 and 2008 (Ryan 2008 *in litt*), our estimate for the U.S. population increased in 2006 to an estimated 2,440 birds, which results in a rangewide estimate of 4,910 birds. In the subsequent 2 years, survey information documents declines in the U.S. population of Pacific coast western snowy plovers. Thus, our estimate for the U.S. population in 2007 is estimated at 1,998 birds with a rangewide population estimate of 4,468 birds, and in 2008 our estimate is 1,812 birds, which indicates a rangewide population of 4,282 birds.

Sand spits, dune-backed beaches, sparsely to unvegetated beach strands, open areas around estuaries, and beaches at river mouths are the preferred coastal nesting areas of the snowy plover (Page and Stenzel 1981; Wilson 1980; Powell *et al.* 1997). Other areas used by nesting snowy plovers include dredge spoil fill, dry salt evaporation ponds, airfield ovals, and salt pond levees (Widrig 1980; Wilson 1980; Page and Stenzel 1981). Nest sites typically occur in flat, open areas with sandy or saline substrates with little or no vegetation (Widrig 1980; Wilson 1980; Page and Stenzel 1981; Fancher 1998). Snowy plovers are sometimes found nesting in similar habitats as the least tern, such as occurs at Batiquitos Lagoon (Powell and Collier 2000) and MCBCP (Powell 1996) in San Diego County, California.

*Life History*

The breeding season of the western snowy plover typically extends from March 1 through September 15. During the breeding season, plovers congregate in loose concentrations with the number of adults at coastal breeding areas ranging from 2 to 318 (Page and Stenzel 1981). Both unpaired males and pairs defend territories against other plover species by posturing, chasing, or fighting. Unpaired males defend territories for up to 45 days before procuring a mate (Page *et al.* 1995). Paired birds use the territories for courtship, nest sites, and sometimes feeding (Page *et al.* 1995). Egg laying in southern California has been documented as early as February 19 (Copper pers. comm. 2002) but most often begins in mid-March and continues through late-July.

Generally, three (3) eggs are laid in a nest that consists of a shallow depression scraped in sandy or saline substrates. After the full clutch is laid, both males and females incubate the eggs for 27-33 days (Warriner *et al.* 1986). Chicks are mobile soon after hatching, and broods rarely remain within the nesting territory (Warriner *et al.* 1986). The male may lead the brood to a brood territory, which can range from 0.8 to 1.2 ha (2 to 3 ac) (Fancher *et al.* 2002). Birds are able to fly within approximately 31 days of hatching.

Snowy plover adults and young forage on invertebrates along intertidal areas, along beaches in wet sand and surf cast kelp, in foredune areas of dry sand above the high tide, on salt pans, and along the edges of salt marshes and salt ponds. Page and Stenzel (1981) observed snowy plovers moving between salt pans, tidal flats, and beaches indicating these areas function together in providing habitat for the species.

Snowy plovers clutches are frequently destroyed by predators, people, tides, or weather, but they re-nest readily after these losses- up to six times in some locations (Wilson 1980; Warriner *et al.* 1986; Page *et al.* 1995). Snowy plovers may also double or triple brood during favorable years. Re-nesting may occur in the same scrape (rarely), in proximity to the initial nest, or in a new location distant from the first attempt (Warriner *et al.* 1986; Powell and Collier 1994; Powell *et al.* 1997). Nests are rarely reused because weather typically destroys scrapes within days of hatching (Page *et al.* 1995).

Polygamy has been observed in snowy plovers along coastal California (Warriner *et al.* 1986). Snowy plover females may abandon chicks as young as 6 days old to find another mate leaving the male to care for the brood (Warriner *et al.* 1986). Males attend the young for 29-47 days (Warriner *et al.* 1986) and then may re-nest with a new partner if sufficient time remains in the season (Stenzel *et al.* 1994). This results in a serial polygamous breeding system in which males may double clutch and females may triple clutch.

While some western snowy plovers remain in their coastal breeding areas year-round, others migrate south or north for winter (Warriner *et al.* 1986; Page *et al.*1995*a*; Powell *et al.* 1997). In Monterey Bay, California, 41 percent of nesting males and 24 percent of the females were consistent year-round residents (Warriner *et al.* 1986). At MCBCP in San Diego County, California, about 30 percent of nesting birds stayed during winter (Powell *et al.* 1994, 1996, 1997). The migrants vacate California coastal nesting areas primarily from late June to late October (Page *et al.* 1995a). There is evidence of a late-summer (August/September) influx of western snowy plovers into Washington; it is suspected that these wandering birds are migrants. Most western snowy plovers that nest inland migrate to the coast for the winter (Page *et al.* 1986, 1995). Thus, the flocks of non-breeding birds that begin forming along the U.S. Pacific coast in early July are a mixture of adult and hatching-year birds from both coastal and interior nesting areas. During migration and winter, these flocks range in size from a few individuals to up to 300 birds (Service 2007d).

*Threats*

Threats to the Pacific Coast population of the western snowy plover remain essentially the same as at the time of its listing in 1993. The magnitude of these threats has been reduced through active management afforded by protections under the Act and undertaken primarily by certain Federal, State, and County agencies (71 FR 20625). The most important threats are ongoing habitat loss and fragmentation; mortalities, injuries, and disturbance resulting from human activities; and lack of comprehensive State and local regulatory mechanisms throughout the range of the Western snowy plover (71 FR 20607). Natural factors, such as inclement weather, have also affected the quality and quantity of western snowy plover habitat (Service 2007d).

*Rangewide Conservation Needs*

The goal to achieve the long-term survival and recovery of the Pacific coast snowy plover population, as identified in the Recovery Plan includes three criteria: (1) maintain for 10 years an average of 3,000 breeding adults distributed among six recovery units (2) maintain a 5-year productivity of at least one fledged chick per male in each recovery unit in the last 5 years prior to delisting; and (3) establish participation plans among cooperating agencies, landowners, and conservation organizations to assure protection and management of breeding, wintering, and migration areas.

While some positive contributions have been made to achieving each of these criteria, recovery actions are still needed (FR 71 20625). Conservation needs identified in the Recovery Plan include: monitoring; management of breeding and wintering habitat to reduce threats (*e.g.* disturbance, loss of natural coastal processes, predation, invasive vegetation); enhancement and creation of habitat; reduction of disturbances on nesting and wintering beaches; and public education.

Environmental Baseline

San Clemente Island is not currently used as a breeding site by western snowy plovers, although five sandy beaches on San Clemente Island (*i.e.*, West Cove, Pyramid Cove, China, Northwest Harbor, and Horse) provide primarily wintering habitat for western snowy plovers. These beaches range in size from the small dune backed beach at West Cove [approximately 150 m (492 ft) long x 30 m (98 ft) wide at low tide] to the largest beach on the island at Pyramid Cove [approximately 1,200 m (93,937 ft) long x 50 m (164 ft)wide at low tide].

Although western snowy plovers are observed foraging and roosting year round, including the breeding season (Lynn *et al.* 2005), nesting has only been documented on three occasions on San Clemente Island. Navy surveys revealed pronounced annual cyclic use of San Clemente Island by western snowy plovers, specifically this species is typically absent during the breeding season while wintering numbers are much higher (up to 41 individuals) (U.S. Navy 2008). Nesting was observed at West Cove Beach in 1989. West Cove Beach was formerly much wider; however, construction of the nearby airfield reduced the transport of sand to this beach (Foster and Copper 2003). At present, most of the beach is subject to inundation during early spring high tides, which reduces its suitability for nesting. Snowy plover nesting has been recorded twice at Horse Beach, once in 1996 and once in 1997 (Foster and Copper 2001). Other potential nesting beaches, including China Beach and Pyramid Cove Beach, are narrow and more likely to be inundated by high tides, reducing their suitability as nesting habitat.

The Recovery Plan identified these five beaches as important wintering habitat for western snowy plovers. Island-wide winter surveys observed a maximum day total of 41 plovers at these beaches from 2000 to 2004 (U.S. Navy 2008). The maximum number of plovers observed during a survey at each beach from 2003 to 2005 is 28 at Pyramid Cove, 22 at Horse Beach, 19 at China Beach, 14 at Northwest Harbor Beach, and 11 at West Cove Beach (Lynn *et al.* 2004, 2005 and 2006). Plovers move regularly between nearby beaches, but the beaches at the northern end of the island (*i.e.*, West Cove Beach and Northwest Harbor) are separated by approximately 27 km (16.8 mi.) from the beaches at the southern end of the island (*i.e.*, Pyramid Beach, Horse Beach, and China Beach), and some movement has been detected between beaches located at the north and south ends (Lynn *et al*. 2005).

The five beaches used by western snowy plovers are some of the most frequently used areas of the island by the military because sandy beaches are required for many training activities that entail movement between land and water. Each of the beaches is included within one of the TARs under baseline conditions (Pyramid Beach-TAR 20, Horse Beach- TAR 21, China Beach-TAR 22, West Cove Beach-TAR 5, and Northwest Harbor-TAR 3). Western snowy plovers are subject to temporary disturbance from foot and vehicle traffic associated with military training. These activities may cause plovers to temporarily fly away and render all or part of the beach unusable by the plover until training is over. Pyramid Beach and China Beach are also within the boundaries of Impact Areas I and II, respectively, and ordnance craters are visible on China Beach (Lynn *et al*. 2005). Western snowy plovers are disturbed and exposed to risk of death or injury associated with ship-shore ordnance use on a regular basis under baseline conditions. However, potential impacts to plovers from training or ordnance use have not been addressed in previous consultations.

Beaches on San Clemente Island are also periodically disturbed for facilities maintenance projects. We previously consulted with the Navy on the potential effects of a hydrophone cable replacement project that entailed digging trenches on the West Cove Beach, which have been filled and returned to the original beach contours (Biological Opinion FWS 1-6-95-F-29). To minimize impacts to the plover, sand was transported to the upper reaches of West Cove Beach. However, this area has since been overgrown with native and non-native vegetation. In addition, informal Endangered Species Act, Section 7 Consultation was conducted with the Service in February 2005 on the Southern California Anti-Submarine Warfare Range (SOAR) Cable Repair at San Clemente Island. The Service issued a concurrence letter dated 20 April 2005 that the cable repair project was “not likely to adversely affect” the western snowy plover.

Native (*e.g.* island fox) and non-native (*e.g.* feral cats) predators likely affect the suitability of San Clemente Island beaches for western snowy plover nesting.

The Navy has conducted periodic western snowy plover monitoring on all San Clemente Island beaches to support the ongoing assessment of the plover’s status. In addition, the Navy conducts ongoing predator management to support recovery of the San Clemente loggerhead shrike, which may also benefit western snowy plovers by reducing island-wide cat abundance.

Effects of the Action

The proposed action includes increased frequency of training on the five San Clemente Island beaches inhabited by western snowy plovers and introduction of amphibious vehicle use at Horse Beach. Western snowy plovers will be subject to increased frequencies of temporary disturbance from foot and vehicle traffic associated with combined forces training operations (*e.g.* Battalion Sized Landings, other combined forces exercises). Training activities could occur both day and night on these beaches.

Plovers that are forced from beaches due to human activity are likely to disperse to the nearest available habitat. For larger beaches, such as Pyramid Beach, training activities will likely cause plovers to temporarily shift to undisturbed portions of the beach until training is over. Observations suggest plovers rapidly resume normal behavior after moving away from military training activities (Lynn *et al*. 2005). Thus, we assume that plovers using the larger beaches on San Clemente Island are likely to continue to use these beaches.

Training activities are likely to have the greatest impact on the smallest beach (*i.e*., West Cove Beach), which will be subject to up to 44 Marine Corps amphibious vehicle operations and 50 NSW operations per year. These activities will subject plovers to movement at night when they are assumed to normally be resting. For smaller beaches, such as West Cove Beach, human and vehicular activity, noise or visual effects may render the entire beach unusable for foraging or resting by plovers until training is over, thus causing plovers to disperse to other areas; however, Navy survey data indicate that plovers roost above West Cove beach near the airfield as well, which is a short dispersal distance. Likewise, if training exercises commence in Impact Area II (China Beach), it is likely that plovers would attempt to fly to nearby habitat at Horse Beach or Pyramid Beach. Monitoring reports indicate that plovers may move readily between nearby beaches; however, the availability of a disturbance-free beach is likely to decrease as training intensity on San Clemente Island increases (*i.e*., beaches suitable for foraging and resting on the same end of the island.) Thus, the duration of some of the operations and multiple sources of disturbance could cause plovers normally foraging and resting along San Clemente Island beaches to disperse and seek foraging habitat along mainland or other Channel Island beaches. This level of disturbance is not likely to result in injury or death to individual plovers as distances between suitable habitat along other Channel Island beaches and the mainland is well within the energy and physiological capabilities of these birds. Moreover, we expect that plovers will still take advantage of San Clemente Island beaches for foraging at times when training activities are low or absent.

Likelihood of direct injury or mortality to an individual plover from tracked or wheeled vehicle use on beaches is very low, but possible. Impacts to plovers from these types of vehicles would most likely occur at night if resting birds are surprised and fail to react quickly enough to flee the direct path of a vehicle. Such impacts are much less likely to occur during the day when the birds are actively foraging. To minimize potential impacts to plover, the Navy will direct tracked and wheeled vehicles to use the existing route for ingress and egress to/from the beach at West Cove and identify an ingress/egress and travel route at Horse Beach. With this measure in place, we anticipate no more than one plover per year will be injured or killed due to training activities including the use of tracked and wheeled vehicles on San Clemente Island beaches.

Western snowy plovers are also increasingly likely to be disturbed, or possibly harmed, as a result of increased use of heavy ordnance over China Beach (Impact Area II) and Horse Beach and Pyramid Cove Beach (Impact Area I) due to the location of the beach directly in the path of the munitions used. Although targets in these Impact Areas are primarily placed away from the shore, rounds sometimes fall short as evidenced by craters on China Beach (Lynn *et al.* 2005). Plovers may fly from the beach, if disturbed by noise associated with training, but still face some risk of injury or fatality due to the location of their habitat within the Impact Areas. Thus, it is likely that some small number of plover(s) will be harmed or killed by ordnance as a result of training activities, but we anticipate that no more than one plover per year will be harmed or injured by ordnance on Horse Beach, China Beach, or Pyramid Beach on San Clemente Island.

The Navy has contributed to the range-wide efforts to monitor the western snowy plover and will continue annual breeding and non-breeding season surveys for the western snowy plover at West Cove and Northwest Harbor. However, new range management directives will be implemented as part of the proposed action. These directives will limit the ability of Navy resource personnel to monitor western snowy plover use of Horse Beach, China Beach, and Pyramid Cove Beach. The Navy will explore the feasibility of using remote sensing technology to monitor western snowy plover use of Pyramid Beach and China Beach.

<u>Conclusion</u>

After reviewing the current status of the western snowy plover, the environmental baseline, and the effects of the proposed action, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the western snowy plover. We have reached this conclusion for the following reasons:

(1) The Pacific coast western snowy plover population is widely distributed along the Pacific coast from Washington State to Baja California, Mexico. While populations fluctuate annually, range-wide population estimates have increased significantly since the species was listed in 1993 to an estimated 4,282 birds in 2008;

(2) The death or injury of up to two plovers per year in association with the proposed training would remove less than 0.1 percent of the Pacific coast western snowy plover population within the U.S. annually;

(3) San Clemente Island rarely supports breeding activity so the proposed action is unlikely to affect the species' reproduction;

(4) The small number of birds injured or killed annually by training activities is not expected to result in an appreciable reduction in the numbers, reproduction, or distribution of the Pacific coast population of the western snowy plover; and

(5) We assume that plovers using the larger beaches on San Clemente Island are likely to continue to use these beaches and that disturbance frequency from training activities will not reach a threshold that deters birds entirely from the island.

## Reptile

**Island night lizard** (*Xantusia riversiana*)

Status of the Species

*Listing Status*

The island night lizard was listed as a threatened species on August 11, 1977 (Service 1977 (42 FR 40682)), primarily due to threats associated with habitat alterations caused by farming, fire, grazing by introduced animals, and invasion by exotic plants. The island night lizard is addressed in the Channel Islands Recovery Plan (Service 1984). Critical habitat has not been designated for the island night lizard.

We received a petition from the National Wilderness Institute, dated February 3, 1997 (Wilderness Institute 1997), to delist the island night lizard on the basis of data error. In a letter to the National Wilderness Institute dated June 29, 1998 (Service 1998), we indicted that due to low priority assigned to delisting activities in our 1997 Fiscal Year Listing Priority Guidance, we were not able to act on the petition at that time.

We received a petition dated March 22, 2004, from the U.S. Navy (U.S. Navy 2004), asserting that the island night lizard populations on Santa Barbara, San Clemente and San Nicolas islands each qualify as distinct vertebrate population segments, meeting the discreteness and significance criteria of the Service's and National Marine Fisheries Service's joint Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act, published in the *Federal Register* on February 7, 1996 (Service 1996 (61 FR 4722)). The petitioners also requested the Service delist the distinct vertebrate population segments of the island night lizard on San Clemente and San Nicolas islands.

On August 22, 2006, we published a 90-day finding for both the 1997 and 2004 petitions to delist the island night lizard (Service 2006a (71 FR 48900)). In our 90-day finding, we determined the 1997 petition from the National Wilderness Institute did not provide substantial information indicating the petitioned action was warranted. However, we determined the 2004 petition from the U.S. Navy provided substantial information indicating the petitioned actions were warranted, and we commenced work on a 12-month finding.

In September 2006, we completed a 5-Year Review of the island night lizard and recommended delisting the San Clemente Island population of the island night lizard (Service 2006b). A preliminary analysis of island night lizard populations from the three islands on which it occurs suggests that each may qualify as a Distinct Vertebrate Population; however, in our 5-Year Review, we indicated we would conduct a further evaluation during the course of the 12-month finding on the Navy's delisting petition (Service 2006b). We have not yet completed our 12-month finding.

*Species Description*

The island night lizard is a medium-sized lizard (adults 65 to 109 mm (2.6 to 4.3 in.) snout-vent length) (Mautz 2001). Its dorsal coloration is highly variable, and differs between islands, ranging from pale ash gray and beige, shades of brown, to varying amounts of black, with a pattern varying from uniform, mottled, to striped (Bezy *et al*. 1980, Fellers and Drost 1991).

*Habitat Affinity*

The island night lizard tends to confine its activity to areas with shelter, such as dense vegetation or rock. Therefore, suitable cover is an important habitat component, and appropriate vegetative cover can be a relative indicator of density (Mautz 2001). Vegetation composition and density on San Clemente, Santa Barbara, and San Nicolas Islands have been affected by the grazing history of the islands and by the resulting habitat changes on each island.

A number of habitat types provide the characteristics island night lizard appears to prefer. The island night lizard has been found in prickly pear cactus (*Opuntia oricola* and *O. littoralis*), maritime desert scrub, rocky outcrops and patches, and to a lesser extent, grasslands, and giant coreopsis (*Coreopsis gigantea*) stands (Mautz 2001). The densest populations of island night lizard have been detected in maritime desert scrub communities dominated by boxthorn. High densities also occur in prickly pear and rocky areas and crevices in clay soils.

*Life History*

The island night lizard is a slow-growing, late maturing and long-lived lizard with a low reproductive potential (Goldberg and Bezy 1974; Mautz 1993, 2001). Goldberg and Bezy (1974) suggested that the island night lizard does not reach sexual maturity until the spring of its 3$^{rd}$ or 4$^{th}$ year, and it begins breeding around March or April. The species is viviparous (gives birth to live young), and young are born around September (Goldberg and Bezy 1974; Fellers and Drost 1991; Mautz 1993). The island night lizard is unique for the genus *Xantusia* in having a brood size greater than two (Fellers and Drost 1991). Productivity differs between islands. Females on San Nicolas Island average 5.3 young per brood, and females on San Clemente and Santa Barbara Islands combined averaged 3.9 young per brood (Fellers and Drost 1991). Females demonstrate irregular intervals between reproduction, but they appear to approach a biennial cycle (Goldberg and Bezy 1974; Fellers and Drost 1991; Mautz 1993). Island night lizards can live up to 25 years (one individual record, Fellers 2005) and several individuals of 11 years or more have been recorded (Fellers *et al.* 1998; Fellers and Drost 1991; and Mautz 1993 as cited in Mautz 2001).

Like other members of *Xantusia*, these night lizards were originally assumed to be nocturnal because they were rarely observed during the day, and they have elliptical pupils. Island night lizards are actually primarily active during the day (Bezy 1988). The species eats a variety of insects, as well as the fruits, leaves, and flowers of boxthorn plants (*Lycium* sp.).

*Distribution and Abundance*

The island night lizard is endemic to three of the Channel Islands off the coast of southern California. The island night lizard occurs on San Clemente Island, San Nicolas Island, and Santa Barbara Island and a small islet (Sutil Island) 1.3 km (0.81 mi.) offshore from Santa Barbara Island (Bezy *et al*. 1980). San Clemente Island is the largest inhabited island. San Clemente Island and San Nicolas Island are managed by the U.S. Navy, and Santa Barbara Island is managed by the National Park Service as part of Channel Islands National Park (Fellers and Drost 1991; U.S. Navy 2002; Fellers *et al*. 1998).

At the time of listing in 1977, densities of island night lizard were not known. Measuring population numbers is challenging because of the secretive behavior of the animals. Nevertheless, abundance of the island night lizard has been estimated on the three islands of occurrence using similar techniques. The density of the species has been estimated on survey plots or transects within different habitat types or plant communities. The densities obtained have been extrapolated across each habitat type or plant community on each island to obtain an abundance estimate for each island (Mautz 2001).

The island night lizard occurs in extremely high densities within undisturbed patches of optimal habitat as well as lower densities in other habitat (Fellers and Drost 1991; Fellers *e al*. 1998; Mautz 2001). Mautz (2001) has postulated that the species may require an extremely dense population to be viable over the long-term due to its highly sedentary behavior. Although island night lizard densities in optimum habitat are comparable on the three islands where they occur, the islands differ in size and habitat availability, and the island night lizard populations vary accordingly.

The island night lizard is most abundant and widespread on San Clemente Island, which is the largest of the islands on which it occurs and contains the most maritime desert scrub habitat that is optimal for island night lizard. San Clemente Island has at least 2,351 ha (5,809 ac) of maritime desert scrub, and the number of island night lizards is estimated to be about 21.3 million (Mautz 2001). Because the action area includes all of San Clemente Island, details regarding the distribution of island night lizards and their habitat on San Clemente Island are provided in the Environmental Baseline section below.

San Nicolas Island supports less 65.8 ha (162.5 ac) of island night lizards habitat, including only 1.0 ha (2.5 ac) of the maritime desert scrub habitats that are optimal for island night lizard. Using data from a study extending from 1992 to 1995, Fellers *et al.* (1998) estimated that the population size on San Nicolas was about 15,350 individuals. On Santa Barbara Island, a study of island night lizard distribution and abundance in the mid 1980's yielded an estimate of only about 6 ha (15 ac) of island night lizard habitat (Fellers and Drost 1991), but much of the habitat was high-quality and supported high numbers of island night lizards. The estimated population size for Santa Barbara Island was about 17,600 lizards (Fellers and Drost 1991). The population on Santa Barbara Island has not been intensively surveyed since the 1980's.

*Genetics*

A study of divergence in the island night lizard identified morphological differences between island populations but did not detect significant genetic distance values using electrophoretic analysis of proteins (Bezy *et al.* 1980). Morphological differences included significant differences in scalation patterns, color pattern, clutch size, and body size (not significant between San Clemente and Santa Barbara). More recently, another genetic analysis, using nuclear and mitochondrial DNA, suggests that lizards on the three islands are genetically different from one another, with San Nicolas Island being the most distinct. According to this study, the San Clemente Island and Santa Barbara Island populations are also distinct, but they have not been isolated as long as the San Nicolas population has (Sites *in litt.* 2006).

*Threats*

A general discussion of the threats faced by island night lizard and threats on Santa Barbara and San Nicolas islands is provided in this section. Because the action area includes all of San Clemente Island, details regarding threats to the island night lizard on San Clemente Island are provided in the Environmental Baseline section below.

Potential threats to this species have been substantially reduced with the removal of grazing animals that were affecting habitat on all three islands where they occur. Some potential threats remain, including habitat degradation by introduced annual grasses, predation by feral cats, and expansion of military training activities, which can degrade and eliminate habitat through activities such as off-road vehicle use, intensive ordnance use, and associated fires. The island night lizard populations on San Nicolas and Santa Barbara islands are more vulnerable to stochastic environmental disturbances because they are geographically restricted.

Non-native grasses may compete with California boxthorn or prickly-pear cactus (common cover species in optimal island night lizard habitat) for space or other resources such as light, water, and nutrients. The potential replacement of native shrub communities with annual grassland is a concern because areas invaded by non-native grasses support substantially fewer island night lizards than those with intact scrub communities (Mautz 2001; Fellers and Drost 1991). In addition, non-native grasses can alter ecological processes such as fire frequency that otherwise could affect the persistence of the island night lizard (U.S. Navy 2002). Since the removal of non-native grazing animals, some native plant species on San Clemente Island now exhibit signs of recovery, including seedling establishment, increases in plant cover, or observations of new occurrences of particular species (Fellers and Drost 1991; Junak and Wilken 1998; Tierra Data Systems 2005). However, vegetation monitoring on San Clemente Island and Santa Barbara

Island has shown no clear trend overall towards expansion of either the shrub communities preferred by island night lizards or non-native grasslands (U.S. Navy 2002; Tierra Data Systems 2005; Corry 2006). There is no current information on vegetation trends on San Nicolas Island. In summary, invasion by non-native grasses is a concern on all the islands, but by itself, we do not consider it a primary threat to any of the island night lizard populations.

Feral cats were introduced to San Clemente Island and San Nicolas Island during the ranching era of the late 1800's and early 1900's and have been documented eating substantial numbers of island night lizards (Cooper *et al*. 2005). Predator control has been conducted intermittently on San Clemente Island and on a more regular basis recently. Despite the threat posed by cats, island night lizards have maintained stable populations with ongoing predation by cats. Cats are also present on San Nicolas Island and have been observed in nearly all parts of the island (Fellers *et al*. 1998). On San Nicolas Island, the feral cat population has been subject to limited control. Therefore, the current cat population continues to be a threat to the population on San Nicolas Island.

A potential for fire exists on both San Nicolas Island and Santa Barbara Island due to human presence. However, based on historical records and current land use, high fire frequency is not likely. As with other Channel Islands, natural fires are infrequent. Human-caused ignition sources, while present, are not as prevalent as on San Clemente Island due to the absence of live-fire military training and the lower number of people present on each island. Ignitions on San Nicolas Island would be most likely to occur in the vicinity of two missile launch sites, which occur outside of documented island night lizard habitat (U.S. Navy 2003). Baseline conditions on San Clemente Island related to ongoing military use and associated risk of fires are discussed in more detail in the Environmental Baseline section below.

*Rangewide Conservation Needs*

The island night lizard is included as a target species in the 1984 Channel Islands Recovery Plan. The overarching goal of this plan is "to restore endangered and threatened species to non-listed status by restoring and protecting habitat that can support viable self-sustaining populations." Basic objectives of the recovery plan include: protection of resources from further degradation by herbivore removal, erosion control, and placement of military operations away from biologically sensitive areas; identification and avoidance of adverse impacts to listed species; restoration of native plant communities; monitoring population status; and responding to recovered populations by modification of listing status, when appropriate. Management of non-native grasses and other weedy species and control of the feral cat population are additional conservation needs. The size of a viable, self sustaining island night lizard population is not identified in the Channel Islands Recovery Plan.

Environmental Baseline

*Distribution*

Island night lizards have been observed at varying densities on San Clemente Island in most plant communities. The principal vegetation communities that support island night lizards are marine succulent scrub (maritime desert scrub) communities (Mautz 2001). Island night lizards have been observed at high densities in maritime desert scrub and are present in other habitat types as well. As shown in Table 16, if the observed densities are extrapolated across the plant communities mapped on the island, over 20 million lizards are estimated to occur on San Clemente Island (Mautz 2001).

Table 16. Midpoint of Regression and Lincoln Index estimates of population density and population size of island night lizard on San Clemente Island

| **Habitat Type or Region** | **Habitat Area (ac / % of island)** | | **Lizard Density (lizards/ac)** | **Lizard Numbers (millions)** |
|---|---|---|---|---|
| Maritime Desert Scrub | acres | percent of island | | |
| Lycium Phase | 5,849 | 16.2 | 783 | 4.45 |
| Prickly Pear Phase | 7,337 | 20.3 | 1036 | 7.60 |
| Cholla & Prickly Pear/Cholla | 6,457 | 17.9 | 576 | 3.72 |
| Grassland (upland plateau) | 9,514 | 26.3 | 462 | 4.40 |
| Scarp Grassland and Coastal Sage | 2,703 | 7.5 | 375 | 1.01 |
| Canyon Shrubland/Woodland | 6,97 | 1.9 | 0 | 0 |
| Active Sand Dunes | 2,25 | 0.6 | 0 | 0 |
| Unsampled Habitats | 3,296 | 9.1 | | |
| **Total** | **36,077** | **100** | | **21.30** |

For habitats known to contain few or no lizards, population density is assumed to be zero. Adapted from Mautz (2001).

The estimates in the table above are based on trapping locations from a limited portion of the island, so the actual numbers of lizards on the island may be substantially different. However, there is clearly a large, dense population of island night lizards on San Clemente Island.

The area that supports the highest densities of island night lizards is believed to have escaped the intensive sheep grazing on the island (U.S. Navy 2002). Optimum habitat on San Clemente Island is primarily distributed in a band along the western marine terraces of the island, although lizards are found at lower densities in many parts of the island (Mautz 2001). The Navy has recognized an INLMA in this area since 1997 (U.S. Fish and Wildlife Service 1997e), which includes approximately 4,500 ha (11,100 ac), where Mautz estimates that approximately half of the island population is found (Mautz 2001).

*Threats*

Like the other Channel Islands, San Clemente Island has experienced a history of ongoing habitat modification due to grazing and browsing of non-native goats, sheep, deer, pigs, and cattle introduced by people. Erosion, reduced shrub cover, and changes in soil composition that resulted from overgrazing (Schwartz 1994; Halvorson 1994; U.S. Navy 2002) are all evident on San Clemente Island, as well as the vegetation recovery following the removal of these animals (Tierra Data, Inc. 2008).

There are a variety of non-native grasses present on San Clemente Island (U.S. Navy 2002), but although individual annual grass species may have expanded their distribution at a specific location over a specific time period, there is little evidence that non-native annual grasses are expanding their distribution throughout the island over time (Tierra Data, Inc. 2008). Thus, non-native invasive species are a concern and could become a more substantial threat if disturbance from fire or other sources increased significantly, but we do not consider them a primary threat to island night lizards at this time.

Feral cat populations persist on San Clemente Island, despite intermittent control efforts that began in 1986 and ongoing year-round efforts that began in 1998. Despite the persistence of the cat population on San Clemente Island and documentation of predation, the island night lizard density has remained very high on sample plots, and the population appears stable (Mautz 2001). Therefore, we do not consider cats to be a substantial threat to island night lizard on San Clemente Island at this time. However, if the cat population was left unchecked, it could become a more substantial threat (Mautz 2001).

Disturbances and habitat modification associated with: (1) baseline levels of training and resulting wildfires (Biological Opinion FWS 1-6-97-F-21; FWS-2808); (2) construction and baseline levels of training at TARs 4 and 16 (Biological Opinion FWS 1-6-00-F-19); and (3) impacts associated with the paving of San Clemente Island Ridge Road and construction of the AVMA from West Cove to the SHOBA gate (Biological Opinion FWS 1-6-97-F-58 and FWS 1-6-04-F-3934.1) have affected baseline habitat of the island night lizard. These past biological opinions anticipated impacts totaling 2,099 ha (5,186 ac) of night lizard habitat in association with creation of fuelbreaks and increased risk of fire throughout Impact Areas I and II. Night lizards were anticipated to remain in Impact Areas I and II, but mortality was anticipated to increase. The baseline conditions, therefore, include the existing threat of fire in Impact Areas I and II based on current activity levels. A previous biological opinion also anticipated impacts to island night lizards occupying 85 ha (209.5 ac) of maritime desert scrub north of the runway and 225 ha (556 ac) at or around TAR 16 due to habitat loss, training-related impacts, and increased fire frequency. Again, night lizards were anticipated to remain in most of the affected habitat, but mortality was anticipated to increase. Finally, a programmatic biological opinion (Biological Opinion FWS 1-6-97-F-58) addressed the loss of 85 ha (210 ac) of grassland, 15 ha (37 ac) of maritime desert scrub, and 299 ha (740 ac) of previously disturbed habitat associated with a variety of construction and training-related impacts. Of these anticipated impacts, only 21 ha (51 ac) of grassland, 13 ha (33 ac) of maritime desert scrub, and 41 ha (102 ac) of previously disturbed habitat potentially occupied by night lizards have been impacted by projects. Despite the effects of human activities, including military training on this species, in optimal habitat the island night lizard persists at extremely high densities on San Clemente Island.

*Conservation Actions*

The Navy is implementing the San Clemente Island INRMP (U.S. Navy 2002), which addresses the island night lizard. Under the INRMP, the species is managed by limiting the amount of surface disturbance that occurs within optimal habitat, implementing best management practices to reduce surface disturbance associated with construction projects, enhancement of degraded habitat, and population monitoring every 5 years. Additional conservation actions outlined in the INRMP that likely benefit the island night lizard include ongoing efforts at invasive plant species control and non-native predator management (*i.e.*, feral cat removal).

The INLMA was created in 1997 to provide a focus area for island night lizard management activities, including habitat restoration (Biological Opinion FWS 1-6-97-F-58) and to offset the effects of surface disturbing construction projects that occurred during the same time period (Biological Opinions FWS -1-6-97-F-18, FWS 1-6-97-F-42, and FWS 1-6-97-F-58). The area supports approximately half of the island population (Mautz 2001). Few active management activities to benefit the island night lizard have occurred within the designation of the INLMA. However, the primary conservation measure that would benefit this species, avoidance of disturbance, has been the primary benefit of its continued recognition. The 5-year duration of the INLMA proposed by the Navy has passed, and although the INLMA is mapped and included within the 2002 INRMP, the Navy does not propose to carry this designation forward in future revisions of the INRMP. The Navy intends to include a more comprehensive and up-to-date management framework to support this species in future revisions of the INRMP.

Effects of the Action

The proposed action includes operations and activities that are likely to adversely affect the island night lizard, including increased use of areas that have, to date experienced little human use. Fire, ordnance use, foot travel and vehicular travel in the Impact Areas I and II, IOA, AVMR, AVMAs (Old Rifle Range and VC-3), AMPs, AFPs, TAR 10, TAR 17, and BTS sites may result in habitat modification and death or injury of individual lizards. Because island night lizards are afforded protection under rocks and soil, we expect many of the thousands of lizards that inhabit existing and proposed operations areas to persist despite ongoing and intensified operational use of San Clemente Island. Within operational areas, island night lizards and their habitat would be most affected by surface disturbing activities and changes in habitat that may occur due to repeated fires or invasive species introduction and spread. In addition, construction of range buildings and gates are proposed in island night lizard habitat. The acreage of island night lizard habitat that is found within operational areas that are likely to experience direct and indirect effects is provided in Table 17, and the estimated number of night lizards and percent of the population in these areas is provided in Table 18.

Table 17. Island night lizard habitat (acres and percent of habitat type) within project footprint

| Operational Area | MDS* Prickly Pear Phase | | MDS* Lycium Phase | | MDS* Cholla and Prickly Pear/Cholla | | Grassland (Upland Plateau) | |
|---|---|---|---|---|---|---|---|---|
| | acres | percent | acres | percent | acres | percent | acres | percent |
| Old Rifle Range AVMA | 0 | 0 | 137.2 | 2.4 | 0 | 0 | 0.5 | 0.005 |
| VC-3 AVMA | 0 | 0 | 0 | 0 | 2.6 | 0.04 | 275.5 | 2.9 |
| AFP 6 | 0 | 0 | 0 | 0 | 0 | 0 | 123.3 | 1.3 |
| AFP 1 | 0 | 0 | 0 | 0 | 34.1 | 0.5 | 0 | 0 |
| Impact Area I | 0 | 0 | 511.6 | 8.8 | 397.8 | 6.2 | 1.0 | 0.01 |
| Impact Area II | 28.0 | 0.4 | 572.0 | 9.8 | 0 | 0 | 0 | 0 |
| AMP, “Self Help” | 0 | 0 | 0 | 0 | 0 | 0 | 3.4 | 0.04 |
| TAR 10 | 0 | 0 | 25.3 | 0.4 | 0 | 0 | 0 | 0 |
| TAR 17 | 0 | 0 | 7.2 | 0.1 | 0 | 0 | 0 | 0 |
| BTS Sites | 0 | 0 | 3.0 | 0.05 | 1.0 | 0.02 | 0 | 0 |
| **Totals** | **28.0** | **0.4** | **1256.3** | **21.5** | **435.5** | **6.7** | **403.7** | **4.2** |

*MDS: Maritime desert scrub

Table 18. Estimated number of island night lizards (number / percent of population) within the project footprint from habitat-based density estimates in Table 16 (Mautz 2001)

| Operational Area | MDS* Prickly Pear Phase | | MDS* Lycium Phase | | MDS* Cholla and Prickly Pear/Cholla | | Grassland (Upland Plateau) | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | lizards | percent | lizards | percent | lizards | percent | lizards | percent | lizards | percent |
| Old Rifle Range AVMA | 0 | 0 | 107,428 | 0.5 | 0 | 0.00 | 231 | 0.001 | 107,659 | 0.5 |
| VC-3 AVMA | 0 | 0 | 0 | 0.00 | 1,498 | 0.01 | 127,281 | 0.6 | 128,779 | 0.6 |
| AFP 6 | 0 | 0 | 0 | 0.00 | 0 | 0.00 | 56,965 | 0.3 | 56,965 | 0.3 |
| AFP 1 | 0 | 0 | 0 | 0.00 | 19,642 | 0.09 | 0 | 0 | 19,642 | 0.1 |
| Impact Area I | 0 | 0 | 400,583 | 1.9 | 229,133 | 1.1 | 462 | 0.002 | 630,178 | 3.0 |
| Impact Area II | 28,980 | 0.1 | 447,876 | 2.1 | 0 | 0.00 | 0 | 0.00 | 476,856 | 2.2 |
| AMP, “Self Help” | 0 | 0 | 0 | 0.00 | 0 | 0.00 | 1,571 | 0.01 | 1,571 | 0.01 |
| TAR 10 | 0 | 0 | 19,810 | 0.09 | 0 | 0.00 | 0 | 0.00 | 19,810 | 0.1 |
| TAR 17 | 0 | 0 | 5,638 | 0.03 | 0 | 0.00 | 0 | 0.00 | 5,638 | 0.03 |
| BTS Sites | 0 | 0 | 2,349 | 0.01 | 576 | 0.00 | 0 | 0.00 | 2,925 | 0.01 |
| **Totals** | **28,980** | **0.1** | **983,683** | **4.6** | **250,848** | **1.2** | **186,509** | **0.9** | **1,450,020** | **6.8** |

*MDS: Maritime desert scrub

**Ordnance Use**

Training exercises that entail heavy ordnance use are likely to disturb island night lizards and could injure or kill lizards that are directly hit or suffer a near miss. The sedentary habit of island night lizards make it unlikely that lizards would move from an area in response to ordnance impact, and the relatively high density of this species increases the potential for lizards to be killed or injured during ordnance use. Impact Areas I and II, where significant impacts from heavy ordnance use are most likely to occur, contain about 611 ha (1,509 ac) of habitat mapped as maritime desert scrub (including prickly pear, California boxthorn, and cholla and prickly pear/cholla phases), 0.4 ha (1.0 ac) of grassland, and an estimated 5.2 percent of the island night lizard population on the island. However, as described above, these Impact Areas have been exposed to heavy ordnance use on an ongoing basis, so a substantial portion of the habitat has been degraded and may not support as many lizards as estimated based on vegetation mapping. Increased use as proposed is likely to further degrade island night lizard habitat within these areas due to damage and destruction of shrubs and increased risk of fire (described above). In addition, increased use of heavy ordnance is likely to increase the rate at which lizards are killed and injured as a result of these projectiles. However, certain locations within the Impact Areas tend to be targeted, and there are substantial portions of the Impact Areas that will likely continue to support island night lizards and high-quality habitat.

Small arms fire at targets, demolition explosions and other forms of ordnance use also have the potential to injure or kill individual island night lizards within TAR 10 and 17 and BTS sites, which encompass approximately 15 ha (36 ac) of maritime desert scrub habitat. The risks associated with injury or fatality at these sites is less, since the footprint of ordnance is smaller. We anticipate that island night lizards that inhabit these sites will be exposed to increased risks associated with small arms and demolitions use, although the most intensive use within the TARs is likely to occur within a much smaller acreage.

The effects of exposure of island night lizards to noise from small arms and other sources are not known but are not expected to be substantial given the persistence of island night lizards in the areas having a history of bombardment, noise, and habitat alteration.

**Fire**

Fires may injure or kill island night lizards and may indirectly result in mortality due to reduced food availability after a fire or increased exposure to predators. Fires are likely to occur within island night lizard habitat as a result of the proposed action, particularly in habitat within Impact Areas I and II. Together, the two impact areas include a total of 611 ha (1,509 ac) of habitat mapped as maritime desert scrub (including prickly pear, California boxthorn, and cholla and prickly pear/cholla phases), 0.4 ha (1 ac) of grassland, and an estimated 5.2 percent of the island night lizard population on the island. Impact Areas I and II contain about 76 percent of the estimated number of lizards within the proposed action's project footprint based on habitat mapping. However, Impact Areas I and II have been subjected to a high level of ordnance use on an ongoing basis and have experienced up to three fires in the last 25 years. Therefore, portions of the existing habitat are degraded and likely support fewer island night lizards. The proposed project will increase the frequency of ordnance use in the impact area (*e.g.*, NSFS (11 percent), EFEX (33 percent), and Bombing Exercises (23 percent)) and therefore increase the risk of fire occurring within the impact area.

The creation and/or expansion of a variety of operational areas (AVMAs, AMPs, AFPs, TARs 10 and 17, and BTS sites) will all increase the potential for increased fire frequency in the surrounding environment. Of these operational areas, the off-road vehicle areas (AVMAs, AMPs, and AFPs) include the greatest estimated number of lizards (estimated 1.5 percent of the island population), but TARs 10 and 17 and the BTS sites are within the area along the West Shore that has been largely unexposed to fire and contains the best-quality habitat for island night lizard. The increase in frequency associated with the increased training activities is not known with any precision, but implementation of the FDRS is anticipated to minimize the fire frequency, and more detail on the frequency and extent of fires is anticipated to emerge over time.

Habitat that supports high densities of island night lizards along the West Shore broadly overlaps with “high density” and “moderate density” San Clemente sage sparrow habitat. Implementation of the FDRS entails precautionary measures that are expected to reduce the size and frequency of fires that might otherwise occur within this habitat. We expect that the precautionary measures, including implementation of the FDRS, annual reviews of fires and fire management, and re-evaluation of the status of sage sparrows and fire management effectiveness if fires exceed thresholds will also reduce the impact of fires on the island night lizard population on San Clemente Island. Based on implementation of the FDRS, we anticipate that most fires along the West Shore will be small and located within or adjacent to TAR 10, TAR 17, and BTS sites.

Despite the potential for fires to adversely affect this species, island night lizards persist within previously burned areas on San Clemente Island. An unpublished study by the Navy at one locale within SHOBA (summarized in a petition to delist the island night lizard, U.S. Navy 2004), indicates that the island night lizard population within the burned area retained a stable age class distribution. Many individual island night lizards were observed to survive fire unharmed under loose rocks and stones as well as in crevices. Similarly, Cunningham *et al.* (2002) reported minimal long-term effects on populations of other lizard species following a catastrophic wildfire in Arizona. Because island night lizards are common and widely distributed on San Clemente Island, burned areas are expected to be re-colonized by individuals that survive fires and by lizards that inhabit adjacent unburned areas, once the vegetation and prey populations begin to recover. Alteration of habitat that results from short fire return intervals within impact areas, however, may result in locally reduced island night lizard populations.

In summary, despite an increase in the risk of fire, at least some habitat and lizards are anticipated to remain within the impact areas. Since Impact Areas I and II under baseline conditions support only a small percentage of the estimated island night lizard population (*i.e.*, likely less than the 5.2 percent estimated from habitat mapping), loss of a portion of these animals from increased fires within the impact areas is not expected to have a significant effect on the island-wide population of this species. More importantly, fuelbreaks and suppression measures outlined within the FDRS are anticipated to prevent a significant increase in fire frequency outside Impact Areas, where the majority of the optimal island night lizard habitat occurs. Therefore, only a limited number of lizards are anticipated to be killed or injured by fires starting within Impact Areas I and II and spreading to other areas on the island, and if burned these areas are anticipated to be recolonized by lizards.

**Fire Management and Suppression**

Fire management may entail future creation of fuelbreaks in areas that support island night lizard. No specific fuelbreak locations have been proposed in the vicinity of this species to date. If fuelbreaks are created using Phos-Chek or herbicide, as proposed within the project description, island night lizards within the fuelbreak footprint could be destroyed. The use of Phos-Chek may also favor the expansion of non-native species due to the fertilizing effect of this retardant. Since the boundaries of future fuelbreaks have not yet been identified, we anticipate that the Navy will consult with the Service regarding any future plans to establish fuel breaks with the potential to impact island night lizards. Thus, the impacts of new fuelbreaks on island night lizard are not considered in this analysis.

**Vehicle Traffic**

Approximately 56 ha (139 ac) of maritime desert scrub and 163 ha (403 ac) of grassland occur within the boundaries of proposed AVMAs, AMPs, AFPs. Together these areas, which are the only areas where off-road vehicle traffic is anticipated to occur, include an estimated 1.5 percent of the population on the island. Based on information provided by the Navy, the level of vehicle use anticipated in the area will substantially degrade the habitat in these areas. Over time, much of the vegetation will be crushed and denuded by the vehicles, and remaining patches of vegetation will consist primarily of non-natives grasses and other weedy species. In addition, lizard mortality will be high as vehicles will crush lizards hiding under rocks and crevices in the soil. Although a few island night lizards may survive within the areas heavily impacted by vehicle use, because of the high mortality and substantial habitat degradation, the area is not anticipated to contribute functionally to the population. Denuding much of the vegetation within the AVMAs, AMPs, and AFPs will create the potential for substantial erosion and additional habitat loss within the surrounding area. However, the Navy has committed to the development and implementation of an erosion control plan, which is anticipated to minimize loss of habitat due to erosion in the surrounding environment.

**Foot traffic**

Island night lizards are not expected to be directly affected by foot traffic, even when such traffic occurs at increased levels as anticipated as part of the Battalion-sized landing. Because island night lizards use microhabitats under rocks, vegetation, or debris, they are expected to be shielded from potential harm or disturbance associated with foot traffic. Island night lizards may, however, be indirectly affected if foot traffic results in expanded distribution of invasive plants that could alter island night lizard habitat.

Significant increases in foot traffic within island night lizard habitat in the IOA and TARs is anticipated as a result of implementation of the proposed action. Foot traffic is unlikely to result in direct harm to island night lizards, since the lizards remain in soil cracks, under rocks, and under heavy shrub cover.

**Invasive Plants**

The significant increases in off road vehicle anticipated as part of the proposed action are expected to result in increased distribution and abundance of invasive plant species on San Clemente Island, particularly within the AVMC. Changes in the plant community are most likely to adversely affect island night lizards if annual grasses or other invasive species alter the composition of plant communities along the West Shore, in optimal island night lizard habitat in a manner that increases the potential for repeated fires and type conversion in this area. The Navy proposes to address the potential for invasive species proliferation by continuing to conduct invasive plant species control efforts on San Clemente Island.

**Construction of Range Buildings and Gates**

Range buildings and gates are proposed for construction within island night lizard habitat at TARs 10 and 17 and Impact Area I. The cumulative acreage of construction disturbance is expected to be less than seven acres. The habitat type within the project footprints is not known, but even if the impacted habitat is the highest-quality habitat for island night lizards, this aspect of the project will impact only about 0.03 percent of the population on the island. Construction activities are likely to result in death or injury of island night lizards that lie in the path of surface moving equipment.

<u>Conclusion</u>

After reviewing the current status of the island night lizard, the environmental baseline, and the effects of the proposed action, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the island night lizard. We have reached this conclusion for the following reasons:

(1) The status of the island night lizard has significantly improved since its listing in 1977 because the primary threat to the species was eliminated with removal of non-native grazers on San Clemente, San Nicolas, and Santa Barbara islands. The San Clemente Island population of night lizard appears to be large and stable despite the presence of non-native grasses, feral cats, and ongoing military activities on the island. The ongoing and proposed conservation and minimization measures for San Clemente Island, including non-native weed removal and feral cat removal and implementation of the fire management plan and erosion control plans are anticipated

to maintain the suitability of island night lizard habitat on this island over the long term. Thus, the Service recommended delisting of the San Clemente Island population of the island night lizard in our 2006 5-Year Review based on its recovery;

(2) Using habitat-based density analysis, the proposed project is anticipated to impact roughly 2.5 percent of the island night lizard population on San Clemente Island. Although the project will impact a large number of lizards (roughly 536,968; see take statement below), this impact is not expected to result in an appreciable reduction in the numbers, reproduction, or distribution of the rangewide population of the island night lizard because the great majority of the lizard population (an estimated 97.5 percent) is expected to be sustained in suitable habitat on San Clemente Island and rangewide.

(3) Island night lizards are largely sedentary, so lizards outside the impacted areas are not anticipated to be affected by the loss of habitat in the impacted areas. The Navy will continue to conduct its ongoing monitoring to ensure that island night lizard populations remain stable.

## INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulations issued pursuant to section 4(d) of the Act, prohibit take of endangered and threatened species without a special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), such incidental taking is not considered to be a prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The following levels of incidental take are based on current information concerning listed animal species' population levels on San Clemente Island. The Service recognizes that the ongoing recovery efforts of the Navy may increase the baseline population numbers of these species. Because this programmatic biological opinion is expected to be in effect for an extended timeframe, it may be necessary, and appropriate, for the Service to review and revise the levels of incidental take below as new information concerning listed species population levels becomes available.

AMOUNT OR EXTENT OF TAKE

**Brown pelican**

- We anticipate that up to 3 California brown pelicans will be killed or injured each year in association with the U.S. Navy's San Clemente Island Military Training Program.

**San Clemente Loggerhead Shrike**

- We anticipate that increases in ordnance use are likely to result in noise and disturbance that will result in lowered reproductive success or death of 1 pair of shrikes per year;

- We anticipate that fires could result in loss 1 active nest and 2 adult per year;

- We anticipate that up to 2 shrikes per year may be struck and injured or killed by vehicles as a result of increased use of roads and the AVMA; and

- We anticipate that 1 active nest per year may be destroyed or otherwise fail as a result of training operations conducted within the IOA.

**San Clemente Sage Sparrow**

Estimating the number of San Clemente sage sparrows that may be taken as a result of the proposed action is difficult due to: (1) uncertainties regarding the acreage and location of habitat that may be affected by future fires and dispersed activities; (2) variability in the size of the sage sparrow population; and (3) the suite of potential responses of sage sparrows to noise, disturbance, fire, and incremental habitat modification. In addition, incidental take of individuals, nests, or pairs is likely to go undetected since monitoring of all individual birds surrounding all proposed training areas is not feasible. Nonetheless, we have estimated the amount and type of sage sparrow habitat we expect to be modified or degraded and the number of birds potentially impacted by these and other impacts associated with the proposed action. Take thresholds are set by habitat acreages burned for instances where we believe it will be difficult to monitor the actual number of individual sparrows taken.

Take levels are estimated for the San Clemente Island Sage sparrow as follows:

<u>Fire and Fire Suppression</u>

The proposed action is anticipated to modify or degrade sage sparrow habitat due to fire within and adjacent to operational areas that will result in death and injury to sage sparrow adults, juveniles, eggs, and nestlings and result in lowered sage sparrow reproduction in some years following fires over the life of the project.

- The proposed action is anticipated to modify or degrade sage sparrow habitat due to fire within and adjacent to operational areas. As described in the FMP, a maximum of 18 ha (45 ac) of high density sage sparrow habitat as mapped in Figure 1 could be cumulatively burned in single fire events less than 2 ha (5 ac) during a 5-year period. From a habitat-based density analysis, this will result in a maximum loss of 32 adult sage sparrows and a low number of eggs and nestlings, which we anticipate to be from no more than two nests per breeding season;

- We anticipate a maximum of 8 ha (20 ac) of medium density habitat south of the runway as mapped in Figure 1 will burn over a 5-year period. From a habitat-based density analysis, this will result in a maximum loss of 6 adult sage sparrows and a low number of eggs and nestlings, which we anticipate to be from no more than one nest per breeding season;

- We anticipate a maximum of 16 ha (40 ac) of low density habitat as mapped in Figure 1 will burn over a 5-year period. From a habitat-based density analysis, this will result in a maximum loss of 6 adult sage sparrows and a low number of eggs and nestlings, which we anticipate to be from no more than one nest per breeding season;

- We anticipate a maximum of 10 ha (25 ac) of medium density sage sparrow habitat north of the runway will burn over a 5-year period. From a habitat-based density analysis, this will result in a maximum loss of 8 adult sage sparrows and a low number of eggs and nestlings, which we anticipate to be from no more than one nest per breeding season;

<u>Fire Suppression</u>

- We anticipate fire suppression activities (*i.e.*, water sprayed from a truck or dropped by a helicopter) will result in death or injury to eggs and/or nestlings; we anticipate that no more than one nest will be impacted per year from such activities;

<u>Air, Foot, and Vehicle Traffic</u>

- We anticipate that eggs and/or nestlings will be blown out of nests from rotorwash resulting in death or injury; the take threshold will be met if more than two such events are documented during any 3-year period;

- We anticipate that eggs and/or nestlings will be trampled and crushed by troops resulting in death or injury; the take threshold will be met if monitoring documents that trampling is suspected in the loss of more than one nest per year;

- We anticipate that 1 individual sage sparrow will be killed per year by vehicle strikes; and

- We expect that nests containing eggs and/or nestlings will be crushed by vehicles within the AVMA/AMP; the take threshold will be met if monitoring documents that more than one nest per year is destroyed by such an event.

Ordnance and Demolition Use

- We anticipate that no more that 1 adult and the eggs and/or nestlings from one nest will be killed or injured by projectiles within operational areas and within 305 m (1,000 ft) of operational areas during any 5-year period.

No take is anticipated from construction of new buildings and related facilities and maintenance or installation of fuel breaks, and none is authorized.

**Western Snowy Plover**

- We anticipate that 1 western snowy plover per year will be killed or injured by exposure to ordnance within the Impact Areas.

- We anticipate that 1 western snowy plover will be killed or injured each year during training activities that use tracked or wheeled assault vehicles on Horse Beach and West Cove Beach.

**Island night lizard**

- We anticipate that all island night lizards within the AVMAs, AFPs, and AMP and within the footprint of new buildings and other structures in TARs 10 and 17 and Impact Area I will be killed over time. Based on a habitat-based density analysis, this will result in the loss of an estimated 1.5 percent of the population on San Clemente Island or about 321,868 lizards.

- Mortality rate due to ordnance use and fire is likely to increase within Impact Areas I and II, which contain an estimated 5.2 percent of the population based on habitat mapping or about 1,107,034 island night lizards. However, the actual number of night lizards in Impact Areas I and II is likely already lower due to past ordnance use in the area, and we believe that much of the habitat and lizards can be sustained over time in these impact areas despite the increased risks for fire-related injury and death; thus, we anticipate that roughly 213,000 lizards or about 1 percent of the population on San Clemente Island will be killed or injured over time in Impact Areas I and II;

- Outside the Impact Areas, there is a potential for increased fire, but implementation of the FDRS is anticipated to limit the size and frequency of fires. In addition, a large portion of the island night lizard population appears to be able to survive fires by sheltering in rocks or cracks in the ground. Thus, we anticipate that a relatively small number of lizards (2000 lizards or 0.01 percent of the population on San Clemente Island) will be injured or killed annually as a result of fires outside Impact Areas I and II; and

- An even smaller number of lizards (100 lizards or 0.0005 percent of the population on San Clemente Island) are also likely to be killed or injured annually during routine training activities in the other operational areas (TAR 10, TAR 17, and BTS sites);

EFFECT OF THE TAKE

In the accompanying biological opinion, we determined that the level of anticipated incidental take of brown pelicans, loggerhead shrikes, sage sparrows, western snowy plovers, and island night lizards is not likely to result in jeopardy to these species.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize and monitor the impacts of this incidental take of brown pelican, San Clemente loggerhead shrike, San Clemente sage sparrow, and San Clemente Island night lizard.

**Brown pelican**

1. The incidental take of brown pelicans will be difficult to detect since it is likely to occur in open ocean waters or within active training areas. The Navy shall, however, report any observed incidental take to the Service annually;

2. The Navy shall minimize unnecessary disturbance to roosting pelicans at Castle Rock and Bird Rock; and

**San Clemente Loggerhead Shrike**

3. The Navy will ensure adequate access to the SHOBA and along China and Horse Beach Canyon Roads (excluding Impact Areas I and II) in continuing its successful recovery program to minimize impacts from training activities on the San Clemente loggerhead shrike; and

4. The Navy will report any incidental take of San Clemente loggerhead shrike to the Service.

**San Clemente Sage Sparrow**

5. The Navy will report any incidental take of sage sparrows and/or loss of its habitat as a result of fire and training activities to the CFWO.

6. The Navy will minimize incidental take of sage sparrows.

**Western Snowy Plover**

7. The incidental take of western snowy plovers will be difficult to detect since it is likely to occur in active training areas. The Navy shall, however, monitor West Cove Beach after amphibious vehicle use on this beach to determine whether plovers continue to use beaches after training events and to determine whether plovers have been injured or killed as a result of these activities.

8. The Navy shall reduce the potential for incidental take of western snowy plovers from wheeled or tracked vehicles on West Cove Beach.

9. The incidental take of island night will difficult to detect since island night lizards shelter under rocks or in the soil, so lizards that have been killed due to fire, vehicle traffic, and ordnance use will seldom be visible. The Navy shall, however, report any incidental take observed during population monitoring and habitat evaluations to the Service.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, your agency must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

**Brown pelican**

The following terms and conditions implement reasonable and prudent measures 1 and 2:

1.1 The Navy shall submit a yearly report that summarizes whether any dead or injured brown pelicans were found or observed on San Clemente Island or in the nearshore waters surrounding the island. The annual report shall include the following information about any pelican detected: Date found; general location; cause of death or injury, if known; condition of the bird; and additional measures taken, if necessary to prevent additional pelican injury or fatalities;

2.1 Helicopters and boats will be routed away from Castle Rock to the maximum extent consistent with training;

2.2 A minimum distance of 100 m (328 ft) for helicopters and 25 m (82 ft) for vessels from Castle Rock will be maintained when transporting people from shore.

**San Clement Loggerhead Shrike**

The following terms and conditions implement reasonable and prudent measures 3 and 4:

3.1. The Navy will submit annual reports to the Service documenting actions taken to minimize impacts of their training and fire management activities on the loggerhead shrike;

4.1 The Navy will notify the Service within 48 hours of discovering any dead or injured San Clemente loggerhead shrike. The notification will include the following information about any dead or injured shrikes detected: date found; general location; cause of death or injury, if known; condition of the animal. In addition, the Navy will summarize information regarding death or injury of San Clemente loggerhead shrikes in an annual report submitted to the Service.

**San Clemente Sage Sparrow**

The following terms and conditions implement reasonable and prudent measures 5 and 6:

5.1 A summary of all fire-related incidental take and/or loss of sage sparrow habitat will be reported annually to the Service's CFWO. Included in the report will be acres of each sage sparrow habitat type burned (high, medium, or low density), mapping of the location of each fire, and a classification of intensity for each fire. The report will be due by March 1 of each year. If and when the fire/burn threshold of 18 ha (45 ac) in high density habitat, 8 ha (20 ac) in medium density habitat south of the runway, 10 ha (25 ac) in medium density sage sparrow habitat north of the runway, or 16 ha (40 ac) in low density habitat is reached, take authorization has been met and the CFWO will be notified immediately. Further, if a single fire event burns 5 or more acres in high density habitat, the CFWO should be notified within 1 day.

5.2 The Navy will notify the Service's CFWO within 48 hours of discovering any dead or injured San Clemente sage sparrows. The notification will include the following information about any dead or injured sparrows detected: date found; general location; cause of death or injury, if known; condition of the animal. In addition, the Navy will summarize information regarding death or injury of San Clemente sage sparrow in an annual report submitted to the CFWO.

6.1 The Navy will evaluate post-fire habitat recovery in sage sparrow habitat that burns along the West Shore (*i.e.*, from the airfield to Seal Cove) outside TAR boundaries. If habitat is not recovering, the Navy will implement restoration activities that may include erosion control, focused weed control, outplanting and/or seeding.

6.2 Fast-Rope exercises should be conducted over disturbed areas rather than sage sparrow habitat to the extent feasible to minimize rotorwash over active nests during the breeding season.

6.3 Low-elevation helicopter activity over the area between Eel Point and the dunes should be avoided to the maximum extent consistent with training activities.

6.4 Timing activities at TAR 10 and 17 should be conducted outside the peak period of the sage sparrow breeding season (usually March/April) to the maximum extent consistent with training activities.

6.5 The footprint of the construction areas for the new building and parking lot within TAR 10, which are slated for construction outside the breeding season, will be marked to avoid habitat areas in coordination with the San Clemente Island natural resources program. Anti-perch devices will be installed on the structures.

**Western Snowy**

The following terms and conditions implement reasonable and prudent measures 7 and 8:

7.1 The Navy shall submit a yearly report that summarizes western snowy plover use of monitored beaches on San Clemente Island and any incidental take that is observed.

8.1 The Navy shall enhance the upland portions of West Cove beach to provide additional resting areas for the western snowy plover by controlling non-native plants in the vicinity of West Cove Beach to the extent feasible and by ensuring man-made materials do not accumulate on the beach.

**San Clemente Island night lizard**

The following terms and conditions implement reasonable and prudent measure 9:

9.1 The Navy shall submit an annual report that summarizes whether any dead or injured island night lizards were found or observed on San Clemente Island. The annual report shall include the following information about any lizards detected: date found; general location; cause of death or injury, if known; condition of the animal.

## CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the Navy's responsibility for these species, pursuant to section 7(a)(1) of the Act.

1. We recommend that the Navy, in coordination with the Service, develop management strategies that specifically address each of the listed plant species on San Clemente Island. The listed plants on the island are identified as Management Focus Species in the INRMP and benefit from general efforts to prevent the spread of invasive species. Our understanding of the genetics of each species has been improved by the ongoing genetics research supported by the Navy. However, little management specifically addressing each species has occurred. Specific recommendations pertaining to each species are provided within the Service's 5-Year Reviews and are included within the description of each plant species in this biological opinion. We recommend that the Navy include the Service's 5-Year Review recommendations, as appropriate, in the upcoming revision of the INRMP. We recommend that, for species that remain narrowly distributed on the island or located close to operational areas, carefully managed propagation and outplanting (in consideration of genetic studies) be accomplished to provide a mechanism for accelerating increases in distribution and abundance, reducing risks to the species, and increasing flexibility for training.

2. We recommend that the Navy collect bush mallow cuttings and/or seeds from Horse Beach Canyon that will allow propagation and outplanting (in consideration of genetic studies) in areas that are not at risk from military training.

3. We recommend that the Navy, in coordination with the Service, build upon the existing population modeling efforts for the San Clemente sage sparrow and the San Clemente loggerhead shrike to better understand the future viability of these populations. We also recommend that comments from reviewers of the sage sparrow PVA be evaluated and included in future population modeling efforts.

4. We recommend that the Navy continue to recognize the Island Night Lizard Management Area as an important area for impact minimization in future planning documents, including the San Clemente Island INRMP.

## REINITIATION NOTICE

This concludes formal consultation on the proposed action. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. Because this biological opinion is programmatic in nature covering multiple actions encompassed by military training and fire management activities over an extended timeframe, we anticipate ongoing coordination will be necessary and appropriate as the proposed action is implemented. In addition, we anticipate that certain future actions discussed generally under the umbrella of this programmatic biological opinion may require subsequent consultations on a case by case basis (*e.g.,* fuel break establishment, controlled burns, erosion control measures) as additional project-specific details become available. Specifically, annual fire management plans and/or erosion control plans may require project-level consultation for specific actions if listed species may be affected by fire or erosion control management activities where project-specific details were not available to provide adequate analysis and/or incidental take exemptions within this programmatic biological opinion. For example, if listed species lie within or adjacent to a proposed fuelbreak footprint, and this impact was not described in the FMP BA or project description, project-level consultation may be warranted. Because conservation measures that minimize potential effects to listed species will be included in annual fire management and erosion control plans as they are developed, these project-level consultations may only require informal consultation and, in the event that formal consultation is necessary, may be streamlined.

Beyond any streamlined consultations that are tiered off of this programmatic consultation, reinitiation of consultation on certain aspects of the programmatic consultation may be required in instances as described in 1-4 above. Specifically, certain assumptions and predictions were made in this biological opinion using data collected over many years on San Clemente Island under different training and fire management regimes. If monitoring reveals that the effects on listed species from training are greater or that the FMP and other conservation measures are not having the intended effect of minimizing these impacts on listed species, reinitiation of consultation may be warranted.

Finally, because the FMP will shape fire-related policy, management, and decisions on San Clemente Island for 5 years (2009-2014) and then may continue or be updated for fire management activities conducted beyond 2014, consultation with the Service may be warranted if future updates are modified in a manner that causes an effect to listed species or critical habitat not considered in this biological opinion.

We appreciate the Navy’s efforts to improve the status of the endangered and threatened species on San Clemente Island while implementing its military mission. We would like to recognize the Navy’s Natural Resources Office for their extensive support in supplying the information needed to complete this consultation. Their knowledge of the natural resources on San Clemente and understanding of military training activities made a significant contribution to this biological opinion. We look forward to working with the Navy in our partnership to conserve the natural resources on San Clemente Island.

If you have any questions or comments concerning this biological opinion, please feel free to contact us. Future coordination efforts to implement this programmatic biological opinion should be directed to David Zoutendyk or SandyVissman of my staff at (760) 431-9440.

Sincerely,

Karen A. Goebel

Karen A. Goebel
Assistant Field Supervisor

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# Appendix C: Summary of Public Participation

A draft of this Environmental Assessment (EA) was made available to the public on 20 April 2009. The Navy sought public comment on the draft EA for a seven-day period, beginning on 20 April 2009, ending on 27 April 2009. The document, with referential material, was posted on the Commander for Navy Region Southwest's (CNRSW) website on 20 April, 2009 and was available for download.

The following public notice of availability of the draft EA was published in the San Diego Union Tribune, online at http://www.signonsandiego.com, in the Coronado Eagle Journal, and online at http://www.eaglenewsca.com on 20 April 2009:

**Notice of Availability for the Draft Environmental Assessment (EA)**
**for the**
**San Clemente Island Fire Management Plan**
**San Clemente Island, California**

Pursuant to the National Environmental Policy Act (NEPA), the Department of the Navy (Navy) has prepared a Draft Environmental Assessment (Draft EA) for the implementation of a Wildland Fire Management Plan on San Clemente Island, California (SCI WFMP).
San Clemente Island (SCI) is the southernmost of the eight California Channel Islands. It lies 55 nautical miles (nm) south of Long Beach and 68 nm west of San Diego. SCI is owned by the Navy as administered by Naval Base Coronado and Navy Region Southwest. The Commander, U.S. Pacific Fleet (CPF) is responsible for its operational administration.

The Draft EA evaluates the potential environmental effects associated with the proposed action, reasonable alternatives to the proposed action, and a no action alternative. Issues to be addressed by the Draft EA include potential environmental impacts with respect to water resources, biological resources, air quality, cultural resources, and safety and environmental health.

The Navy proposes to implement the SCI WFMP to offset the anticipated increase in ignition sources as a result of expanded training activities, as described in the Southern California Range Complex Final Environmental Impact Statement/Overseas Environmental Impact Statement (http://www.socalrangecomplexeis.com). The Draft EA has been prepared to assess the potential environmental impacts of implementing fire management strategies identified in the SCI WFMP. The SCI WFMP has been developed in compliance with the Federal Wildland Fire Management Policy applicable to federally held lands.

Copies of the Draft EA will be available for public review at the following web site: https://www.cnic.navy.mil/cnrsw/index.htm.

A 7-day public comment period begins April 20, 2009 and ends April 27, 2009. There are three ways to provide public comment:

1. To provide comment by email, please submit them to Mr. Kent Randall by email at tory.randall@navy.mil;
2. To provide comment by telephone, please call Mr. Kent Randall at (619)556-2168;

3. To provide comment by U.S. Mail, please send to the following address:

Mr. Kent Randall
NAVFAC Southwest
1220 Pacific Highway
San Diego, CA 92132

Comments on the Draft EA may be submitted on or before April 27, 2009. Written comments postmarked (if mailed) by April 27, 2009 will become part of the public record.

No comments were received from the public.

# Appendix D: Record of Non-Applicability

Department of Defense
US Navy

Record of Non-Applicability

San Clemente Island
Wildland Fire Management Plan
Naval Base Coronado, California

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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 Defense (DoD) determined that the majority of practices outlined in the San Clemente Island Wildland Fire 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 routine fuels management activities and small prescribed fire projects that would result in minor and insignificant emission increases. Fire-related monitoring projects would require the use of vehicles to transport personnel, and so would routinely add travel-related emissions to the air. 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. 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 DOI'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.

______________________________ __________________

Anthony Gaiani Date
Captain, U. S. Navy
Commanding Officer
Naval Base Coronado
Commander Navy Region Southwest

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