Laser Testing & Training
Naval Air Warfare Center Weapons Division
Sea Range
Point Mugu, CA

Final

Environmental Assessment/
Overseas Environmental Assessment

Naval Air Warfare Center Weapons Division

Point Mugu, CA

January 2010

Acronyms and Abbreviations

AGL	above ground level
ALA	Administrative Lead Agency
ANSI	American National Standards Institute
APE	Area of Potential Effect
ASBS	Area of Special Biological Significance
BO	Biological Opinion
BQ	Beam Quality
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CDFG	California Dept of Fish and Game
CFR	Code of Federal Regulations
CEQ	Council on Environmental Quality
CO	carbon monoxide
CO_2	carbon dioxide
COIL	chemical oxygen iodine laser
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DoD	Department of Defense
DON	Department of the Navy
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEL	free electron laser
FMP	Fishery Management Plan
ft	foot/feet
GIS	Geographic Information System
ha	hectare
HALE	high altitude long endurance
HAPC	habitat area of particular concern
He	helium
H_2S	hydrogen sulfide
HSMST	High Speed Maneuvering Surface Target
INRMP	Integrated Natural Resource Management Plan
JATO	jet assisted takeoff
°K	degrees Kelvin
kg	kilogram
km	kilometer
L	liter
LGAC	Laser-Generated Air Contaminant
LH_2	Liquid Hydrogen
LNTL	Lead Navy Technical Laboratory
LSRB	Laser Safety Review Board
m	meter
µg	microgram
µm	micrometer
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
mi	mile(s)
MSL	mean sea level
MST	Mobile Ship Target
MW	megawatt
mW	milliwatt
N_2	nitrogen
NAAQS	National Ambient Air Quality Standards
NAVFAC	Naval Facilities Engineering Command
NAWCWD	Naval Air Warfare Center Weapons Division
NAWQC	National Ambient Water Quality Criteria
NBVC	Naval Base Ventura County
NEPA	National Environmental Policy Act
nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic & Atmospheric Administration
NO_2	nitrogen dioxide
NHZ	Nominal Hazard Zone
NOHD	Nominal Ocular Hazard Distance
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
NO_x	nitrogen oxides
O_3	ozone
OEA	Overseas Environmental Assessment
OEIS	Overseas Environmental Impact Statement
OPNAVINST	Chief of Naval Operations Instruction
ORM	Operational Risk Management
PERP	portable equipment registration program
PAH	polycyclic aromatic hydrocarbon
PFMC	Pacific Fishery Management Council
PM_X	particulate matter less than X (2.5 or 10) microns in diameter
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RDT&E	research, development, test, and evaluation
RHA	Risk Hazard Assessment
RLSSO	Range Laser System Safety Officer
RONA	Record of Non-Applicability
RSA	range safety approval
RWQCB	Regional Water Quality Control Board
SCB	Southern California Bight
SCCAB	South Central Coast Air Basin
SDTS	Self Defense Test Ship
SIP	State Implementation Plan
SLAM	Standoff Land Attack Missile
SNI	San Nicolas Island
SO_2	sulfur dioxide
SO_x	sulfur oxides
SOP	Standard Operating Procedure
SUA	Special Use Airspace
SWRCB	State Water Resources Control Board
UAV	Unmanned Aerial Vehicle
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VCAPCD	Ventura County Air Pollution Control District
VOCs	volatile organic compounds

Final

ENVIRONMENTAL ASSESSMENT/OVERSEAS ENVIRONMENTAL ASSESSMENT

Lead Agency for the EA:	Department of the Navy
Title of Proposed Action:	Laser Testing/Training, Point Mugu Sea Range
Affected Jurisdiction:	Ventura County
Designation:	Environmental Assessment/Overseas Environmental Assessment (EA/OEA)

Abstract

This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses the potential environmental impacts of the proposed laser testing and training on the Point Mugu Sea Range, including components within as well as outside of the 12 nautical mile (nm) limit of the United States (U.S.) Territorial Seas. This EA/OEA has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321, as amended); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] 1500-1508, 1 July 1986); Department of the Navy Procedures for Implementing NEPA (32 CFR 775); Executive Order (EO) 12114, Environmental Effects Abroad of Major Federal Actions; and Chief of Naval Operations Instruction (OPNAVINST) 5090.1C, *Environmental and Natural Resources Program Manual* (Chapter 5), 30 October 2007. The NEPA process ensures that environmental impacts of proposed major federal actions are considered in the decision making process. Potential environmental impacts have been analyzed for all relevant or otherwise required issue areas, with separate sections on air quality, marine sediments and water quality, biological resources, cultural resources, airspace and land and water use, public safety, and hazardous materials. No impacts are associated with other environmental resources or issues. No significant environmental impacts within U.S. territory, or significant harm to the overseas environment, have been identified for the implementation of the proposed action (preferred alternative) or either of two action alternatives for laser testing and training on the Point Mugu Sea Range, or for the no-action alternative.

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EXECUTIVE SUMMARY

The United States (U.S.) Navy proposes to increase test, evaluation, and training activities on the Point Mugu Sea Range to characterize performance and to identify and resolve issues associated with the Department of Defense (DoD), other agency, coalition partner, and commercial use of laser technology. This work would involve laser testing and training under various weather conditions on the Point Mugu Sea Range and San Nicolas Island (SNI), and include lasers integrated onto aircraft, ships, and land-based platforms. The proposed action would involve directing laser energy at various types of fixed or dynamic targets from fixed or dynamic laser sources. Lasers would be operated on surface craft at sea, on aircraft, or on land at SNI. Likewise, targets could be at sea, in the air, or on SNI. Laser operations would include laser systems at wavelengths from 180 to 14,000 nanometers (0.18 to 14.0 micrometers) and at power levels up to a maximum of 1 megawatt (MW). The proposed testing, evaluation, and training activities would be supported by Naval Air Warfare Center Weapons Division (NAWCWD) personnel and facilities at Naval Base Ventura County. All proposed use of lasers on the Sea Range would conform to the safety and procedural requirements established in the Sea Range EIS (U.S. Navy 2002), as well as in the Navy Laser Hazards Control Program (OPNAVINST 5100.27B, 2 May 2008) and any revisions adopted in the future.

This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses the potential environmental impacts of the proposed laser testing and training on the Point Mugu Sea Range, including components within as well as outside of the 12 nautical mile (nm) limit of the U.S. Territorial Seas. This EA/OEA has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321, as amended); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] 1500-1508, 1 July 1986); Department of the Navy Procedures for Implementing NEPA (32 CFR 775); Executive Order (EO) 12114, Environmental Effects Abroad of Major Federal Actions; and Chief of Naval Operations Instruction (OPNAVINST) 5090.1C, *Environmental and Natural Resources Program Manual* (Chapter 5), 30 October 2007. The NEPA and EO 12114 processes ensure that environmental impacts of proposed major federal actions are considered in the decision making process. The Naval Air Systems Command (NAVAIR) is the proponent and decision maker for the proposed action.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Laser Testing/Training Program proposed by NAWCWD, the action proponent, is to support DoD directives on the development of laser applications vital to the National Defense through research, development, testing and evaluation (RDT&E) and training applications on the Point Mugu Sea Range. Specifically, the proposed action is intended to allow both RDT&E and training use of lasers in realistic maritime environments where potential conflicts with civilian activities and safety risks to the public are minimized. Lasers have already proven to be critical communications and targeting tools. As enemy missiles and other forms of ordnance become faster and more elusive to current defensive weapons on ships, high power lasers show promise as the most probable systems capable of defeating them. However, before lasers can be effectively used as a weapon to replace guns and anti-missile weapons on ships, their performance and suitability must be demonstrated in a marine environment.

The mission of NAWCWD includes operating the Point Mugu Sea Range to support the RDT&E and training use of advanced weapons technology, helping to ensure the battlespace dominance of our forces. The proposed action is needed to support this mission. Lasers hold great potential for the U.S. military, but lasers perform differently in different environments. For the Navy, it is important that lasers function

properly at sea and near water, the environment where the Navy usually operates. Even though laser or coherent light remains in a tight beam, its energy is quickly absorbed by moisture and distorted by density and temperature variations that affect the refractive index of air. The Navy is working to mitigate these issues in order to use lasers in its operating areas. Therefore, it is important to accomplish testing and training in a realistic environment with different types of lasers, using different frequencies and power levels, in various weather conditions. The Navy is developing novel military applications of lasers and assessing potential hazards to materials and personnel from the use of lasers by enemy forces. The Point Mugu Sea Range is a particularly valuable site for laser system operations in a realistic and operationally relevant environment because of its coastal location, maritime environment, and extensive test, evaluation, and training capabilities. Within the Sea Range, the remoteness and existing infrastructure of SNI make it a valuable resource for laser operations.

ALTERNATIVES

The directed energy test program requirement is for operationally realistic engagements in both maritime and land environments, including four scenarios (Air-to-Air, Air-to-Surface, Surface-to-Air, and Surface-to-Surface). The proposed action (preferred alternative), to conduct laser testing, evaluation, and training on the Sea Range, meets testing requirements. The proposed action (preferred alternative) comprises nine scenarios, most of which include multiple options. Each scenario is defined by a) class of laser(s) to be used; b) the laser platform (from aircraft, vessel, or land); c) the target location (land, sea surface, or air) and mobility (stationary, slow-, or fast-moving). Two additional action alternatives were identified, each consisting of a subset of the scenarios developed for the proposed action which would partially accomplish the project's purpose and need. Alternative 1 would include lasers on airborne, ocean surface, or land (SNI) platforms aimed at targets on SNI; and lasers on SNI aimed at airborne or ocean surface targets. Alternative 2 would limit activities to airborne or ocean surface platforms and targets on and over the open ocean environment; no targets or laser platforms would be placed on SNI.

ENVIRONMENTAL CONSEQUENCES

Resources analyzed in this EA/OEA include: air quality, marine sediments and water quality, biological resources, cultural resources, airspace and land and water use, public safety, and hazardous materials. The environmental consequences associated with implementation of laser testing and training at the Point Mugu Sea Range and no-action alternative are presented in Table ES-1. As shown in Table ES-1, implementation of laser testing and training or the no-action alternative would not result in significant impacts to any resource area within U.S. territory and would not cause significant harm to the overseas environment. The no-action alternative would not meet the purpose and need for the proposed action.

Table ES-1 Environmental Consequences of Alternatives

Resource Area	Proposed Action	Alternative 1 or 2	No-Action Alternative
Air Quality	o	o	o
Marine Sediments and Water Quality	o	o	o
Biological Resources	o	o	o
Cultural Resources	o	o	o
Airspace, Land and Water Use	o	o	o
Public Safety	o	o	o
Hazardous Materials	o	o	o

Notes: o = No significant impact within U.S. territory or significant harm to the overseas environment

■ = Potentially significant impact or harm to the environment

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ENVIRONMENTAL ASSESSMENT/OVERSEAS ENVIRONMENTAL ASSESSMENT

LASER TESTING AND TRAINING, POINT MUGU SEA RANGE

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CHAPTER 1
INTRODUCTION

1.1 OVERVIEW

The Naval Air Warfare Center Weapons Division (NAWCWD) Point Mugu is located in Ventura County along the Pacific Coast of Southern California and includes the 36,000 square mile (mi) Point Mugu Sea Range (Figure 1-1). The Sea Range currently supports test and evaluation of sea, land, and air weapons systems as well as various categories of training activities. This testing and training is addressed in the Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for the Point Mugu Sea Range, dated March 2002. The Navy proposes to extend its test and evaluation and training capability to include laser operations on the Sea Range, including San Nicolas Island (SNI). All laser operations will be scheduled and managed by NAWCWD.

Appendix A provides general background information on lasers and descriptions of the types of lasers that could be used as part of the proposed action (Naval Surface Warfare Center, Dahlgren Laboratory 2008; NAVAIR Ranges Department 2008); these include the following:

- Solid State
- Fiber
- Carbon Dioxide (CO_2)
- Free Electron
- Chemical Oxygen Iodine Laser (COIL)

In order to propagate a beam of light at a distance of several kilometers and still keep it tightly focused on an endpoint, an understanding of atmospheric effects is needed. The Navy operates in a maritime environment, and moisture is the most problematic of conditions affecting a tightly focused, coherent beam of light. Testing and training related to laser systems must therefore occur in a maritime environment such as that which exists at the Sea Range.

This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses the potential environmental impacts of the proposed laser testing and training on the Point Mugu Sea Range, including components within as well as outside of the 12 nautical mile (nm) limit of the U.S. Territorial Seas. This EA/OEA has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321, as amended); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] 1500-1508, 1 July 1986); Department of the Navy Procedures for Implementing NEPA (32 CFR 775); Executive Order (EO) 12114, Environmental Effects Abroad of Major Federal Actions; and Chief of Naval Operations Instruction (OPNAVINST) 5090.1C, *Environmental and Natural Resources Program Manual* (Chapter 5), 30 October 2007.

Figure 1-1
Regional Location
Point Mugu Sea Range

1.2 SUMMARY OF THE PROPOSED ACTION

The proposed action would consist of an increase in test, evaluation, and training activities on the Sea Range to characterize performance and to identify and resolve issues associated with the Department of Defense (DoD), other agency, coalition partner, and commercial use of laser technology, including Classes 1, 2, 3, and 4. This work would involve laser testing and training under various weather conditions on the Sea Range and SNI, and include lasers integrated onto aircraft, ships, and land-based platforms. The proposed action would involve directing laser energy at various types of fixed or dynamic targets from fixed or dynamic laser sources. Lasers would be operated on surface craft at sea, on aircraft, or on land. Likewise, targets could be at sea, in the air, or on land.

Laser operations would include laser systems at wavelengths from 180 to 14,000 nanometers (0.18 to 14.0 micrometers) and at power levels up to a maximum of 1 megawatt (MW). The proposed action would involve the testing and training use of these lasers on the Point Mugu Sea Range, including the use of SNI.

The proposed testing, evaluation, and training activities would be supported by NAWCWD personnel and facilities and at Naval Base Ventura County (NBVC). All proposed use of lasers on the Sea Range would conform to the safety procedural requirements established in the *Point Mugu Sea Range EIS/OEIS* (NAWCWD 2002a), as well as in the Navy Laser Hazards Control Program (OPNAVINST 5100.27B, 2 May 2008) and any revisions adopted in the future. The proposed action would include the use of high altitude long endurance (HALE) unmanned aerial vehicles (UAVs) to be used as both a laser platform and target. These HALE UAVs would be fueled by liquid hydrogen (LH_2) and would operate out of Point Mugu, supported by a new LH_2fueling facility.

The proposed action would initially be focused on laser testing and evaluation. Current training activities have been limited to range-finding and target designation lasers. As laser systems are proven in testing, lasers would be increasingly incorporated into training events.

1.3 PURPOSE AND NEED

1.3.1 Purpose

The purpose of the Laser Testing/Training Program proposed by NAWCWD, the action proponent, is to support DoD directives on the development of laser applications vital to the National Defense through research, development, testing and evaluation (RDT&E) and training applications on the Point Mugu Sea Range.

The directed energy test program requirement is for operationally realistic engagements in both maritime and land environments, including four scenarios (Air-to-Air, Air-to-Surface, Surface-to-Air, and Surface-to-Surface). The infrastructure needed to meet this requirement includes the following:

- maritime and land test ranges with environmental, range safety, explosive safety, laser safety, flight clearances, and Federal Aviation Administration and Laser Clearing House clearances;
- unmanned over-the-horizon range surveillance and data and communications relay;
- unmanned over-the-horizon time, space, and position information instrumentation;
- target with appropriate command/control, telemetry, data acquisition, fourier transform spectrometer, and instrumentation to measure laser and transient thermal parameters;
- temporary laser protection shelters on or near shooter and sensors; and

- a hazard pattern prediction system and associated sensors to measure characteristics of the environment.

The proposed action, to conduct laser testing/evaluation and training on the Sea Range, meets these requirements. The Sea Range provides the combination of accessible land, air, sea space, and infrastructure, as well as separation from potential conflicts with other military or public uses, to readily accommodate the necessary open air maritime testing/training use of lasers.

1.3.2 Need

The mission of NAWCWD includes operating the Point Mugu Sea Range to support the RDT&E and training use of advanced weapons technology, helping to ensure the battlespace dominance of our forces. The proposed action is needed to support this mission.

Lasers have already proven to be critical communications and targeting tools. As enemy missiles and other forms of ordnance become faster and more elusive to current defensive weapons on ships, high power lasers show promise as the most probable systems capable of defeating them. However, before lasers can be effectively used as weapons to replace guns and anti-missile weapons on ships, their performance and suitability must be demonstrated in a marine environment.

Lasers hold great potential for the U.S. military, but lasers perform differently in different environments. For the Navy, it is important that lasers function properly at sea and near water, the environment where the Navy usually operates. Even though laser or coherent light remains in a tight beam, its energy is quickly absorbed or scattered by moisture and distorted by density and temperature variations that affect the refractive index of air. The Navy is working to overcome these problems in order to use lasers in its mission areas. Therefore, it is important to accomplish testing and training in a realistic environment with different types of lasers, using different frequencies and power levels, in various weather conditions.

The Navy is both developing novel military applications of lasers and assessing potential hazards to materials and personnel from the use of lasers by enemy forces. Because of its coastal location, maritime environment, and extensive test and evaluation and training capabilities, the Sea Range is a particularly valuable site for laser system operations in a realistic and operationally relevant environment. Within the Sea Range, the remoteness and existing infrastructure of SNI make it a valuable resource for laser operations.

1.4 SCOPE OF THE EA/OEA

This document integrates the requirements of NEPA, which applies to federal actions and their effects within the 12-nm limit of the U.S. Territorial Seas, with those of EO 12114, which applies to actions and effects occurring in the overseas environment, beyond the 12-nm limit. Where appropriate, this document distinguishes components of the action and effects occurring within versus outside of the 12 nm limit. Owing to the fluid nature of the activities and resources, it is not always possible to draw a sharp distinction between impacts inside versus outside of 12 nm. In such cases, impacts are assumed to occur *both* within and outside of 12 nm, a conservative approach.

CEQ regulations and Department of the Navy (DON) policy for implementing NEPA and EO 12114 specify that an EA or OEA should only address those resource and issue areas that are subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact.

The proposed action requires minimal new construction at NBVC; it primarily involves the use of existing roads, facilities, infrastructure, and the temporary placement of portable equipment and temporary structures on previously graded land or otherwise without excavation, on SNI and at Point Mugu. Project-related aircraft and vessel operations would occur within established range areas following established safety procedures as mentioned above. Project personnel for testing events would include approximately 40 persons currently working at NAWCWD, Point Mugu and residing locally, plus an additional 10 to 30 temporary personnel who would reside in military housing or other local accommodations.

Considering the nature of the proposed action, there would be negligible and clearly insignificant impacts in several resource/issue areas as follows:

- *Geology.* Project-related activities, i.e. the movement of people and equipment as well as the placement of structures would cause only superficial ground disturbance (i.e., no excavation or grading). The new LH_2 fueling station would be installed on previously filled and graded land next to the airfield. No removal or alteration of geologic features or resources would occur as a result of the proposed action. As appropriate, geologic features may be included in the discussions of Marine Sediments and Biological Resources.

- *Onshore Water Quality.* No non-marine surface waters are present at the proposed site of the LH_2 at the Point Mugu airfield, or in proposed target or shooter locations on SNI. All activities on SNI would occur on dry land and would entail minimal if any ground disturbance. All NAWCWD activities at Point Mugu, including construction and use of the new LH_2 facility, would conform to the installation storm water pollution prevention plan and associated best management practices which include eliminating discharges of sediment and other pollutants that could affect water quality.

- *Aesthetics and Visual Resources.* As an intermittent activity involving Navy aircraft, vessels/vehicles and personnel on the Sea Range where these types of activities are routine, the proposed action would have no effect on aesthetics and visual resources.

- *Socioeconomics.* As noted above, the proposed action would bring a small number (10 to 30) of new personnel to Ventura County on a temporary basis to support the program. These individuals can be accommodated without impact on socioeconomic indicators such as population, employment, income, housing, or schools. No need for new facilities to accommodate participants is foreseen. For these same reasons, there would be no impact on minority or economically disadvantaged segments of the population, and hence no impacts related to Environmental Justice (EO 12898). Economic aspects of recreation, traffic, and fisheries are considered under Airspace, Land, and Water Use.

- *Infrastructure and Utilities.* Apart from small, temporary structures such as shelters (conex boxes) for lasers and targets on SNI, the only new infrastructure needed to support the proposed action is the new LH_2 fueling station next to the Point Mugu airfield. The LH_2 fueling station would be connected to the existing base utility infrastructure, and would use relatively small amounts of electricity and water during its operation, with negligible effects on other users of base infrastructure and utilities. Otherwise, existing roads, facilities, and infrastructure would be utilized, and no modifications to existing roads or facilities (temporary lodging, meals, recreation, sanitation, etc.) are needed to accommodate the action and associated personnel.

- *Noise*. Intermittent aircraft and vessel noise associated with the proposed action is a routine occurrence on the Sea Range and at Point Mugu. Temporary construction noise associated with installing the LH_2 station next to the airfield would be negligible in comparison to ongoing airfield operations. No heavy equipment operations or other sources of sound, such as sonar, are proposed. The activities would be far from sensitive human populations. Potential disturbance of wildlife by project activities is considered under Biological Resources.

The above topics will not be discussed further in the EA/OEA. The environmental issues to be addressed in this EA/OEA include:

- *Air Quality*. The analysis considers project emissions from combined sources with respect to applicable thresholds established under the Clean Air Act.
- *Marine Sediments and Water Quality*. These physical elements of the marine environment are combined in a single section.
- *Biological Resources.* The analysis considers potential project impacts on marine and terrestrial habitats and communities, fisheries, wildlife (seabirds, marine mammals, and sea turtles), and special status species (threatened, endangered, and other species of concern).
- *Cultural Resources.* Potential impacts on historic properties on the land and in water areas where the proposed action would occur are considered.
- *Airspace, Land, and Water Use.* Military and non-military uses of the airspace, land, and water where the proposed action would occur and the potential impacts of the proposed action on these uses, especially as related to the California Coastal Zone, are considered.
- *Public Safety.* Potential risks to public safety are considered.
- *Hazardous Materials.* Potentially hazardous constituents of the lasers and targets as well as fuels and lubricants carried by aircraft and vessels are considered.

1.5 OTHER REGULATORY COMPLIANCE

A number of regulatory compliance requirements are integral to the completion of the NEPA/EO 12114 process. These include (but are not necessarily limited to) requirements related to the following statutes:

- Clean Air Act (42 USC § 7401 et seq.)
- Clean Water Act (Federal Water Pollution Control Act [33 USC §1251 et seq.])
- Safe Water Drinking Act (42 USC § 300f et seq.)
- Endangered Species Act of 1973 (16 USC § 1531 et seq.)
- Marine Mammal Protection Act (16 USC § 1361 et seq.)
- Magnuson-Stevens Fishery Conservation and Management Act (16 USC § 1801 et seq.)
- Migratory Bird Treaty Reform Act of 2004 (16 USC § 710 et seq.)
- EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds)
- National Historic Preservation Act (16 USC § 470 et seq.)
- Coastal Zone Management Act (16 USC § 1451 et seq.)

Each of the above is addressed within the context of the relevant section of the EA/OEA. As defined, the proposed action does not require permits or authorizations from other agencies, although there would be continuing coordination with other agencies as specific laser test and training activities are planned, including the Federal Aviation Administration (FAA), Coast Guard, and the U.S. Strategic Command Laser Clearinghouse.

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CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION (PREFERRED ALTERNATIVE)

2.1.1 Overview

The proposed action is to conduct laser test, evaluation, and training activities under various weather conditions on the Point Mugu Sea Range, including SNI. All activities would be outside of the Channel Islands National Marine Sanctuary waters, and lasers would not be fired at any part of the Sanctuary. The proposed action would involve directing laser power up to 1 MW at various types of fixed or dynamic targets from fixed or dynamic laser sources. Laser testing or training events could occur on up to 125 days per year, with an average duration of 4 hours for each event, during which the laser would be operated approximately 40 times following the protocols described below.

The proposed action includes multiple types of lasers, including weapons, designators, tracking lasers, communications, and range finders. Laser operations will include laser Classes 1, 2, 3, and 4, including systems at wavelengths from 0.18 μm to 14.0 μm and at power levels up to a maximum of 1 MW. Shooter platforms would be on land at SNI, on ocean surface vessels, and on aircraft. Targets would generally be the same types used in current testing/training and would also be located on SNI, at sea, or they would be airborne. Regardless of laser class, a formal risk analysis of particular laser characteristics, pointing system capabilities, and firing parameters will be accomplished for every laser operation, including those that fire toward the mainland. The risk analysis would be used by the Range Laser System Safety Officer (RLSSO) to make risk decisions and implement either engineering or administrative controls or protective measures to eliminate hazards or reduce the degree of risk.

The proposed action comprises nine test scenarios, most of which include multiple options. Each scenario is defined by a) class of laser(s) to be used; b) the laser platform (from aircraft, vessel, or land); c) the target location (land, sea surface, or air) and mobility (stationary, slow-, or fast-moving). Table 2-1 describes each of the scenarios and related options. Figure 2-1 shows locations where targets or shooter platforms would be located on and near SNI.

Most laser shots on the Sea Range would be directed to the south or to the west, away from the mainland. Shots to the north or east have extreme limits due to safety requirements and would occur less frequently. To avoid impacts on the mainland, all lasers pointed horizontally or angled upward would only be fired toward the open ocean, at a target on SNI, or at a target with SNI as a backdrop. All land-based targets and shooter platforms would be located on existing pads, roads, or disturbed areas, such as the Standoff Land Attack Missile (SLAM) site, near the Vandal launch site, Thousand Springs/Tender Point, Building 807 Launch Complex, Daytona Beach, Corral Harbor, the end of Redeye Road, and the existing Laser Target area on SNI (off of Jackson Highway) (Figure 2-1). For ocean surface targeting, the laser target may be one of the target vessels routinely used on the Sea Range, or it may be attached to a surface vessel or buoy.

Table 2-1 Laser Testing/Training Scenarios

Scenario Description	Option	Laser Location	Target Location	Notes
1) Surface to Land High Power Laser ➢ Ship is underway. ➢ Laser on ship shoots at instrumentation & targets. ➢ Lower power laser. ➢ High power Class 4 laser is fired to measure effects on targets and beam quality and power. ➢ Shelter provided for personnel who operate instrumentation and replace targets.	A	Ocean Surface	Thousand Springs and/or Tender Point	Tender Point target area available for use only outside of snowy plover nesting season.
	B	Ocean Surface	Bldg. 807 Launch Complex	
	C	Ocean Surface	Vandal Launch Site	
	D	Ocean Surface	SNI Laser Target	
	E	Ocean Surface	Daytona Beach	
	F	Ocean Surface	End of Redeye Road	
	G	Ocean Surface	Corral Harbor	
2) Surface to Surface High Power Laser ➢ Ship is moving in relation to a dynamic target. ➢ Lower power laser. ➢ High power Class 4 laser is fired to address dynamic target ➢ Target to be a surface craft.	A	Ocean Surface	Ocean Surface	
	B	Ocean Surface	Ocean Surface	Target is offshore of SNI near Bachelor Beach.
	C	Ocean Surface	Ocean Surface	Target is offshore of SNI near West NAVFAC Road.
	D	Ocean Surface	Ocean Surface	Target is offshore of SNI near Cissy Cove.
3) Air to Land High Power Laser ➢ Lower power laser. ➢ High Power Class 4 Laser fired downward towards a stationary or dynamic ground target to study target tracking, laser performance and propagation issues.	A	Airborne	SLAM Target Area	
	B	Airborne	Thousand Springs and/or Tender Point	Tender Point target area available for use only outside of snowy plover nesting season.
	C	Airborne	SNI Laser Target	
	D	Airborne	Vandal Launch Site	
	E	Airborne	Daytona Beach	
	F	Airborne	End of Redeye Road	
	G	Airborne	Corral Harbor	
4) Air to Surface High Power Laser ➢ Lower power laser. ➢ High power Class 4 laser on aircraft will be fired downward at a surface craft.	NA	Airborne	Ocean Surface	

Scenario Description	Option	Laser Location	Target Location	Notes
5) Land to Land High Power Laser ➢ Laser fired towards the target to study laser performance and propagation issues. ➢ Lower power laser. ➢ High power Class 4 lasers fired.	NA	Bldg 165	SLAM Target Area	Stationary target or dynamic target (along Jackson Hwy).
6) Land to Air High Power Laser ➢ Lower power laser. ➢ Class 4 laser will be fired at a dynamic airborne target (BQM-74) to study target tracking, laser performance and propagation issues.	A	Thousand Springs and/or Tender Point	Airborne	Tender Point laser location area available for use only outside of snowy plover nesting season.
	B	Bldg. 807 Launch Complex	Airborne	
	C	Vandal Launch Site	Airborne	Target is shot while passing over SLAM Site.
	D	Daytona Beach	Airborne	
	E	Corral Harbor	Airborne	
7) Land to Surface High Power Laser ➢ Lower power laser. ➢ High power Class 4 laser fired at a dynamic surface target to study target tracking, laser performance and propagation issues. ➢ Target to be a surface craft.	A	Thousand Springs and/or Tender Point	Ocean Surface	Tender Point laser location area available for use only outside of snowy plover nesting season.
	B	Bldg. 807 Launch Complex	Ocean Surface	
	C	Vandal Launch Site	Ocean Surface	
	D	Daytona Beach	Ocean Surface	
	E	Corral Harbor	Ocean Surface	
8) Surface to Air High Power Laser ➢ Ship moving in relation to a dynamic inbound target. ➢ Lower power laser. ➢ High power Class 4 laser then fired to address dynamic target.	NA	Ocean Surface	Airborne	
9) Air to Air High Power Laser ➢ Airborne laser moving in relation to a dynamic inbound target. ➢ Lower power laser. ➢ High power Class 4 laser then fired to address dynamic target.	NA	Airborne	Airborne	

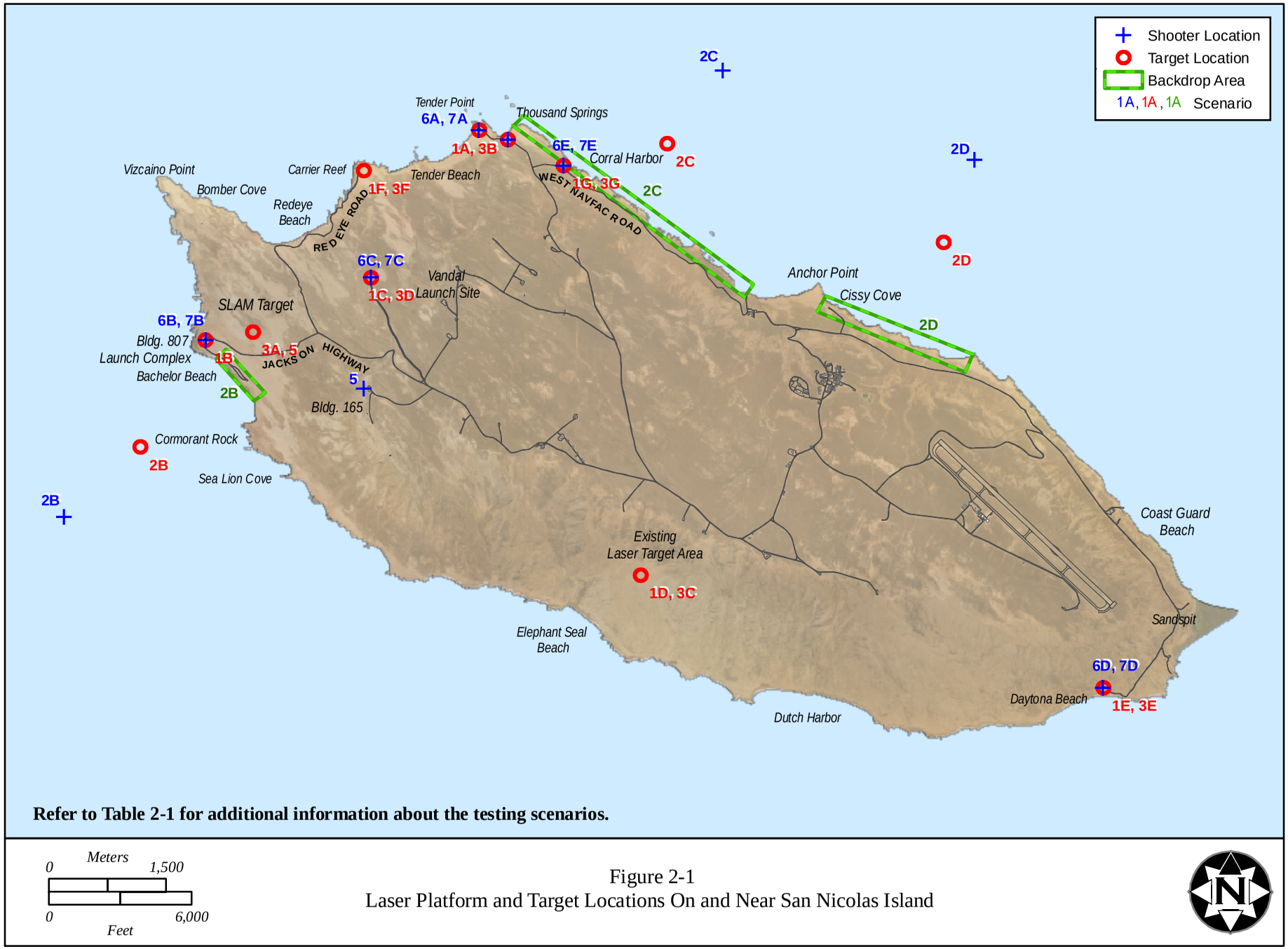

Figure 2-1
Laser Platform and Target Locations On and Near San Nicolas Island

The parts of the Sea Range that will be used will be dictated by the risks, and the risk mitigation, associated with each test and training event conducted on the Sea Range. Test and training operations and the transmission of laser energy will also occur farther offshore, but will be scheduled and managed by NAWCWD. For a scenario where a laser mounted 32 feet (ft) (9.8 meters [m]) above the water line is fired at a surface target 3.0 nm (5.6 kilometers [km]) away, the surface hazard would extend to 20 nm (37 km) and the air-space hazard would extend to 267 nm (494 km) due to the curvature of the earth (NAWCWD 2008). For lasers fired at an angle above horizontal, the distances of surface and air-space hazards would decrease considerably as the angle above horizontal increases (NAWCWD 2008).

The proposed action would include monitoring, reconnaissance, and range clearance procedures as needed to ensure there are no hazards to people, ships, or planes downrange of the target when the laser is fired, including beyond the boundaries of the Sea Range. For distances out to 200 miles, the ARSR-3 radar will be used to ensure that the airspace is clear of non-participating aircraft. The standard protocol of publishing Notices to Mariners (NOTMARs) and Notices to Airmen (NOTAMs) and the use of marine radio channels for communicating will ensure that aircraft and vessels avoid these areas while Navy activities are underway. Any laser operations that have the potential of creating hazards to aircraft shall be coordinated with the FAA to ensure that when the laser is fired no non-participating aircraft are in the hazard area. That includes coordinating Altitude Reservations (ALTRVs). Similar coordination with the Laser Clearinghouse will occur whenever laser testing creates potential hazards to satellites.

2.1.2 Project Elements

The following sections summarize the major elements of the proposed action.

2.1.2.1 Lasers

Laser types operated would include: Solid-state, Fiber, CO_2, Free Electron, and Closed-cycle COIL. All classes of laser would be utilized. Power levels are expected up to and including 1 MW at wavelengths from 0.18 μm to 14.0 μm.

Each proposed test of, or training use of, a laser would follow the protocols of OPNAVINST 5100.27B. This would include the calculation of hazard zones, which would need to be cleared; coordination with the FAA, Laser Clearinghouse, and Coast Guard; and the issuance of NOTAMS and NOTMARS as appropriate to the properties of the laser to be used.

It will be crucial to verify aim point and target tracking capability before operating any laser. This will confirm that laser energy will be confined to the hazard area pre-defined and cleared for the test event. Aim point will typically be verified visually by utilizing a lower power class laser to ensure the laser is properly aligned before emitting higher energy at the target. Target tracking capability will be similarly verified. If possible, a high power laser would first be set at a low power setting as an additional safety precaution to further ensure proper alignment and target tracking. The laser would be directed at the target initially for only a few seconds building up to more power as confidence in system performance is attained. Once the laser has been properly aligned with the target and target tracking capability is verified, higher power settings and longer durations of use would take place.

2.1.2.2 Targets

<u>Airborne Targets</u>

Airborne targets would be used in laser testing. These include the BQM-74 which is powered by a turbojet engine and can be either air-launched from a DC-130 range aircraft or surface-launched from Point Mugu (Building 55 Launch Complex) or SNI (Alpha Launch Complex). Targets launched from

SNI are fired west into a 90-degree azimuth launch cone; the heading is normally about 270 degrees (to the west). When surface-launched, this target requires use of one jet assisted takeoff (JATO) bottle. This metal alloy bottle contains solid rocket propellant which, when ignited, provides initial thrust necessary until its turbojet engine can propel the target independently. The bottle falls off soon after the launch and typically lands 700 to 1,400 ft (210 to 420 m) in front of the launch pad. Residues of aluminum, lead, and copper are associated with the JATO bottles (NAWCWD 2002a). The BQM-74 is generally used at altitudes lower than 1,000 ft (300 m) and can be recovered by parachute and then refurbished for another test. Target retrieval following the test or operation is conducted by a range or contractor helicopter, and a range boat is used for backup target recovery.

Hazardous constituents in the BQM-74 include oils, hydraulic fluids, a NiCad battery, and 16 gallons (48 kilograms [kg]) of JP-8 fuel. The BQM-74 was recovered in 57% of its launches in the baseline year reported in the *NAWCWD Point Mugu Sea Range EIS/OEIS* (NAWCWD 2002a). Other classes of airborne targets will also be used such as the GQM-163A, fixed and rotary wing UAVs, and rockets (Table 2-2). UAVs would include small UAVs that could be hand-launched from almost anywhere on the Sea Range or SNI. Larger UAVs such as the Predator most likely would launch out of NBVC Point Mugu, but some could be launched from SNI using existing infrastructure. HALE UAVs powered by LH_2 would be fueled and launched from NBVC Point Mugu (refer to Section 2.1.5 for further information). These aerial targets would contain fuels, engine oil, hydraulic fluid, and batteries. With the exception of the GQM-163A, all aerial targets would be intended for recovery.

Table 2-2 Annual Laser Testing/Training Activities for Sea Range

Scenarios	Type of Target	Location of Testing Target (estimated # of annual events)			
		On/Over SNI	0-3 nm	3-12 nm	> 12 nm
1, 3, and 5	Land (Target board, beam profiling equipment, vehicles, simulated military infrastructure)	74			
2, 4, and 7	Surface (HSMST, MST, LCMT, Zodiac-type craft – all with or without target boards)		7	21	21
6, 8, and 9	Aerial (BQM-74, GQM-163A, Unmanned aerial vehicle)		7	12	22
Total Annual Test Events = 164		**74**	**14**	**33**	**43**

Sea-Surface Targets

Surface targets can be seaborne such as remotely controlled powered boats like the Mobile Ship Target (MST), the High Speed Maneuvering Surface Target (HSMST), and Zodiac-type craft (Table 2-2). Targets are typically towed to a desired location on the range and augmentation systems energized (i.e., turned on) by range personnel. These targets can be towed by other boats or operated by remote control by range personnel. The NAWCWD Surface Craft and Surface Targets Divisions at Port Hueneme provides range support for most of the boat targets and transportation of targets personnel.

MST

The MST proposed for use as a target in laser testing is a 260-ft (80-m) steel hulk that has been stripped of excess hazardous constituents. The MST operates under its own power using diesel engines with only the necessary fuel on board to perform the test requirements. The MST can be hit by lasers and remain afloat.

Hazardous constituents in the MST include diesel fuel, engine oil, and batteries.

HSMST

The HSMST is a 22-ft rigid aluminum-hulled boat proposed for use as a target in laser testing. The HSMST can simulate high speed enemy patrol boats while being controlled by remote control.

Land-based Targets

SNI contains several proposed target areas that are located on existing pads or disturbed areas. Except as noted below, all of the proposed target areas have access roads to allow the delivery of targets and other necessary instrumentation. Targets would include target boards, beam profiling equipment, vehicles, and simulated military infrastructure (Table 2-2). Shelter would be provided to protect personnel who operate instrumentation and replace targets from exposure to laser energy.

SLAM Target

An existing missile target area located on the northwest portion of SNI is used for air-to-surface weapons testing. The target consists of several stacks of empty shipping containers. No personnel are allowed in Warning Zone 1 during target launches or during laser weapons testing at the SLAM target.

Vandal Launch Pad

The Vandal Launch Pad is part of the Alpha Launch Complex, located on the west end of SNI, which is primarily used for missile and target launching activities. The target would be set up in a cleared area near the Vandal Launch Pad at about 310 ft above mean sea level (MSL). This area is not currently being used as a target area.

Thousand Springs

Targets and instrumentation would be set up on an existing parking/turn around area at the end of the dirt road. This area is not currently being used as a target area.

Tender Point

As currently proposed, Tender Point would only be used from September to March, outside the snowy plover nesting season (see Section 3.3.3.7), to avoid affecting that federally listed threatened species. Year-round use of this location may be considered in the future, in which case the Navy would evaluate potential effects of this change in use on the snowy plover and consult with the U.S. Fish and Wildlife Service as required under the Endangered Species Act and prepare appropriate additional NEPA documentation. Targets and instrumentation would be set on the rocky terrace above the high tide line. This area is not currently being used as a target area and would be accessed from the end of the road at Thousand Springs.

Building 807 Launch Complex

The Building 807 Launch Complex is located on the southwest coast of SNI and is primarily used to launch targets and other missiles. This area is not currently being used as a target area.

Daytona Beach

The Daytona Beach site is located near the southeast tip of SNI and faces south. The target would be set up on the existing paved parking area that is utilized as part of the barge landing. This area is not currently being used as a target area.

Corral Harbor

The Corral Harbor site is located near the northwest side of SNI and faces northeast. The target would be set up on an existing paved parking lot. This area is not currently being used as a target area.

End of Redeye Road

This site is located at the end of Redeye Road on the northwest side of SNI and faces northwest. Redeye Road is currently impassable so the target would be either walked in or dropped off by helicopter and placed in the previously disturbed area at the end of the road, above and inland from shoreline areas used by marine mammals or seabirds. This site would only be used outside the snowy plover nesting season, which also would result in the avoidance of the Brandt's cormorant nesting season. This area is not currently being used as a target area.

SNI Laser Target

The SNI Laser Target area is located in a previously disturbed area south of Jackson Highway at 480 ft above MSL. This area has been used in the past for low-power laser testing but the target sensors in place are no longer functioning.

2.1.3 Aircraft

Participating aircraft could include any of the following, singly or in combination, in a particular exercise:

- Helicopter (including V-22) – used in the transport of personnel and target recovery, as well as providing an aerial platform for the laser, typically at slow speed and low altitude.
- Multi-engine propeller aircraft (e.g., C-130) – used for aerial target launch as well as a laser platform, typically at moderate speeds and mid-level altitudes.
- A variety of UAVs, both fixed- and rotary winged types, ranging from small, hand-launched aircraft to larger Predator-type drones - used as both laser and target platforms.
- HALE LH_2 fueled UAVs - used as laser platform; capable of an altitude of 65,000 feet with flight durations up to 7 days, but typical operation scenarios would be of shorter duration. These UAVs would utilize LH_2 which is converted into a gas that runs a generator producing electricity to power the propellers.
- Jet aircraft (e.g., F/A-18, F-35, or Lear Jets) – used as a laser platform, typically at relatively high speed and medium to high altitude.
- Instrumentation and/or range surveillance/clearance aircraft (e.g., P-3, E-2, S-3, King Air 100) – used for range surveillance, high altitude clearance, video, and TM relay.

In accordance with the Sea Range Final Environmental Impact Statement (U.S. Navy 2002) and established practice to minimize noise impacts on SNI wildlife, aircraft would maintain a minimum altitude of 1,000 ft above ground level over the coastline of SNI during laser activities.

2.1.4 Vessels

Participating vessels for at-sea test/training activities would include range support boats, as well as HSMSTs which could be used in non-target roles. Support boats that are regularly used on the Sea Range are medium-sized, typically from 80 to 120 ft (24 to 36 m) in length, varying in maximum speed and passenger capacity. The Self Defense Test Ship (SDTS) (USS Paul F. Foster, DD 964), which is berthed at Port Hueneme (http://www.navy.mil/search/display.asp?story_id=6656), is an example of a typical firing platform for lasers on the ocean surface. Fleet and other vessels would also be used, including the cruiser class of ship.

2.1.5 Infrastructure to Support Laser Operations

The proposed laser test and training events could use the following or similar facilities:

- **Control Shelter**: Laser testing may include a temporary (conex box) or existing shelter to house remote computers, video surveillance, instrumentation, and any personnel conducting laser operations during test events. This is particularly true of ship-based and land-based laser systems that have not yet been integrated into warfighting platforms. The internal configuration of the shelter will vary dependant on test requirements. If a conex box is used, it would be placed on a level, previously disturbed area and would require no excavation, grading, or anchoring.
- **Video Surveillance Systems**: Video systems will be used to monitor laser operations, to verify aim point prior to laser firing, to assess target damage, and to ensure the area is free of personnel and wildlife prior to laser operation. This provides an observer the opportunity to monitor the target zone and call for a stop to the test if unauthorized vehicles, personnel, or wildlife are spotted within the Nominal Hazard Zone (NHZ) specific to the laser. External configuration and number of video cameras would vary based on the test plan and would be dependent on test requirements. Video and radar surveillance would be used to supplement human observers of the laser beam hazard corridor to prevent humans from entering the corridor and to minimize chances of injury to wildlife.
- **Beam Profiling Equipment**: Typically, laser beam characteristics will be profiled in laboratories or at other facilities before arrival at the Sea Range in order to facilitate a data-driven safety analysis before operation. However, laser operations on the Sea Range may also include cameras, power meters, and other instrumentation for alignment and profiling of the laser beam.
- **Atmosphere Profiling Equipment**: Depending on test requirements, it may be important to characterize, as close to test event time as possible, the atmosphere through which the laser beam will travel. A scintillometer may be used to measure refractive index fluctuations, turbulent heat flux, and crosswind. Nephelometers, lidars, and meteorological weather stations may also be used to study the atmosphere.
- **Generators:** Power for laser systems may be provided by the host platform (e.g., the onboard power supply of a ship or aircraft) or by an auxiliary generator provided specifically for the test event.
- **Range Instrumentation:** Laser test and operations will use much of the same Sea Range infrastructure that is used for traditional aircraft and kinetic weapons testing, depending on test requirements:
    - Test control and data processing facilities
    - Time space position instrumentation
    - Electro optical instrumentation (video/film cameras)

- Telemetry and related sensor systems
- Communications systems
- Airborne electro optical and telemetry instrumentation
- Aircraft and surface craft for range clearance

- **LH_2 Fuel Tank:** Hydrogen powered HALE UAVs would require the installation of a cryogenic LH_2 fuel tank and delivery system with a proposed location near Hanger 323 (Figure 2-2) at NBVC Point Mugu. The tank would be filled by tank truck prior to planned operations with enough LH_2 fuel to support the specific operation (with 1% loss per day, long term storage of LH_2 is impractical due to requirements to maintain storage temperature below 20 degrees Kelvin [°K]). The LH_2 fuel would be used up during the operation and the tank would not be refilled until the next scheduled operation that required it. To meet expected operational needs, the double-walled cryogenic tank would need to have a capacity of approximately 9,000 gallons of LH_2. The tank would be placed on an approximately 400 ft^2, 2-foot thick concrete pad that would be poured in place on the site, which has been repeatedly graded and filled over the years. The location is set back from the east side of the apron with a 75-ft clearance from all buildings and electrical sources. The pad would be surrounded by bumpers, K-rail, or fence. This area would also include an unloading area, pumps, a piping system, secondary containment, a leak detection system, a 30-ft tall hydrogen burn stack to burn excess vapor, a fire suppression/deluge system, power, and instrumentation. The hydrogen would be loaded onto the UAV via a 150-ft hard line fuel run to the apron. This new facility would be tied into the existing base utility infrastructure. The facility would use small amounts of electricity and water for lighting, cooling, and an alarm system, as well as a deluge system that would be automatically triggered in the event of a fire.

2.1.6 Project Personnel

Project personnel would include approximately 40 persons currently working at Point Mugu and residing locally, plus an additional 10 to 30 temporary personnel during testing activities who would reside in military housing or local rental accommodations.

2.1.7 Safety Procedures

2.1.7.1 Laser Systems

Laser Safety

The Sea Range has established safety procedures as described in the Sea Range EIS and these procedures will be followed for laser testing and training. Additional laser safety procedures will be implemented. Potential hazards will vary with the scenarios, so each testing or training event will be managed on a case-by-case basis to eliminate or reduce the risk. All test and training events requiring laser operations would require the approval of the RLSSO for range operations and must be done in accordance with an approved Standard Operating Procedure (SOP). An SOP would be prepared for each different laser system and different type of laser operation.

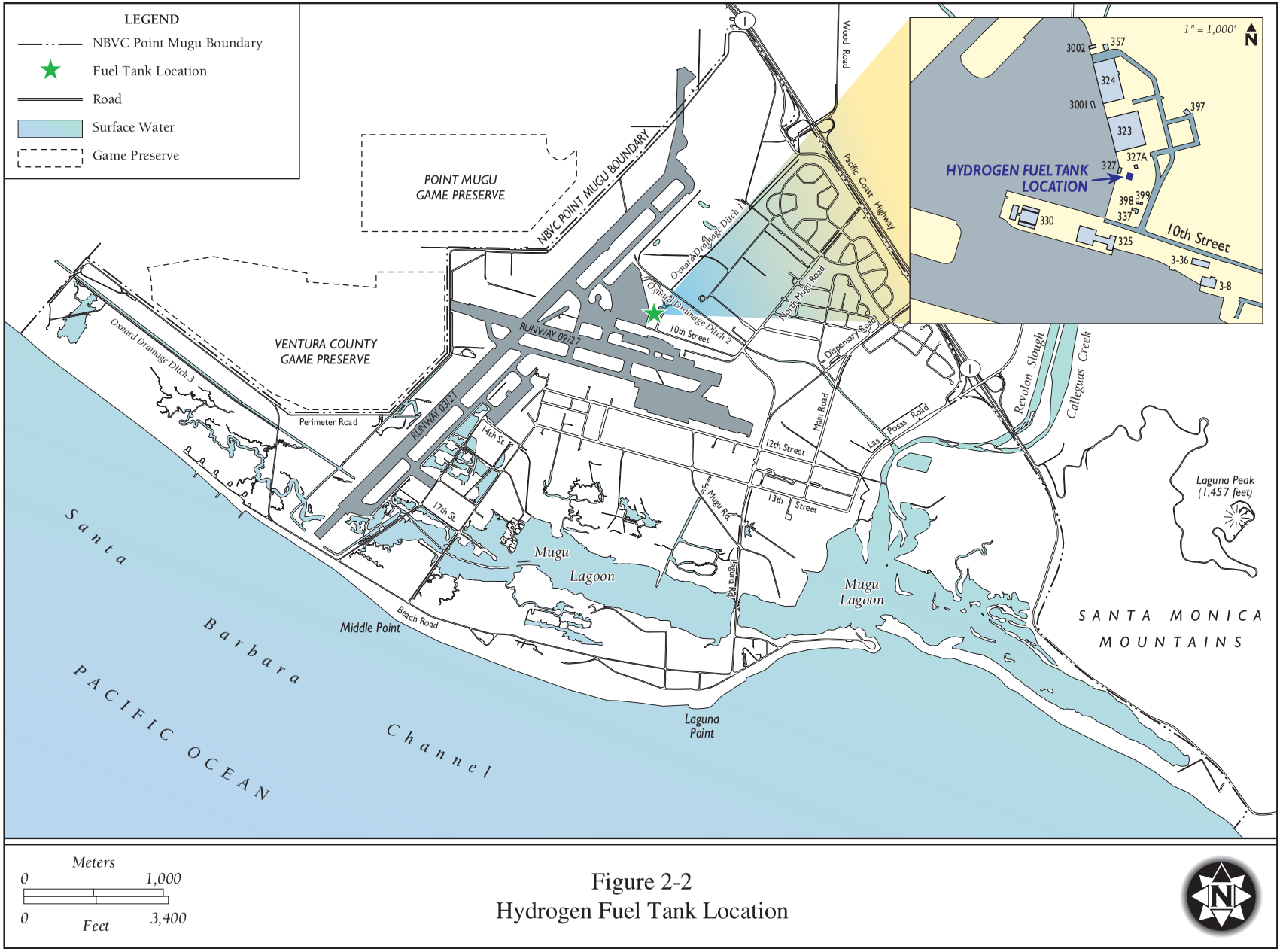

Figure 2-2
Hydrogen Fuel Tank Location

To allow a full evaluation of risks and safety considerations and permit the planning and preparation for laser operations, the following data shall be provided for each test and/or training event: a written description of test objectives, how laser(s) or laser system(s) will be used, people involved, and required data. If it is determined that the Sea Range can support the test, the following will be required or developed:

- system and laser specifications;
- a detailed test plan(s) that includes a description of objectives, risks, hazard zones, required NOTAMs, NOTMARs, and needed coordination with the FAA and Laser Clearinghouse in the event that a laser will be fired at or above the horizon;
- layout diagram(s), if applicable, of the test scenario showing land sites, surface craft and/or aircraft locations, maneuver patterns, altitudes, time lines, and targets;
- SOPs governing the use of the system during the test or training events that include detailed step-by-step operational procedures (firing sequence) for pre-operation (alignment and diagnostic checks), safety interlocks, low-power operation (if applicable), high power lasing, post-operation, and emergency shutdown; and
- qualification/certification statements for operators of the laser system(s).

Once all information is provided and successfully analyzed, the RLSSO will generate a Range Safety Approval (RSA) for the program.

General Laser Safety Considerations

Laser energy is unique in that it travels great distances and maintains much of its power over those distances. It is therefore very important that absolute control of a laser system be maintained, including precision pointing and precise control of the release of high power laser energy.

Laser systems must comply with the laser safety design requirements described within OPNAVINST 5100.27B dated 2 May 2008 and the American National Standards Institute (ANSI) Z136.1-2007. These instructions are available on the web.

As the RLSSO analyzes proposed laser systems and related testing and training scenarios for adequacy, there are a number of system features that help to manage risk. These system features may include but are not limited to the following:

- A beam director that provides adequate control and prevention of glint/stray light.
- Proven alignment of a high power laser with system targeting lasers.
- Movement locks, both software and hardware, which prevent a beam director from slewing outside a pre-defined azimuth and elevation firing path. These hard stops must limit the tracking system such that horizontal and vertical movement can be limited based upon the restrictions associated with different test or training event scenarios and a system's physical location.
- Tracking accuracy and slew rate that has the capability of ensuring aim point maintenance.
- A mechanism to ensure that aim point is being maintained prior to release of high power laser energy.
- Interlocks to ensure that laser energy is purposefully released as specified in SOPs.

- Capability to conduct system alignment and diagnostic checks in a safe manner.
- Provision to adequately control any hazardous system byproducts.
- Hazard warning indicators (e.g., flashing lights) to alert personnel in the area that a laser system operation is taking place.
- Other devices or mechanisms as deemed appropriate to protect system operators and other personnel in the area.

The RLSSO will take these factors, and others like them, into account as part of the Operational Risk Management (ORM) process. For any proposed use of a laser on the Sea Range, a detailed Risk Hazard Assessment (RHA) would be performed and used in conjunction with the ORM process to assess, manage, and mitigate risks.

Operational Risk Management

ORM procedures as described in OPNAVINST 3500.39B (30 July 2004) will be implemented for each particular testing or training activity, including the following steps (summarized from the original source):

- **Identify Hazards.** Outline the steps in the operation and list all of the hazards associated with each step, along with their possible causes.
- **Assess Hazards.** Assess the degree of risk associated with each hazard in terms of probability and severity.
- **Make Risk Decisions.** Develop risk control options and assess their benefits and utility.
- **Implement Controls.** Implement either engineering or administrative controls or protective measures to eliminate hazards or reduce the degree of risk.
- **Supervise.** Conduct follow-up evaluations of the controls, monitor their effectiveness, and take corrective action when necessary.

Additional Information Required

Before a laser would be approved for use on the Sea Range, the following information must be provided to the RLSSO:

- System specifications, including laser systems and their purposes, system interlocks/warning indicators and information on beam stability, aim point accuracy/maintenance, tracking dynamics, azimuth and elevation tracking locks, and power and cooling requirements
- Drawings and/or photographs
- Modes of operation
- Information on how potential hazards have been mitigated through design, safety devices, warning devices, and procedures/training
- Identification of any safety-critical software and how that software was verified.
- Identification of any hazardous materials used by the laser system, its power and thermal systems, or any other components of the system
- Subcomponents or supporting equipment (i.e., chillers, power system), power requirements, etc.
- Laser specifications (for each laser)
    - Laser name and purpose
    - Laser type (pulsed or continuous wave)
    - Wavelength

  - Average power (continuous wave)
  - Laser Pulse Characterization, if applicable, including:
    - Energy per pulse (Joules)
    - Pulse repetition frequency (Hertz)
    - Pulse width
    - Pulse format
    - Other pulse characteristics
  - Near-field Beam contour that encloses 100% of the power
  - If the optical beam train between the laser and the telescope is not shrouded, explain why and provide account of how much power may be spilling into the wings in the near-field.
  - Beam irradiance distribution at the exit of the telescope (e.g., Gaussian, Top Hat)
  - Anticipated full range of possible focal distances and Beam Divergences from the telescope
  - Spot size at target at various ranges (radius at $1/e^2$ irradiance based on platform jitter & beam quality of the laser). Size should be measured normal to the direction of propagation.
  - Aperture diameter
  - Laser Turn-on time period
  - Laser Turn-off time period
  - Beam director glints (i.e. from spiders or other sources): to include power and degree off main beam
  - Beam jitter and Power Spectral Density of the jitter
- Recommended Laser eye protection

2.1.7.2 LH_2 Safety

For certain laser testing and training scenarios, the proposed action would use LH_2 HALE UAVs as both targets and Laser platforms. The HALE UAVs would operate out of NBVC and would require the installation of a LH_2 fueling facility, including a storage tank. LH_2 is a cryogenic liquid that would be stored in a specialized, thermally insulated tank located near Building 323 (refer to Figure 2-2) and is situated to meet safety clearance standards. The LH_2 storage and fueling operations would be in compliance with Occupational Safety and Health Administration regulations on Hydrogen, 29 CFR 1910.103.

The storage tank would be filled prior to planned operations with enough LH_2 fuel to support the specific operation (with approximately 1% loss per day, long term storage of LH_2 is impractical due to requirements to maintain storage temperature below 20°K). The LH_2 fuel would be used up during the operation and the tank would not be refilled until the next scheduled operation that required it. The storage tank and piping would be designed to meet American Society of Mechanical Engineers Code and American National Standards Institute Pressure Piping Code for the pressures and temperatures specific to LH_2 (Air Products and Chemicals, Inc. 2007). This design would also include the use of safety relief valves and gaskets appropriate for use with LH_2.

The hazards associated with storing and transferring LH_2 include explosion, fire, asphyxiation, and exposure to extremely low temperatures (Air Products and Chemicals, Inc. 2007). Potentially explosive hydrogen would be stored at the proposed LH_2 fueling station.

Unique properties of hydrogen lend the gas to special structural and operational safety precautions:

- The gas is highly flammable and potentially explosive;
- Hydrogen is lighter than air, diffuses rapidly, and quickly escapes unsealed containment; and

- The gas is odorless, colorless, and tasteless, making unaided detection difficult or impossible, including the gas's colorless flame, which can be invisible to the unaided eye.

However, properties of hydrogen also make the gas less dangerous than other common fuels. Hydrogen is nontoxic and nonpoisonous. It will not contaminate groundwater, nor contribute to atmospheric pollution in the event of a release, and it does not create fumes. Because the gas is lighter than air, it rapidly dissipates into non-flammable concentrations in the atmosphere and does not gravitate to the ground or easily accumulate in buildings or vehicles. Without ignition, leaks often disperse to non-flammable levels in close proximity to the release site. Hydrogen flames have a low radiant heat and although a hydrogen flame itself is hot, low levels of heat surround the flame reducing the risk of secondary fires (U.S. Marine Corps 2005)

The National Fire Protection Association's *Storage, Use and Handling of Compressed Gases and Cryogenic Fluids* (NFPA 55), sets minimum required separation distances (the amount of space to be kept between a potential fire hazard and other facilities) for a 9000 gallon LH_2 fueling station (Air Products and Chemicals, Inc. 2007). Depending on materials and characteristics, these distances range from 5 ft to 75 ft for buildings, combustion sources (i.e., open flames, electrical), and other combustible materials. The site location near Building 323 (refer to Figure 2-2) allows for a clearance of 75 ft from all buildings and electrical and is therefore in compliance with NFPA 55. As noted previously, the facility would include a deluge system triggered automatically to extinguish a fire if one occurs.

The 1% loss per day of LH_2 storage and vaporization losses associated with transfer (i.e., either from delivery or fueling of UAVs) results in the production of hydrogen gas. Equipment would be installed to capture this hydrogen gas which would then be vented via a 30-ft tall exhaust mast. In order to minimize the risk of frostbite from exposure to cryogenic LH_2, only fully authorized, trained and certified personnel shall perform maintenance and undertake a transfer of LH_2 fuel to UAVs.

2.1.8 Wildlife Protection

The path from the laser to the target would be monitored by observers with binoculars or remote cameras as necessary to ensure that the laser is not fired if and when wildlife is within the NHZ identified in the RHA. Laser targets mounted on floating structures would not be placed on horizontal surfaces where sea lions might haul out, and surfaces near a target may have "bird spikes" (www.nixalite.com) attached to discourage perching.

2.2 ALTERNATIVES

This section considers whether there are alternative means of achieving the stated purpose and need for the proposed action. In addition, a no-action alternative is described.

2.2.1 Alternatives Not Carried Forward

Since the purpose and need are to conduct laser RDT&E and training activities on the Point Mugu Sea Range, locations other than the Sea Range were not considered. Alternatives were considered that included the use of placing laser shooter platforms on the mainland at Point Mugu and firing towards targets located in the Sea Range. This would allow for laser testing and training scenarios that included Land-to-Surface and Land-to-Air, but lasing from Point Mugu would involve increased difficulties in achieving sufficient range clearance and risks to public health and safety made these alternatives impractical. Therefore, this alternative was eliminated from further analysis.

Consideration was also given to whether alternative testing parameters - limiting the range of frequencies and/or power level - could at least partially meet the purpose and need. This was not considered viable because the frequency range and maximum power level stated for the proposed action accurately reflect the spectrum of technological advances in laser weapons applications. Disallowing certain types of lasers would slow advances in the understanding and applications of those segments of laser technology. In addition, there would be a negligible benefit to such limitations, given that significant risks associated with particular frequencies or higher power lasers are required to be mitigated in any case before a laser can be used. Finally, imposing such limitations without a compelling reason would be inconsistent with the NAWCWD mission and the operation of Sea Range to develop, test, and apply modern technology in realistic maritime environments.

2.2.2 Action Alternatives

The consideration of viable action alternatives focused on means to achieve most of the purpose and need, while providing some potential advantage to offset a reduction of RDT&E and training opportunities. Two action alternatives were identified, each of which allows for air, land, or sea-based laser platforms that would engage stationary and/or dynamic targets. Each new alternative is discussed further below. Table 2-3 provides comparisons with the proposed action.

2.2.2.1 Alternative 1

Under Alternative 1, scenarios 1, 3, 5, 6, and 7 would be accommodated. Air, land, and sea surface laser platforms could be tested on targets located on SNI; whereas land-based laser platforms could also be tested on aerial or ship targets at varying distances from SNI. Most laser testing/training activity would occur on and in the near vicinity of SNI, but to retain flexibility to accommodate new types of testing and training, participating ships or aircraft would not have to be within a set distance of the island. However, scenarios involving aerial and ship-based lasers aimed at aerial and ship targets would not be conducted, thereby eliminating potential risks associated with the simultaneous movement of lasers and targets in these scenarios. Alternative 1 would include the same project elements, aircraft, vessels, infrastructure, project personnel, and safety procedures as described under the proposed action. While this alternative would partially meet the purpose and need, it would not include laser testing and training scenarios for all maritime sea and air environments that occur in the Sea Range, including ocean surface-to-surface and air-to-air scenarios.

2.2.2.2 Alternative 2

Under Alternative 2, laser testing and training would occur over and on the open ocean in the Sea Range, and scenarios 2, 4, 8, and 9 would be accommodated. As for Alternative 1, a particular distance from SNI is not specified in order to retain the flexibility to accommodate new testing and training requirements. By removing the land-based elements, this alternative would avoid any potential risks and impacts associated with activities on SNI. Otherwise, Alternative 2 would include the same project elements, aircraft, vessels, infrastructure, project personnel, and safety procedures as described under the proposed action. While this alternative would partially meet the purpose and need, it would not include laser testing and training scenarios for any maritime land environments that occur on SNI.

Table 2-3 Comparison of Proposed Action and Alternatives

Scenario Description	Option	Proposed Action	Alternative 1	Alternative 2
1) Surface to Land High Power Laser	A	**X**	**X**	
	B	**X**	**X**	
	C	**X**	**X**	
	D	**X**	**X**	
	E	**X**	**X**	
	F	**X**	**X**	
	G	**X**	**X**	
2) Surface to Surface High Power Laser	A	**X**		**X**
	B	**X**		**X**
	C	**X**		**X**
	D	**X**		**X**
3) Air to Land High Power Laser	A	**X**	**X**	
	B	**X**	**X**	
	C	**X**	**X**	
	D	**X**	**X**	
	E	**X**	**X**	
	F	**X**	**X**	
	G	**X**	**X**	
4) Air to Surface High Power Laser	NA	**X**		**X**
5) Land to Land High Power Laser	NA	**X**	**X**	
6) Land to Air High Power Laser	A	**X**	**X**	
	B	**X**	**X**	
	C	**X**	**X**	
	D	**X**	**X**	
	E	**X**	**X**	
7) Land to Surface High Power Laser	A	**X**	**X**	
	B	**X**	**X**	
	C	**X**	**X**	
	D	**X**	**X**	
	E	**X**	**X**	
8) Surface to Air High Power Laser	NA	**X**		**X**
9) Air to Air High Power Laser	NA	**X**		**X**

2.2.3 No-Action Alternative

A no-action alternative is also considered in this EA/OEA. Under the no-action alternative, the proposed testing, evaluation, and training use of lasers on the Point Mugu Sea Range would not occur. However, this is not a viable option because the purpose and need for the proposed action would not be met. The consequences of the no-action alternative would be to delay testing, evaluation, and training use of lasers in an open air maritime environment. This would slow the development of laser technology which is needed to counter increasingly sophisticated threats to military and non-military assets in coastal

environments. Since other nations are rapidly developing laser technology for military applications, the no-action alternative would erode the technological advantage of the U.S. military and put our forces at greater risk. The No-Action Alternative would erode the RDT&E and training mission of NAWCWD and the Sea Range by denying use of the Sea Range to support the testing and development of this emerging technology.

CHAPTER 3
AFFECTED ENVIRONMENT

3.1 AIR QUALITY

3.1.1 Definition of Resource

Estimated emissions from a proposed federal action are typically compared with the relevant national and state standards to assess the potential for increases in pollutant concentrations. Impacts would occur if the action alternatives would directly or indirectly produce emissions that would be the primary cause of, or would significantly contribute to, a violation of state or federal ambient air quality standards. Emission thresholds associated with Clean Air Act (CAA) conformity requirements are another means of assessing the significance of air quality impacts. A formal conformity determination is required for federal actions occurring in nonattainment or maintenance areas when the total direct and indirect stationary and mobile source emissions of nonattainment pollutants or their precursors exceed *de minimis* thresholds.

Air quality in a given location is defined by pollutant concentrations in the atmosphere and is generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). One aspect of significance is a pollutant's concentration in comparison to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards, established by the United States Environmental Protection Agency (USEPA), are termed the National Ambient Air Quality Standards (NAAQS) (Figure 3-1). The NAAQS represent maximum acceptable concentrations that generally may not be exceeded more than once per year; the annual standards are never allowed to be exceeded. State standards, established by the California Air Resources Board (CARB), are termed the California Ambient Air Quality Standards (CAAQS). The CAAQS are at least as restrictive as the NAAQS and include pollutants for which national standards do not exist.

Areas that violate ambient air quality standards are designated as nonattainment areas. Nonattainment designations for ozone (O_3) and carbon monoxide (CO) include subcategories indicating the severity of the air quality problem (e.g., the classifications range from *basic* to *severe* for O_3). Areas that comply with federal air quality standards are designated as attainment areas. Areas that have been redesignated from nonattainment to attainment are designated as maintenance areas. Areas that lack monitoring data to demonstrate attainment or nonattainment status are designated as unclassified and are considered to be in attainment for regulatory purposes.

The air pollutants that are considered in this analysis include volatile organic compounds (VOCs), O_3, CO, nitrogen oxides (NO_x), particulate matter less than or equal to 10 microns in diameter (PM_{10}), and particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$). Emissions are often characterized as being "primary" or "secondary" pollutants. Primary pollutants are those emitted directly into the atmosphere such as CO, sulfur dioxide (SO_2), PM_{10} and $PM_{2.5}$. Secondary pollutants are those formed through chemical reactions in the atmosphere such as O_3 and nitrogen dioxide (NO_2). SO_2 and NO_2 are commonly referred to and reported as generic oxides of sulfur (SO_x) and NO_x, respectively, as SO_2 and NO_2 constitute the majority of their respective oxides. Although VOCs (also referred to as hydrocarbons or reactive organic gases) and NO_x (other than nitrogen dioxide) have no established ambient standards, they are important as precursors to O_3 formation.

POLLUTANT	AVERAGING TIME	CALIFORNIA STANDARDS(1)	NATIONAL STANDARDS(2)	
			Primary	Secondary
Ozone (O_3)	8 Hour	0.07 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	Same as Primary Standards
	1 Hour	0.09 ppm (180 µg/m^3)	•	
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	•
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.03 ppm (56 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary Standard
	1 Hour	0.18 ppm (338 µg/m^3)	•	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	•	0.03 ppm (80 µg/m^3)	•
	24 Hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	•
	3 Hour	•	•	0.5 ppm (1300 µg/m^3)
	1 Hour	0.25 ppm (655 µg/m^3)	•	•
Respirable Particulate Matter ≤ 10 Microns in Diameter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	•	Same as Primary Standards
	24 Hour	50 µg/m^3	150 µg/m^3	
Respirable Particulate Matter ≤ 2.5 Microns in Diameter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	15 µg/m^3	Same as Primary Standards
	24 Hour	No Separate Standard	35 µg/m^3	
Sulfates	24 Hour	25 µg/m^3	•	•
Lead (Pb)	30 Day Average	1.5 µg/m^3	•	•
	Calendar Quarter	•	1.5 µg/m^3	Same as Primary Standard
Hydrogen Sulfide (H_2S)	1 Hour	0.03 ppm (42 µg/m^3)	•	•
Vinyl Chloride (chloroethene)	24 Hour	0.01 ppm (26 µg/m^3)	•	•
Visibility Reducing Particles	8 Hour (10:00 A.M. to 6:00 P.M.)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent. Measurement in accordance with California Air Resources Board (CARB) Method V.	•	•

ppm – parts per million µg/m^3 – micrograms per cubic meter mg/m^3 – milligrams per cubic meter • – no standard established

(1) CO, SO_2 (1- and 24-hour), NO_2, O_3, PM_{10}, and visibility reducing particles standards are not to be exceeded. All other California Standards are not to be equaled or exceeded.

(2) Not to be exceeded more than once a year except for annual standards.

Source: CARB 2008b (updated 6/26/08).

Figure 3-1
California and National Ambient Air Quality Standards

3.1.2 Regulatory Setting

3.1.2.1 Federal Requirements

Section 176(c) of the CAA, as amended, requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the CAA and with federally enforceable air quality management plans. The USEPA general conformity rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emission thresholds that trigger requirements for a conformity analysis are called *de minimis* levels. *De minimis* levels (in tons per year) vary by pollutant and are also subject to the severity of the nonattainment status.

The USEPA conformity rule establishes a process that is intended to demonstrate that a proposed federal action would not: 1) cause or contribute to new violations of federal air quality standards; 2) increase the frequency or severity of existing violations of federal air quality standards; and 3) delay the timely attainment of federal air quality standards. Compliance is presumed if the net increase in direct and indirect emissions from a federal action would be less than the relevant *de minimis* level for the region in which the action is proposed. However, if the increase in emissions for a nonattainment pollutant exceeds *de minimis* levels, a formal conformity determination process must be implemented. For the purposes of this air quality analysis, project emissions would be potentially significant if they exceed federal *de minimis* levels. If emissions exceed their respective *de minimis* levels, further analysis of the emissions and their consequences would be performed to assess whether there is a likelihood of a significant impact to air quality.

3.1.2.2 State and Local Requirements

The CAA requires each state to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce federal air quality standards throughout the state. SIP documents are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated. In California, the SIP consists of separate elements for each air basin, depending on the attainment status of that air basin. Local governments and air pollution control districts have had the primary responsibility for developing and adopting the regional elements of the California SIP.

3.1.3 Existing Conditions

3.1.3.1 Climate and Meteorology

Coastal southern California and the adjacent valleys, mountains, and basins experience a "mediterranean climate" characterized by 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 photochemically 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 far 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, the Sea Range surrounding SNI 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 as one approaches the mainland coast. Due to the influence of the continent on the overall wind flow, in addition to the eddies and other complicating factors nearshore, there is a strong tendency for the relatively persistent northwesterly winds in the outer Sea Range to become more westerly as the air approaches the mainland.

SNI is arid; total precipitation at SNI averages 8.40 inches (21.3 centimeters) per year. The dry season occurs between May and September. The rainy season occurs between November and March when SNI receives 87 % of its total annual rainfall. The month of highest average precipitation is typically January. The average mean monthly temperature on land is 59 °F (15 °C), with a seasonal variation (January to July) of approximately 9 °F (5 °C). Temperatures during the coolest month average 54.7 °F (13 °C), and during the warmest month average 65.4 °F (19 °C). Prevailing winds are northwesterly, with an average speed from that direction of 13 knots (24.1 km/hour or 15 miles/hour).

3.1.3.2 Attainment Status and *de minimis* thresholds

Although SNI is part of Ventura County, the USEPA has determined that SNI is separate and distinct from the South Central Coast Air Basin (SCCAB) which includes the Ventura County Air Pollution Control District (VCAPCD). SNI is in attainment/unclassified of the NAAQS for all criteria pollutants; therefore, the provisions of the General Conformity Rule and *de minimis* thresholds do not apply. Due to the lack of major emitting sources on the SNI in conjunction with predominantly strong winds from the northwest, the likelihood of pollutants remaining in the ambient air of the Island is very low.

Vessels originating from Port Hueneme and aircraft originating from Point Mugu in Ventura County would support the activities of the proposed action. Effective 19 June 2008, Ventura County has been reclassified as a "serious" nonattainment area for the federal 8-hour O_3 standard (*de minimis* thresholds are 50 tons/year for VOCs and NO_x) and is in attainment of all other criteria pollutants (USEPA 2008a, USEPA 2008b, 40 CFR 93.153). Ventura County is classified as a nonattainment area for the state O_3, $PM_{2.5}$, and PM_{10} standards (CARB 2008a).

Aircraft would originate from Point Mugu; therefore, the landings and takeoffs would occur within the SCCAB and have been estimated in Section 4.1. Transport operations would be above 3,000 ft (915 m) above ground level (AGL) (i.e., above the atmospheric inversion layer and would not impact the local air quality). Therefore, only aircraft emissions associated with operations below 3,000 ft (915 m) (including landings and takeoffs at Point Mugu) are analyzed in this EA.

3.1.3.3 Emissions from Stationary Sources

Stationary sources on SNI consist of a power plant, a gasoline refueling station, small boilers, several internal combustion engines, and various adhesive and sealant operations. All non-exempt emitting sources on SNI are permitted under Title V Part 70 Permit, Number 1207 (VCAPCD 2007). The permit limits the total hourly and monthly emissions of criteria pollutants by these sources, as well as total fuel use, total power produced, and amount of sealant and adhesive product used (VCAPCD 2007).

3.1.3.4 Emissions from Mobile Sources

Mobile sources of emissions on SNI consist of aircraft operations as well as combustion emissions from vehicles on SNI. In addition, activities surrounding SNI include test and training operations that involve launching missiles and/or targets from SNI. Emissions are associated with combustion of propellants and/or fuels used to propel the missiles and targets.

3.2 MARINE SEDIMENTS AND WATER QUALITY

3.2.1 Definition of Resource

This section describes the oceanographic conditions, marine water quality, and bathymetry and sediment quality within the Point Mugu Sea Range and at SNI. The Sea Range extends offshore of central California and includes the northern portion of the Southern California Bight (SCB). Oceanographic conditions describe tidal currents, speeds, and cycles. Water quality describes the chemical and physical composition of water as affected by natural conditions and human activities. Bathymetry describes the depth of the ocean floor, and sediment quality describes the composition of ocean bottom sediments.

Water resource regulations focus on the right to use water and protection of water quality. The principal federal laws protecting water quality are the Clean Water Act (CWA), as amended (33 USC 1251 et seq.) and the Safe Drinking Water Act (42 USC 300f et seq.). Both laws are enforced by the USEPA. The CWA provides protection of surface water quality and preservation of wetlands.

At the state level, the Porter-Cologne Water Quality Control Act (California Water Code 13000- 13953.4) gives the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs) responsibility for protection of the waters within their regions. The regional boards are also responsible for implementing provisions of the CWA delegated to states, such as the National Pollutant Discharge Elimination System, which regulates point sources of pollutants. The SWRCB adopted the Water Quality Control Plan for Ocean Waters of California in 1974; the amended plan (The Ocean Plan) establishes beneficial uses and water quality objectives for waters of the Pacific Ocean adjacent to the California coast outside of enclosed bays, estuaries, and coastal lagoons. The Ocean Plan prescribes effluent quality requirements and management principles for waste dischargers and specific waste discharge prohibitions. It also contains a prohibition against discharge of specific hazardous substances and sludge, bypass of untreated waste, and discharges that impact Areas of Special Biological Significance (ASBS). However, the SWRCB may grant exceptions to allow a discharge into an ASBS provided that the exception will not compromise protection of ocean waters for beneficial uses, and that the public interest will be served (Los Angeles RWQCB 1994).

3.2.2 Existing Conditions

3.2.2.1 Oceanic Conditions

The Sea Range straddles Point Conception which is considered a major geographic feature that affects marine water resources. North of Point Conception, the marine waters are under the influence of the cold, southward flowing California Current. The shape of California's coastline south of Point Conception creates a broad ocean embayment known as the SCB. The SCB encompasses the area from Point Conception south to Mexico and is influenced by two major oceanic currents: the southward flowing, cold-water California Current and the northward flowing, warm-water California Countercurrent. These currents mix in the SCB and strongly influence patterns of ocean water circulation and temperatures.

3.2.2.2 San Nicolas Island

The Channel Islands are located in a region of variable mixing between the cold waters of the California Current and the warm nearshore waters of the California Countercurrent. SNI is located far enough offshore and to the south that it is subjected both to the warmer waters of the California Countercurrent and to the colder waters of the California Current. In general, the circulation patterns around the Island are similar to the patterns of the two major currents. However, some localized currents and eddies are caused by the Island's shape and orientation (Engle 1994).

The coldest sea surface temperatures occur in March (monthly average 57 ° F [14 °C]), while the warmest temperatures occur in September (66 °F [19 °C]) (Engle 1994). Consequently, marine biota of the Island has been termed "intermediate" because both cold and warm water species occur at the Island. The Island is relatively isolated from the effects of human activities that typically occur in the nearshore environments of the mainland (Engle 1994).

SNI is part of Ventura County and is situated in Watershed 11 which also includes Anacapa, Santa Barbara, San Clemente, and Santa Catalina Islands (RWQCB 1994). The ocean waters surrounding San Nicolas Island and Begg Rock to a distance of 1 nm (1.9 km) offshore or to the 300-foot (91-m) isobath, whichever is greater, have been designated as an ASBS based on their relatively pristine water quality. The Island is a mesa with the topography sloping gently upward from the northern end of the Island. The average surface elevation is 500 ft (152 m) above MSL, with a maximum elevation of 908 ft (277 m) above MSL. The dry season occurs between May and September, and the wet season occurs between November and March when SNI receives 87 % of its total rainfall. The existing beneficial uses for water resources at SNI include navigation, water contact recreation, non-contact water recreation, commercial and sport fishing, shellfish harvesting, and preservation of terrestrial and marine habitats and rare, threatened, or endangered species (RWQCB 1994). Freshwater resources include all surface water and groundwater at San Nicolas Island.

3.2.2.3 Nearshore Marine Water Quality

As discussed above, the quality of ocean water in the immediate area of SNI is relatively pristine. Most of the marine water pollution within the SCB area stems from municipal discharges originating on the mainland. A potential source of water pollution offshore comes from the oil and gas development industry. As activity increases from offshore oil and gas development, the potential for discharge into the Sea Range also increases. In recent years, the increased frequency and extent of regional beach and shellfish-bed closures coupled with decreases in local fishing catches are taken as signs of declining water quality (NOAA 2006). However, the distance of SNI from the mainland, the large diluting volume of the ocean, and the shelves and basins near the mainland where many pollutants settle ensure high water quality at the Island.

3.2.2.4 Marine Sediments and Bathymetry

The bathymetry surrounding SNI is irregular in shape. The Island is a pinnacle that is surrounded by water depths that slope to greater than 1,200 ft (366 m) within 6 nm (11 km) of the southern portion of the Island. The subtidal area nearest the Island is characterized by sand, bedrock, or boulder (NAWCWD 2002a).

3.3 BIOLOGICAL RESOURCES

3.3.1 Definition of Resource

Biological resources existing in the proposed project area include terrestrial and marine flora and fauna and the environments they inhabit, generally on San Nicolas Island and specifically in areas that may be affected by the proposed action. Terrestrial resources discussed include vegetation communities, wildlife, and special status species. Marine biological resources discussed include sea birds, aquatic vegetation, invertebrates and fishes, and special-status species such as sea turtles and marine mammals. Where appropriate, marine biological resources are further categorized by the habitat type in which they occur (rock versus sand). Special topics such as essential fish habitat (EFH), special aquatic sites, and fisheries are also discussed for the proposed action area.

3.3.2 Terrestrial Biological Resources

3.3.2.1 Vegetation Communities

SNI contains remnants of the original island ecological condition, but it has been heavily disturbed from past land uses and exploitation (Schwartz 1994). Natural ecosystems on SNI are degraded and have been impacted by non-native species, particularly non-native plants and sheep grazing. SNI has strong floristic affinities with nearby geographic regions, sharing 89% of its native plants with the southern California mainland, 66% to 82% with the four Northern Channel Islands, 43% to 82% with the other three Southern Channel Islands, and 9% to 34% with islands off the Pacific coast of Baja California, Mexico (Junak 2008). Approximately 278 vascular plant species have been documented on SNI (Junak 2008). Compared to the other seven Channel Islands, SNI has a relatively limited richness of native plant species and also has the highest percentage (51%) of introduced plant species (Junak 2008). SNI has no federally listed endangered or threatened plant species (U.S. Navy 2005).

Figure 3-2 shows the vegetation of San Nicolas Island based on classification and mapping by Halvorson et al. (1996). Unvegetated and developed areas are included. Vegetation communities include scrub communities covering 7,354 acres (2,976 hectares [ha]). Freshwater aquatic vegetation communities include vernal pools and riparian habitats. Coastal and inland dunes are found along the coastline of San Nicolas Island and coastal marsh is found in 3 small areas. Annual iceplant, native and non-native grasslands, and disturbed and developed communities also occur. Barren areas which support no vegetation cover 3,469 acres (1,403 ha) (Junak 2008). Table 3-1 lists the extent and percent cover of these plant communities (Junak 2008). Additional details on the distribution and floristic composition of vegetation communities are provided in the Integrated Natural Resources Management Plan (INRMP) for San Nicolas Island (U.S. Navy 2005).

Table 3-1 Vegetation of San Nicolas Island

Vegetation Type	Area (acres)	Area (ha)	% of SNI
Coastal scrub*	6,005	2430	42.1
Barren	3,469	1404	23.4
Grassland	1,740	704	12.2
Coreopsis scrub	1,349	546	9.5
Stabilized dune (inland)	783	317	5.5
Developed	324	131	2.3
Riparian	235	95	1.6
Unstabilized dune (coastal)	138	56	1.0
Coastal marsh	10	4	0.1

*Includes caliche scrub, goldenbush scrub, coyote-bush scrub, lupine scrub, and annual iceplant.
Source: Junak 2008.

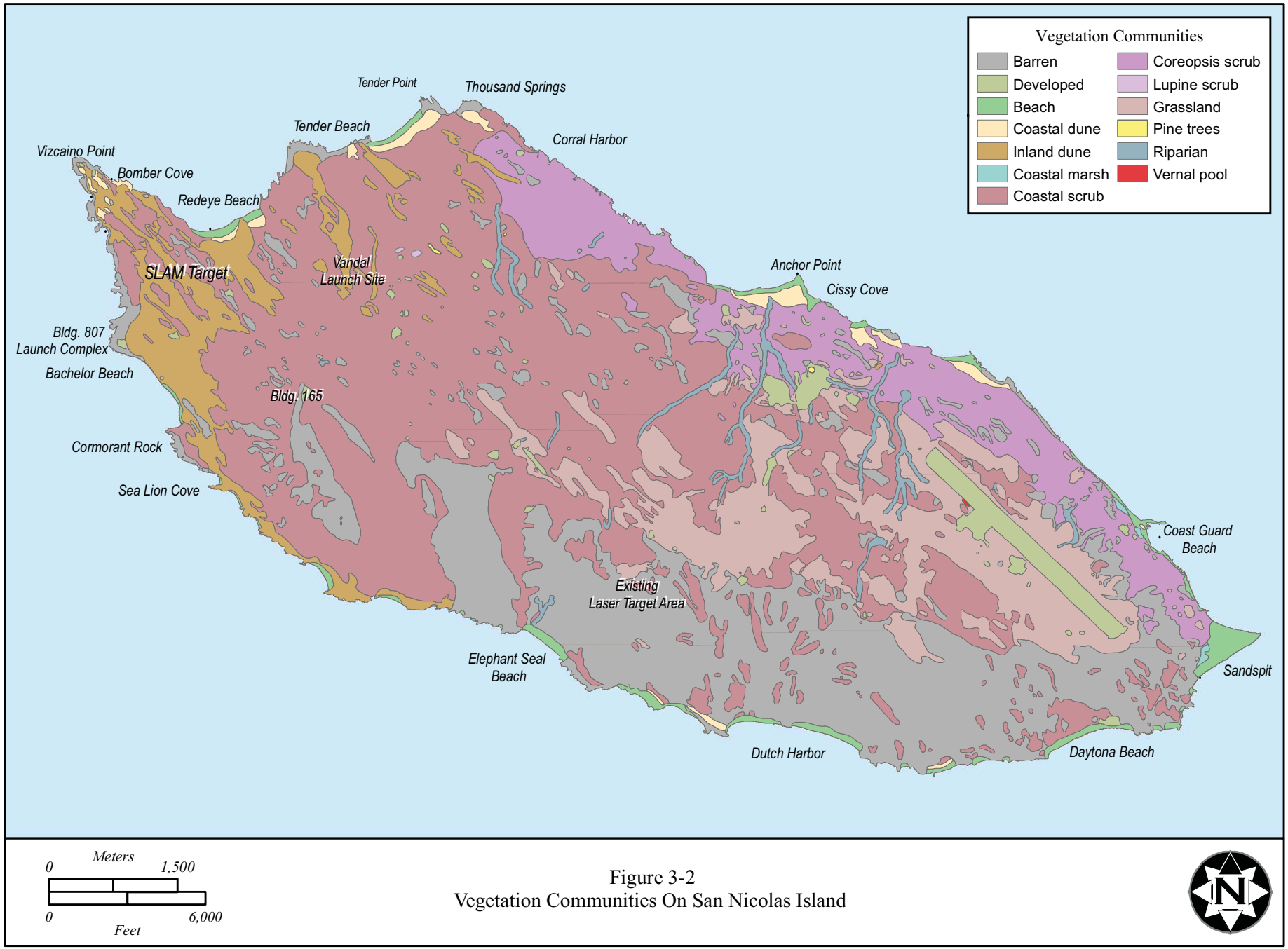

Figure 3-2
Vegetation Communities On San Nicolas Island

3.3.2.2 Terrestrial Wildlife

SNI has a limited diversity of fauna due to low annual rainfall, small size, isolation from other landmasses and relatively sparse plant cover. Human usage of the Island, including the introduction of grazing animals, feral cats, military activities, and the introduction of non-native species has also had impacts on native land animal populations (U.S. Navy 2005). Nevertheless, over 200 species of invertebrates have been documented on SNI, including 13 species of terrestrial snails. Reptiles on SNI include 3 species of lizards: side-blotched lizard (*Uta stansburiana*), southern alligator lizard (*Elgaria multicarinatus*), and island night lizard (*Xantusia riversiana*, discussed below). SNI supports two native terrestrial mammalian species, the state listed threatened SNI fox (*Urocyon littoralis dickeyi*) and the endemic SNI deer mouse (*Peromyscus maniculatus exterus*), which are widely distributed on the Island (U.S. Navy 2005). An overview of wildlife and lists of species documented on SNI are provided in the INRMP (U.S. Navy 2005).

Of the over 300 species of birds known to occur on SNI, most are not year-round residents but are seasonal visitors, migrants, or vagrants (Wehtje 2000). Only 17 species of birds regularly breed on SNI including three non-native species. Three Channel Island endemic bird subspecies occur on SNI: island horned lark (*Eremophila alpestris insularis*), San Clemente Island house finch (*Carpodacus mexicanus clementae*), and dusky orange-crowned warbler (*Vermivora celata sordida*). In addition, SNI also supports a wintering population of burrowing owls (*Athene cunicularia*). All migratory birds in the project area are protected by the Migratory Bird Treaty Act (MBTA) of 1918, which prohibits the taking, killing, or possessing of migratory birds or the parts, nests, or eggs of such birds, unless permitted by regulation. Conservation of migratory birds is also mandated by EO 13186, and is addressed by the Navy for all activities occurring on SNI (U.S. Navy 2005).

3.3.2.3 Terrestrial Special-Status Species

Special-status species include those species that are listed, proposed for listing, or are active candidates for listing as threatened or endangered under the federal Endangered Species Act (ESA) by the United States Fish and Wildlife Service (USFWS); or as rare, threatened, or endangered under the California ESA by the California Department of Fish and Game (CDFG).

SNI has no federally listed endangered or threatened plant species. Thirty species of vascular plants, bryophytes and lichens occur on state lists, California Native Plant Society lists, or are island endemics (U.S. Navy 2005). The only special status plant species that may occur within the proposed project areas is the Trask's milkvetch (*Astragalus traskiae*). The only terrestrial special-status wildlife species that may occur in the vicinity of the onshore project areas are the island night lizard and the San Nicolas Island fox.

Trask's Milkvetch

Trask's milkvetch, a state-listed rare species, is a perennial herb with spreading branches; it blooms from March through August. This species is widespread and abundant along the perimeter of SNI, especially on sandy slopes, stabilized dunes, coastal bluffs, eroded caliche slopes, sandy canyon bottoms, and flats (Junak 2008). Populations range in size from a few scattered individuals to dense stands with thousands of plants. The proposed action areas near the Vandal Launch Site, Building 165, SLAM Target Area, and the existing laser target area are near to but outside of the known distribution of the Trask's milkvetch. In addition, the backdrop areas near Cissy Cove and along West NAVFAC Road are located near the known distribution of this plant.

Island Night Lizard

The island night lizard is a medium-sized, cryptically patterned lizard endemic to San Clemente Island, Santa Barbara Island, and SNI. The island night lizard is currently listed as a federally threatened species. However, the USFWS is considering delisting this species because recovery goals have been met and populations appear to be stable. On SNI, island night lizards are generally distributed only over the eastern half of the island with exception of a few isolated populations along the western and southern shore. They may be found in any habitat that provides abundant cover. In prickly-pear (*Opuntia* sp.) habitats, the majority of lizards are found in older stands of cactus where growth is thick and dead pads have accumulated on the ground providing adequate refuge (USFWS 1984). Predators of the island night lizard include the San Nicolas Island fox and feral cats. Introduced southern alligator lizards may compete for burrows and food. Critical Habitat for the island night lizard has not been designated (U.S. Navy 2005). The backdrop areas located near Cissy Cove and at Bachelor Beach provide moderate habitat for the island night lizard. All other project areas are located in low quality habitat for this species (U.S. Navy 2005).

San Nicolas Island Fox

The SNI fox subspecies is listed by the state as threatened. The subspecies on Santa Catalina, Santa Cruz, San Miguel, and the Santa Rosa Islands are listed as a federally endangered due to a precipitous decline in populations. SNI foxes are omnivorous, foraging on insects, vegetation, mice, and seasonally available bird eggs. They occupy all island habitat types, with densities being highest in areas of native vegetation and lowest in barren areas or those comprised primarily of alien annual grasslands. The SNI fox population appears to be at a high density with an estimated population over 400 animals. However, the SNI fox population is affected both by competition with feral cats and disturbance by humans (U.S. Navy 2005).

3.3.3 Marine Biological Resources

3.3.3.1 Oceanic and Deep Offshore Marine Habitats

The Point Mugu Sea Range includes regions of complex bathymetry which provide diverse habitats for a variety of marine life (NAWCWD 2002a). Beyond the depths of kelp beds (greater than 100 ft [30 m]), approximately 3 % of the sea floor consists of rubble and rocky outcrops inhabited by marine invertebrate assemblages (Dailey et al. 1993). On the continental shelf regions, sand and gravel substrate is typically interspersed between these rocky areas. Offshore shelves, ridges, and banks exhibit the most diverse macrobenthic assemblages of the deep water regions in the Sea Range. The high species diversity is attributed mainly to the persistent upwelling and the wide range of sediment types. Nearshore and offshore lower slope regions are lower in species abundance and diversity. Macrobenthic species diversity and biomass decrease over slope depth, and on lower slopes, these parameters approach their lowest values. Deep sea basins exhibit the lowest macrofaunal species abundance and diversity of any other benthic habitat in the offshore region. This impoverishment is likely due to the anaerobic conditions and high sedimentation rates typical of these areas (NAWCWD 2002a).

Open water areas offshore are part of a pelagic habitat that hosts various fish, invertebrates, drift algae, and plankton communities. The pelagic habitat of the SCB can be subdivided into three zones: epipelagic (depths to 328 ft [100 m]), mesopelagic (328 ft [100 m] to1,640 ft [500 m]), and bathypelagic (depths greater than 1,640 ft [500 m]). The epipelagic zone is illuminated and subject to fluctuations in temperature and is inhabited by a higher abundance of species than the deeper pelagic habitats

(NAWCWD 2002a). Sea lions and seabirds may rest on buoys or other floating structures on the open ocean.

3.3.3.2 Nearshore and Shallow Offshore Marine Habitats

Waters surrounding SNI within 1 nm or to a depth of 300 ft (91 m), whichever is greater, are identified as an ASBS (NAWCWD 2002a). The nearshore marine environment at SNI includes intertidal and subtidal habitats which are comprised of either rocky or sandy substrate typical of the SCB region. Biological communities vary distinctly by depth and substrate type (Tissot et al. 2006). The shallowest marine environment, rocky intertidal habitat, is a continuously changing, exposed habitat that is home to organisms that can withstand tidal fluctuations, wave action, desiccation, and large amounts of sunlight. Shallow sandy habitats are also exposed to changing conditions, with varying degrees of wave action and the influence of tides and currents. As depth increases, substrates become more stable and species compositions are different from those seen in high energy, shallow water environments.

Different substrates provide extremely different habitat characteristics, and physical oceanographic factors affect the substrates uniquely. Rocky habitat provides substrate for attachment of organisms; therefore, it is often inhabited by a large diversity of sessile invertebrates and algae. Diversity of fishes is high in rocky habitats due to the many areas available for refuge from predators provided by this complex substrate type. Sandy habitat provides little or no hard substrate for attachment but offers soft sediments utilized by organisms that anchor into or hide in the sand. Fishes and benthic macroinvertebrates feed on benthic infauna and/or epifauna living in or on the surface of the sand.

Shallow offshore marine habitats are also comprised of either sand or rocky substrates with similar attributes to nearshore environments, although with greater water depths these habitats are less subject to disturbance by oceanographic conditions (e.g., wave action). These habitats are relatively stable environments for organisms, although still are subject to shifting currents and tidal fluctuations. Species compositions vary dramatically between rocky and sandy habitats (similar to nearshore environments), with higher diversity of organisms in rocky areas. Open water areas offshore are part of a pelagic habitat that hosts various fish, invertebrates, drift algae, and plankton communities.

3.3.3.3 Marine Invertebrates and Plants

Intertidal Environments

The rocky intertidal zone at SNI is home to a large diversity of invertebrates and algal species, as well as beds of surfgrass (*Phyllospadix* spp.). Examples of common invertebrates in rocky intertidal zones in the SCB include various limpets, crabs, mussels, barnacles, abalone, and anemones. The federally endangered black abalone (*Haliotis cracherodii*) that is known to reside at SNI will be discussed further in Section 3.3.3.6. Algae grow in abundance on rocks and in shallow pools of the intertidal zone. Common algae species found in this environment include red turf algae (e.g. *Corallina officinalis* var. *chiliensis*), green sea lettuce (*Ulva sp.*), and large brown macroalgae (e.g. *Egregia menziesii*). Very few invertebrates or algal species are found in sand beach areas.

Subtidal Environments

Rocky subtidal habitat at SNI supports a large diversity of invertebrates and plants. The most common inhabitants are sessile invertebrates and macroalgal species, including species that make up large kelp forests of which the upper portion is visible on the sea surface and termed a "kelp bed." Kelp forests (primarily comprised of *Macrocystis pyrifera*) are an important resource that occurs at SNI and throughout the SCB. Kelp forests create an entire habitat that is home to a large variety of organisms.

Kelp forests are generally dynamic systems that fluctuate in size and those found near SNI are no exception. According to surveys conducted by the CDFG, the shapes of kelp beds have varied over the years but overall abundance has remained relatively stable (CDFG 2008). The abundance of kelp around SNI is generally highest off the northern shores of the island, but kelp can be found around most shores of the island in varying abundance (Figure 3-3). Rocky subtidal areas, especially those that support kelp beds, provide the greatest potential to support the endangered white abalone (*Haliotis sorenseni*), although this species is not known to presently occur at SNI. White abalone is discussed further in Section 3.3.3.7. Historically, SNI was an important area for commercial kelp harvesting, and large kelp beds were harvested at sites along the northern and southern shores. At present, however, there is no demand for commercial kelp harvesting along the California coast due to economic conditions, and the beds at SNI are not being harvested. Commercial kelp beds are managed by the CDFG, and the beds at SNI could be available to commercial harvesters in the future. Kelp beds extend out as far as 3 nm (5.6 km) from shore on the western shores of SNI and are found just outside the intertidal to 1½ nm (2.8 km) from shore in all other parts of the island.

Like other areas in southern California, the shallow water sandy substrate at SNI provides habitat for a variety of deposit and filter feeders that live on and in the sediments and very few algal species. The relatively exposed coasts of SNI limit the growth of organisms that require calm, protected waters (e.g., eelgrass [*Zostera* spp.]). Coast Guard Beach, located on the somewhat protected northern shore of SNI, was the only reported location of eelgrass at the island during a comprehensive SCB-wide survey conducted in 2004 (Engle and Miller 2005). The main primary producers inhabiting unvegetated shallow water areas include diatoms and microscopic algae growing on sand or mud particles. Given the large number of filter and deposit feeders, detritus is the most significant food source for marine organisms in this community. Filter or deposit feeders commonly found in such habitats include associations of phoronid worms (*Phoronopsis californica*), ornate tube worms (*Diopatra ornata*), and sea cucumbers (*Parastichopus parvimensis*). Other species typical of southern California subtidal sandy bottom habitats include polychaete worms (e.g. *Diopatra splendidissima*, *Pista pacifica*, *Loimia medusa*), echinoderms (e.g. *Dendraster excentricus*, *Astropectin armatus*, ophiuroids), crabs (e.g. *Pagurus* spp., *Paguristes* spp., *Randallia ornata*, *Blepharipoda occidentalis*), clams (e.g. *Ensis* sp.), cnidarians (e.g. *Harenactis attenuata*, *Zaolutus actius*, *Renilla kollileri*, *Stylatula elongatus*), and snails (e.g. *Olivella biplicata*, *Polinices* sp.).

3.3.3.4 Fish

Approximately 481 species of fish inhabit the SCB (Cross and Allen 1993). From 1994 to 1995, the most harvested commercial species in the Sea Range were Pacific sardine (*Sardinops sagax caerulea*), Pacific mackerel (*Scomber japonicus*), yellowfin and skipjack tuna (*Thunnus albacores* and *Katsuwonus pelamis*), rockfish (genus *Sebastes*), northern anchovy (*Engraulis mordax*), swordfish (*Xiphias gladius*), Dover sole (*Microstomus pacificus*), and thresher shark (*Alopias vulpinus*). The waters surrounding SNI host a variety of both northern and southern fish species similar to other areas in the SCB, although the greater distance of SNI from the mainland appears to inhibit some southern species from recruiting to the area (Cowen and Bodkin 1993). Fish species compositions vary by water depth, habitat type, and position in the water column. The following descriptions are grouped by habitat type. Discussion of EFH is presented in Section 3.3.3.5.

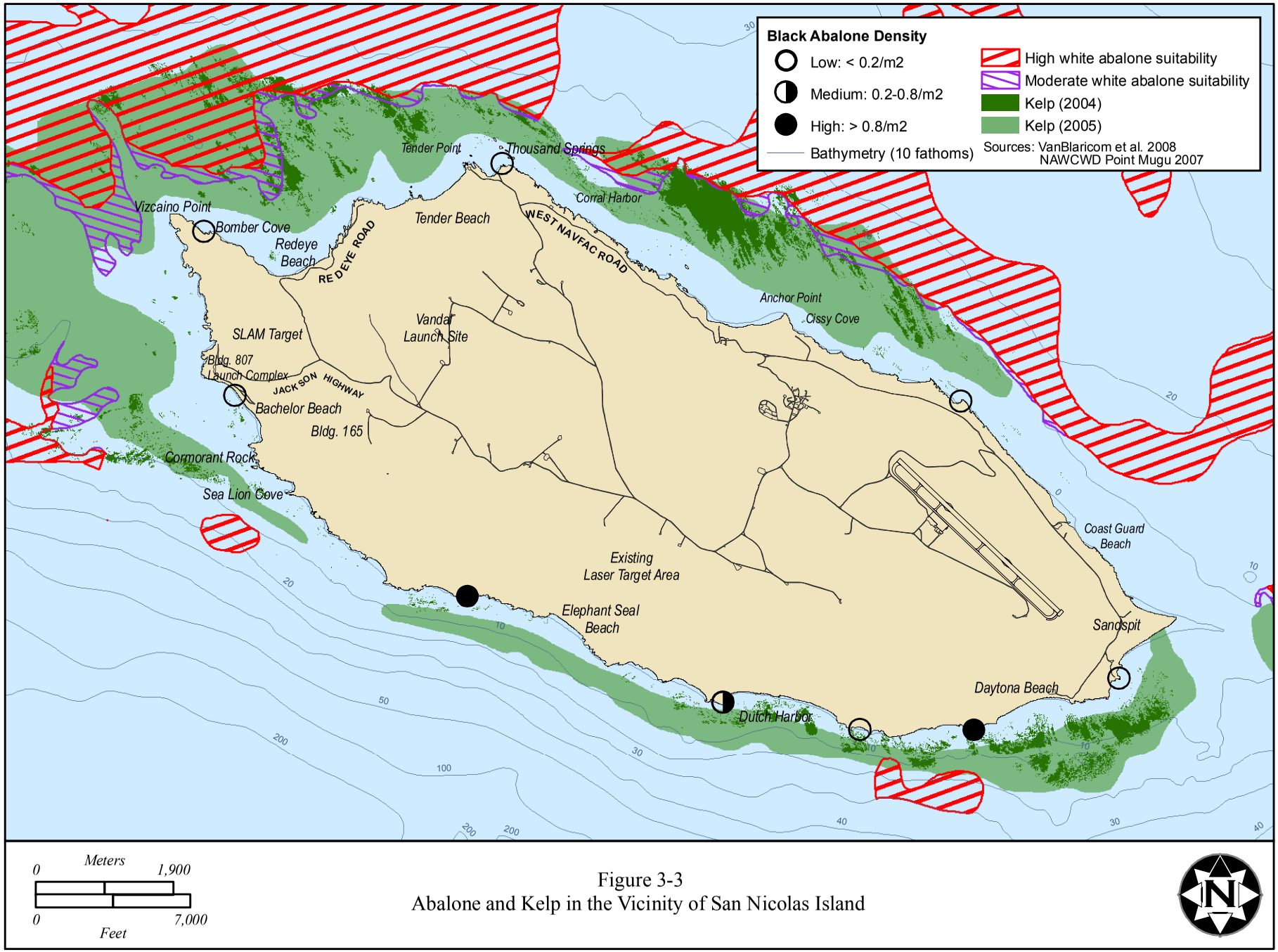

Figure 3-3
Abalone and Kelp in the Vicinity of San Nicolas Island

Rocky Subtidal

The rocky subtidal areas surrounding the northern and northwestern shores of SNI are extremely productive habitats for fishes. Fish diversity and density in rocky habitat is the highest of all habitat types that exist in southern California. The most prominent group of fishes that resides in this habitat is rockfish, which occur in high numbers at depths less than 330 ft (100 m). Over 50 rockfish species are found in the waters of the SCB, with the most prominent species being bocaccio (*Sebastes paucispinis*), squarespot (*S. hopkinsi*), swordspine (*S. ensifer*), and greenstripe (*S. elongates* [Pinkard-Meier and Butler 2008]). Examples of other fishes that commonly reside in rocky subtidal habitats in the SCB include Garibaldi (*Hypsypops rubicundus*), blacksmith (*Chromis punctipinnis*), Lingcod (*Ophiodon elongatus*), torpedo rays (*Torpedo californica*), and blackeye gobies (*Coryphopterus nicholsi* [Cowen and Bodkin 1993]).

Sandy Subtidal

Sandy subtidal habitat near SNI is similar to other areas in the SCB, with markedly lower abundance of fish than in rocky habitats. Sand occurs patchily along all shores of SNI but is the prominent habitat along the southern and southeastern shores. Sandy subtidal areas are inhabited mainly by benthic-feeding fish, fish that bury in the sand, or fish that are transiting between areas. Common benthic feeders include several species of flatfish (Family Pleuronectidae), sablefish (*Anoplopoma fimbria*), bat rays (*Myliobatis californica*), and Pacific hake (*Merluccius productus*) (NAWCWD 2002a). One common species that is known to transit over sand areas is the ocean whitefish (*Caulolatilus princeps*).

Pelagic

Pelagic habitat within the Sea Range of SNI is home to highly migratory species, including sharks, tunas, billfish, and swordfish. Other relatively large pelagic, including Pacific bonito (*Sarda chiliensis*) and yellowtail (*Seriola lalandi*), and various life stages of groundfish inhabit this zone in open water or in association with fronts, current systems, marcophyte canopies, or drift algae (U.S. Navy 2008a).

3.3.3.5 Essential Fish Habitat (EFH)

Pursuant to the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA; 16 USC 1801-1882), the Pacific Fishery Management Council (PFMC) developed Fishery Management Plans (FMPs) and identified EFH for commercially and recreationally harvested species. EFH is defined as "…those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The MSFCMA requires federal agencies to consult with National Marine Fisheries Service (NMFS) on any action that would adversely affect EFH.

Within EFH areas additional designations of habitat areas of particular concern (HAPC) have been created for some groups of species. These are habitat types or areas within EFH which are identified based on the following considerations, as identified in the 2005 Groundfish FMP amendment: 1) the importance of the ecological function provided by the habitat; 2) the extent to which the habitat is sensitive to human-induced environmental degradation; 3) whether, and to what extent, development activities are or will be stressing the habitat type; and 4) the rarity of the habitat type.

EFH near SNI has been identified in the FMPs for three groups of managed species: coastal pelagic species, highly migratory species, and west coast groundfish (PFMC 1998, 2005, 2007). Coastal pelagic species include anchovy, sardine, mackerel, and market squid (U.S. Navy 2005) and corresponding EFH includes the coastal and offshore waters throughout the U.S. Exclusive Economic Zone (EEZ) to 200 nm (370 km) offshore where sea surface temperatures range from 50° to 79°F (10° C to 26° C). No HAPCs

have been designated for coastal pelagic species. Highly migratory species include, but are not limited to, albacore, swordfish, and several species of shark and tuna. EFH for highly migratory species includes all of the waters within the EEZ, but no HAPCs have been designated within EFH. The west coast groundfish species complex includes 83 species of bottom-dwelling fishes that occur in diverse habitats. Approximately 30 of these species are known to occur in the waters around SNI (Pinkard-Meier and Butler 2008). EFH for west coast groundfish includes the entire west coast of the U.S. out to depths of 11,483 ft (3,500 m). The FMP for west coast groundfish identifies five HAPCs (PFMC 2005), listed below:

- **Estuaries** – inland extent of the estuary HAPC is defined as mean higher high water, or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 parts per thousand during the period of average annual low flow. The seaward extent is an imaginary line closing the mouth of a river, bay, or sound; and to the seaward limit of wetland emergents, shrubs, or trees occurring beyond the lines closing rivers, bays, or sounds. This HAPC also includes those estuary-influenced offshore areas of continuously diluted seawater.
- **Seagrass** – includes those waters, substrate, and other biogenic features associated with eelgrass species (*Zostera* spp.), widgeongrass (*Ruppia maritima*), or surfgrass (*Phyllospadix* spp.).
- **Canopy Kelp –** includes those waters, substrate, and other biogenic habitat associated with canopy-forming kelp species (e.g., *Macrocystis* spp. and *Nereocystis* sp.).
- **Rocky Reefs** – includes those waters, substrates and other biogenic features associated with hard substrate (bedrock, boulders, cobble, gravel, etc.) to the mean higher high water level. A first approximation of its extent is provided by the substrate data in the groundfish EFH assessment GIS. However, at finer scales through direct observation, it may be possible to further distinguish between hard and soft substrate in order to define the extent of this HAPC.
- **Areas of Interest** – discrete areas that are of special interest due to their unique geological and ecological characteristics. In southern California, areas of interest include all seamounts, canyons, specific areas in the federal waters of the Channel Islands National Marine Sanctuary and specific areas of the Cowcod Conservation Area.

Of the five HAPCs designated for west coast groundfish, only two occur in the proposed project area. Canopy kelp beds and associated rocky reef areas are located patchily nearshore on all sides of SNI in the proposed action area. Seagrass does not occur in the proposed action area, but does occur in areas inshore of the proposed action area.

SNI is also located within a Cowcod Conservation Area. Cowcod (*Sebastes levis*) is an overfished stock that is being rebuilt under the Federal West Coast Groundfish Fishery Management Plan. Cowcod Conservation Areas, where no fishing can occur deeper than 20 fathoms, were created to help recover cowcod populations, which are found from about 70-350 meters in depth, primarily in the Southern California Bight.

3.3.3.6 Marine Birds

The shallow water environment and offshore areas surrounding SNI provide foraging opportunities for a variety of shorebirds, and pelagic seabirds are common in the offshore area. Within the Sea Range,

seabird densities are estimated range from less than 0.01 to 0.46 bird per acre (0.02 to 1.14 birds per hectare). In the area immediately surrounding SNI the density has been estimated at 0.1 bird per acre (0.25 birds per hectare) (NAWCWD 2002a). Seabirds include various species of gulls, terns, murres, auklets and cormorants, shearwaters, petrels, and the California brown pelican (*Pelecanus occidentalis californicus*) (State of the California Current 2007). The California brown pelican is federally threatened, and will be discussed further in Section 3.3.3.7. All seabirds in the project area are protected by the MBTA, which prohibits the taking, killing, or possessing of migratory birds or the parts, nests, or eggs of such birds, unless permitted by regulation. Conservation of migratory birds is also mandated by EO 13186, and is addressed by the Navy for all activities occurring on SNI (U.S. Navy 2005).

SNI provides important breeding habitat for several seabird species, including the western gull, (*Larus occidentalis*), Brandt's cormorant (*Phalacrocorax penicillatus*), and black oystercatcher (*Haematopus bachmani*). Gulls and cormorants seasonally establish large breeding colonies on the west end of SNI. Numbers of nesting birds have increased in recent years due to protection from human activities (U.S. Navy 2005). The federally threatened western snowy plover (*Charadrius alexandrinus nivosus*) nests in several locations at SNI and is discussed in Section 3.3.3.7. California brown pelican roosting areas, snowy plover habitat, and nesting areas for Brandt's cormorants are shown on Figure 3-4.

3.3.3.7 Marine Special-Status Species

Special-status marine species known or likely to occur in the region of the proposed action include marine mammals, federally listed threatened or endangered birds, federally listed threatened or endangered sea turtles, and the federally listed endangered white abalone and black abalone. Some marine mammals are federally listed as threatened or endangered and all are protected by the Marine Mammal Protection Act (MMPA).

Abalone

The white abalone (*Haliotis sorenseni*) was listed as an endangered species under the Endangered Species Act (ESA) in May 2001. A recovery plan for the species has been completed (NMFS 2008a). In its final rule to list the species, NMFS determined that it would not be prudent to designate critical habitat because the identification of such habitat would increase the risk of poaching (NMFS 2001). White abalone are marine gastropods that grow slowly and have a lifespan of 30 years or more. Juvenile white abalone seek cover in rocky crevices and under rocks, while adults reside in low to mid relief rocky areas at the sand-rock interface. White abalone were historically found in waters ranging from 66 to 200 ft (20 to 61 m) but are now found in relatively deep waters ranging from 98 to 200 ft (30 to 61 m) (Butler et al. 2006) (Figure 3-3). White abalone are herbivores that feed on drift macroalgae and, therefore, are commonly found in association with the brown algae *Laminaria farlowii* and *Agarum fimbriatum* (Hobday and Tegner 2000; Lafferty 2001).

Quantitative analyses have produced different estimates of suitable white abalone habitat in the SCB (Davis et al. 1998; Hobday and Tegner 2000; Butler et al. 2006). Recent (2002-2004) habitat mapping and surveys for white abalone at San Clemente Island and Tanner and Cortes Banks resulted in a much greater estimate of suitable habitat and population sizes (Butler et al. 2006). A habitat model for white abalone around SNI was made by the National Oceanic and Atmospheric Administration (NOAA) using depth ranges and general substrate types as input parameters.

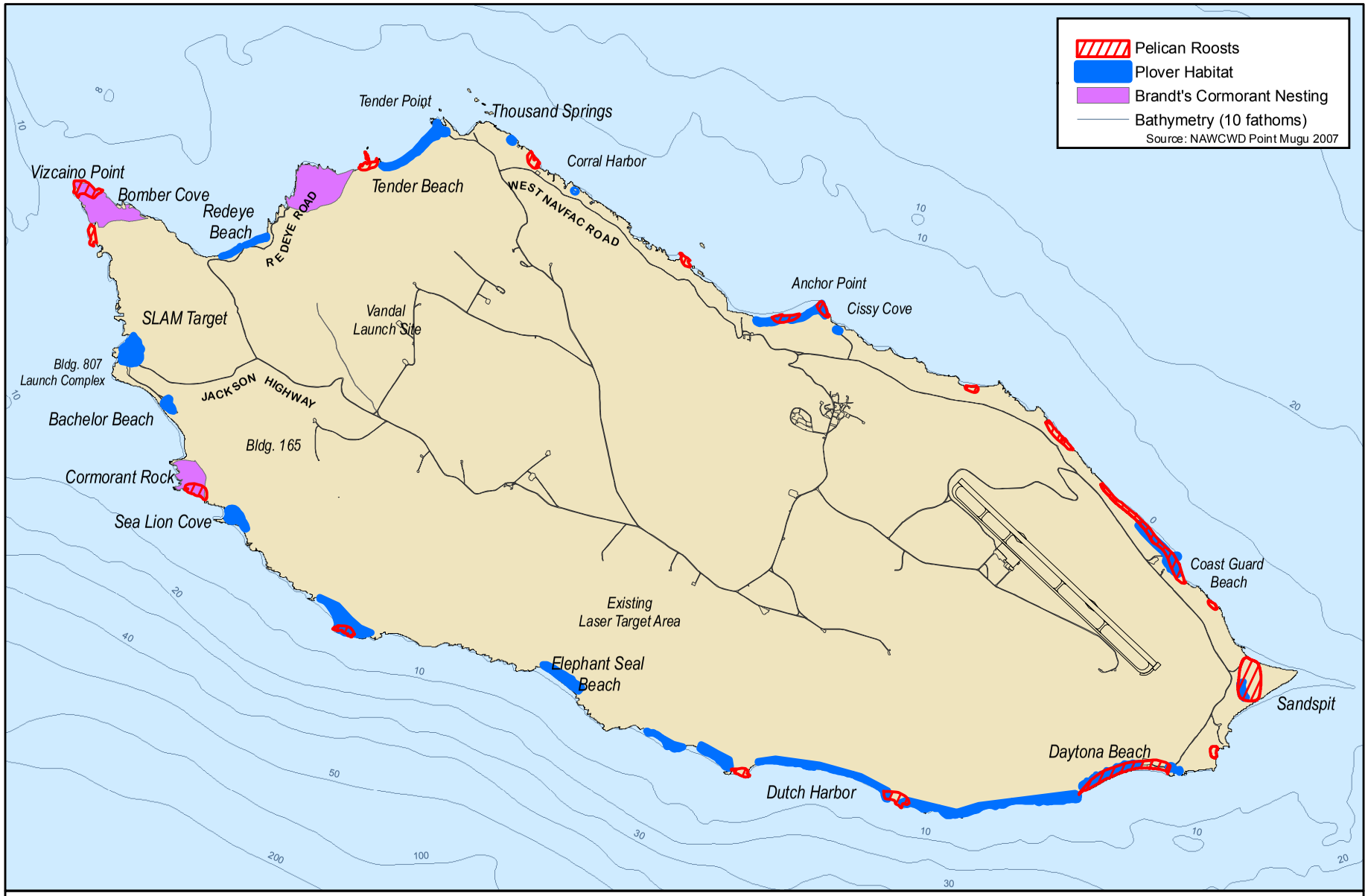

Figure 3-4
Pelican Roosts, Plover Habitat, and Brandt's Cormorant Nesting Areas on San Nicolas Island

This habitat model was further refined using bathymetric data from the Point Mugu Range Sustainability Office, confining the estimate to white abalone's preferred depth range of 60 to 180 ft (18 to 55 m). According to this effort, white abalone habitat is most prevalent along the northern shores of SNI, with patches of suitable habitat along the southern shores. White abalone habitat seems to correspond closely to locations of kelp beds. Construction of this habitat model considered environmental parameters but did not actually survey for presence/absence of abalone.

During remotely operated vehicle surveys conducted at SNI, no white abalone were identified in a 2.5 acre (1 ha) search area. Surveys were limited in coverage due to poor weather conditions and restraints on access to waters near SNI that are used for military exercises (Pinkard-Meier and Butler 2008). Fisheries landing data collected during the peak of the abalone fishing period indicated that less than one half of one percent of all landings came from SNI, and this species has not been sighted at SNI for many years (Hobday and Tegner 2000).

The black abalone (*Haliotis cracherodii*) was recently listed as an endangered species (NMFS 2008b, 2009). Preparation of a recovery plan for the species is underway, whereas critical habitat has not been designated (NMFS 2009). Like white abalone, they are relatively slow-growing, long-lived snails with a flattened shell, reaching a diameter of about 4 inches (10 centimeters) at 4-8 years, and growing more slowly thereafter (NMFS 2008b).

The current range of black abalone is from Mendocino County to northern Baja California. Historically, the largest numbers of animals occurred on the Channel Islands. Black abalone occur on rocky shores where exposed bedrock provides a complex surface with ample crevices in which the animals find refuge from predators and exposure at low tides (NMFS 2008b). They occur primarily in the intertidal zone, but are found to a depth of 20 ft (6 m). Following a relatively short period (3 to 10 days) of larval dispersal, they settle onto rocky substrates and feed on algal films. As they become larger, black abalone commonly feed by trapping pieces of drift kelp under the edge of their shell (NMFS 2008b).

Prior to European arrival, black abalone were abundant on SNI, providing a major food and cultural resource for Native Californians. They also supported a Chinese abalone fishery on SNI in the early 20th century (Schwartz 1995). More recently, black abalone were heavily harvested by commercial fishermen between 1970 and 1993. Beginning in the late 1980s and continuing to the present, a disease referred to as "withering syndrome," linked to El Niño and rising sea temperatures, has decimated black abalone populations and was the primary reason for the decision to list the species as endangered (NMFS 2008b, 2009). At present, SNI supports one of only a few remaining viable populations of black abalone in which densities are high enough for reproduction by broadcast spawning (NMFS 2008b, 2009).

The most extensive and rigorous long-term data on the abundance of black abalone come from SNI and have been collected by G. VanBlaricom of the U.S. Geological Survey and University of Washington. Surveys in the intertidal and shallow subtidal habitats on all sides of SNI have been conducted for over 10 years (VanBlaricom 1993, 2007; G. VanBlaricom, U.S. Geological Survey and University of Washington, unpublished data). The sites with highest densities, on the order of 1/m^2, are located on the southern shores of SNI (Figure 3-3). Offshore of Bachelor Beach, a proposed project backdrop, is an area of medium black abalone density.

Marine Birds

The only special-status marine bird species that occur on SNI are the California brown pelican and western snowy plover. The California brown pelican, listed by the USFWS as endangered in 1970, is a large diving bird that forages in the coastal waters and roosts in shoreline areas throughout southern

California and the Channel Islands. Breeding colonies occur on several islands off California and Baja, California but not on SNI. On SNI, California brown pelicans regularly roost at Vizcaino Point at the western tip of SNI and at several smaller areas around the island (NAWCWD 2002a) (Figure 3-4). They are expected to be present foraging in the shallow water and offshore project area. Due to its successful and sustained recovery following the implementation of bans on the use of organochlorine pesticides, this species was proposed for de-listing in February 2008 (USFWS 2008a).

The Pacific coast population of the western snowy plover was listed as a federally threatened species in 1993. Members of this population breed on beaches along most of the west coast of the U.S. and south through Baja California, Mexico (USFWS 2006). Western snowy plovers are known to nest and forage on beaches and in the intertidal zone at SNI (Figure 3-4). They are year-round residents of SNI, although wintering populations from other areas are transient. Breeding occurs seasonally from March through September. SNI beaches are exempt from a Critical Habitat designation for the western snowy plover due to the protections afforded the species through the INRMP (USFWS 2005).

Foraging habitat occurs for special-status marine birds in the offshore areas of the Sea Range. Short-tailed albatrosses are pelagic wanderers, traveling thousands of miles at sea during the non-breeding season. The short-tailed albatross was listed as endangered throughout its range in the U.S. under the ESA in 2000 (USFWS 2000), and is also listed as a California bird species of special concern. The short-tailed albatross may forage in the area, but does not nest in the SCB (U.S. Navy 2008a).

Xantus's murrelets (*Synthliboramphus hypoleucus)* are endemic to the Pacific coast of North America, ranging along the coast from Baja California, Mexico to British Columbia, Canada and offshore to a distance of approximately 500 km. The Xantus's murrelet population as a whole is designated as a candidate species under the ESA and a threatened species in the state of California. Xantus's murrelet does nest on islands within the SCB and can be expected to forage within the Sea Range; however, this species does not nest on SNI (U.S. Navy 2008a),

The ashy storm-petrel (*Oceanodroma homochroa*) is a pelagic species which typically only comes ashore to breed and raise young. It was identified by the USFWS as a Bird of Conservation Concern in 2002 and a likely candidate for listing under the ESA (U.S. Navy 2008a). As recently as 2007, the Center for Biological Diversity filed a petition to the USFWS to list the ashy storm-petrel as threatened under the ESA, to which USFWS has recently responded to by commencing a status review to see if the petition request is warranted (USFWS 2008b; Wolf 2007). The ashy-storm petrel does nest on islands within the SCB and can be expected to forage within the Sea Range; however, this species does not nest on SNI (U.S. Navy 2008a).

Marine Mammals

All marine mammals are protected under the MMPA of 1972 as amended (16 USC 1361 et seq.), and some species are additionally protected by the ESA of 1973 (16 USC 1531). Marine mammals listed as threatened or endangered under the ESA are also automatically considered "depleted" under the MMPA.

Three species of pinnipeds are seen regularly on SNI and within the Sea Range: California sea lion (*Zalophus californianus californianus*), northern elephant seal (*Mirounga angustirostris*), and Pacific harbor seal (*Phoca vitulina richardsi*) (Figures 3-5 and 3-6). SNI and surrounding waters provide important foraging, breeding, and haul-out areas for these pinnipeds. Harbor seal haul-out sites are patchily distributed on all shores of SNI with the exception of the northeast stretch. Elephant seal haul-outs exist along most of the southern, eastern, and western shores. California sea lions are known to haul-out along the entire stretch of the southern shore of SNI. In addition to the three commonly sighted

pinnipeds, the Northern fur seal (*Callorhinus ursinus*) and federally threatened Guadalupe fur seal (*Arctocephalus townsendi*) have been sighted near SNI on rare occasions (U.S. Navy 2005) and are expected to be found regularly within the Sea Range. There are no known rookeries or haul-out sites in California for the Guadalupe fur seal (Caretta et al. 2007).

The southern sea otter (*Enhydra lutris nereis*) is a federally listed threatened species north of Point Conception. A small population of sea otters was translocated to SNI beginning in 1987 in order to attempt to re-establish a southern population, and this population is considered an "experimental population, non-essential" by the USFWS (2008c) (Figure 3-6). Many of the 139 individuals translocated did not remain in the area, and as of 2004, abundance estimates yielded a total of 32 individuals. Although no official determination has been made, the USFWS has considered terminating the experimental relocation at SNI. Efforts to assure that sea otters remained within the management zone (waters surrounding SNI) ceased in 2000 after a decision was made that such actions might jeopardize southern sea otter populations (USFWS 2003). Individuals are seen swimming along the kelp beds that line the coast of SNI on rare occasions (USFWS 2003). Sea otters feed within kelp beds on various prey items including sea urchins, crabs, and abalone and, therefore, are usually restricted to the extensive giant kelp beds located offshore (U.S. Navy 2005).

Several cetacean species, both odontocetes (toothed whales) and mysticetes (baleen whales), have been sighted near SNI, although in small numbers. Other cetacean species are known to occur in the Sea Range and in the vicinity of SNI. Odontocetes sighted near SNI include Dall's porpoise and northern right whale dolphins, and mysticetes include gray and humpback whales. Blue whales may occur within 3 nm (5.6 km) of SNI, but the occurrence of this species nearshore would be considered rare (NAWCWD 2002a; U.S. Pacific Fleet 2005). The humpback, sei, fin, sperm, and blue whales are federally listed endangered species that are known to occur within the Sea Range (NOAA 2008, U.S. Navy 2008a); the California population of gray whales was delisted in 1994 due to rising numbers (NMFS 1994). The endangered North Pacific right whale is considered a rare visitor to the Sea Range (U.S. Navy 2008a).

Sea Turtles

Four threatened or endangered species of sea turtles potentially occur within the waters surrounding SNI: loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), eastern Pacific green (*Chelonia mydas*), and olive ridley (*Lepidochelys olivacea*). In general, sea turtles are rarely sighted in the waters around SNI or any other offshore island in southern California. Sea turtles are found more often in areas of warm water, whether the source is natural or artificial, and there are no sources of warm water near the proposed project area. There are no known sea turtle nesting beaches in the SCB. It is possible, but very unlikely that individual sea turtles could be encountered in the nearshore waters off SNI, specifically during summer or early fall when the water is warmest. Of the four species that occur in the project region, the leatherback is the only species that has been sighted, albeit rarely, near SNI. All four species are considered very unlikely to occur in any areas of project activity (NAWCWD 2002a; NMFS and USFWS 1998a-d; U.S Navy 2005; U.S. Pacific Fleet 2005).

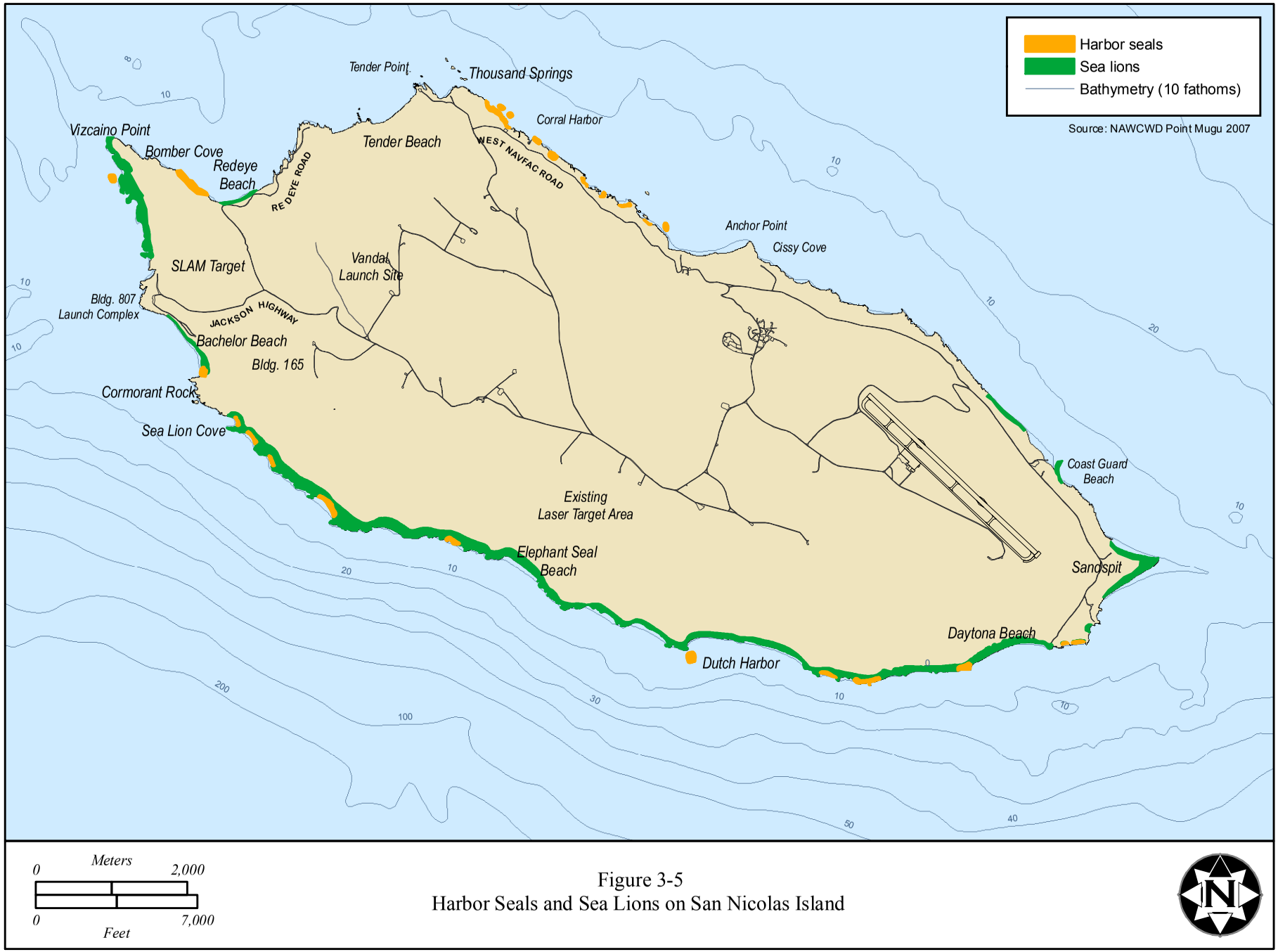

Figure 3-5
Harbor Seals and Sea Lions on San Nicolas Island

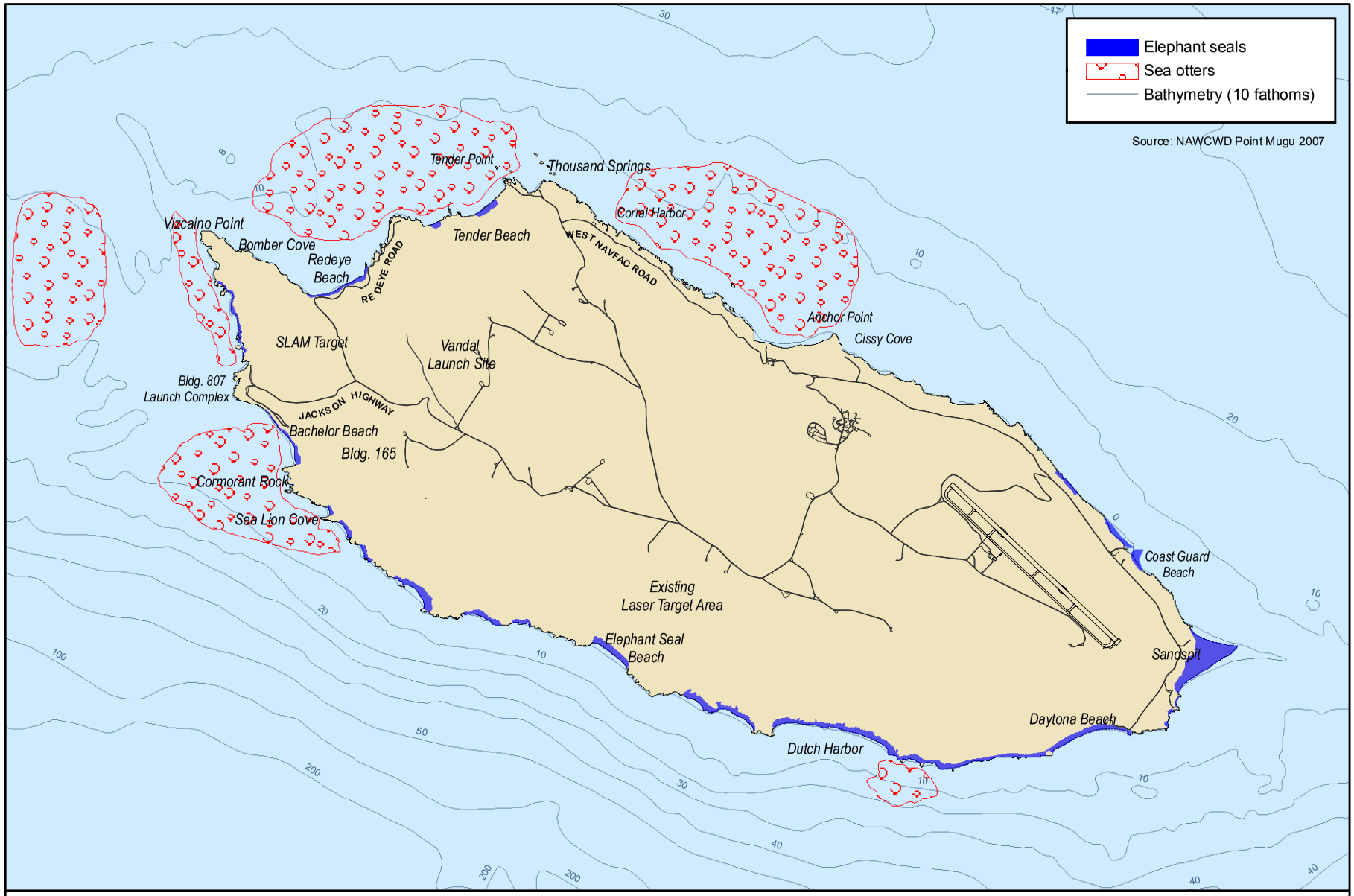

Figure 3-6
Elephant Seals and Sea Otters on and in the Vicinity of San Nicolas Island

3.4 CULTURAL RESOURCES

3.4.1 Definition of Resource

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Cultural resources can be divided into three major categories: archaeological resources (prehistoric and historic), architectural resources, and traditional cultural resources.

Archaeological resources are locations where human activity measurably altered the earth or left deposits of physical remains (e.g., stone flakes, arrowheads, or bottles). Archaeological resources may be either prehistoric or historic and can include campsites, roads, fences, trails, dumps, battlegrounds, mines, and a variety of other features.

Architectural resources include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. Architectural resources generally must be more than 50 years old to be considered for protection under existing cultural resource laws. However, more recent structures, such as Cold War era military buildings, may warrant protection if they have the potential to be historically significant structures. Architectural resources must also possess integrity (i.e., its important historic features must be present and recognizable).

Traditional cultural resources can include archaeological resources, buildings, neighborhoods, prominent topographic features, habitats, plants, animals, and minerals that Native Americans and other groups consider essential for the continuance of traditional cultures.

3.4.2 Existing Conditions

SNI has been the subject of archaeological investigations for the last 100 years, including a complete archaeological survey of the island. During the course of these archaeological investigations more than 530 prehistoric sites and 48 historic sites have been recorded across SNI (Reinman and Lauter 1984, Schwartz and Rossback 1993, Schwartz 1995).

Prehistoric archaeological sites on SNI consist primarily of middens (shellfish or multi-use processing sites) located on large, stabilized dunes less than 980 ft (300 m) from the shoreline (Martz 2002). These sites contain an abundance of fish, marine mammal, and shellfish remains and tools used to prepare the marine resources for consumption. Other prehistoric sites on SNI include habitation sites, lithic reduction areas, rock art, isolated hearths, human burials, and an aqueduct. Prehistoric archaeological sites are distributed throughout SNI and can be found in the vicinity of all proposed onshore project areas, with the exception of the laser target area (NAWCWD 1997).

From the mid-1850s until the Navy began using SNI for training missions in 1943, SNI was an important fishing and ranching location. Historical archaeological sites reflecting this cultural heritage consist of fishing camps on the northwestern and southeastern tips of SNI, ranching base camps on the terraces above NAVFAC Beach, and multiple Chinese abalone collecting sites along the northwestern and southern coastlines (NAWCWD 1997).

Archaeological studies focusing on underwater resources have identified 20 ships known to have sunk off the coast of SNI. Most shipwreck remains are likely to be found at harbors and at hazards on the western and eastern ends of SNI. Known shipwreck remains have been identified offshore of the proposed Cissy Cove and Bachelor Beach backdrop areas (NAWCWD 1997).

There is a possibility that submerged archaeological sites could exist in nearshore waters surrounding SNI. These sites would have been occupied over 7,000 years ago when sea levels were lower than current levels. Submerged archaeological sites off the coast of SNI are most likely to occur within 1,640 to 3,280 ft (500 to 1,000 m) of fish habitat, within 1,640 ft (500 m) of rocky shore habitat, and within 1,640 ft (500 m) of a drinking water source (NAWCWD 2002b).

3.5 AIRSPACE, LAND, AND WATER USE

3.5.1 Definition of Resource

Regulations applicable to all aircraft are promulgated by the FAA to define permissible uses of designated airspace and to control that use. These regulations are intended to accommodate the various categories of aviation, whether military, commercial, or general aviation. The regulatory scheme for airspace and air traffic control varies from highly controlled to uncontrolled. Less controlled situations include flight outside of U.S. controlled airspace, such as flight over international waters off the coast of California. Examples of highly controlled air traffic situations are flights in the vicinity of airports, where aircraft are in a critical phase of flight, either take-off or landing.

Special Use Airspace (SUA) refers to areas with defined dimensions where flight and other activities are confined due to their nature and the need to restrict or limit nonparticipating aircraft. The majority of SUA is established for military flight activities and may be used for commercial or general aviation when not reserved for military activities. Restricted Areas are airspace over U.S. land or territorial waters that are used by the military to exclude non-authorized aircraft and to contain hazardous military activities. Warning Areas are designated airspace for military activities that are in international airspace but are open to all aircraft. Flights in Warning Areas by non-participating aircraft are not prohibited since these areas are over international waters.

Land and water use comprises the natural conditions and/or human-modified activities occurring at a particular location. The terms “land use” or “water use” can also refer to the use of an area by recreational, commercial, and military users.

3.5.2 Existing Conditions

3.5.2.1 Airspace

NAWCWD controls 36,000 square miles (93,200 square kilometers) of SUA over the Pacific Ocean associated with the Point Mugu Sea Range (refer to figure 1-1). SUA is airspace within which specific activities must be confined, or wherein limitations are imposed on aircraft not participating in those activities. This area provides the Navy with a realistic operational environment for the safe conduct of controlled air, surface, and subsurface launched missile tests, aircraft tests, and fleet exercises involving aircraft, surface ships, and various targets. The combination of location, widespread instrumentation sites, unique test capabilities, and a highly skilled technical workforce provides the most advanced and efficient method for conducting the critical test and evaluation and training necessary to maintain technical standards in the U.S. Navy.

Airspace overlying the Sea Range includes both Restricted Areas and Warning Areas. Project activities on or near SNI and Point Mugu would be located within a Restricted Area, within which non-military flight activities are closely restricted. The offshore project activities would all occur within Warning Areas of the Sea Range (refer to Figure 1-1).

3.5.2.2 Land Use

Located approximately 57 nm (106 km) southwest of Point Mugu, SNI is owned and operated by the Navy as a major element of the Sea Range. Most of SNI is used as a range instrumentation site to support Point Mugu Sea Range operations. SNI facilities support all aspects of range operations, such as missile and target launches. All development on SNI is associated with the military, and land uses are considered either military support or open space. SNI has one minor population center, Nicktown, which is located on the north side of the Island. No permanent residences are established on SNI; however, approximately 200 people live as part-time residents at Nicktown. There is no public access to SNI, and the population fluctuates almost daily with visitors from many different activities within the DoD.

There are over 150 buildings located on SNI with facilities to transport, house, and support personnel and related materials, in addition to a 10,000 ft (3,048 m) asphalt runway and facilities to support testing operations. Adjoining the airfield are a control tower, hangars, ground control approach capabilities, and one fire station located near the airfield. Additional facilities include extensive range, support, and fuel storage facilities; machine/repair shops and storage buildings; and ordnance and launching facilities. Infrastructure includes water wells, a desalination plant, water distribution and sewage systems, and a power plant and power distribution system. SNI has a total of 47 mi (75.6 km) of roads, of which 21.6 mi (34.8 km) are paved. A total of 7 permanent barracks are available, containing 255 rooms with a capacity for 417 people. Large items are barged to SNI at Daytona Beach from the Navy's deep-water harbor at Port Hueneme, California. The barge landing area enables sea transport of material and equipment to and from SNI. Barge landings at Daytona Beach occur about once every two weeks.

3.5.2.3 Water Use

In addition to SNI's military uses, the waters of SNI are used for commercial and recreational fishing. Most types of inshore fisheries common in southern California can occur in the nearshore waters of SNI (Ventura County Commercial Fisherman's Association 1997). Occasional fisheries occurring near SNI include drift sea bass fishing, live fish trapping, hook and line bottom fishing (rock cod), hook-and-line trolling (halibut and sea bass), open-water trolling (albacore and swordfish), squid purse seining, and crab trapping. However, primary nearshore fisheries at SNI are urchins and lobster (abalone fisheries are currently closed). These fisheries occur in less than 120 ft (37 m) of water around SNI; fall and winter are the heaviest seasons for these fisheries. Commercial passenger fishing vessels frequently offer 1-day sport fishing excursions either from the Ventura or Santa Barbara harbor.

Recreational fishing boats are launched from Cissy Cove, and Daytona Beach is a popular fishing spot. SNI is surrounded by kelp forests, exhibits an upwelling of nutrients, and has numerous fishing spots along the shoreline. Many of the better areas to fish are identified by fishing signs. Some of the more common species include cabezon, California sheephead, rock bass, white bass, and calico bass. Fishermen must have a California ocean-fishing license to fish on SNI and abide by bag and size limits. The CDFG is responsible for the enforcement of fishing regulations on SNI. Fishermen also must abide by SNI area closures due to environmental laws protecting certain wildlife and respect cultural resources areas, such as Indian middens located near coastal area (U.S. Navy 2005). Environmental personnel post flyers in obvious locations around the island regarding fishing on SNI, including specific information on different species of fish and catch limits (U.S. Navy 2005). Furthermore, restrictions are enacted to clear the appropriate range areas of non-participants before military operations are conducted.

3.5.2.4 Coastal Zone Management Act (CZMA) – Consistency Determination

The coastal zone generally extends from the mean high tide line to a distance of 3 nm (5.6 km) from shore. As defined in the CZMA (16 USC 1453[1]), the term "coastal zone" does not include "lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government." Although SNI is wholly owned and operated by the DON and, therefore, is excluded from the coastal zone, the Navy will ensure that the proposed action is consistent to the maximum extent practicable with the enforceable policies of the California Coastal Act of 1976, as amended. The coastal zone of SNI extends from the mean high tide line to a distance of 3 nm (5.6 km) from the shore. The Navy seeks to manage its coastal properties within the environmental programs of the CZMA and California Coastal Act and has submitted a federal consistency analysis (Negative Determination) for submittal to the California Coastal Commission. Concurrence on the Coastal Consistency Negative Determination was received from the California Coastal Commission on 5 May 2009 (Appendix C).

3.6 PUBLIC SAFETY

3.6.1 Definition of Resource

Public safety issues include potential hazards inherent in laser firings, flight operations, missile firings, operation of U.S. Navy vessels, and target operations. Issues related to public proximity and access are also addressed. The safety policy of NAWCWD is to take every reasonable precaution in the planning and execution of all operations which occur on the Sea Range to prevent injury to people and damage to property. This involves implementing extensive measures for risk mitigation and increased range control in the areas determined to have the highest risk to public safety.

3.6.2 Existing Conditions

3.6.2.1 Laser Safety

Before any lasers are used at the Sea Range, operations must comply with OPNAVINST 5100.27B/ Marine Corps Order 5104.1C Navy Laser Hazards Control Program and approved by NAWCWD Range Laser System Safety Officer (RLSSO). This OPNAVINST incorporated the industry standard, ANSI Z136.1, Safe Use of Lasers, into its requirements. In addition to OPNAVINST 5100.27B, NAWCWD would implement a detailed RHA/SOP process prior to the use of laser system on the Sea Range and at SNI. To allow a full evaluation of risks and safety considerations and permit the planning and preparation for laser operations, the following data shall be provided: a written description of test objectives, how laser(s) or laser system(s) will be used, and people involved. If it is determined that the Sea Range can support the test, then the following will be required or developed:

- detailed test plan(s) describing objectives, risks, and hazard zones;
- layout diagram(s), if applicable, of the test scenario showing land sites, surface craft and/or aircraft locations, maneuver patterns, altitudes, time lines, and targets;
- SOPs governing the use of the system(s) during the test or training events; and
- qualification/certification statements for operators of the laser system(s).

A team of NAWCWD engineers, scientists, and RLSSO reviews every step of planned laser tests, and if there are any unknowns that have not been addressed or mitigated, the test does not proceed. If all information is provided and analysis indicates that the Sea Range can safely accommodate the proposed event, the RLSSO will generate an RSA for the program.

Additionally, the Navy's Laser Safety Review Board (LSRB) provides a systems safety review of all DON lasers used in combat, combat training, or for purposes that are classified in the interest of national security, and of all lasers capable of exceeding Class 3A levels (see Table 1-1). Guidance relating to laser safety on military ranges is contained in MIL-HDBK-828A, Department of Defense Handbook: Laser Safety on Ranges and in Other Outdoor Areas and ANSI Z136.6 (2007), Safe Use of Lasers Outdoors, also contains guidance and recommended practices.

The LSRB is composed of the Bureau of Medicine and Surgery, which serves as the Administrative Lead Agency (ALA); Marine Corps Headquarters; the Naval Safety Center; the lead Navy technical laboratory (LNTL) for lasers; and all systems commands, such as Naval Air Systems Command and Naval Sea Systems Command. The LNTL for the Navy is NSWCDL, based on expertise in lasers and laser safety. NSWCDL's head of the LNTL also is a sitting member of multiple ANSI Z136 subcommittees focused on the safe use of lasers.

3.6.2.2 General Laser Control Measures

General laser control measures have been established for the protection of scientists, Navy personnel, and the public. These include laser safety analysis, SOPs, safety buffer zones, remote viewing and operation, range control measures (barriers and warning systems), interlock controls, target backstops, and administrative controls. These measures would apply to the proposed action and are described below.

- *Laser Safety Analysis*. A prerequisite prior to each test is a laser safety analysis that quantifies potential ocular and skin hazards and provides recommendations for their mitigation.
- *Laser System SOPs*. As required by ANSI Z136.1 and ANSI Z136.6 standards, as well as the Navy's own laser protection standard, each laser system and designated firing must have an SOP developed and approved. This SOP designates the individual(s) responsible for the safe operation of the laser system, the specific control measures employed to minimize unintended exposures, conditions under which the laser system may be operated and appropriate personal protective equipment for operators, and the specific nominal ocular hazard distance (NOHD) and NHZ. Each laser system SOP must be submitted to the Navy's LSRB and the NAWCWD RLSSO for approval; only after approval may the laser test be conducted. SOPs require laser safety training as well as medical surveillance for the operators to ensure their health and safety.
- *Safety Buffer Zone (Laser Hazard Cone)*. Range control measures include use of safety zones, from which personnel are excluded during testing. In accordance with laser range operational procedures, horizontal and vertical buffer zones are established prior to lasing activities.
- *Administrative Controls*. Access to laser operating areas is restricted to authorized and properly trained personnel only, which reduces the possibility of inadvertent exposure to laser radiation. Prior to any lasing activities, and in accordance with laser SOPs, the area is swept to clear it of all unauthorized personnel. In addition, prior to lasing activities, materials with reflective surfaces are either cleared from the area or otherwise covered/obscured to minimize reflective hazards. Each laser system has SOPs established for its use to ensure operational safety. Signage indicating a laser controlled area would be posted in accordance with ANSI Z136.1 specifications for the operation of Class 4 lasers. Additional administrative controls are outlined in ANSI Z136.1, Safe Use of Lasers, which has been adopted by the DoD as the governing standard for laser safety.

- *Barriers and Warning Systems*. Barriers are erected before tests to exclude personnel from the laser controlled area. Various types of warning systems, such as warning lights (flashing siren and light) and audible sirens and alarms are initiated prior to testing to alert personnel of the pending laser operation.
- *Remote Operation*. Personnel operate laser systems from remote locations because safety procedures require that personnel be a safe distance from the operating laser systems. The laser system is connected to a computer system, allowing the operators and technicians to monitor its operation and measurement instruments in a safe manner. The NOHD and NHZ are determined for each laser system to ensure that the operators, as well as other personnel and the general public, are located beyond the distances where skin or ocular hazards are present, including specular (highly reflective, such as from a mirror) or diffuse reflection of laser energy.
- *Laser Safety Interlock Controls*. Safety interlocks work through an instantaneous feedback loop to cut off the power to an emitting laser if a single mechanical or electrical component fails or if the laser beam strays from the anticipated beam path. For example, lower-power beams are initially used to validate that the center of the intended target is being illuminated when fired upon. Validation is accomplished by calorimeter sensors placed around the intended aim point of the target. The sensors detect the position of the narrow laser beam by fractions of an inch relative to the center of the aim point. The laser beam is then intentionally made to drift off target, to check the sensors. If the laser beam veers off the intended path, the beam will heat up the calorimeter sensors, which will in turn send a signal that the laser is off-target and instantaneously turn off the power to the laser. Another safety interlock example is a system that must be engaged to allow power to flow to the laser system, such as a magnetic connection between a closed door and the door frame leading into the area where the laser system is operated. If this door is opened, then electrical power is disconnected from the system and the laser system cannot operate.
- *Laser Backstops*. A laser beam is composed of light, which, if it encounters no obstacle, can continue traveling in a straight line to infinity. To prevent any chance of a laser beam traveling farther than the test requires and into an uncontrolled/uncleared area (e.g., populated mainland), NAWCWD would utilize SNI as a backstop for some events. In testing/training scenarios where SNI is not used at a backstop, the engagement angle will be looked at to ensure laser energy goes out to sea for the laser-on-target time. To minimize reflected laser energy, all materials and objects associated with the target – for example, a stand holding it in place – are painted with or composed of light-absorbing materials.
- *Air-space Clearance*. Any laser operations that have the potential of creating hazards to aircraft shall be coordinated with the FAA to ensure that when the laser is fired no non-participating aircraft are in the hazard area. Similar coordination with the Laser Clearinghouse will occur whenever laser testing creates potential hazards to satellites.

3.6.2.3 Non-Beam Control Measures

Potential non-beam hazards associated with the use of lasers, along with the health and safety measures in place to minimize these hazards, are described below.

- *Electrical Accidents*. Operators of the laser systems have many controls in place, including electrical interlocks, ground fault circuit interrupters, proper grounding, and SOPs outlining how to operate the system to minimize the possibility of electrical accidents.
- *Fire Hazard*. The irradiation of objects by a Class 4 laser beam presents a fire hazard; however, the targets are constructed of flame-retardant material, as defined by the National Fire Protection Association, thus minimizing the potential fire hazard. Furthermore, the control of the beam path and target area minimizes the potential for any resulting fires to spread beyond the immediate target area.
- *Laser-generated Air Contaminants (LGACs)*. Air contaminants may be generated when certain Class 4 laser beams interact with matter such as plastics, composites, metals, and tissues (ANSI, 2007). Areas will be cleared of debris prior to testing, and NAWCWD will ensure that appropriate industrial hygiene characterizations of exposure to LGACs take place in accordance with 29 CFR 1910.1000, Air Contaminants and OPNAVINST 5100.23G, the Navy Safety and Occupational Health Program Manual, so that no occupational over-exposures occur.
- *Collateral Radiation*. Potential collateral radiation or broad-band black-body radiation (i.e., ultraviolet or blue light) produced as a result of air breakdown at the laser/target interface does not present an immediate hazard to personnel, because no personnel will be within close proximity to the target impact area. Once lasing activities stop, all collateral radiation (if any) ceases, and no residual collateral radiation remains.

3.6.2.4 Range Safety

Sea Range safety policy, procedures, and guidance are covered in NAVAIR Instruction 3700.3 (NAVAIR 2007). This document defines range safety requirements, criteria, the safety planning process, and operational procedures. Although the Commander of NAWCWD has the ultimate responsibility for range safety, the authority for execution of these safety programs is delegated to the Sea Range Safety Officer in the Range Safety Office.

Public access and proximity to the Sea Range is a principal safety consideration since most of the waters of the Sea Range are open to the public. NAWCWD controls the 36,000 mi^2 (93,000 km^2) of SUA associated with the Sea Range. In addition, the airspace over the Point Mugu airfield, beach, and to 3 nm (5.6 km) offshore is a Restricted Area, and non-participating aircraft are precluded from entering this area. Another Restricted Area encompasses airspace over SNI to prevent access of unauthorized aircraft. In these areas, NAWCWD has the authority to control access of individuals, aircraft, and ships. The air-to-surface and surface-to-air laser testing/training scenarios would take place within Sea Range boundaries where NAWCWD controls the airspace. Any laser operations that have the potential of creating hazards to aircraft shall be coordinated with the FAA to ensure that when the laser is fired no non-participating aircraft are in the hazard area.

Access to SNI is strictly controlled. Access is granted for military-related activities and for pre-approved, non-military users, primarily for scientific purposes. Three surface restricted water areas are located around SNI: Alpha, Bravo, and Charlie. In addition, NAWCWD has established two airspace Restricted Areas over SNI that extend 3 nm (5.6 km) around the island. The two areas are divided by a line that extends from the north side to the south side of SNI where the Bravo boundaries intersect the shorelines; they extend from the surface to 100,000 ft (30,500 m).

NAWCWD's Point Mugu Sea Range has an extensive surveillance system to implement real-time safety clearance procedures prior to initiation of an operation on the range. This system includes the use of land-, sea-, and air-based radar in addition to aircraft surveillance of the range which is necessary to ensure that the public remains clear of designated operational areas where they could be subjected to hazardous conditions. The range uses specially modified P-3 aircraft to provide extended Sea Range surveillance. Past Range Safety Office records show that accidents involving the public on the Sea Range have never occurred (NAWCWD 2002a).

When the Sea Range is used for military testing and training operations, the Navy notifies commercial, civilian, and other military aviation through a NOTAM which provides appropriate information to the FAA and its air traffic control agencies to route traffic around these Warning Areas and Restricted Areas when they are active (Warning Areas are located over non-Territorial Waters of the U.S.; Restricted Areas are located over land or Territorial Waters). Although a NOTAM does not preclude uncontrolled air traffic from entering a Warning Area even when the area is active, DoD Directive 4540.01, *Use of Airspace by U.S. Military Aircraft and For Missile/Projectile Firings*, provides guidance for operating within Warning Areas: non-participating aircraft are identified by radar, and contact with these aircraft is made by radio; if aircraft remain in a clearance area, even after being requested to leave, the Sea Range will delay, cancel, or move a test to a clear area.

Similar procedures exist for notification of the commercial shipping and recreational boating communities of potentially hazardous activities on the Sea Range. These notifications are made through NOTMARs and daily VHF-FM Marine Radio (Channel 16) broadcasts. The Sea Range has established procedures to ensure that non-participating surface vessels are not exposed to undue risk. The surveillance aircraft survey designated clearance areas to ensure that surface vessels are not present. Any vessels, if present, are warned that they are in an area of an impending hazardous activity and are requested to leave the area. Contact with vessels is made by marine band FM radio; however, loud speakers can be used if the boat is not radio-equipped. If vessels remain in the clearance area, the Sea Range will delay, cancel, or move the test to a clear area. A test will not be initiated if a nonparticipating vessel is present in the clearance area (NAWCWD 2002a).

3.7 HAZARDOUS MATERIALS

3.7.1 Definition of Resource

Hazardous materials addressed in this DEA/OEA are chemical substances that pose a substantial hazard to human health or the environment. The definition of "hazardous materials" includes extremely hazardous substances, hazardous chemicals, hazardous substances, and toxic chemicals. In general, these materials pose hazards because of their quantity, concentration, physical, chemical, or infectious characteristics. Certain types of lasers produce hazardous or toxic materials during the process of lasing, but these systems would be self contained so that all hazardous materials are captured and safely stored. Hazardous materials are often used in targets because they are strong, lightweight, reliable, long-lasting, or low cost. When targets are used for their intended purpose, component hazardous materials are considered hazardous constituents.

A hazardous waste may be a solid, liquid, semi-solid, or contained gaseous material that alone or in combination may: 1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or 2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or

otherwise managed. Hazardous wastes are controlled by the Resource Conservation and Recovery Act (RCRA; 42 U.S.C. § 6901 et seq.).

3.7.2 Existing Conditions

As outlined in the *NAWCWD Point Mugu Sea Range EIS/OEIS* (NAWCWD 2002a) a range of hazardous material are associated with the RDT&E activities of the sea range. Hazardous materials associated with the proposed action are described below.

3.7.2.1 Hazardous Constituents Deposition

Aerial Targets

Aerial targets are used for testing and training purposes. In addition to the JATO bottle which falls away from the target after launch, most air targets contain jet fuel, oils, hydraulic fluid, batteries, and explosive cartridges as part of their operating systems. Following a test or training operation, targets are generally flown (using remote controls) to pre-determined recovery points on the Sea Range (either 10 nm [19 km] south of Anacapa Island or 6 nm [11 km] north of SNI). Fuel is shut off by an electronic signal, the engine stops, and the target begins to descend. A parachute is activated and the target descends to ocean surface where it is retrieved by range personnel using helicopters or range support boats. However, some targets are physically hit by missiles, and these targets fall into the ocean.

Surface Targets

Surface targets are used during missile and bombing exercises. Surface targets are stripped of unnecessary hazardous constituents and other augmentation and made environmentally clean; therefore, only minimal amounts of hazardous constituents are on board.

Ships and Boats

Test and training operations involve numerous combatant ships, target retrieval aviation rescue boats, and other support craft. These vessels are manned and do not intentionally expend any hazardous constituents into the water. However, small amounts of diesel fuel and engine oil may leak and be deposited on the ocean surface.

3.7.2.2 Shipboard Hazardous Materials Management

Environmental compliance policies and procedures applicable to shipboard operations on the Sea Range are defined in OPNAVINST 5090.1C (U.S. Navy 2007). These instructions reinforce the Clean Water Act's prohibition against discharge of harmful quantities of hazardous substances into or upon U.S. waters out to 200 nm. Navy ships are required to conduct operations at sea in such a manner as to minimize or eliminate any adverse impacts on the marine environment. This includes stringent hazardous waste discharge, storage, dumping, and pollution prevention requirements.

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.1 AIR QUALITY

4.1.1 Approach to Analysis

Criteria pollutant emissions resulting from proposed laser testing and training activities at SNI have been evaluated for the proposed action. Air quality impacts would be significant if emissions associated with the proposed action would: 1) increase ambient air pollution concentrations above the NAAQS; 2) contribute to an existing violation of the NAAQS; 3) interfere with, or delay timely attainment of the NAAQS; or 4) impair visibility within federally-mandated Prevention of Significant Deterioration Class I areas. Additionally, a conformity analysis would be required before initiating any action that may lead to nonconformance with a SIP, an exceedence of *de minimis* criteria pollutant thresholds, or contribution to a violation of the NAAQS.

The evaluation of air quality includes two separate analyses, described below:

- *Conformity and NEPA Air Quality Analysis.* To assess the air pollutant emissions from activities within U.S. territory, including emissions on the mainland and SNI, emissions within the 3 nautical mile (nm) (5.6 km) limit of U.S. territorial waters (subject to the General Conformity Rule), and emissions within the 12 nm (22 km) limit of U.S. territorial waters (subject to NEPA).
- *EO 12114 Air Quality Analysis.* To assess the air pollutant emissions from activities occurring outside U.S. territorial waters.

De minimis levels apply for conformity purposes, which relate to emissions within 3 nm (5.6 km) of the air basin. Since SNI and the offshore region proposed for the laser testing and training are considered in attainment/unclassified for the NAAQS, the provisions of the General Conformity Rule do not apply. Offshore emissions do not follow the *de minimis* and General Conformity Rule significance criteria; project emissions greater than 3 nm (5.6 km) offshore were analyzed as subject to NEPA and EO 12114.

The estimated emissions for marine vessels were divided into those emissions associated with vessel transport operations originating at Point Mugu and those activities occurring offshore of SNI. In accordance with DON guidance, marine vessel emissions that occur more than 3 nm (5.6 km) offshore are not included in the conformity applicability analysis. Total project emissions include aircraft activities (e.g., aerial target launches, transport of personnel, and target recovery), vessel activities (e.g., mobile ship target circuit patterns, target transport, personnel transport, and target recovery), vehicle activities (e.g., personnel transport to land-based target areas), and hydrogen fueling station construction activities at Point Mugu (e.g., heavy equipment and vehicle emissions).

As discussed in Section 3.1.3, aircraft emissions associated with landings and takeoffs of aircraft at Point Mugu have been analyzed. Additionally, the transport flights from Point Mugu to SNI would likely be above 3,000 ft (915 m) AGL which is considered to be above the atmospheric inversion layer and therefore, would not impact the local air quality. Therefore, only emissions occurring below 3,000 ft (915 m) AGL within the 3 nm (5.6 km) limit were estimated.

4.1.2 Proposed Action

4.1.2.1 Assumptions

Air quality impacts from the proposed laser testing/training program would occur from the use of aircraft, vessels, aerial targets, support vehicles and generators, and heavy construction equipment all of which are mobile emission sources. Portable generators greater than or equal to 50 break horsepower are subject to registration as part of the VCAPCD Portable Equipment Registration Program (PERP). It has been assumed that only PERP registered generators would be used for proposed land-based training events, and generators would be appropriately permitted prior to use. For the purposes of this Air Quality Analysis the use of portable generators are considered temporary mobile source emissions since they would be used to provide power for land-based lasers/targets and would only operate for the duration of the training event.

Total emissions resulting from project activities have been estimated using data presented in Chapter 2 and general air quality assumptions and emission factors listed in Appendix B. Emission calculations for all project activities, including estimates of aircraft activity, marine vessel activity, aerial target, vehicle/generator, and hydrogen fueling station construction emissions are provided in Appendix B.

Analysis of emissions from HALE UAVs fueled by LH_2 is not required because these emissions would be water vapor, which is a harmless, unregulated gas.

4.1.2.2 Impacts

Since SNI and the offshore region proposed for the laser testing/training program are classified as attainment/unclassified by the USEPA, the provisions of the General Conformity Rule do not apply. However, emissions within U.S Territory (3-12 nm offshore of SNI) and outside U.S Territory (greater than 12 nm offshore of SNI) have been estimated for planning purposes and as subject to NEPA and EO 12114 (Table 4-1).

Estimated emissions occurring within the SCCAB at Point Mugu within 3 nm (5.6 km) (subject to the General Conformity Rule) and within 12 nm (22 km) (subject to NEPA) as a result of implementation of the proposed action are shown in Tables 4-2 and 4-3, respectively.

Table 4-1 Total Proposed Action Emissions - SNI

Component	Pollutant (tons/year)					
	VOCs	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Aircraft Operations	2.32	2.61	5.31	0.14	1.54	1.53
Vessel Operations	2.26	14.64	22.88	4.86	0.61	0.60
Aerial Target Operations	0.00	0.00	0.01	0.00	0.00	0.00
Vehicle & Generator Operations	0.93	3.56	2.58	0.00	0.39	0.35
Construction Emissions	0.04	0.42	0.16	0.00	0.02	0.02
Subtotal	**5.55**	**21.23**	**30.94**	**5.00**	**2.56**	**2.50**
de minimis/Significance threshold	NA	NA	NA	NA	NA	NA
Exceeds *de minimis* threshold?	No	No	No	No	No	No

Notes: NA – not applicable since SNI is in attainment/unclassified of the NAAQS for all criteria pollutants. Emissions are presented for planning purposes only.
VOCs=volatile organic compounds; NO_x=nitrogen oxides; CO=carbon monoxide; SO_x=sulfur oxides; PM_{10}/$PM_{2.5}$=particulate matter greater than 10/2.5 microns in diameter.
Sources: CARB 2008b, USEPA 2008a, USEPA 2008b.

Table 4-2 Proposed Action Emissions – SCCAB <3 nm

Component	Pollutant (tons/year)					
	VOCs[1]	NO_x[1]	CO	SO_x	PM_{10}	$PM_{2.5}$
Aircraft Operations	2.29	1.62	5.06	0.09	1.72	1.70
Vessel Operations	0.39	2.60	3.90	0.84	0.10	0.10
Aerial Target Operations	0.00	0.00	0.00	0.00	0.00	0.00
Vehicle & Generator Operations	0.00	0.00	0.00	0.00	0.00	0.00
Construction Emissions	0.04	0.42	0.16	0.00	0.02	0.02
Subtotal	**2.72**	**4.64**	**9.12**	**0.93**	**1.84**	**1.82**
de minimis/Significance threshold	50	50	NA	NA	NA	NA
Exceeds *de minimis* threshold?	No	No	No	No	No	No
VCAPCD emissions forecast (2010)	16,936	21,754	72,854	3,796	10,001	3,577
Exceeds 10% of forecast?	No	No	No	No	No	No

Notes:[1] Effective June 19, 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.
NA = not applicable since Ventura County is in attainment of the federal CO, SO_2, PM_{10} and $PM_{2.5}$ standards.
Sources: CARB 2008b, CARB 2008c, USEPA 2008a, USEPA 2008b, 40 CFR 93.153.

Table 4-3 Proposed Action Emissions – SCCAB (3-12 nm)

Component	Pollutant (tons/year)					
	VOCs	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Aircraft Operations	0.02	0.41	0.12	0.02	0.23	0.22
Vessel Operations	1.10	6.76	11.35	2.33	0.29	0.29
Aerial Target Operations	0.00	0.00	0.00	0.00	0.00	0.00
Vehicle & Generator Operations	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	**1.12**	**7.17**	**11.47**	**2.35**	**0.52**	**0.51**

Note: *de minimis* thresholds and VCAPCD emissions forecast do not apply to offshore (>3 nm) emissions.

4.1.3 Conformity Applicability Analysis

The estimated emissions associated with the proposed action would be below *de minimis* threshold levels for conformity for SNI and the SCCAB (Ventura County). In addition, estimated emissions would not be regionally significant, as they would be substantially less than 10 % of the emissions estimated for the VCAPCD (CARB 2008c). Therefore, the proposed action would conform to the VCAPCD SIP and would not trigger a conformity determination under Section 176(c) of the CAA. In addition, since SNI has been categorized as an attainment/unclassified area by the USEPA, it is not subject to the General Conformity Rule. However, estimated emissions would be below *de minimis* levels; therefore, even if SNI was considered a nonattainment or maintenance area, a formal conformity determination would not be necessary. Accordingly, a Record of Non-Applicability (RONA) has been prepared by the U.S. Navy (Appendix B). The proposed action would have no significant impact on air quality at or near SNI or Point Mugu, and would not significantly harm the global commons under EO 12114.

4.1.4 Mitigation Measures

Implementation of the proposed action would not result in significant air quality impacts; therefore, no mitigation measures are proposed or required.

4.1.5 Alternative 1

Air quality impacts from the Alternative 1 laser testing and training program would be less than those analyzed under the proposed action. Emissions on and within 3 nm of SNI would be equal to or less than those of the proposed action (Tables 4-1 and 4-2), reflecting the inclusion of land-based scenarios in this alternative. Emissions farther from land would be less than those of the proposed action (Table 4-3) due to the elimination of air-air, air-sea, and sea-sea scenarios from this alternative. Alternative 1 would have no significant impact on air quality at or near SNI or Point Mugu and would not significantly harm the global commons under EO 12114.

4.1.6 Alternative 2

Air quality impacts from the Alternative 2 laser testing and training program would be less than those analyzed under the proposed action. Emissions on SNI would be limited to transit to and from SNI. In the offshore areas, emissions would be less than those of the proposed action because of the elimination of air- land and sea-land scenarios. Alternative 2 would have no significant impact on air quality at or near SNI or Point Mugu, and would not significantly harm the global commons under EO 12114.

4.1.7 No-Action Alternative

Under the no-action alternative, the proposed laser testing/training program would not occur and existing conditions as described in Section 3.1 would remain unchanged. Therefore, no significant impacts to air quality would occur.

4.2 MARINE SEDIMENTS AND WATER QUALITY

4.2.1 Approach to Analysis

Water quality criteria established under the authority of federal and state law were considered to help determine the significance of water quality impacts from activities associated with the proposed action (e.g., laser testing, ship activities, target impacts, etc.) on the Point Mugu Sea Range and at SNI.

Significance of water quality impacts is based on the potential for long-term effects to aquatic resources. Water quality criteria established under the authority of federal law were considered to help determine the significance of water quality impacts from proposed activities offshore from SNI. As required by the CWA (33 USC 1251 et seq.), the USEPA established National Ambient Water Quality Criteria (NAWQC) which identify numerical maximum concentration levels for contaminants in discharges to surface waters for the protection of both ecological and human health (Table 4-4). Factors considered in determining whether the proposed action would have significant impacts on marine water quality included the extent or degree to which the proposed action would cause concentrations of chemicals in the ocean to exceed NAWQC standards. There would be no impact on freshwater or drinking water sources because no such resources are present in the proposed testing areas.

Table 4-4 Marine Water and Sediment Quality Standards

Contaminant[1]	National Ambient Water Quality Criteria (µg/L)		NOAA Sediment Guidelines (ppm)
	Acute (1-Hour Average[2])	Chronic (4-Day Average)	
Metals			
Cadmium (Cd)	40	8.8	1.2
Copper (Cu)	4.8	3.1	34
Lead (Pb)	210	8.1	46.7
Mercury (Hg)	1.8	0.94	0.15
Nickel (Ni)	74	8.2	20.9
PAH Constituents			
Naphthalene	2350	No Data Available	0.16
Acenaphthene	970	710	0.044

Notes: [1]No water quality or sediment standards are available for benzene, toluene, xylene, potassium hydroxide electrolyte, lithium, lithium chloride, or sulfuric acid.
[2]Represents instantaneous maximum
µg/L = micrograms per liter; PAH = polycyclic aromatic hydrocarbon ; ppm = parts per million
Sources: USEPA 1986, 2006; NOAA 1999.

4.2.2 Proposed Action

4.2.2.1 Land Surface Targets

Land surface targets on SNI would include target board, beam profiling equipment, vehicles, and simulated military infrastructure. During the proposed laser testing activities, these targets would release minimal to no constituents that would impact water quality on SNI.

4.2.2.2 Aerial Targets

Aerial targets would be used for laser testing and training activities on the Sea Range and at SNI. Most aerial targets contain jet fuel, oils, lubricants, hydraulic fluid, and batteries. The BQM-74 aerial targets are generally recovered after use for testing and training. These targets would fly to predetermined recovery points; fuel would be shut off by an electronic signal; the engine would stop; a parachute would activate as the target descends; and the target would land on the ocean's surface, where it would be retrieved by range personnel using helicopters or range support boats. For unmanned aerial vehicle targets, the target would be flown by remote control and landed at a designated airstrip. In cases when the target is completely recovered, there would be no release of hazardous materials into marine waters or onto SNI.

Some BQM-74 or UAV targets would potentially malfunction or receive enough damage from the laser testing to result in an explosion or cause the target to crash into the ocean surface and break apart on impact. The GQM-163A is not a recoverable target. The hazardous constituents of concern for fuels, engine oil, and hydraulic fluids are hydrocarbons with the most toxic components of fuel oils being aromatic hydrocarbons such as benzene, toluene, xylene, and polycyclic aromatic hydrocarbons (PAHs) such as naphthalene, acenaphthene, and fluoranthene. The *Southern California Range Complex EIS/OEIS* (U.S. Navy 2008b) provides a water quality impact analysis for the BQM-74 using the following assumptions:

- The target breaks apart on impact with an affected volume of water of 2.5 x 10^5 gallons (the top 3 ft of the water column times an estimated impact surface area of 10,600 ft^2);
- The target contains 21.5 pounds of fuel (20 % remaining of initial 107 pounds) and that 5 % of the fuel is comprised of PAHs;
- Combined concentrations from multiple exercises are not considered because it is highly unlikely that an area would be impacted by multiple crashes.

These assumptions give an estimated total PAHs concentration of 503 µg/L (U.S. Navy 2008) which is below the threshold established in the NAWQC for individual PAHs: naphthalene (acute = 2,350 µg/L) and acenaphthene (acute = 970 µg/L; chronic = 710 µg/L). Cumulative concentrations are not analyzed because it is highly unlikely that multiple crashes will impact the same volume of ocean water.

There would be no impact from PAHs on marine sediments because PAHs would be diluted in the water column to insignificant levels. Impacts from PAHs released from a GQM-163A or conventional UAV crashing into the water surface would be similar to those analyzed for the BQM-74.

The battery from a BQM-74, GQM-163A, or UAV would settle on the sea floor and is primary source of contaminants that could impact marine sediments. Constituents of concern in batteries can include potassium hydroxide electrolyte, lithium, lithium chloride, nickel cadmium, lead, and sulfuric acid. Saltwater criteria and NOAA sediment quality guidelines for battery constituents are shown in Table 4-4. The analysis of impacts from batteries used during a typical testing event presented in the *Point Mugu Sea Range EIS/OEIS* (NAWCWD 2002a) would have similar potential water quality and marine sediment effects as batteries in aerial targets used under the proposed action. This analysis is based on the following conservative assumptions:

- all battery constituents are water soluble and 100 percent bio-available (i.e., readily available to react with the environment); and
- the battery constituents of concern constitute 33 percent of the total battery mass.

The concentration of battery constituents was calculated to range from 0.01 to 0.08 µg/L for water quality and 0.0005 to 0.003 ppm for marine sediments (NAWCWD 2002a). The estimated concentration for battery constituents is significantly below water and marine sediment quality criteria provided in Table 4-4. Therefore, the battery constituents concentration associated with the proposed laser testing scenarios in the Sea Range involving aerial targets would represent a less than significant impact on water quality or marine sediment quality.

4.2.2.3 Sea Surface Targets

Surface targets include HSMSTs, MSTs, LCMTs, or Zodiac-type craft. In general, these targets are constructed of non-toxic materials, and have few or no hazardous constituents. Ship hulks are cleaned of hazardous materials prior to use. These targets would be equipped either with or without target boards. During laser testing it is unlikely that damage that these targets receive would not be sufficient to cause sinking. Therefore, there is no expected impact to water quality or marine sediments from sea-surface targets.

4.2.3 Mitigation Measures

Significant impacts to water quality or marine sediments would not occur as a result of proposed action; therefore, no mitigation measures are proposed or required.

4.2.4 Alternative 1

Marine sediment and water quality impacts under the Alternative 1 laser testing and training program would be less than those analyzed under the proposed action. Because certain scenarios involving ocean-surface targets would be eliminated, the number of targets directly impacting the ocean surface under Alternative 1 would be less than under the proposed action (refer to Table 2-3). Therefore, Alternative 1 would have no significant impacts on marine sediment and water quality.

4.2.5 Alternative 2

Marine sediment and water quality impacts under the Alternative 2 laser testing and training program would be equal to or less than those of the proposed action, because this alternative would not include a land-based laser shooting at ocean-surface or airborne targets (refer to Table 2-3). Therefore, Alternative 2 would have no significant impacts on marine sediment and water quality.

4.2.6 No-Action Alternative

Under the no-action alternative, laser testing and training would not occur and existing conditions as described in Section 3.2 would remain unchanged. Therefore, implementation of the no-action alternative would have no significant impact on public safety.

4.3 BIOLOGICAL RESOURCES

4.3.1 Approach to Analysis

The factors used to assess the significance of impacts to biological resources include the extent or degree to which the action would cause the loss or degradation of habitat, species, protected species or populations, or cause adverse impacts to EFH. Potential environmental consequences of both direct and indirect impacts are considered.

4.3.2 Proposed Action

4.3.2.1 Terrestrial Biological Resources

Vegetation Communities

The LH_2 fueling station would be located on unvegetated, previously graded land in a developed area next to the airfield; construction and use of the facility would have no impact on vegetation. The onshore target and shooter locations on SNI are previously disturbed areas that are used by ongoing Navy activities. The transient occurrence of wildlife in the terrestrial portion of the proposed project area is possible, but the confinement of the proposed action to the existing heavily used, developed/disturbed area indicates that no significant impact to vegetation would occur.

Terrestrial Wildlife

Construction and use of the LH_2 fueling station would have no impact on wildlife due to facility's location in a developed area next to the airfield. On SNI, proposed laser testing and training activities may displace wildlife typically found in the immediate vicinity of the proposed sites. However, these disturbed areas do not provide high quality habitat and are currently used for ongoing Navy activities. Therefore, impacts to terrestrial wildlife would not be significant.

Terrestrial Special Status Species

No special-status species occur at the proposed location of the LH_2 fueling station. Special-status species that occur in the vicinity of the proposed onshore project areas on SNI are the Trask's milkvetch, island night lizard, and the San Nicolas Island fox. The Trask's milkvetch occurs near but not within the proposed project areas. As described above, the onshore project sites are located in previously disturbed areas and no construction or ground disturbance would occur. Therefore, no impact to the Trask's milkvetch would occur.

The island night lizard and the island fox may occur within the project areas. However, given the disturbed nature of the sites and their ongoing use for Navy activities, the presence of these species at the sites is considered unlikely and no significant impacts would occur.

4.3.2.2 Marine Biological Resources

Marine Invertebrates and Plants

Surface targets would not be located within intertidal zone of SNI and, therefore, the proposed action would not impact the intertidal zone where invertebrate and marine plant and algae densities are typically high. Areas of dense kelp are avoided by Navy vessels as a matter of standard practice whenever possible. Otherwise, project-related vessel movement would be the same as routinely occurs on the Sea Range and unlikely to cause appreciable damage to kelp plants, especially considering the strong surge to which SNI kelp beds are normally exposed. Owing to the density of seawater, the terminal velocity reached by sinking objects is relatively slow (compared to falling objects in air). As a result, debris is unlikely to land with sufficient force to damage any object on the bottom, and in any case would affect only a minute portion of the seabed. Therefore, activities associated with the proposed action would have no significant impact on marine invertebrates or plants. Vessels in the marine environment greater than 12 nm from shore would be consistent with Sea Range usage described in the 2002 EIS/OEIS and would have negligible, if any, effect on marine invertebrates or plants; therefore, there would be no harm to the global commons under EO 12114. Threatened and endangered marine invertebrates are discussed in the Marine Special-Status Species section, below.

Marine Birds

Before a laser can be fired, the Navy will require as standard procedure that no persons, wildlife, reflective surfaces, or non-target obstructions of any sort are present within the hazard area (which is specific to the type of laser being used) between the laser and the target. A bird in flight or at long distance might not be detectable, but the likelihood of a bird crossing the laser beam at the instant the laser is fired is remote.

Birds may be temporarily displaced to nearby areas by project activities. SNI and the surrounding Sea Range is currently utilized for various military training activities and activities associated with the proposed action would not significantly increase the overall intensity of military activities presently conducted in the area. As birds are highly mobile organisms, any disturbance would be very localized and temporary; no significant impact on the abundance or distribution of marine birds would be anticipated.

As described in Chapter 3, marine bird densities range from less than 0.01 to 0.46 bird per acre (0.02 to 1.14 birds per hectare) within the Sea Range and near SNI the density has been estimated at 0.1 bird per acre (0.25 birds per hectare) (NAWCWD 2002a). Given these densities of birds within the Sea Range,

the likelihood of a bird passing through the laser beam in the exact moment it is fired is extremely low and no significant impacts to sea birds abundance or distribution are expected to occur.

Although average densities are low, large numbers of birds and/or marine mammals can congregate in feeding frenzies on the water surface. In addition, sea lions or seabirds may haul out or land on floating targets, particularly if they are unattended. The measures described in Section 2.1.8 will ensure that marine mammals or seabirds are not present within the hazard zone when a laser is fired. These passive methods of protection will not adversely affect marine mammals or seabirds.

Vessels and aircraft activity further from 12 nm from shore would be widely dispersed and isolated from any breeding or feeding area for marine birds; therefore; there would be no harm to the global commons under EO 12114. Endangered or threatened marine birds are discussed in the Marine Special-Status Species section, below.

Fish and EFH

Routine vessel movement on the Sea Range, such as would occur with the proposed action, is not expected to affect fish or their habitats. An extremely small fraction of the seafloor habitat could be affected by debris, and the likelihood of striking and injuring a fish is so low it is negligible. Therefore, activities associated with the proposed action would have no impact on fish.

Under the provisions of the MSFCMA, as reauthorized by the Sustainable Fisheries Act Amendments, federal agencies must consult with NMFS prior to undertaking any actions that may adversely affect EFH. Federal agencies retain the discretion to determine what actions fall within the definition of "adverse affect." Temporary or minimal impacts, as defined below, are not considered to "adversely affect" EFH. "Temporary impacts" are those that are limited in duration and that allow the particular environment to recover without measurable impact. "Minimal impacts" are those that may result in relatively small changes in the affected environment and insignificant changes in ecological functions. The proposed action area includes EFH for coastal pelagic species, highly migratory species, and west coast groundfish. No alterations to EFH for coastal pelagic species or highly migratory species would occur, as these organisms and the associated EFH areas are pelagic, and no permanent alteration of the pelagic environment would take place from the proposed action. Routine vessel movement on the Sea Range, as would occur in conjunction with the proposed action, would have no effect on EFH. Small quantities of unrecovered debris may float or sink through the water column, but this is unlikely to have any effect on EFH. EFH for west coast groundfish also occurs throughout the marine portion of the proposed project area. HAPCs for groundfish include kelp canopy and rocky reefs, which occur around SNI. Areas of dense kelp are avoided by Navy vessels as a matter of standard practice whenever possible. Otherwise, project-related vessel movement would be the same as routinely occurs on the Sea Range and unlikely to cause appreciable damage to kelp plants, especially considering the strong surge to which SNI kelp beds are normally exposed. Owing to the density of seawater, the terminal velocity reached by sinking objects is relatively slow (compared to falling objects in air). As a result, debris is unlikely to land with sufficient force to damage any object on the bottom, and in any case would affect only a minute portion of the seabed. Therefore, activities associated with the proposed action would have no effect on groundfish EFH and would not harm the global commons under EO 12114.

Marine Special-Status Species

Marine Birds

The western snowy plover is known to nest on SNI's beaches. No testing locations would be located within snowy plover nesting habitat. The proposed project sites at the Building 807 Launch Complex and

Thousand Springs are located near nesting areas. The proposed project activities at the Building 807 Launch Complex would be restricted to existing developed areas and no permanent structures would be erected that would provide perches for potential predators (e.g., western gulls), and no habitat modification would occur. Personnel would not be allowed outside of the proposed action area, and beach access would be strictly prohibited throughout the duration of proposed activities. The Thousand Springs site is just above the beach where snowy plovers nest. The Thousand Springs area is closed off during the breeding/nesting season to avoid impacts and laser testing and training would not occur in this area at these times. Therefore, the proposed action would have no effect on the western snowy plover.

The federally threatened California brown pelican does not nest at SNI, so there is no concern for disruption of nesting activities. However, pelican roosting areas occur on SNI. The California brown pelican may be temporarily displaced to nearby roosting areas by project activities. However, the affected areas would be very small in relation to the available shoreline and open water habitat, so the birds are expected to relocate nearby. The proposed action would not significantly increase the overall intensity or geographic extent of military activities presently conducted in the area. Project activities are not expected to lead to substantial disruption of important resting or foraging activities. As described in Section 2.1.8, range safety procedures will ensure that birds and other wildlife are not present within the laser target hazard area when the laser is fired. Therefore, the proposed action would have no effect on the California brown pelican.

USFWS issued a Biological Opinion (BO) for Navy activities taking place at SNI in 2001 which included terms and conditions for Navy activities that may disturb listed species. The proposed action follows the terms and conditions set forth in the SNI BO (USFWS 2001) designed to protect the western snowy plover and California brown pelican, and is consistent with the western snowy plover and California brown pelican management requirements developed in the BO (USFWS 2001) and the INRMP (U.S. Navy 2005). There would be no significant impacts on the California brown pelican or western snowy plover, including their migratory activities as defined by the MBTA.

Abalone

The federally endangered black abalone resides in sheltered locations in the intertidal and shallow subtidal zones, and none of the targets would be located in these depths. The endangered white abalone is known to reside in depths that overlap with those of the shooter platform and target sites. White abalone have specific habitat requirements (rock reef surrounded by sand in 98 to 213 ft (30 to 65 m) depth), which are only met within a small portion of the seafloor surrounding SNI, and the presence of white abalone at SNI has not been documented recently. Owing to the density of seawater, the terminal velocity reached by sinking objects is relatively slow (compared to falling objects in air). As a result, debris is unlikely to land with sufficient force to damage any object on the bottom, and in any case would affect only a minute portion of the seabed. Therefore, the proposed action would have no significant impact on the endangered black abalone or white abalone.

Marine Mammals

The southern sea otter, pinnipeds, and cetaceans known to occur in the proposed action area are highly mobile organisms which are unlikely to be affected by the passage of vessels, which is routine on the Sea Range. Safety procedures ensure that the laser cannot be fired until it is locked onto the target, and no marine mammals or other wildlife or obstructions are between the shooter and target locations. The likelihood that an undetected marine mammal could move into the path of the beam as the laser is

triggered is considered remote. No reasonably foreseeable "takes" of marine mammals as defined by the MMPA would be anticipated, and no significant impacts would occur.

The only onshore project areas in which marine mammals are expected to be found in abundance are the Bachelor Beach and Corral Harbor backdrop areas. The proposed laser target area at Bachelor Beach is located at an elephant seal, harbor seal, and sea lion haul-out area and Corral Harbor is a haul-out location for harbor seals. Proposed project activities at these sites would not occur during the breeding or pupping season for these species. Prior to scheduling the use of a particular site, NAWCWD would contact the Navy's SNI Natural Resources staff for current information regarding the occurrence of marine mammals at sites under consideration. Within 24 hours prior to commencing testing activities at these sites, observers (including a biologist familiar with the habits and identification of marine mammals) would search for marine mammals within the target area and testing would be postponed until any marine mammals found to be present leave the area. Similarly, laser platforms and target locations would avoid areas where sea otters have been regularly sighted, such as kelp beds along the south shore of SNI, and laser testing would not commence until the absence of otters from any potential hazard zone (specific to the type of laser) is confirmed by observers. Accordingly, no reasonably foreseeable "takes" of marine mammals as defined by the MMPA would be anticipated, and no significant impacts would occur.

Sea Turtles

The probability of occurrence of sea turtles in the project area is very low as sea turtles are rarely sighted in the vicinity of SNI. If a sea turtle was present in the action area, the likelihood of its being struck by a vessel or debris associated with the project would still be remote. Due to the rare occurrence of these species in the proposed action area and the low likelihood of activities impacting these organisms, there would be no effect or impact of the proposed action on loggerhead, leatherback, eastern Pacific green, or olive ridley sea turtles.

The proposed action would not significantly impact marine special-status species and would cause no significant harm to the overseas environment under EO 12114.

4.3.3 Mitigation Measures

Significant impacts on biological resources would not occur as a result of proposed action; therefore, no mitigation measures are proposed or required.

4.3.4 Alternative 1

Biological resources impacts under the Alternative 1 laser testing and training program would be the same on SNI, i.e. terrestrial biological resources, as for the proposed action. Potential impacts on marine biological resources would be similar to those of the proposed action in the nearshore environment, but less in the open ocean environment. The same restrictions to operations and precautions described under the proposed action would be followed under Alternative 1; therefore, this alternative would have no significant impacts on biological resources.

4.3.5 Alternative 2

Biological resources impacts under the Alternative 2 laser testing and training program would be less than those analyzed under the proposed action. No impacts on terrestrial resources would occur, and vessel and aircraft activity would be widely dispersed and unlikely to encounter areas of concentrated breeding or feeding for marine species. Alternative 2 would have no significant impacts on biological resources.

4.3.6 No-Action Alternative

Under the no-action alternative, laser testing and training would not occur and existing conditions described in Section 3.3 would remain unchanged. Therefore, no significant impacts to marine or terrestrial biological resources would occur.

4.4 CULTURAL RESOURCES

4.4.1 Approach to Analysis

The primary factors considered in determining the significance of potential effects on cultural resources includes the extent or degree to which the proposed action would alter the characteristics or diminish the integrity of a significant prehistoric or historic resource.

To assess the effects of a proposed action on cultural resources, the area of potential effect (APE) must be defined. The APE is the geographic area within which the undertaking may cause changes in the character or use of historic properties, if any such properties exist. It is important that the APE include the full geographic range of possible direct and indirect impacts. For the proposed action addressed in this EA, the APE includes the onshore and offshore area of SNI in the immediate vicinity of the proposed project areas, including the shooter and target platforms and the backdrop areas (refer to Figure 2-1). The APE at the Point Mugu LH_2 site is a fairly small area where a liquid hydrogen fuel tank may be installed. The area itself has been previously graded and filled and contains no cultural resources; the nearest archaeological site is 2,130 ft (650 m) away.

4.4.2 Proposed Action

The proposed action would not involve effects on National Register or eligible properties. Potential onshore impacts would be limited to the immediate area of the shooter and target platform locations and the backdrop areas. All shooter and target platforms would be placed on previously disturbed or developed areas, such as the SLAM missile target area, and existing roads would be used for the transportation of all equipment and personnel on SNI. There would be no onshore ground disturbance. The shooter and target platforms would not require grading or the placement of gravel or any other earth moving actions to install. There would be no permanent structures placed onshore; therefore, existing buildings and structures and any archaeological sites would not be affected.

Offshore impacts on cultural resources would be limited to potential effects from debris settling directly on a submerged resource of significance and affecting its integrity. No known shipwrecks are located near the offshore target areas. A predictive model of shipwrecks within the Point Mugu Sea Range indicates that shipwreck remains are most likely to be found no greater than ½ nm from shore (NAWCWD 1999). The location of the offshore targets farther than ½ nm offshore thereby reduces the likelihood of a shipwreck being present. Owing to the density of seawater, the terminal velocity reached by sinking objects is relatively slow (compared to falling objects in air). As a result, debris is unlikely to land with sufficient force to damage any object on the bottom, and in any case would affect only a minute portion of the seabed. Therefore, the proposed action would have no effect on cultural resources in the global commons under EO 12114.

The Navy submitted a determination of "No Adverse Effect to Historic Properties" per 36CFR800.5 for the proposed laser testing to the California State Historic Preservation Officer on 8 October 2009, and has not received a response in over 30 days, (Appendix C). A concurrence letter was received from the Ventura County Cultural Heritage Board, who was a party to the consultation (Appendix C).

4.4.3 Mitigation Measures

Significant impacts on cultural resources would not occur as a result of proposed action; therefore, no mitigation measures are proposed or required.

4.4.4 Alternative 1

Cultural resources impacts under the Alternative 1 laser testing and training program would be same as those analyzed under the proposed action because the same areas of the island and nearshore waters are likely to be used. In both cases, no impact on cultural resources would occur.

4.4.5 Alternative 2

Since the scenarios for this alternative would occur mostly well offshore from SNI, there is lower potential for any cultural resource to be encountered, but in both cases, no impact on cultural resources would occur.

4.4.6 No-Action Alternative

Under the no-action alternative, laser testing and training would not occur and existing conditions as described in Section 3.4 would remain unchanged. Therefore, implementation of the no-action alternative would have no significant impact on cultural resources.

4.5 AIRSPACE, LAND AND WATER USE

4.5.1 Approach to Analysis

Factors used to assess the significance of impacts on air space include 1) consideration of an alternative's potential to result in an increase in the number of flights such that they could not be accommodated within established operational procedures and flight patterns, 2) a requirement for an airspace modification, or 3) an increase in air traffic that might increase collision potential between military and non-participating civilian operations.

Land and water use impacts would be significant if they would: 1) be inconsistent or in non-compliance with applicable land and water use plans or policies, 2) preclude the viability of an existing land or water use activity, 3) preclude continued use or occupation of an area, 4) be incompatible with adjacent or vicinity land or water use to the extent that public health or safety is threatened, or 5) conflict with airfield planning criteria established to ensure the safety and protection of human life and property.

4.5.2 Proposed Action

4.5.2.1 Airspace

The proposed action does not include proposed airspace modifications and would not change the existing relationship of the Navy's SUA with federal airways, uncharted visual flight routes, and airport-related air traffic operations. SNI has an existing airfield and associated military noise; therefore, the proposed action would be consistent with current uses. The airspace over and out to approximately 3 nm (5.6 km) around SNI is restricted; only authorized air traffic into the San Nicolas Island airfield is approved by NAWCWD. All offshore activities would be located within established warning areas, which are designated airspace for military activities. A NOTAM would be published 15 days prior to activities conducted in the offshore airspace of the Sea Range. In addition, all project activities would be postponed until airspace within the project area was clear of non-participating aircraft. Any laser operations that have the potential of creating hazards to aircraft shall be coordinated with the FAA to

ensure that when the laser is fired no non-participating aircraft are in the hazard area. Similar coordination with the Laser Clearinghouse will occur whenever laser testing creates potential hazards to satellites. Therefore, airspace over San Nicolas Island and the Sea Range would not be adversely affected by the proposed action.

4.5.2.2 Land and Water Use

Land use associated with the proposed action would be consistent with current land uses and designations at NBVC Point Mugu and SNI. Project activities would take place at locations previously designated for such activities, such as the SLAM Target and the Laser Target Area. In accordance with existing safety procedures, access to portions of SNI and Sea Range would be temporarily restricted during testing operations. SNI lies in an area on the Point Mugu Sea Range that is designated for these testing activities, and closures of portions of SNI and nearshore waters are common. Regular activities at other parts of SNI (e.g., Nicktown) and on areas of the Sea Range not associated with testing activities would be allowed to continue during testing operations.

The Navy maintains control over waters within 300 yards (274 m) of SNI, within which public access is restricted. Military training, fishing, and recreational uses would be limited during testing activities. Restrictions on public use of the area within 3 nautical miles of SNI are already provided for in the designation of the Naval Restricted Area (33 CFR 334.980). In addition, a NOTMAR would be published 15 days prior to the offshore activities. Public and military vessels would be restricted from the testing and surrounding areas. The standard protocol of publishing descriptions of Navy activities in the NOTMAR, and the use of marine radio channels for communicating with approaching vessels would ensure that vessels transiting through the area avoid the waters while testing activities are underway (Section 3.6, Public Safety). The proposed action would not affect any fish populations or fish habitat and would have only a minor, but non-significant impact on fishing activity. All offshore uses associated with the laser testing and training are consistent with military testing and training activities and no significant impact to land and water use would result from the proposed action.

4.5.2.3 Coastal Zone Management Act (CZMA) – Coastal Consistency Analysis

A Coastal Consistency Negative Determination was submitted to the California Coastal Commission. Concurrence on the Coastal Consistency Negative Determination was received from the California Coastal Commission on 5 May 2009 (Appendix C).

4.5.3 Mitigation Measures

Significant impacts to airspace and land and water use would not occur as a result of proposed action; therefore, no mitigation measures are proposed or required.

4.5.4 Alternative 1

Airspace, land and water use impacts under the Alternative 1 laser testing and training program would be less than those analyzed under the proposed action, due to the elimination of several scenarios that involve aircraft and vessel activities in the offshore areas where there is overlap with other users of airspace and ocean areas. In any case, NOTAMs and NOMARs would be published and coordination with the FAA and Laser Clearinghouse would be conducted prior to all activities that requiring these. Alternative 1 would have no significant impacts on airspace, land and water use.

4.5.5 Alternative 2

Airspace, land and water use impacts under the Alternative 2 laser testing and training program would be similar to those analyzed under the proposed action. NOTAMs and NOMARs would be published and

coordination with the FAA and Laser Clearinghouse would be conducted prior to all activities that requiring these. Alternative 2 would have no significant impacts on airspace, land and water use.

4.5.6 No-Action Alternative

Under the no-action alternative, laser testing and training would not occur and existing conditions as described in Section 3.5 would remain unchanged. Therefore, implementation of the no-action alternative would have no significant impact on airspace or land and water use.

4.6 PUBLIC SAFETY

4.6.1 Approach to Analysis

This section evaluates potential public safety effects associated with the proposed action. The primary factor considered in determining the significance of these effects includes the extent or degree to which the proposed action would create a substantial risk to public safety.

4.6.2 Proposed Action

The proposed action includes the use of multiple types of Class 1, 2, 3 and 4 lasers up to 1MW of power, including weapons, designators, laser trackers, communications, and range finders. As outlined in Section 2.1.7, a series of requirements must be met, ORM procedures followed, and an SOP established for each laser system, prior to operation on the Sea Range or at SNI.

4.6.2.1 Laser Biological Effects

Exposure to laser radiation may present risks to the eyes and skin. Injuries can be associated with three mechanisms: thermal, photochemical, and acoustical transient (eye only) (World Health Organization 1982; UC Berkeley 2001). Thermal injury mechanisms all require that sufficient radiant energy is absorbed in a tissue at a fast enough rate to create a substantial increase above normal tissue temperature (typically 10 to 25°C [50 to 77°F]) for short periods of time, typically less than a minute (World Health Organization 1982). A photochemical injury results from potential impact of light particles (photons) on skin molecules; the molecule's chemical composition gets altered, resulting in minor or severe sunburn, and prolonged exposure may promote the formation of skin cancer. Acoustical transient effects are related to pulse duration and may occur in short-duration pulses (up to 1 millisecond), depending on the specific wavelength of the laser. The acoustical transient effect is poorly understood, but it can cause retinal damage that can't be accounted for by thermal injury alone (UC Berkeley 2001).

Laser retinal injury can be severe because of the focal magnification (optical gain) of the eye that is approximately 105 (UC Berkeley 2001). Class 3 lasers may cause injury to the eye through intrabeam viewing or through viewing a specular reflection for less than 0.25 second. Viewing a diffuse reflection from a Class 3 laser should not cause injury to the eye (see Table 1-1). Class 4 lasers pose the same hazards as Class 3 lasers, but due to their increased beam power (greater than 500 MW), they may also cause injury to the eye when viewing a diffuse reflection and may present a hazard to the skin.

Pulsed lasers are also proposed to be used in testing and training on the Sea Range, including SNI. The averaged power of a pulsed laser will usually be less than that of a continuous-wave laser, but the peak power in the pulse may be very large if the pulse duration is very short. Pulses lasting less than 1 microsecond focused on the retina can cause an acoustical transient, resulting in substantial damage and bleeding, in addition to thermal injury (UC Berkeley 2001). Standards to be used by NAWCWD include ANSI Z136.1, which defines the maximum permissible exposure for direct, reflected or scattered laser emissions that the eye can receive without expecting an eye injury (under specific exposure conditions).

By implementing strict health and safety procedures, NAWCWD scientists and engineers conducting high energy laser testing would be located well beyond distances that could result in injury from either continuous-wave or pulsed lasers, and distance to the general public would be even farther away from testing. In addition, the laser control measures that would be in place during testing as part of NAWCWD's Health and Safety Program (see Section 3.6), minimize the potential for exposure to lasers that could result in injury and provide automatic and manual mechanisms to cease testing. Therefore, the impacts of increased testing on public safety are considered to be negligible.

4.6.2.2 Non-beam Effects

In addition to direct hazards to the eyes and skin associated with exposure to the laser beam, there are potential non-beam hazards – electrocution, fire, LGACs, and collateral radiation – as a result of lasing operations. The non-beam control measures in place and strict adherence to the health and safety program minimizes the health and safety risks associated with non-beam effects of lasing activities on the Sea Range and at SNI.

4.6.2.3 High Voltage/Current Effects

Some laser systems would require the use of up to 1 MW of power. The hazards associated with high voltage and current, would be identified for each laser system, and only properly trained and authorized personnel would be allowed to operate the laser system. Therefore, the impacts to public safety on the Sea Range and at SNI are considered to be negligible.

4.6.2.4 Aviation and Maritime Safety

The proposed action would include monitoring, reconnaissance and range clearance procedures as needed to ensure there are no hazards to people, ships or planes downrange of the target when the laser is fired. The standard protocol of publishing NOTMARs and NOTAMs and the use of marine radio channels for communicating ensure that vessels avoid these areas while Navy activities are underway. The FAA requires facilities that propagate lasers into atmosphere to file a letter of intent describing activity to FAA. Any laser operations that have the potential of creating hazards to aircraft shall then be coordinated with the FAA to ensure that when the laser is fired no non-participating aircraft are in the hazard area. During such activities, the NOHD would have to be determined for any proposed lasing and if laser is not eye safe in FAA-controlled airspace, NAWCWD would be required to detect aircraft in exclusion zone and terminate beam. Coordination with the Laser Clearinghouse would also occur whenever laser testing creates potential hazards to satellites. This involves notification to Laser Clearinghouse at least 48 hours prior to space directed test which then assigns time windows during which lasing is permitted based on predictive avoidance of satellites.

Airspace overlying the Sea Range includes both Restricted Areas and Warning Areas. Project activities on and near San Nicolas Island would be located within a Restricted Area, within which non-military flight activities are closely restricted. The offshore project activities would all occur within Warning Areas of the Sea Range (refer to Figure 1-1).

Warning measures, continuous radar coverage, restricted access to the affected airspace, and visual clearances by range operation and test personnel would be implemented during all planned laser system tests. Therefore, the proposed action would have negligible impacts on aviation and maritime safety. Advance notice of scheduled operations and danger zone closures would be provided to the public, when possible.

4.6.2.5 Liquid Hydrogen Storage and Fueling Facility

The proposed LH_2 storage and fueling facility would be located adjacent to Building 323. This location is over 1 km distance from the NBVC boundary, which is significantly greater than the recommended minimum safety distance from areas with public access (i.e., 75 ft) set by National Fire Protection Association's *Storage, Use and Handling of Compressed Gases and Cryogenic Fluids* (NFPA 55) for an LH_2 storage tank of 9000-gallon capacity (Air Products and Chemicals, Inc. 2007). Also, hydrogen gas dissipates rapidly when released into the atmosphere, so there is no concern of a hydrogen gas cloud posing any risks to the public surrounding the base. Fire risks are minimized by the incorporation of a deluge system for fire suppression.

4.6.3 Mitigation Measures

Significant impacts to public safety would not occur as a result of proposed action; therefore, no mitigation measures are proposed or required.

4.6.4 Alternative 1

Public safety impacts under the Alternative 1 laser testing and training program would be similar to those analyzed under the proposed action. The scenarios proposed under Alternative 1 would include the same actions to reduce or eliminate impacts to public safety as described under the proposed action. Therefore, Alternative 1 would have no significant impacts on public safety.

4.6.5 Alternative 2

Public safety impacts under the Alternative 2 laser testing and training program would be similar to those analyzed under the proposed action. The scenarios proposed under Alternative 2 would include the same actions to reduce or eliminate impacts to public safety as described under the proposed action. Therefore, Alternative 2 would have no significant impacts on public safety.

4.6.6 No-Action Alternative

Under the no-action alternative, laser testing and training would not occur and existing conditions as described in Section 3.6 would remain unchanged. Therefore, implementation of the no-action alternative would have no significant impact on public safety.

4.7 HAZARDOUS MATERIALS

4.7.1 Approach to Analysis

Terminology used in this section has specific definitions important to its use. "Hazardous materials" refers to chemical substances prior to their use. "Hazardous constituents" are the chemical contaminants associated with debris.

Hazardous constituents are an inherent part of the laser testing and training activities of the proposed action. Constituents used to increase the strength of materials, lighten weight, reduce the incidence of failure, lower life-cycle costs, and prolong life may be hazardous when released into the environment. Hazardous features of these constituents are understood, and safe handling and pollution prevention measures are a routine part of systems programs to minimize and manage their effects throughout the acquisition process.

4.7.2 Proposed Action

Certain types of laser systems contain hazardous materials or produce hazardous constituents during lasing. All laser systems used in the proposed action would be required to be self-contained and would not release any hazardous materials or hazardous constituents into the environment. The COIL laser contains effluents that are toxic, but a closed-cycle COIL has been developed to contain the effluents and would be used on the Sea Range and at SNI. The operation of the FEL (free electron) laser releases X-rays but a laser system using an FEL laser would be required to contain all X-rays.

The components associated with the targets to be used in the proposed action contain hazardous constituents which include metallic residues from JATO bottles, propellants, batteries, jet fuel, diesel fuel, lubricants, and hydraulic fluid. Each of these constituents has the potential to affect human health and the environment through direct contact with individuals, groundwater, surface water, soil, and air. With the exception of laser systems, all hazardous materials associated with the proposed action would be similar to hazardous materials currently in use on the Sea Range and at SNI. Facilities and personnel are already in place to manage, utilize, store, and dispose of hazardous materials and constituents (NAWCWD 2002a). Impacts to water quality from target debris have been analyzed in Section 4.2. Because the loss of debris will be incidental (i.e., most targets will be recovered and recycled) over a large area of the Sea Range, the impacts from hazardous materials will not be significant.

4.7.3 Mitigation Measures

Significant impacts from hazardous materials would not occur as a result of proposed action; therefore, no mitigation measures are proposed or required.

4.7.4 Alternative 1

The Alternative 1 laser testing and training program would involve the same hazardous materials as analyzed under the proposed action. However, these materials would be used in a fewer number of scenarios; therefore, with the implementation of Alternative 1 there would be no significant impacts from hazardous materials.

4.7.5 Alternative 2

The Alternative 2 laser testing and training program would involve the same hazardous materials as analyzed under the proposed action. However, these materials would be used in a fewer number of scenarios; therefore, with the implementation of Alternative 1 there would be no significant impacts from hazardous materials.

4.7.6 No-Action Alternative

Under the no-action alternative, laser testing and training would not occur and existing conditions as described in Section 3.7 would remain unchanged. Therefore, implementation of the no-action alternative would have no significant impact from hazardous materials.

CHAPTER 5
CUMULATIVE IMPACTS

Federal law (42 U.S.C. 4321 et seq.) and DON regulations for implementing NEPA (32 CFR 775), as described in OPNAVINST 5090.1C, require that the cumulative impacts of a proposed action be assessed. According to CEQ regulations, the analysis of cumulative impacts in an EA should consider the potential environmental impacts resulting from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency… or person undertakes such other actions" (40 CFR 1508.7).

5.1 DEFINITION OF CUMULATIVE IMPACTS

Cumulative impacts may occur when there is a relationship between a proposed action and other actions expected to occur in a similar location or during a similar time period. This relationship may or may not be obvious. Actions overlapping, or in close proximity to, the proposed action can have more potential for cumulative impacts on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide temporally would tend to offer a higher potential for cumulative impacts.

To analyze cumulative impacts, a cumulative impacts region must be identified for which impacts of the proposed action and other past, proposed, and reasonably foreseeable actions would be cumulatively recorded or experienced. In order to analyze cumulative impacts, a cumulative impacts region must be identified for which impacts of the proposed action and other past, proposed, and reasonably foreseeable actions would be cumulatively recorded or experienced. The cumulative effects region addressed in this EA is limited to the Point Mugu Sea Range, including SNI. Baseline conditions for the cumulative effects region are as described in Chapter 3 of this EA. Past, present, and reasonably foreseeable actions in the cumulative effects region are briefly described below. Emphasis has been placed on actions that overlap the proposed laser testing and training in space and/or time, or have otherwise affected (or would affect) the condition of environmental resources in the test area.

5.2 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

5.2.1 Point Mugu Sea Range Training and Operations

The Navy has prepared an EIS/OEIS (NAWCWD 2002a) addressing test and training operations on the Point Mugu Sea Range. The geographic scope of this document includes the 36,000 mi^2 Sea Range, which encompasses U.S. Navy-owned SNI and Point Mugu. The EIS/OEIS addressed three main elements: Theater Missile Defense, training, and facility modernization. Proposed test and training activities were anticipated to result in an increase in the number of aircraft and surface target vessels launched from SNI. Laser systems for detection and guidance are commonly used on the Point Mugu Sea Range and are addressed in the Point Mugu Sea Range EIS/OEIS.

5.2.2 Harpoon Block III (H3) Littoral Testing Program on the Point Mugu Sea Range

An EA is currently under preparation for the Navy proposal to accommodate the H3 Littoral Testing Program at SNI, California. The testing program involves a series of simulated missile flights in which a jet carries a captive missile to test its guidance system along the approach from offshore to nearshore SNI, and up to seven actual launches of a non-warhead exercise missile from offshore of SNI to a floating target near shore.

5.2.3 San Nicolas Island Reverse Osmosis Brine and Filter Backwash Discharge Project

The proposed project consists of increasing brine and filter backwash discharge at the existing reverse osmosis facility. The current permit allows for discharge of 67,000 gallons per day. This would increase under the proposed project to 216,000 gallons per day. The proposed outfall pipeline would consist of a 2,000-ft long high density polyethylene pipe that would end in a spillway constructed on the jetty. The brine would discharge onto the riprap of the jetty and flow into the ocean. An EA is currently under preparation.

5.2.4 SNI Natural Resource Management Programs

The San Nicolas INRMP for the period 2006 - 2010 (U.S. Navy 2005) establishes a management framework for natural resources and Navy training on SNI. The INRMP describes existing and anticipated Navy operations on SNI and recommendations to protect and enhance environmental resources. The proposed action follows the management guidelines provided in the INRMP. Laser testing and training would follow aircraft altitude restrictions and test sites have been sited to avoid sensitive resources and other Navy land uses to the maximum extent practicable.

5.3 CUMULATIVE IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

This section addresses the cumulative impacts of the proposed action and alternatives in combination with the relevant past, present, and planned actions described above. The most germane planned action to proposed action is the underway Point Mugu Sea Range training and operations described in the Point Mugu Sea Range EIS. The proposed action and alternatives have been evaluated with and against the EIS cumulative impacts analysis as well as the other projects described above. This cumulative impacts assessment is consistent with the Point Mugu Sea Range EIS cumulative impacts assessment. Accordingly, the implementation of the proposed action would result in no significant cumulative impacts for any of the applicable resource areas.

5.3.1 Air Quality

The proposed action would conform to the applicable SIP and would not trigger a conformity determination under Section 176(c) of the CAA. The DON has prepared a RONA for CAA Conformity in the SCCAB and SDAB (Appendix B). Moreover, these negligible impacts, when added to the impacts from the other listed projects, would account for a very small percentage increase of overall air emissions budgets for the air basin. Emissions of the proposed action on SNI, along with other pending Navy actions, have been largely accounted for in RDT&E activities that were analyzed in the Point Mugu Sea Range EIS/OEIS, which found no significant air quality impact from existing and proposed Navy activities. Emissions of either action alternative would be less than those of the proposed action. As a result, the emissions associated with the proposed action would not have a cumulative impact on air quality.

5.3.2 Marine Sediments and Water Quality

The proposed action or either action alternative would have only short-term, localized effects, if any, on sediment and water quality. Such effects are limited to minor disruption of sediments on the seafloor and the low likelihood of accidental discharges from project vessels, which would be contained and cleaned up in accordance with Navy policy. As described in the Point Mugu Sea Range EIS, previous, ongoing, and proposed future actions in support of training and RDT&E are not expected to measurably affect sediment quality, nor to result in violations of water quality standards and criteria because pollutants are released in relatively small quantities and are widely dispersed in the environment. Due to the limited

scope of potential sediment and water quality impacts associated with the proposed action, the action would have only minor, temporary effects, if any, and would not measurably add to quantities of pollutants in the marine environment. Hence there would be no cumulative impact on marine sediments and water quality.

5.3.3 Biological Resources

5.3.3.1 Terrestrial Biological Resources

Implementation of the proposed action or either action alternative would have no significant effects on terrestrial biological resources because of the confinement of the action on land to man-made and disturbed habitats. Further, the Navy has concluded there would be no effect on sensitive plant species and no effect to threatened or endangered animals. Hence there is no potential interaction with the effects of land-based actions on the native plants and animals of SNI elsewhere on SNI. When combined with the effects of other past, present, and foreseeable projects' activities in this already disturbed and heavily used area, implementation of the proposed action of either action alternative is unlikely to have any additional cumulative effect on plant and animal populations on SNI.

5.3.3.2 Marine Biological Resources

Implementation of the proposed action or either action alternative would have short-term, localized effects, if any, to marine habitats, invertebrates, fish, and marine birds that occur in the vicinity of the proposed action. These effects would be limited to momentary behavioral reactions to the presence of vessels and activity. Marine habitats would not be eliminated or adversely modified, and no harm to individual animals or effects on the distribution or abundance of species is anticipated. Further, the Navy has concluded there would be no effect to threatened or endangered species or EFH, and no impacts to migratory birds or special aquatic sites. Implementation of the proposed action or either action alternative, in conjunction with other past, present, and foreseeable projects, would not substantially alter or otherwise affect marine habitats and species in the vicinity of the proposed action. Therefore, there would be no cumulative impacts on marine biological resources.

5.3.4 Cultural Resources

Implementation of the proposed action or either action alternative would not adversely impact cultural resources. The proposed action would not result in disturbance of known archaeological sites. The Navy's cultural resource management program on SNI assures that potentially significant cultural resources are protected and are not subject to incremental degradation. Therefore, the proposed action, in conjunction with other past, present, and foreseeable activities, would not result in cumulative impacts to cultural resources.

5.3.5 Airspace, Land and Water Use

Implementation of the proposed action or either action alternative would not result in significant airspace or land and water use impacts. Existing land use designations would not change as a result of the proposed action and the existing land uses within the project area would continue to be used for the same purposes. The proposed action would not impose new restrictions on the public's right of access to the sea in the coastal zone. The near shore areas around SNI are U.S. Territorial Waters and access is restricted for reasons of public safety or military security. The California Coastal Commission has concurred with the Navy's determination that the proposed action would not affect coastal resources and their uses (Appendix C). Therefore, implementation of the proposed action, or either action alternative, in

conjunction with other past, present, and foreseeable actions would not result in cumulative impacts to land or water use.

5.3.6 Public Safety

Scheduling procedures associated with test and training events would be in accordance with existing Sea Range coordination procedures to ensure the safety of both participants and non-participants. These procedures ensure that the laser testing and training would not be scheduled to occur when another test or training event is scheduled in the same area. As a result, implementation of the proposed action or either action alternative would not have a cumulative effect on public safety.

5.3.7 Hazardous Materials

The proposed action or either action alternative would result in only incidental loss of debris (i.e., most targets will be recovered and recycled) over a large area of the Sea Range. This pattern is similar to the widespread distribution of hazardous constituents analyzed in the *Point Mugu Sea Range EIS/OEIS* (NAWCWD 2002a) where small amounts were dispersed in the areas nearest the coastline and larger amounts in the center of the Sea Range, beyond Territorial Waters. Only near SNI is the context of hazardous constituents likely to be a concern. Because the proposed action would only contribute a limited amount of hazardous materials to the environment of the Sea Range and SNI, there would be no cumulative impact on marine sediments and water quality.

CHAPTER 6
OTHER CONSIDERATIONS REQUIRED BY NEPA

This chapter addresses additional topics required by NEPA. These include identifying and analyzing irreversible and irretrievable commitments of resources and possible conflicts with federal, regional, state and local plans, policies, and controls. Issues related to EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-income Populations,* and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks,* are also presented.

6.1 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long term or permanent basis. This includes the use of non-renewable resources such as metal, fuel, and other natural or cultural resources. These resources are non-retrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered a non-retrievable resource. Another topic that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

Under the proposed action, laser testing and training would be conducted in the waters and airspace near SNI and on the Point Mugu Sea Range. The test program would not result in a significant irreversible or irretrievable commitment of resources. Fuel for the necessary test platforms (e.g., aircraft, surface vessels, and target vessels) would be a commitment of resources; however, the use of fuel for the testing program would have a negligible impact on fossil fuel resources and human labor associated with Navy operations and training.

6.2 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

The laser testing and training program would occur in the waters and associated airspace of the Point Mugu Sea Range. SNI is a Navy-owned property that is isolated from the mainland and any sensitive populations or centers of children's activity. Human inhabitants of SNI are DoD personnel and/or contractors for the purpose of managing and maintaining Navy land and facilities. No permanent non-DoD population exists on SNI. Low-income populations, minorities, and children would not be disproportionately affected by the proposed action. Therefore, the provisions of EO 12898 and 13045 are satisfied.

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CHAPTER 7
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CHAPTER 8
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Appendix A

Background Information on Lasers

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BACKGROUND INFORMATION ON LASERS

(*Sources*: Naval Surface Warfare Center, Dahlgren Laboratory 2008; NAVAIR Ranges Department 2008)

The word "laser" is an acronym for "light amplification by stimulated emission of radiation." A laser is a device that emits a coherent beam of light (electromagnetic energy). Most light is incoherent, meaning it is made up of many frequencies, which scatter and diffuse quickly, such as light from a flashlight. Light emitted by a laser (said to be "lased") is of one phase (one wavelength), so it does not scatter and stays in a narrow, intense beam without dissipating quickly. One attribute of a laser is its beam quality (BQ), which describes how well the beam remains collimated. A perfect beam has a BQ of 1, while an imperfect beam has BQ > 1. Lasers work by using electricity, chemical reactions, intense coherent or incoherent light, or other means to excite the atoms or molecules of a gas, liquid, or other substance to a state in which more of the atoms or molecules are at higher energy levels than lower energy levels resulting in a population inversion which allows for the stimulated emission and creation of laser light. The following are brief descriptions of five of the types of lasers that could be used as part of the proposed action for the Laser Testing and Training on the Point Mugu Sea Range:

- Solid State: Commonly, solid-state lasers have an active medium which is a crystal doped with an impurity ion. Specific examples include Neodymium: Yttrium Aluminum Garnet (Nd:Y3Al5O12) and Ytterbium: Yttrium Aluminum Garnet (Yb:Y3Al5O12). These two types of solid-state lasers are often referred to as Nd:Yag and Yb:Yag, respectively. Solid-state lasers are rugged, simple to maintain, and capable of generating high powers. High power operation causes thermal expansion and distortion of the optical properties of the crystal, which degrades the beam quality of the laser beam. Therefore, the lasers are cooled by liquids to keep the temperature difference between various points in the crystal as small as possible.

- Fiber: A fiber laser is a laser in which the active gain medium is an optical fiber doped with rare-earth elements such as erbium, ytterbium, neodymium, dysprosium, praseodymium, and thulium. This is a special type of solid-state laser in which the active medium is pumped optically using the light from diode lasers. Many high-power fiber lasers are based on double-clad fiber. The gain medium forms the core of the fiber, which is surrounded by two layers of cladding. The lasing mode propagates in the core, while a multimode pump beam propagates in the inner cladding layer. The outer cladding keeps this pump light confined. This arrangement allows the core to be pumped with a much higher-power beam than could otherwise be made to propagate in it and allows the conversion of pump light with relatively low brightness into a much higher-brightness signal. As a result, fiber lasers and amplifiers are occasionally referred to as "brightness converters." Fiber lasers are more efficient than solid-state slab lasers. Fiber lasers have their own challenges in scaling to high average powers and many approaches are being investigated to combine the output of multiple fiber lasers into a single beam.

- Carbon Dioxide (CO_2): The most common gas composition in electrically excited CO_2 lasers is a mixture of Helium (He), Nitrogen (N_2), and CO_2. Additional gases other than CO_2 are used to increase the efficiency of the laser. The optics for the CO_2 lasers must be coated to be highly reflective at the far infrared wavelength of about 10 μm. CO_2 lasers with average powers of about 1 MW have been demonstrated. While this laser propagates reasonably well in dry air, there is significant absorption of CO_2 laser light by water vapor. Absorption and scattering of the 10 μm radiation is also lower than that around 1 μm wavelength, which is the wavelength of the solid-state laser.

- Free Electron: A free electron laser (FEL) generates intense, powerful beams of laser light by the action of relativistic, high energy (several tens of mega electron volts) electron beams passing through an undulating magnetic structure. The wavelength of the light can be tuned by changing the energy of the electron beam, changing the period of the magnetic structure, or by changing the strength of the magnetic field of the undulator. This key feature enables the FEL to be designed to produce an optimum wavelength for propagation through an atmosphere that may have water vapor and aerosols. The beam quality of the laser beam from the FEL is intrinsically better than that from other lasers due to the absence of any medium inside the laser.
- COIL: Chemical oxygen iodine laser, or COIL, is an infrared chemical laser. It is capable of output power scaling up to megawatts in continuous mode. Its output wavelength is 1.315 μm, the wavelength of transition of atomic iodine. The laser is fed with gaseous chlorine, molecular iodine, and an aqueous mixture of hydrogen peroxide and potassium hydroxide. The aqueous peroxide solution undergoes a chemical reaction with chlorine, producing heat, potassium chloride, and oxygen in an excited state with a spontaneous lifetime of about 45 minutes. This singlet delta oxygen transfers its energy to the iodine molecules injected to the gas stream; they are nearly resonant with the singlet oxygen, so the energy transfer during the collision of the particles is rapid. The excited iodine then undergoes stimulated emission and lases at 1.315 μm in the optical resonator region of the laser. COIL laser was developed by the U.S. Air Force in 1977 for military purposes. The effluents of COIL are toxic, but a closed-cycle COIL has been developed by the Air Force (Advanced Tactical Laser or ATL) to contain the effluents. Only closed-cycle COIL lasers will be considered for laser operations on the Sea Range. COIL wavelength lie in a water absorption band.

Table A-1 describes the four different classes of lasers, all of which would be used in the proposed program.

Table A-1 Classes of Lasers

Laser Class	Description	Energy Emitted	Safety Issues	Examples
Class 1*	Low powered devices considered safe from all potential hazards	N/A	No injury, regardless of exposure time, to eyes or skin. No safety measures necessary.	Laser printers, toys, CD players, CD ROM devices, laboratory analytical equipment
Class 2*	Low power, visible light lasers that could possibly cause damage to a person's eyes	< 1 milliwatt (mW)	Usually safe. Eye protection normally afforded by the aversion response (turning away from a bright light source or closing or blinking eyes). If directly viewed for long periods of time with no blinking, damage to eyes could result.	Pointers used in presentations, toys, range finding equipment, aiming devices
Class 3**	Medium Power	< 500 mW	May be hazardous to eyes under direct and specular reflection (almost perfect reflection such as a mirror) viewing conditions, but is normally not hazardous.	Laser scanners, military hand-held laser rangefinders, entertainment light shows, target illuminators
Class 4	High power	> 500 mW	Direct beam or specular reflection is hazardous to eyes and skin. May pose a diffuse reflection hazard (reflected off an imperfect reflective surface) or fire hazard. May produce air pollutants.	Medical surgery, research, drilling, cutting, welding, aircraft target designator used for guided weapons, military laser weapons

*Class 1M and 2M categories also exist, which have the same parameters as above, except that direct viewing with an optical instrument such as a telescope could be potentially hazardous.

**Two subcategories exist under Class 3: Class 3R lasers are potentially hazardous if the eye is appropriately focused and stable, but probability of injury is low; energy emitted is < 5 mW. Class 3B may be hazardous under direct and specular reflection viewing conditions; energy emitted is < 500 mW.

- Source: American National Standards Institute, March 2007

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Appendix B

Record of Non-Applicability (RONA) & Air Quality Data

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RECORD OF NON-APPLICABILITY (RONA) FOR CLEAN AIR ACT CONFORMITY

Laser Testing & Training
Naval Air Warfare Center Weapons Division
Sea Range, Point Mugu CA

SOUTH CENTRAL COAST AIR BASIN

INTRODUCTION

The U.S. Environmental Protection Agency (USEPA) published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule* in the 30 November 1993, Federal Register (40 Code of Federal Regulations [CFR] Parts 6, 51, and 93). The U.S. Navy published *Clean Air Act (CAA) General Conformity Guidance* in OPNAVINST 5090.1C (Appendix F) dated 30 October 2007. These publications provide implementing guidance to document CAA Conformity Determination requirements.

Federal regulations state that no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license to permit, or approve any activity that does not conform to an applicable implementation plan. It is the responsibility of the Federal agency to determine whether a Federal action conforms to the applicable implementation plan, before the action is taken (40 CFR Part 1, Section 51.850[a]).

The general conformity rule applies to federal actions proposed within areas which are designated as either nonattainment or maintenance areas for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants. Former nonattainment areas that have attained a NAAQS are designated as maintenance areas. Emissions of pollutants for which an area is in attainment are exempt from conformity analyses.

A majority of the Proposed Action would occur at or near San Nicolas Island (SNI). Although SNI is part of Ventura County, the USEPA has determined that SNI is separate and distinct from the South Central Coast Air Basin (SCCAB) which includes the Ventura County Air Pollution Control District (VCAPCD). San Nicolas Island is in attainment/unclassified of the NAAQS for all criteria pollutants; therefore, the provisions of the General Conformity Rule and *de minimis* thresholds do not apply. However, emissions estimates for the proposed laser testing and training activities at SNI have been estimated for planning purposes.

Vessel activities and aircraft landings and takeoffs, in support of the Proposed Action would originate from Point Mugu. Effective June 19, 2008, Ventura County has been reclassified as a "serious" nonattainment area for the federal 8-hour O_3 standard (*de minimis* thresholds are 50 tons/year for VOCs and NO_x) and is in attainment of all other criteria pollutants (USEPA 2008a, USEPA 2008b, 40 CFR 93.153). Therefore, only project emissions of VOCs and NO_x (i.e., O_3 precursors) are analyzed for conformity rule applicability.

De minimis levels apply for conformity purposes, which relate to emissions within 3 nm of the air basin. Since SNI and the offshore region proposed for the laser testing and training are considered in attainment/unclassified for the NAAQS, the provisions of the General Conformity Rule do not apply. Offshore emissions do not follow the *de minimis* and General Conformity Rule significance criteria; project emissions greater than 3 nm (5.6 km) offshore were analyzed as subject to NEPA and EO 12114.

Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* levels (40 CFR Part 1, Section 51.853[b]) and are not regionally significant (totals less than 10 percent of projected regional emissions for that pollutant) (40 CFR Part 1, Section 93.153).

PROPOSED ACTION

Activity: The Proposed Action consists of a laser testing and training program which would involve directing laser power up to 1MW at various types of fixed or dynamic targets from fixed or dynamic laser sources.

Proposed Action Name: Laser Testing/Training, Point Mugu Sea Range

Proposed Action Summary: The Laser Testing/Training Program involves nine test scenarios, most of which include multiple options. Each scenario is defined by a) type of laser(s) to be used; b) the laser platform (from aircraft, vessel, or land); c) the target location (land, sea surface, or air) and mobility (stationary, slow- or fast-moving).

Emissions associated with the Proposed Action would occur from combustion emissions from engines powered by fossil fuels, including aircraft, marine vessels, aerial targets and personal vehicles and generators.

Air Emissions Summary:

The estimated emissions for marine vessels were divided into those emissions associated with vessel transport operations originating at Point Mugu and those activities occurring offshore of SNI. Total project emissions include aircraft activities (e.g., landings and takeoffs at Point Mugu, aerial target launches, transport of personnel, and target recovery), vessel activities (e.g., mobile ship target circuit patterns, target transport, personnel transport, and target recovery), vehicle activities (e.g., personnel transport to land-based target areas), and hydrogen fueling station construction activities at Point Mugu (e.g., heavy equipment and vehicle emissions).

Since SNI and the offshore region proposed for the laser testing and training are classified as attainment/unclassified by the USEPA, the provisions of the General Conformity Rule do not apply. However, emissions within U.S Territory (3-12 nm offshore of SNI) and outside U.S Territory (greater than 12 nm offshore of SNI) have been estimated for planning purposes and as subject to NEPA and EO 12114 (Table 1). Estimated emissions occurring within the SCCAB at Point Mugu within 3 nm (5.6 km) (subject to the General Conformity Rule) and within 12 nm (22 km) (subject to NEPA) as a result of implementation of the Proposed Action are shown in Tables 2 and 3, respectively. Based on the air quality analysis for the Proposed Action, the maximum estimated emissions in the SCCAB would be below conformity *de minimis* levels and would be less than 10 percent of projected regional emissions.

Table 1 Total Proposed Action Emissions - SNI

Component	Pollutant (tons/year)					
	VOCs	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Aircraft Operations	2.32	2.61	5.31	0.14	1.54	1.53
Vessel Operations	2.26	14.64	22.88	4.86	0.61	0.60
Aerial Target Operations	0.00	0.00	0.01	0.00	0.00	0.00
Vehicle & Generator Operations	0.93	3.56	2.58	0.00	0.39	0.35
Construction Emissions	0.04	0.42	0.16	0.00	0.02	0.02
Subtotal	**5.55**	**21.23**	**30.94**	**5.00**	**2.56**	**2.50**
de minimis/Significance threshold	NA	NA	NA	NA	NA	NA
Exceeds *de minimis* threshold?	No	No	No	No	No	No

Notes: NA – not applicable since SNI is in attainment/unclassified of the NAAQS for all criteria pollutants. Emissions are presented for planning purposes only.
VOCs=volatile organic compounds; NO_x=nitrogen oxides; CO=carbon monoxide; SO_x=sulfur oxides; PM_{10}/$PM_{2.5}$ particulate matter greater than 10/2.5 microns in diameter.
Sources: CARB 2008a, USEPA 2008a, USEPA 2008b.

Table 2 Proposed Action Emissions – SCCAB <3 nm

Component	Pollutant (tons/year)					
	VOCs[1]	NO_x[1]	CO	SO_x	PM_{10}	$PM_{2.5}$
Aircraft Operations	2.29	1.62	5.06	0.09	1.72	1.70
Vessel Operations	0.39	2.60	3.90	0.84	0.10	0.10
Aerial Target Operations	0.00	0.00	0.00	0.00	0.00	0.00
Vehicle & Generator Operations	0.00	0.00	0.00	0.00	0.00	0.00
Construction Emissions	0.04	0.42	0.16	0.00	0.02	0.02
Subtotal	**2.72**	**4.64**	**9.12**	**0.93**	**1.84**	**1.82**
de minimis/Significance threshold	50	50	NA	NA	NA	NA
Exceeds *de minimis* threshold?	No	No	No	No	No	No
VCAPCD emissions forecast (2010)	16,936	21,754	72,854	3,796	10,001	3,577
Exceeds 10% of forecast?	No	No	No	No	No	No

Notes:[1] Effective June 19, 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.
NA = not applicable since Ventura County is in attainment of the federal CO, SO_x, PM_{10} and $PM_{2.5}$ standards.
Sources: CARB 2008a, CARB 2008c, USEPA 2008a, USEPA 2008b, 40 CFR 93.153.

Table 3 Proposed Action Emissions – SCCAB (3-12 nm)

Component	Pollutant (tons/year)					
	VOCs	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Aircraft Operations	0.02	0.41	0.12	0.02	0.23	0.22
Vessel Operations	1.10	6.76	11.35	2.33	0.29	0.29
Aerial Target Operations	0.00	0.00	0.00	0.00	0.00	0.00
Vehicle & Generator Operations	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	**1.12**	**7.17**	**11.47**	**2.35**	**0.52**	**0.51**

Note: *de minimis* thresholds and VCAPCD emissions forecast do not apply to offshore (>3 nm) emissions.

Affected Air Basin: South Central Coast Air Basin

Date RONA Prepared: September 10, 2009

RONA Prepared By: NAWCWD Point Mugu with direct support from TEC Inc.

PROPOSED ACTION EXEMPTION(S)

San Nicolas Island is located within an attainment/unclassified area; therefore the estimated emissions associated with SNI **are** exempt from General Conformity Rule Requirements. Since Ventura County (excluding SNI) is located within a nonattainment area; the estimated emissions associated with activities occurring at or near Point Mugu (within the SCCAB and under VCAPCD jurisdiction) **are not** exempt from General Conformity Rule Requirements.

ATTAINMENT AREA STATUS AND EMISSIONS EVALUATION CONCLUSION

Although SNI is part of Ventura County, the USEPA has determined that SNI is separate and distinct from the SCCAB and is in attainment/unclassified of the NAAQS for all criteria pollutants. Effective June 19, 2008, Ventura County (part of the SCCAB) has been reclassified as a "serious" nonattainment area for the federal 8-hour O_3 standard and is in attainment of all other criteria pollutants.

The U.S. Navy concludes that *de minimis* thresholds for applicable criteria pollutants would not be exceeded nor would the projected emissions be regionally significant (i.e., greater than 10 percent of the air basin's emission budgets) as a result of implementation of the Proposed Action. The emissions data supporting this conclusion is shown in Tables 1, 2, and 3, above. Therefore, the U.S. Navy concludes that formal Conformity Determination procedures are not required, resulting in this RONA.

RONA APPROVAL

To the best of my knowledge, the information presented in this RONA is correct and accurate, and I concur in the finding that implementation of the Proposed Action does not require a formal CAA Conformity Determination.

_____ _____

[NAME] Date
[TITLE]

EMISSIONS SUMMARY
Laser Testing/Training Program, Point Mugu Sea Range

Total Emissions within 3 nm, tons/year

Proposed Action - with 3 nm of Shore	CO	NOx	VOC	SOx	PM10	PM2.5
Aircraft Emissions	5.06	1.62	2.29	0.09	1.72	1.70
Vessel Emissions	3.90	2.60	0.39	0.84	0.10	0.10
Aerial Target Emissions	0.00	0.00	0.00	0.00	0.00	0.00
Vehicle & Generator Emissions	0.00	0.00	0.00	0.00	0.00	0.00
Construction Emissions	0.16	0.42	0.04	0.00	0.02	0.02
Total	**9.12**	**4.63**	**2.71**	**0.94**	**1.84**	**1.82**
***de minimis* thresholds, Ventura County**	**NA**	**50.00**	**50.00**	**NA**	**NA**	**NA**

Total Proposed Action Emissions, tons/year

Proposed Action Total	CO	NOx	VOC	SOx	PM10	PM2.5
Aircraft Emissions	5.31	2.61	2.32	0.14	1.54	1.53
Vessel Emissions	22.88	14.64	2.26	4.86	0.61	0.60
Aerial Target Emissions	0.01	0.00	0.00	0.00	0.00	0.00
Vehicle & Generator Emissions	2.58	3.56	0.93	0.00	0.39	0.35
Construction Emissions	0.16	0.42	0.04	0.00	0.02	0.02
Total	**30.93**	**21.23**	**5.55**	**5.00**	**2.57**	**2.50**

Total Emissions within 3 nm - 12 nm, tons/year

Proposed Action - 3 -12 nm of Shore	CO	NOx	VOC	SOx	PM10	PM2.5
Aircraft Emissions	0.12	0.41	0.02	0.02	0.23	0.22
Vessel Emissions	11.35	6.76	1.10	2.33	0.29	0.29
Aerial Target Emissions	0.00	0.00	0.00	0.00	0.00	0.00
Vehicle & Generator Emissions	0.00	0.00	0.00	0.00	0.00	0.00
Total	**11.47**	**7.17**	**1.12**	**2.35**	**0.52**	**0.51**

Aircraft Emissions

Type of Aircraft	A/C Sorties	Ave. A/C Time on Range (hrs)	Total Time on Range (hrs)	% Below 3,000 ft	Time Below 3,000 ft	Percentage 0-3 nm from shore	Percentage 3-12 nm from Shore	Percentage >12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	Fuel Flow	Emission Indices, lbs/1,000 lbs fuel					Emissions Factors (lb/operation or lb/hr)					Emissions 0-3 nm Offshore (lbs)					Emissions 3-12 nm Offshore—US Territory (lbs)					Emissions >12 nm Offshore—Outside US Territory				
	No.	hr	hr	%	hr	Percent			Hours			lbs/hr	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM
Laser Testing/Training Program																																					
Fighter (F/A-18)	50	4.0	200.0	15%	30.0	10%	30%	60%	3.00	9.00	18.00	4049	0.89	11.58	0.12	0.40	6.31	3.60	46.89	0.49	1.62	25.55	10.81	140.66	1.46	4.86	76.65	32.43	421.99	4.37	14.58	229.94	64.86	843.97	8.75	29.15	459.89
4 Engine Fixed Wing (C-130)	25	4.0	100.0	40%	40.0	20%	40%	40%	8.00	16.00	16.00	850	4.03	6.71	0.97	0.40	3.97	3.43	5.70	0.82	0.34	3.37	27.40	45.63	6.60	2.72	27.00	54.81	91.26	13.19	5.44	53.99	54.81	91.26	13.19	5.44	53.99
Helicopter	25	3.0	75.0	85%	63.8	40%	40%	20%	25.50	25.50	12.75	600	6.25	6.40	0.55	0.40	4.20	3.75	3.84	0.33	0.24	2.52	95.63	97.92	8.42	6.12	64.26	95.63	97.92	8.42	6.12	64.26	47.81	48.96	4.21	3.06	32.13
P-3	75	4.0	300.0	20%	60.0	30%	30%	25%	18.00	18.00	15.00	1200	1.82	8.43	0.41	0.40	3.97	2.18	10.12	0.49	0.48	4.76	39.31	182.09	8.86	8.64	85.75	39.31	182.09	8.86	8.64	85.75	32.76	151.74	7.38	7.20	71.46
UAV	41	3.0	123.0	100%	123.0	20%	30%	50%	24.60	36.90	61.50	124.5	4.93	4.42	0.23	0.40	4.20	0.61	0.55	0.03	0.05	0.52	15.10	13.54	0.70	1.23	12.86	22.65	20.31	1.06	1.84	19.30	37.75	33.84	1.76	3.06	32.16
																					Total Emissions, tons		**0.09**	**0.24**	**0.01**	**0.01**	**0.13**	**0.12**	**0.41**	**0.02**	**0.02**	**0.23**	**0.12**	**0.58**	**0.02**	**0.02**	**0.32**

Notes: * Assumed the UAV would be a single-engine propeller, approximatly half as much fuel flow as a cessna-type twin engine propeller.

LTO Operations at Pt. Mugu

Type of Aircraft	A/C Sorties		Emissions Factors (lb/operation)					LTO Emissions (lbs)				
	No.		CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM
Fighter (F/A-18)	50		139.40	13.09	53.74	0.82	16.17	6970.00	654.50	2687.00	41.00	808.50
4 Engine Fixed Wing (C-130)	25		5.99	19.91	0.10	0.79	3.97	149.75	497.75	2.50	19.75	99.25
Helicopter	25		0.35	0.35	0.11	0.08	NA	8.66	8.66	2.67	1.97	
P-3	75		37.50	21.21	24.59	1.34	10.79	2812.50	1590.75	1844.25	100.50	809.25
UAV	41		0.01	0.01	0.23	0.02	NA	0.53	0.53	9.27	0.96	
							LTO Emissions, tons	**4.97**	**1.38**	**2.27**	**0.08**	**0.86**

Helicopter LTO's = Time in Mode (minutes x 60 seconds) x fuel use (kg/s) x emission index (g pollutant per kg fuel)/458.9 = lbs per operation

	CO	NOx	VOC	SOx	PM
take off =	0.313	0.313	0.0183	0.06	NA
approach =	0.034	0.034	0.0885	0.02	NA
Total EF =	**0.346**	**0.346**	**0.107**	**0.079**	**NA**

UAV LTO's (assumed a cessna aircraft)

	CO	NOx	VOC	SOx	PM
take off =	0.002	0.002	0.072	0.008	NA
climb out =	0.002	0.002	0.082	0.008	NA
approach =	0.009	0.009	0.072	0.008	NA
Total EF =	**0.013**	**0.013**	**0.2261**	**0.02**	**NA**

Assumptions for LTO's:

* Fighter (F/A-18) emission factors from AESO Memorandum 9815, Nov 2002.
* P-3 emission factors from AESO Memorandum 9911, Apr 2000.
* C-130 emission factors from AESO Memorandum 2000-09, Jan 2001.
* Helicopter (assumed Bell 206) emission factors derived from EDMS 5.1 model.
* UAV (assumed cessna 421 aircraft) emission factors derived from EDMS 5.1 model.

Vessel Emissions

Ship/Boat Type	Number of Operations	Ship Time on Range (hrs)	Percent at Each Power Level	Total Time on Range (hrs)	Percentage 0-3 nm from shore	Percentage 3-12 nm from Shore	Percentage >12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore	Emissions Factors (lb/hr)					Emissions 0-3 nm Offshore (lbs)					Emissions 3-12 nm Offshore - US Territory (lbs)					Emissions >12 nm Offshore - Outside US Territory				
		hr	%	hr	Percent			Hours			CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM
Laser Testing/Training Program																														
Guardian Fast Patrol Craft	60	10.0	100%	600.0	20%	40%	40%	120.0	240.0	240.0	1.94	14.83	0.5	2.39	0.2	232.8	1779.6	60.0	286.8	24.0	465.6	3559.2	120.0	573.6	48.0	465.6	3559.2	120.0	573.6	48.0
Range Support Boat	10	14.0	100%	140.0	15%	40%	45%	21.0	56.0	63.0	4.50	16.50	2.10	4.20	1.00	94.5	346.5	44.1	88.2	21.0	252.0	924.0	117.6	235.2	56.0	283.5	1039.5	132.3	264.6	63.0
Range Support Boat - Mobile Ship Target (MST)	15	8.0	100%	120.0	17%	50%	33%	20.4	60.0	39.6	7.31	8.46	0.38	2.12	0.55	149.1	172.6	7.8	43.2	11.2	438.6	507.6	22.8	127.2	33.0	289.5	335.0	15.0	84.0	21.8
Self Defense Test Ship (SDTS)/Guided Missile Destroyer	30	14.0	100%	420.0	17%	50%	33%	71.4	210.0	138.6	102.58	40.61	9.22	17.71	2.12	7324.2	2899.6	658.3	1264.5	151.4	21541.8	8528.1	1936.2	3719.1	445.2	14217.6	5628.5	1277.9	2454.6	293.8
														Total Emissions, tons		**3.90**	**2.60**	**0.39**	**0.84**	**0.10**	**11.35**	**6.76**	**1.10**	**2.33**	**0.29**	**7.63**	**5.28**	**0.77**	**1.69**	**0.21**

Total Emissions (tons) within US Territory =	15.25	9.36	1.48	3.17	0.39
Total Emissions (tons) outside US Territory =	7.63	5.28	0.77	1.69	0.21
Total Emissions (tons) =	**22.88**	**14.64**	**2.26**	**4.86**	**0.61**

Aerial Target Emissions

					Emission Factor (lb per item)							Emissions, tons/year						
Ordnance Group	**AQ Data**	**Ordnance Type**	**Location of Target Launch**	**Quantity Fired**	**CO2**	**CO**	**Nox**	**PM10**	**PM2.5**	**SO2**	**Lead**	**CO2**	**CO**	**Nox**	**PM10**	**PM2.5**	**SO2**	**Lead**
Aerial Target	AP-42	BQM74	Fired 0-3 nm	7	4.8	5.30E-01		1.60E-01	1.70E-01		7.00E-02	**0.0168**	**0.001855**		**0.00056**	**0.000595**		**0.000245**
Aerial Target	AP-42	BQM74	Fired 3-12 nm	12	4.8	5.30E-01		1.60E-01	1.70E-01		7.00E-02	**0.0288**	**0.00318**		**0.00096**	**0.00102**		**0.00042**
Aerial Target	AP-42	BQM74	Fired > 12 nm	22	4.8	5.30E-01		1.60E-01	1.70E-01		7.00E-02	**0.0528**	**0.00583**		**0.00176**	**0.00187**		**0.00077**

NOTES: Emission factors from AP-42, Section 15.6, for M267 practice warhead

Assumptions:

1) Used AP-42 emission factors for a rocket which was assumed to be close to the BQM74. The AP-42 website indicates that guided missiles will be posted in the future.

Vehicle Emissions

				CO		NO_x		VOCs						SOx		PM10				Emissions, lbs/day							Emissions, tons per year						
Vehicle Class	No. of Vehicles	Speed (mph)	VTM (mi/vehicle-day)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear(g/mi)	Brake Wear (g/mi)	CO	NOx	VOCs	SOx	PM10	PM2.5	Days	CO	NOx	VOCs	SOx	PM10	PM2.5
Heavy-duty truck, diesel	2	10	10	11.383		21.608		3.438						0.025		0.141		0.036	0.028	0.50	0.95	0.15	0.001	0.009	0.0089	60	0.015	0.03	0.005	0.000	0.000	0.000
Light-duty truck, catalyst	3	10	10	3.019	11.792	0.27	0.586	0.056	0.867	0.177	0.026	0.047	0.061	0.004	0.002	0.01	0.015	0.008	0.013	0.36	0.03	0.03	0.0003	0.002	0.0022	60	0.011	0.001	0.001	0.000	0.000	0.000
																			TOTAL	**0.86**	**0.98**	**0.18**	**0.0014**	**0.0113**	**0.0112**		**0.026**	**0.029**	**0.005**	**0.000**	**0.000**	**0.000**

ASSUMPTIONS:

* 2008 Emission Factors from EMFAC2007, average temp 60F

Generator Emissions

				Emission Factors								Emissions, lbs/day						Emission, tons (total)					
Equipment	FUEL	HP	Load Factor	CO (lb/bhp-hr)	VOC (lb/bhp-hr)	NOX (lb/bhp-hr)	SOX (lb/bhp-hr)	PM10 (lb/bhp-hr)	No of Equipment	Hrs Per Day	Days in Service	CO lbs/day	VOC lbs/day	NOX lbs/day	SOX lbs/day	PM10 lbs/day	PM2.5 lbs/day	CO tons (total)	VOC tons (total)	NOX tons (total)	SOX tons (total)	PM10 tons (total)	PM2.5 tons (total)
Generator	DIESEL	33	74	1.10E-02	3.97E-03	1.52E-02	1.08E-05	1.68E-03	1	8	60	2.15	0.78	2.97	0.00	0.33	0.29	0.065	0.023	0.089	0.000	0.010	0.009
Generator	DIESEL	268	74	1.10E-02	3.97E-03	1.52E-02	1.08E-05	1.68E-03	1	8	60	17.49	6.30	24.13	0.02	2.67	2.37	0.525	0.189	0.724	0.001	0.080	0.071
Generator	DIESEL	1006	74	1.10E-02	3.97E-03	1.52E-02	1.08E-05	1.68E-03	1	8	60	65.65	23.63	90.60	0.06	10.01	8.90	1.969	0.709	2.718	0.002	0.300	0.267
											TOTAL	**2.15**	**0.78**	**2.97**	**0.00**	**0.33**	**0.29**	**2.559**	**0.921**	**3.531**	**0.003**	**0.390**	**0.347**

Hydrogen Fueling Station Construction Emissions

Heavy Equipment

				Emission Factors (g/hp-hr)								Emissions (lbs/day)						Emission (tons total)					
Equipment	FUEL	HP	Load Factor	CO	VOC	NO_X	SO_X	PM_{10}	No of Equip	Hrs/Day	Days in Service	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Excavator	DIESEL	250	85	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	4	14	5.06	1.27	15.31	0.01	0.71	0.63	0.035	0.009	0.107	0.000	0.005	0.004
Dump Truck	DIESEL	250	41	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	4	14	2.44	0.61	7.38	0.00	0.34	0.31	0.017	0.004	0.052	0.000	0.002	0.002
Roller	DIESEL	145	57.5	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	4	14	1.99	0.50	6.01	0.00	0.28	0.25	0.014	0.003	0.042	0.000	0.002	0.002
Paver	DIESEL	160	59	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	4	14	2.25	0.57	6.80	0.00	0.32	0.28	0.016	0.004	0.048	0.000	0.002	0.002
Air Compressor	DIESEL	50	48	7.69E-03	2.18E-03	1.93E-02	1.08E-05	1.52E-03	1	8	14	1.48	0.42	3.71	0.00	0.29	0.26	0.010	0.003	0.026	0.000	0.002	0.002
Generator	DIESEL	45	74	1.10E-02	3.97E-03	1.52E-02	1.08E-05	1.68E-03	1	8	14	2.93	1.06	4.05	0.00	0.45	0.40	0.021	0.007	0.028	0.000	0.003	0.003
Concrete Truck	DIESEL	210	20	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	4	14	1.00	0.25	3.03	0.00	0.14	0.13	0.007	0.002	0.021	0.000	0.001	0.001
Concrete Pump Truck	DIESEL	210	20	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	4	14	1.00	0.25	3.03	0.00	0.14	0.13	0.007	0.002	0.021	0.000	0.001	0.001
Water Truck	DIESEL	250	50	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	4	14	2.98	0.75	9.01	0.01	0.42	0.37	0.021	0.005	0.063	0.000	0.003	0.003
										TOTAL		**16.06**	**4.41**	**43.01**	**0.03**	**2.38**	**2.12**	**0.15**	**0.04**	**0.41**	**0.00**	**0.02**	**0.02**

Note: It has been conservatively estimated that construction would last for 2 weeks (14 days)

Construction Vehicles

				CO		NO_X		VOCs						SOx		PM10				Emissions, lbs/day							Emissions, tons per year					
Vehicle Class	No. of Vehicles	Speed (mph)	VTM (mi/vehicle-day)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	CO	NOx	VOCs	SOx	PM10	PM2.5	Days	CO	NOx	VOCs	SOx	PM10	PM2.5
Heavy-duty truck, diesel	3	10	10	11.383		21.608		3.438						0.025		0.141		0.036	0.028	0.75	1.43	0.23	0.00165	0.013558	0.013423	14	0.0053	0.01	0.00159	1.2E-05	9.5E-05	9.4E-05
Light-duty truck, catalyst	3	10	10	3.019	11.792	0.27	0.586	0.056	0.867	0.177	0.026	0.047	0.061	0.004	0.002	0.01	0.015	0.008	0.013	0.36	0.03	0.03	0.00029	0.002249	0.002226	14	0.0025	0.00018	0.00021	2E-06	1.6E-05	1.56E-05
																			TOTAL	**1.11**	**1.45**	**0.26**	**0.0019**	**0.0158**	**0.0156**		**0.0078**	**0.0102**	**0.0018**	**0.0000**	**0.0001**	**0.0001**

Appendix C

Agency Correspondence

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CALIFORNIA COASTAL COMMISSION
45 FREMONT STREET, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200

May 5, 2009

D.T. Shide
Environmental Program Manager
Attn: Emilie Lang
Naval Base Ventura County
311 Main Road, Suite 1
Point Mugu, CA 93042-5033

Re: **ND-017-09** Navy Laser Testing and Training Program, Point Mugu Sea Range, including San Nicolas Island, southern California

Dear D.T. Shide:

The Commission staff has reviewed the above-referenced negative determination for the Navy's Laser Testing and Training Program on the Point Mugu Sea Range (including at San Nicolas Island). The tests would be used for evaluation and training purposes, under varying weather conditions and with different types and intensities of lasers. The Navy has incorporated a number of measures to protect wildlife resources, including: (a) compliance with all Sea Range safety and procedural requirements; (b) avoiding exposing any persons, wildlife, or reflective surfaces to deployed lasers; (c) providing notices to mariners prior to any offshore activities; (d) avoiding having ships travel through kelp beds to the degree possible; (e) avoiding using snowy plover nesting areas and seasons; (f) avoiding marine mammal breeding and pupping seasons; (g) avoiding known sea otter use areas; (h) limiting on-land activities to already disturbed areas; and (i) recovering targets (for both logistical and environmental reasons), for studying, reusing, and recycling where feasible.

With these measures, the Commission staff **agrees** with your conclusion that the proposed project will not adversely affect coastal resources. We therefore **concur** with your negative determination made pursuant to 15 CFR Section 930.35 of the NOAA implementing regulations. Please contact Mark Delaplaine at (415) 904-5289 if you have any questions regarding this matter.

Sincerely,

(for) PETER M. DOUGLAS
Executive Director

cc: CCC Ventura District Office

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DEPARTMENT OF THE NAVY
NAVAL BASE VENTURA COUNTY
311 MAIN ROAD, SUITE 1
POINT MUGU, CA 93042-5033

IN REPLY REFER TO
5090
Ser N45VCS/0215
March 16, 2009

Mr. Peter Douglas
Executive Director
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

Dear Mr. Douglas:

We are submitting this Coastal Consistency Negative Determination (CCND) for the Laser Testing and Training Program located on the Point Mugu Sea Range, Ventura County, California. The project consists of conducting laser test, evaluation and training activities under various weather conditions on the Point Mugu Sea Range, including San Nicolas Island (SNI). The objective of the test is to accomplish testing and training in a realistic environment with different types of lasers, using different frequencies and power levels, at various types of fixed and dynamic targets. The proposed project will have no significant effect on resources of the coastal zone.

This submittal is in compliance with Section 930.35(d) of the National Oceanic and Atmospheric Administration (NOAA) Federal Consistency Regulations (15 CFR 930). We have determined that there will be no negative impact to the Coastal Management Zone from this action.

We request your concurrence on our project. When completed, please fax the letter of concurrence to Ms. Emilie N. Lang, Wetland Ecologist, at (805) 989-1011. If you have any questions or need further information, please contact Ms. Emilie N. Lang at (805) 989-4740.

Sincerely,

Daniel T. Shide

D. T. SHIDE
Environmental Program Manager
By direction

Enclosure: 1. CCND

CCND
LASER TESTING AND TRAINING PROGRAM
NAVAL BASE VENTURA COUNTY, POINT MGUU

This CCND, in compliance with Section 930.35(d) of the NOAA Federal Consistency Regulations (15 CFR 930), is submitted for the Laser Testing and Training Program located on the Point Mugu Sea Range, Ventura County, California.

Location

The Naval Air Warfare Center Weapons Division (NAWCWD), Point Mugu is located in Ventura County along the Pacific Coast of southern California and includes the 36,000 square mile Point Mugu Sea Range (Figure 1-1). The Sea Range currently supports test and evaluation of sea, land, and air weapons systems as well as various categories of training activities. Activities associated with the proposed action would occur within the Sea Range, including SNI. Located approximately 60 mi (97 km) southwest of Point Mugu, SNI is sparsely developed, but extensively instrumented with metric tracking radar, electro-optical devices, telemetry, and communications equipment to support Fleet training and weapons testing.

The Department of the Navy has determined that the project occurs both outside and within the coastal zone. 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 held in trust by the Federal Government". SNI is owned and operated by the Department of the Navy as a major element of the Point Mugu Sea Range, and therefore is excluded from the coastal zone. The coastal zone surrounding SNI extends three nautical miles seaward from the high tide line and is under the jurisdiction of the State of California. The Navy recognizes that actions outside of the coastal zone may affect land or water uses or natural resources of the coastal zone and therefore are subject to the provisions of the Act. Consequently, an analysis of the impacts of the proposed action on the coastal zone was conducted.

Background

The word "laser" is an acronym for "light amplification by stimulated emission of radiation". A laser is a device that emits a coherent beam of light (electromagnetic energy). Most light is incoherent, meaning it is made up of many frequencies, which scatter and diffuse quickly, such as light from a

Encl (1)

flashlight. Light emitted by a laser (said to be "lased") is of one frequency (one wavelength), so it does not scatter and stays in a narrow, intense beam without dissipating quickly. One attribute of a laser is its beam quality (BQ), which describes how well the beam remains collimated. A perfect beam has a BQ of one, while an imperfect beam has BQ greater than one. Lasers work by using electricity, chemical reactions, intense coherent or incoherent light, or other means to excite the atoms or molecules of a gas, liquid, or other substance to a state in which more of the atoms or molecules are at higher energy levels than lower energy levels resulting in a population inversion which allows for the stimulated emission and creation of laser light.

Lasers have already proven to be critical communications and targeting tools. As enemy missiles and other forms of ordnance become faster and more elusive to current defensive weapons on ships, high power lasers show promise as the most probable systems capable of defeating them. However, before lasers can be effectively used as a weapon to replace guns and anti-missile weapons on ships, their performance and suitability must be demonstrated in a marine environment.

Lasers hold great potential for the U.S. military, but as is true for most technology, lasers perform differently in different environments. For the Navy, it is important that lasers function properly at sea and near water, the environment where the Navy usually operates. Even though laser or coherent light remains in a tight beam, its energy is quickly absorbed by moisture and distorted by density and temperature variations that affect the refractive index of air. The Navy is working to overcome these problems in order to use lasers in its mission areas. Therefore, it is important to accomplish testing and training in a realistic environment with different types of lasers, using different frequencies and power levels, in various weather conditions.

The Navy is developing novel military applications of lasers and assessing potential hazards to materials and personnel from the use of lasers by enemy forces. Because of its coastal location, maritime environment, and extensive test and evaluation and training capabilities, the Sea Range is a particularly valuable site for laser system operations in a realistic and operationally relevant environment. Within the Sea Range, the remoteness and existing infrastructure of SNI make it a valuable resource for laser operations.

Project Description

The purpose of the Laser Testing and Training Program is to support DoD directives on the development of laser applications to the National Defense through research, development, testing and evaluation (RDT&E) and training applications. Specifically, the proposed action is intended to allow both RDT&E and training use of lasers in realistic maritime environments where potential conflicts with civilian activities and safety risks to the public are minimized.

The proposed action is to conduct laser test, evaluation and training activities under various weather conditions on the Point Mugu Sea Range, including SNI. All activities would be outside of the Channel Islands National Marine Sanctuary waters, and lasers would not be fired at any part of the sanctuary. The proposed action would involve directing laser power at various types of fixed or dynamic targets from fixed or dynamic laser sources. Laser testing or training events could occur on up to 125 days per year, with an average duration of four hours for each event, during which the laser would be operated approximately 40 times following the protocols described below.

The proposed action includes multiple types of lasers, including weapons, designators, tracking lasers, communications, and range finders. Laser operations will include laser classes one, two, three and four, including systems at wavelengths from 0.18 µm to 14.0 µm and at power levels up to a maximum of one megawatt. Laser ("shooter") platforms would be on land at SNI, on ocean surface vessels, and on aircraft. Targets would generally be the same types used in current testing and training and would also be located on SNI, at sea, or they would be airborne. Regardless of laser class, a formal risk analysis of particular laser characteristics, pointing system capabilities, and firing parameters will be prepared for every laser operation. All proposed use of lasers on the Sea Range would conform to the safety and procedural requirements established in the Sea Range EIS (NAWCWD 2002a), as well as in the Navy Laser Hazards Control Program (OPNAVINST 5100.27B, May 2, 2008) and any revisions adopted in the future. Safety procedures include ensuring that no persons, wildlife, or reflective surfaces are within the "hazard area" between the laser and the target, and a mechanism that prevents the high power laser from being fired unless it has locked on the target.

The proposed action comprises nine test scenarios, most of which include multiple options. Each scenario is defined by a) the

class of laser(s) to be used, b) the laser platform (from aircraft, vessel, or land), c) the target location (land, sea surface, or air) and mobility (stationary, slow or fast moving). If pointed horizontally, lasers would only be fired toward the open ocean, at a target on SNI, or at a target with SNI as a backdrop. All land-based targets and shooter platforms would be located on existing pads, roads, or disturbed areas, such as the Standoff Land Attack Missile (SLAM) site, near the Vandal launch site, Thousand Springs, Building 807 Launch Complex, and the existing Laser Target area on SNI (off of Jackson Highway). Figure 2-1 shows locations where targets or shooter platforms would be located on and near SNI.

The proposed action would include monitoring, reconnaissance, and range clearance procedures as needed to ensure there are no hazards to people, ships or planes downrange of the target when the laser is fired. The standard protocol of publishing Notices to Mariners (NOTMARs) and Notices to Airmen (NOTAMs) and the use of marine radio channels for communicating ensure that vessels avoid these areas while Navy activities are underway. Any laser operations that have the potential of creating hazards to aircraft shall be coordinated with the Federal Aviation Administration to ensure that when the laser is fired, no non-participating aircraft are in the hazard area. Similar coordination with the Laser Clearing House will occur whenever laser testing creates potential hazards to satellites.

Negative Determination Analysis

The Department of the Navy has evaluated the project and determined that it does not affect coastal uses or resources. The support for this negative determination is provided as follows.

Public Access and Recreation (Sections 30210 and 30220)

The project will not affect public access or recreation. The Navy maintains control over waters within 300 yards (274 m) of SNI, within which public access is restricted. In addition, a NOTMARs and NOTAMs would be published 15 days prior to the offshore activities. Military training, fishing, and recreational uses would be limited during testing activities. Recreational boats and some recreational activities may be temporarily inconvenienced by restrictions; however, recreational activities are expected to remain at a low level near SNI since the island is not open to public use. The proposed action would

have only a minor, if any, impact on fishing activity. Safety procedures mentioned previously would ensure that the potential hazard area associated with each type of laser is clear of fishermen or other persons before the laser is fired.

Marine Resources and Biological Productivity Water Quality (Sections 30230)

Marine Invertebrates and Plants
Surface targets would not be located within intertidal zone of SNI and therefore the proposed action would not impact the intertidal zone where invertebrate and marine plant and algae densities are typically high. Areas of dense kelp are avoided by Navy vessels as a matter of standard practice whenever possible. Otherwise, project-related vessel movement would be the same as routinely occurs on the Sea Range and unlikely to cause appreciable damage to kelp plants, especially considering the strong surge to which SNI kelp beds are normally exposed.

The federally endangered black abalone resides in sheltered locations in the intertidal and shallow subtidal zones, and none of the targets would be located in these depths. The endangered white abalone is known to reside in depths that overlap with those of the shooter platform and target sites. White abalone have specific habitat requirements (rock reef surrounded by sand in 98 to 213 feet (30 to 65 meters) depth), which are only met within a small portion of the seafloor surrounding SNI, and the presence of white abalone at SNI has not been documented recently. Owing to the density of seawater, the terminal velocity reached by sinking objects is relatively slow (compared to falling objects in air). As a result, debris is unlikely to land with sufficient force to damage any object on the bottom, and in any case would affect only a minute portion of the seabed. Therefore, activities associated with the proposed action would have no significant impact on marine invertebrates or plants, including the black and white abalone.

Birds
Before a laser can be fired, the Navy will require as standard procedure that no persons, wildlife, reflective surfaces, or non-target obstructions of any sort are present within the hazard area (which is specific to the type of laser being used) between the laser and the target. A bird in flight or at long distance might not be detectable, but the likelihood of a bird crossing the laser beam at the instant the laser is fired is remote and discountable.

Birds may be temporarily displaced to nearby areas by project activities. SNI and the surrounding Sea Range is currently utilized for various military training activities and activities associated with the proposed action would not increase the intensity of activities presently conducted in the area. As birds are highly mobile organisms, any disturbance would be very localized and temporary; no significant impact on the abundance or distribution of marine birds would be anticipated. The western snowy plover is known to nest on the beaches of SNI. No testing locations would be located within snowy plover nesting habitat and the testing site located nearest to snowy plover nesting habitat would not be used during the nesting season. The federally threatened California brown pelican does not nest at SNI, so there is no concern for disruption of nesting activities. California brown pelicans may be temporarily displaced from roosting or foraging areas by project activities. However, the affected areas would be very small in relation to the available shoreline and open water habitat, so the birds are expected to relocate nearby. The proposed action would not significantly increase the overall intensity or geographic extent of military activities presently conducted in the area. Project activities are not expected to lead to substantial disruption of important resting or foraging activities.

Fish

Routine vessel movement on the Sea Range, such as would occur with the proposed action, is not expected to affect fish or their habitats. An extremely small fraction of the seafloor habitat could be affected by debris, and the likelihood of striking and injuring a fish is so low it is negligible. Therefore, activities associated with the proposed action would have no impact on fish.

Marine Mammals

The southern sea otter, pinnipeds, and cetaceans known to occur in the proposed action area are highly mobile organisms which are unlikely to be affected by the passage of vessels, which is routine on the Sea Range. Safety procedures ensure that the laser cannot be fired until it is locked onto the target, and no marine mammals or other wildlife or obstructions are between the shooter and target locations. The likelihood that an undetected marine mammal could move into the path of the beam as the laser is triggered is considered remote and discountable. The only onshore project areas in which marine mammals are expected to be found in abundance are the Bachelor Beach and Corral Harbor backdrop areas. Proposed project activities at these sites would not occur during the breeding or pupping season for these

species. Prior to commencing testing activities at these sites, observers would search for marine mammals within the target area and testing would be postponed until any marine mammals found to be present leave the area. Similarly, laser platforms and target locations would avoid areas where sea otters have been regularly sighted, such as kelp beds along the south shore of SNI, and laser testing would not commence until the absence of otters from any potential hazard zone (specific to the type of laser) is confirmed by observers. Accordingly, no reasonably foreseeable "takes" of marine mammals as defined by the MMPA would be anticipated, and no effects would occur.

Sea Turtles
The probability of occurrence of sea turtles in the project area is very low as sea turtles are rarely sighted in the vicinity of SNI. As such, the likelihood of a vessel or debris striking a sea turtle is remote and discountable. Due to the rare occurrence of these species in the proposed action area, and the low likelihood of activities impacting these organisms, there would be no effect or impact of the proposed action on loggerhead, leatherback, eastern pacific green, or olive ridley sea turtles.

Water Quality (Sections 30231)

Certain types of laser systems contain or produce hazardous materials during lasing. However, all laser systems used in the proposed action would be self-contained and would not release any hazardous materials or hazardous constituents into the environment.

The targets to be used in the proposed action contain potentially hazardous constituents that include propellants, batteries, fuel, lubricants, and hydraulic fluid. The targets, and their components, associated with the proposed action would be essentially identical to those currently in use on the Sea Range and at SNI. Facilities and personnel are already in place to manage, utilize, store, and dispose of any hazardous materials and constituents. Most targets will be recovered so that the effects of the laser can be measured, and these targets would be subsequently reused or recycled. Some incidental loss of debris would occur, but this would be over a large area of the Sea Range, resulting in no effects to water.

Environmental Sensitive Habitat Areas (Section 30240)

The project will have no effect on environmentally sensitive habitat areas. Terrestrial special-status species and their associated habitat occur on SNI. However, the onshore project sites are located in previously disturbed areas and no construction or ground disturbance would occur in sensitive plant or wildlife habitats. Therefore, no negative effects to sensitive habitat or special-status species would occur.

The proposed action area includes essential fish habitat (EFH) for coastal pelagic species, highly migratory species, and west coast groundfish. No alterations to EFH for coastal pelagic species or highly migratory species would occur, as these organisms and the associated EFH areas are pelagic, and no alteration of the pelagic environment would take place from the proposed action. Routine vessel movement on the Sea Range, as would occur in conjunction with the proposed action, would have no effect on EFH. Small quantities of unrecovered debris may float or sink through the water column, but this is unlikely to have any effect on EFH. EFH for west coast groundfish also occurs throughout the marine portion of the proposed project area. Habitat Areas of Particular Concern (HAPC) for groundfish include kelp canopy and rocky reefs, which occur around SNI. Areas of dense kelp are avoided by Navy vessels as a matter of standard practice whenever possible. Otherwise, project-related vessel movement would be the same as routinely occurs on the Sea Range and unlikely to cause appreciable damage to kelp plants, especially considering the strong surge to which SNI kelp beds are normally exposed. Owing to the density of seawater, the terminal velocity reached by sinking objects is relatively slow (compared to falling objects in air). As a result, debris is unlikely to land with sufficient force to damage any object on the bottom, and in any case would affect only a minute portion of the seabed. Therefore, activities associated with the proposed action would have no effect on groundfish EFH.

Archaeological or Paleontological Resources (CCMP Section 30244)

The proposed action would not involve effects on National Register or eligible properties. Potential onshore effects would be limited to the immediate area of the shooter and target platform locations and the backstop areas. All shooter and target platforms would be placed on previously disturbed or developed areas, such as the SLAM missile target area, and existing roads would be used for the transportation of all equipment and personnel on the island. There would be no

onshore ground disturbance. The shooter and target platforms would not require grading or the placement of gravel or any other earth moving actions to install. There would be no permanent structures placed onshore; therefore, existing buildings and structures and any archaeological sites would not be affected.

Offshore effects on cultural resources would be limited to potential effects from debris settling directly on a submerged resource of significance and affecting its integrity. No known shipwrecks are located near the offshore target areas. A predictive model of shipwrecks within the Point Mugu Sea Range indicates that shipwreck remains are most likely to be found no greater than one-half nautical miles from shore. The location of the offshore targets farther than one-half nautical miles offshore thereby reduces the likelihood of a shipwreck being present. Owing to the density of seawater, the terminal velocity reached by sinking objects is relatively slow (compared to falling objects in air). As a result, debris is unlikely to land with sufficient force to damage any object on the bottom, and in any case would affect only a minute portion of the seabed. Therefore, the proposed action would have no effect on cultural resources.

Scenic and Visual Qualities (Section 30251)

The project will have no effect on the scenic or visual qualities of the coast. As an intermittent activity involving Navy aircraft, vessels/vehicles and personnel on the Sea Range where these types of activities are routine, the proposed action would have no effect on scenic resources.

In accordance with the Federal Coastal Zone Management Act of 1972, as amended Section 307 (c) (1), this CCND demonstrates that the activity will not affect resources of the coastal zone.

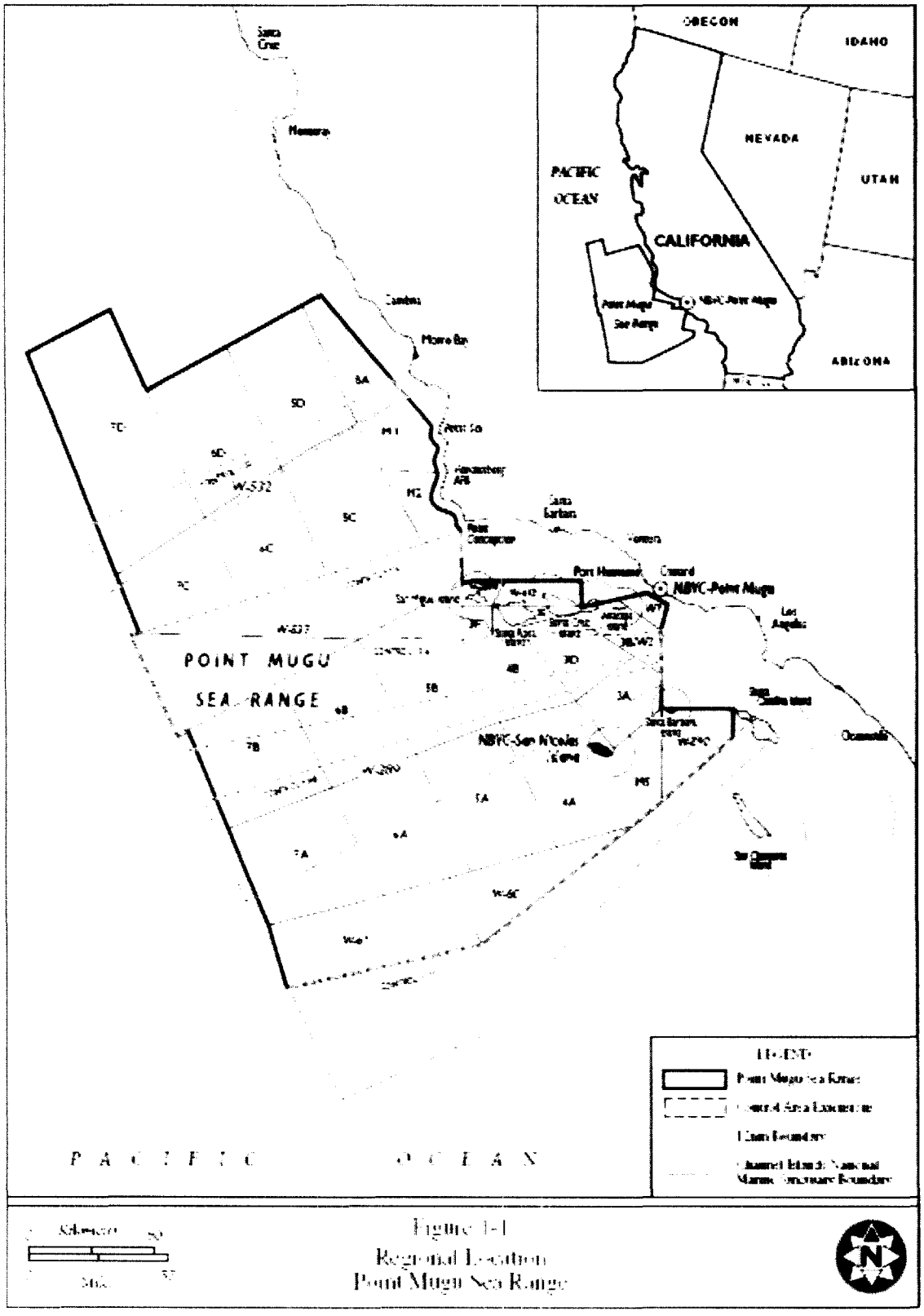
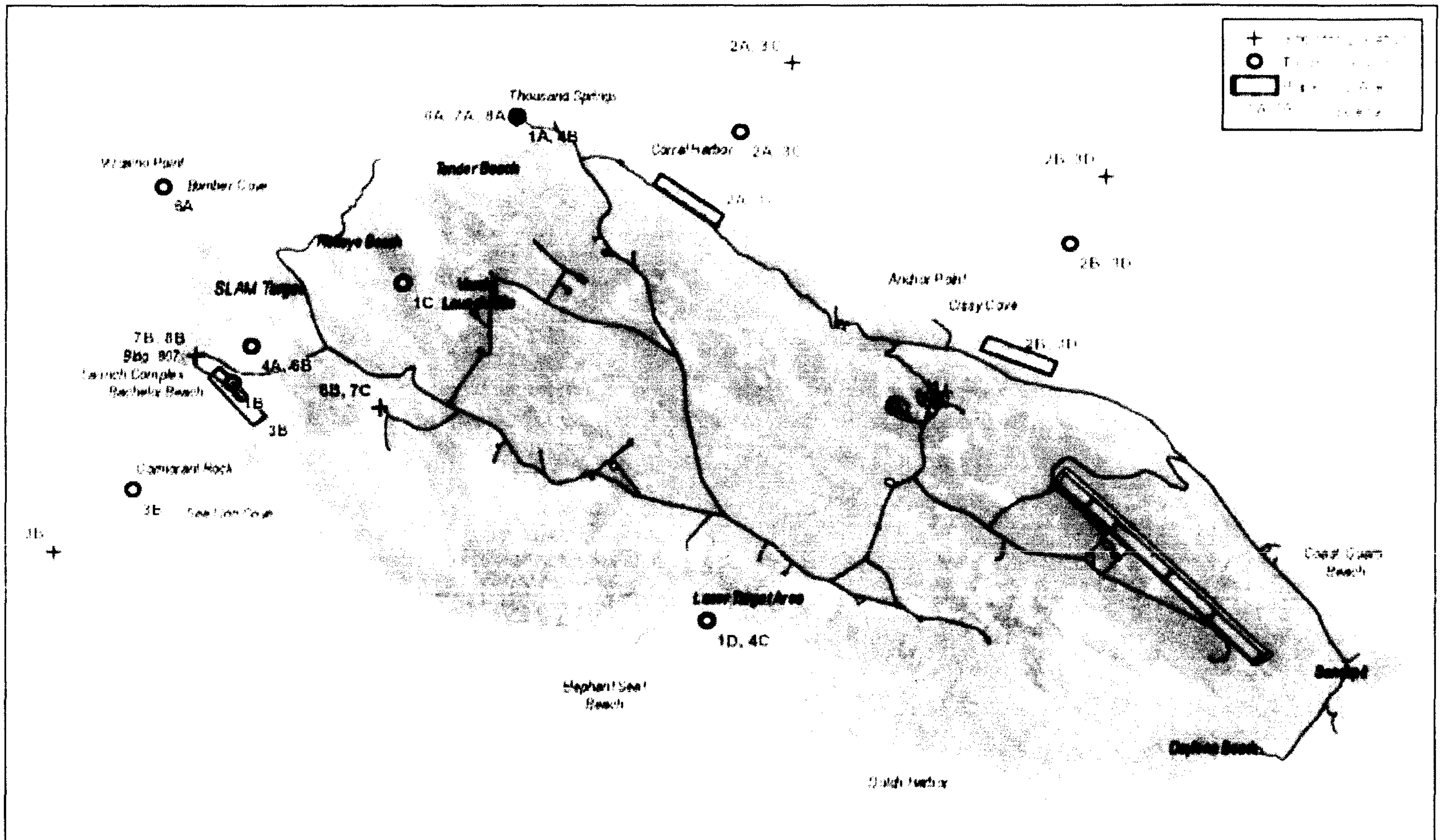


Figure 1-1
Regional Location
Point Mugu Sea Range



Refer to Table 2-1 for additional information about the testing scenarios.

Figure 2-1
Laser Platform and Target Locations On and Near San Nicolas Island

RESOURCE MANAGEMENT AGENCY

county of ventura

Planning Division
Kimberly L. Rodriguez
Director

November 12, 2009

J. J. Mc Hugh
Captain, U.S. Navy
Commanding Officer
Department of the Navy
Naval Base Ventura County
311 Main Road, Ste. 1
Point Mugu 93042-5033

Dear Captain McHugh:

Thank you for the opportunity to comment on historic resource effects from the Laser Testing and Training Program. The Ventura County Cultural Heritage Board found at its meeting of November 9, 2009 that it concurs with your finding of No Adverse Effect to Historic Properties.

If you have any questions on this matter please contact me, 654-2414.

Yours truly,

Kim Hocking
Staff, Ventura County Cultural Heritage Board

E-mail cc Mr. Allen Adams

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DEPARTMENT OF THE NAVY
NAVAL BASE VENTURA COUNTY
311 MAIN ROAD, SUITE 1
POINT MUGU, CA 93042-5033

IN REPLY REFER TO:
5090
Ser N45VCS/0506
October 8, 2009

Mr. Milford Wayne Donaldson, FAIA
State Historic Preservation Officer
Department of Parks and Recreation
P.O. Box 942896
Sacramento, CA 94296-0001

Dear Mr. Donaldson:

The Naval Air Warfare Center Weapons Division (NAWCWD) proposes to add laser testing to the suite of activities conducted at the Point Mugu Sea Range offshore of San Nicolas Island (SNI), Naval Base Ventura County (NBVC). This letter initiates Section 106 consultation in accordance with 36 CFR 800.3(a), regulations implementing the National Historic Preservation Act of 1966, as amended.

The Proposed Action is to conduct laser tests, evaluations and training activities under various weather conditions on the Point Mugu Sea Range, including SNI. The Proposed Action would involve directing laser power at various types of fixed or dynamic targets from fixed or dynamic laser sources.

The purpose of the Laser Testing and Training Program is to support DoD directives on the development of laser applications to the National Defense through research, development, testing and evaluation (RDT&E) and training applications. Specifically, the Proposed Action is intended to allow both RDT&E and training the use of lasers in realistic maritime environments where potential conflicts with civilian activities and safety risks to the public are minimized.

Included in this letter are definitions of the Area of Potential Effects (APE) and information to support the Navy's determination that the undertaking will not adversely affect historic properties. The remainder of this letter is organized to present an overview of the undertaking and associated APE and discussion of the proposed project's potential to affect archaeological properties.

a. Proposed Action.

(1) The proposed action would consist of an increase in test, evaluation, and training activities on the Sea Range to characterize performance and to identify and resolve issues associated with the Department of Defense (DoD), other agency, coalition partner, and commercial use of laser technology. This work would involve laser testing and training under various weather conditions on the Sea Range and at SNI, and include lasers integrated onto aircraft, ships, and land-based platforms. The proposed action would involve directing laser energy at various types of fixed or dynamic targets from fixed or dynamic laser sources. Lasers would be operated on surface craft at sea, on aircraft, or on land. Likewise, targets could be at sea, in the air, or on land.

(2) Laser operations would include laser systems at wavelengths from 180 to 14,000 nanometers (0.18 to 14.0 µm) and at power levels up to a maximum of 1 megawatt (MW).

(3) The proposed testing, evaluation, and training activities would be supported by facilities and personnel at NBVC. All proposed use of lasers on the Sea Range would conform to the safety and procedural requirements established in the Sea Range EIS (NAWCWD 2002), as well as in the Navy Laser Hazards Control Program OPNAVINST 5100.27B and any revisions adopted in the future.

(4) The proposed action would also include the use of High Altitude Long Endurance (HALE) unmanned aerial vehicles (UAVs) to be used as both a laser platform and target. These HALE UAVs are fueled by liquid hydrogen and would operate out of NBVC Point Mugu, which would require the installation of a liquid hydrogen storage and fueling facility.

(5) The proposed action would initially be focused on laser testing and evaluation. Current training activities have been limited to range-finding and target designation lasers. As laser systems are proven in testing, lasers would be increasingly incorporated into training events.

b. Description of Undertaking and APE.

(1) The APE can best be described in four tiers. The first tier is the Point Mugu Sea Range itself, made up of open ocean areas from Morro Bay to the Mexican border enclosure (1). Dispersed activities would occur throughout this area,

though most likely in the waters between SNI and the northern Channel Islands.

(2) The second tier is an area of more intense activity that would take place in the waters surrounding SNI out to about three nautical miles. This area would see the same types of activities, but they would be more concentrated with the ability to use resources located on the island.

(3) The third tier would be sites actually on SNI enclosure (2). These locations would be used to place temporary targets for mobile lasers to engage, or would be used to place lasers to shoot at targets off, or in some cases, on the island itself. The areas were all specifically chosen to be areas devoid of cultural resources, with one exception.

(4) The last tier involves a specific location at Point Mugu, where a hydrogen fuel tank would be installed enclosure (3). The hydrogen fuel tank would be used to support certain UAVs that would be part of the testing program.

c. Identification of Historic Properties.

(1) Previously completed professional cultural resources investigations provide a basis for identifying historic properties in the APE for the proposed projects.

(2) The shipwreck assessment (Ogden Environmental Services 1999; "Shipwreck Study Point Mugu Sea Range") identifies a number of shipwrecks around SNI. Further, the study's predictive model indicates that shipwrecks are most likely to occur within one-half mile of the shore and in waters less than 30 feet deep. The APE for the Harpoon test extends from approximately three miles offshore and stops just offshore.

(3) In terms of prehistoric sites, our predictive model (Ogden Environmental Services 1997; "Underwater Archaeological Study Point Mugu Sea Range") models the potential for the presence of prehistoric archaeological sites to be found around SNI. The study extrapolates from the known settlement pattern and considers changes in the shoreline over the last 11,000 years. The study identifies low, moderate, and high probability zones based upon likelihood of the occurrence of prehistoric archaeological sites.

(4) JRP Historical Consulting Services inventoried the installation for historic era buildings and structures in 1998. The report, entitled "Inventory and Evaluation of National Register of Historic Places Eligibility for Buildings and Structures at Naval Air Weapons Station, Point Mugu, Ventura County, California", (Inventory and Evaluation) applied archival research and fieldwork to identify buildings and structures meeting the criteria of eligibility for listing in the National Register of Historic Places (NRHP).

(5) The entirety of SNI have previously been surveyed for the presence of prehistoric archaeological properties (Martz 2002). Some 537 archaeological sites have been mapped and recorded through these efforts. The report entitled "San Nicolas Island Prehistoric Archaeological Sites Mapping and Recordation Project" provides an up-to-date assessment of site integrity and research potential of each prehistoric site on the island.

(6) Martz categorized each of the sites into the following categories:

Number	Site Type
80	Substantial Habitation Site
79	Camp
164	Stone Artifact Manufacture and Shellfish Processing Location
90	Shellfish Processing Location
100	Flaked Stone Reduction Location
14	Deflated Hearth Feature
8	Unknown

(7) In addition two unique sites types are present:

Number	Site Type
1	Rock Art - 'Cave of the Whales'
1	Water Conveyance System

(8) Although there has been no complete inventory of historic era archaeological sites, the site inventory is well known through a number of historic thematic studies. The island was home to a sheep ranch from 1857 to 1943. The sheep ranch was located at three different locations through time and a number of associated outlying sites are known. These locations are well documented in two reports: "Historic Sheep Ranching on San Nicolas Island" (Swanson 1993) based on archival research and "Out

Where the Wind Blows and the Breakers Roll High: Sheep Ranching at the North Shore Ranch of San Nicolas Island" (McCawley 1997) based on oral history. Also present are a number of fishing camps that were in use from about 1860 through 1943 documented in "An Overview of the History of the Fishing Industry in Southern California and on San Nicolas Island" (Swanson 1999). Among these are a number of Chinese abalone camps occupied from about 1860 to 1910 documented in "A Historic Archaeology Investigation of the Chinese Abalone Fishing Industry on San Nicolas Island, California" (Krautkramer 2002). Added to this are a number of shipwrecks located along the shoreline documented in the "Shipwreck Study" (AMEC Earth and Environmental Services 1999).

(9) The inventory of historic archaeological sites comprises:

Number	Site Type
3	Sheep Ranches
12	European fishing camps
34	Chinese fishing camps
23	Shipwrecks

(10) For the Point Mugu site, JRP Historical Consulting Services inventoried the installation for historic era buildings and structures in 1998. The report, entitled "Inventory and Evaluation of National Register of Historic Places Eligibility for Buildings and Structures at Naval Air Weapons Station, Point Mugu, Ventura County, California", applied archival research and fieldwork to identify buildings and structures meeting the criteria of eligibility for listing in the National Register of Historic Places (NRHP). From this effort 11 structures were determined eligible for listing in the National Register of Historic Places. Those buildings comprise:

Building	Function
36	Pacific Missile Range Headquarters
55	Launch pad complex
727,728,729	Launch Pad Bravo
354,354A	Regulus Warhead Integration Facility
97,98	Naval Satellite Operations Center Radar
375,390	Naval Satellite Operations Center Headquarters

(11) Although there has been no complete inventory for prehistoric sites on the Point Mugu property, the majority of the

non-filled, non-wetland acreage has been surveyed. This work has resulted in the discovery of one prehistoric site (CA-VEN-187/256) on the installation. The prehistoric site was evaluated for eligibility and documented in the report entitled "Life in the Margins: Archaeological Excavations at Point Mugu (CA-VEN-187/256), (Statistical Research 2004). Their conclusion is that the site is eligible for inclusion in the National Register.

(12) There have been a number of historic context studies completed for the Point Mugu site. The pre-military history of the property has been documented in the report "From Spanish Land Grants To World War II: An Overview of Historic Resources at the Naval Air Weapons Station, Point Mugu, California" (Swanson 1994). The World War II era was addressed in the report entitled "History of The U.S. Navy at Point Mugu: World War II Era (1942-1945)" (Newland and VanWormer 1996), and the Cold War era was addressed in "The Navy's Pacific Guided Missile Sea Range, 1946-1991: Historic Context for Cold War-Era Buildings and Structures at Naval Air Weapons Station (NAWS), Point Mugu Ventura County, California" by JRP Historical Consultants", dated 2000.

(13) From these studies one historic era archaeological site (CA-VEN-1239) was identified. The site was evaluated for eligibility by ASM affiliates and documented in the report "A Pier into the Past at Point Mugu: The History and Archaeology of a Japanese-American Sport fishing Resort" (Schaefer and McCawley 1999). This site was determined eligible for listing in the National Register.

d. Potential to Affect Architectural Resources.

(1) The 1998 Inventory and Evaluation (JRP 1998) identified 12 structures as eligible for listing on the National Register of Historic Places, one on SNI and 11 at Point Mugu. None of these structures are within the APE. The closest of these structures is located over 800 meters from the nearest APE. Therefore, the proposed undertaking has no potential to affect historic architectural properties.

e. Potential to Affect Archaeological Resources.

(1) Although these studies have shown the potential for prehistoric sites to be located in the waters around SNI, no study to date has confirmed the presence of any such resources.

If they do exist, they most likely comprise large stone artifacts only, with little possibility of adverse impact from missile debris. Laser targets are expected to break up upon impact into many small pieces and are expected to cause only minor disturbance of the ocean floor.

(2) A number of shipwrecks are reported for the waters around SNI. Most of these are vessels which have been reported as lost, but there has been no wreckage found of these vessels. For vessels which do have known wreckage sites, these are all embedded in the sand beaches around the island. Since they are now on dry land, they are outside of the offshore APE. Only a couple of confirmed wreck sites are located offshore. These are World War II-era military vessels which were sunk during previous missile testing operations. Neither of these are likely eligible for inclusion in the National Register of Historic Places.

(3) Of the on-land portions of the APE enclosures (4) through (8), only one location contains any archaeological resources. The location known as the SLAM target site includes the archaeological site, CA-SNI-168. SNI-168 was previously determined eligible for listing in the National Register of Historic Places. SNI-168 was subject to a Section 106 consultation for use of the SLAM target site which resulted in a No Adverse Effect determination based on completion of data recovery excavations at the site. The data recovery excavations were completed in 1997 (Rosenthal and Jertberg 1997, "CA-SNI-168 Data Recovery, and Indirect Effects Area Investigations, San Nicolas Island, SLAM Targets").

(4) The APE at the Point Mugu site is a fairly small area where a liquid hydrogen fuel tank may be installed. The area itself contains no cultural resources and the nearest archaeological site is 650 meters away (enclosure 8).

f. Finding.

(1) Consistent with the above considerations and in accordance with 36 CFR 800.4(d)(1), NBVC has determined that a No Adverse Effect finding is appropriate for the proposed laser tests. Only one of the locations to be used contains any National Register eligible properties; that property was subject to data recovery excavations; and the area to be used for laser testing falls directly within the area excavated for data recovery.

5090
Ser N45VCS/0506
October 8, 2009

The Navy respectfully requests your comment on our proposed determination of No Adverse Effect to Historic Properties for the proposed laser tests. Should you have any questions, please contact, Mr. Allen Adams at (805) 989-9247.

Sincerely,

J. J. McHUGH
Captain, U.S. Navy
Commanding Officer

Enclosures:
1. Tier 1 APE Sea Range
2. Tier 2 APE SNI
3. Tier 4 APE Point Mugu
4. Inventory Results/Tier 3 APE SNI
5. Inventory Results/Tier 3 APE SNI
6. Inventory Results/Tier 3 APE SNI
7. Inventory Results/Tier 3 APE SNI
8. Inventory Results/Tier 3 APE SNI /Tier 4 APE Point Mugu

Copy to:
COMNAVREGSW (N45)

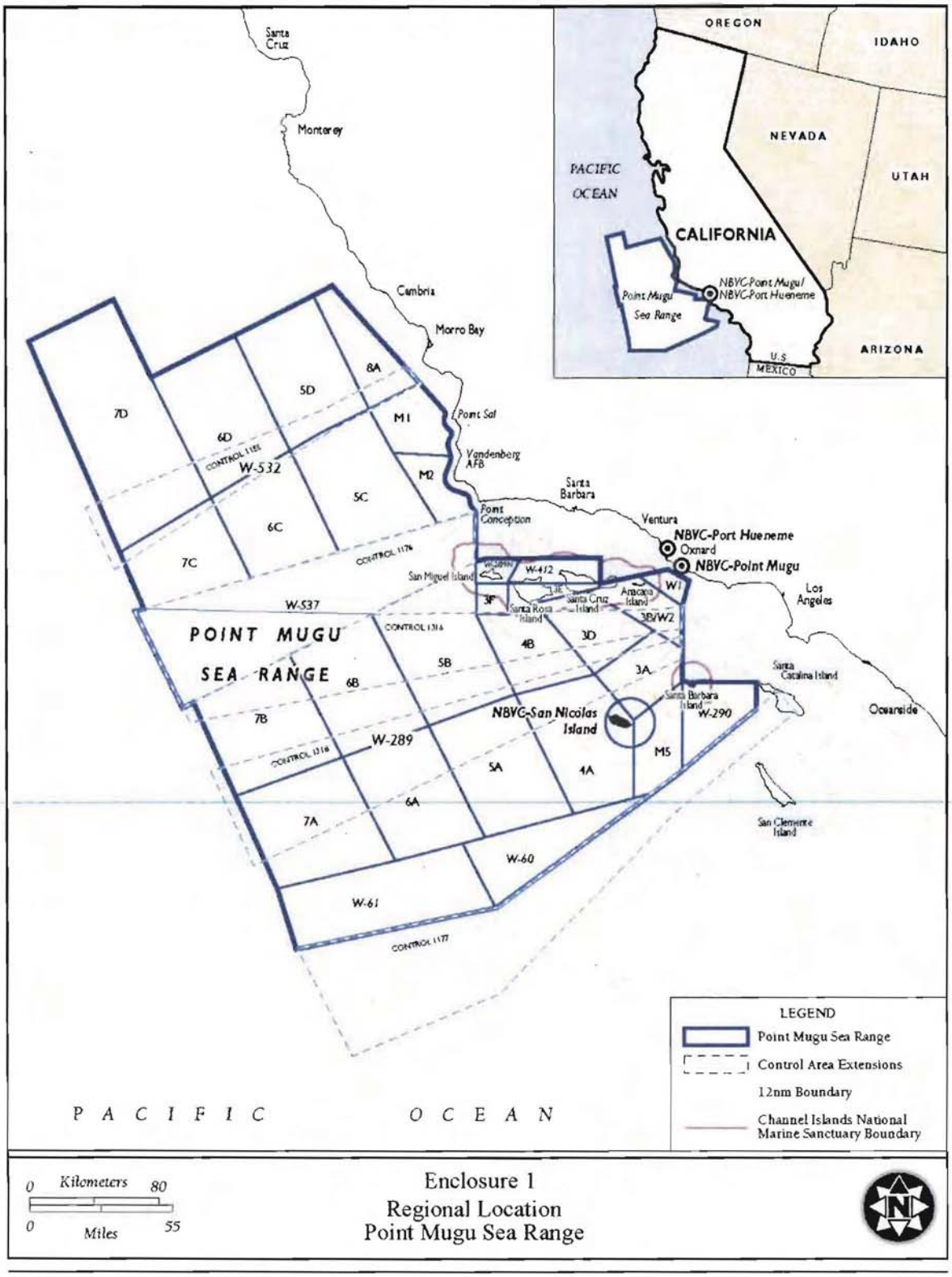
Friends of the Bard Mansion
P.O. Box 113, Port Hueneme, CA 93003

Port Hueneme Historical Society
220 Market Street, Port Hueneme, CA 93041

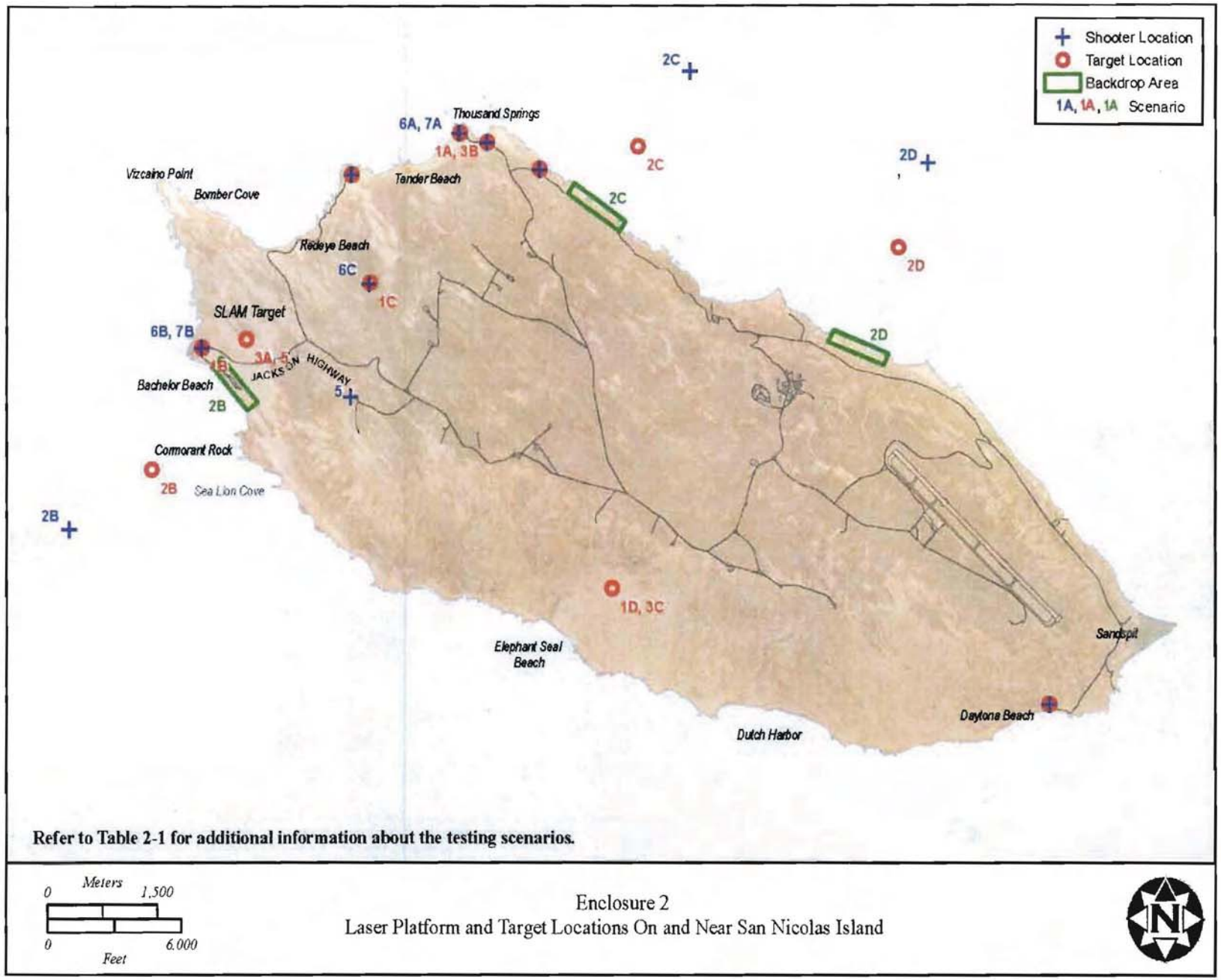
Ventura County Heritage Board
800 South Victoria Avenue, Ventura, CA 93009

Heritage Trust of Oxnard
125 North F Street, Oxnard, CA 93030

Santa Ynez Band of Mission Indians
Attn: Vincent Armenta - Chairman
P.O. Box 517, Santa Ynez, CA 93460

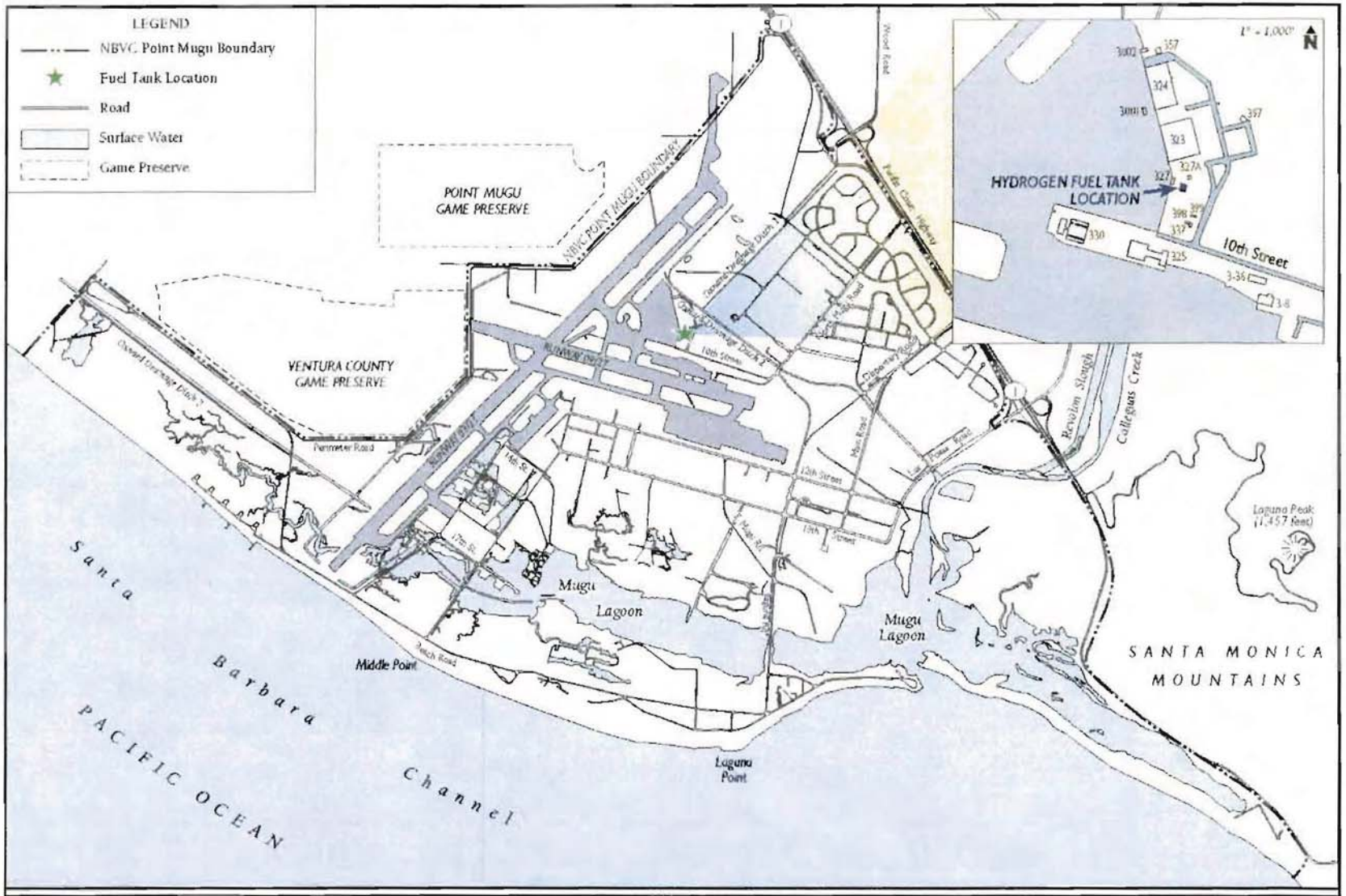

OREGON
IDAHO
NEVADA
UTAH
PACIFIC OCEAN
CALIFORNIA
NBVC-Point Mugu/ NBVC-Port Hueneme
Point Mugu Sea Range
ARIZONA
U.S. MEXICO
Santa Cruz
Monterey
Cambria
Morro Bay
Point Sal
Vandenberg AFB
Point Conception
Santa Barbara
Ventura
NBVC-Port Hueneme
Oxnard
NBVC-Point Mugu
Los Angeles
Oceanside
Santa Catalina Island
San Clemente Island
San Miguel Island
Santa Rosa Island
Santa Cruz Island
Anacapa Island
Santa Barbara Island
NBVC-San Nicolas Island
POINT MUGU SEA RANGE
W-532
W-537
W-289
W-412
W-290
W-60
W-61
CONTROL 1176
CONTROL 1316
CONTROL 1177
7D
6D
5D
8A
M1
M2
5C
6C
7C
6B
5B
4B
3D
3A
7B
5A
4A
M5
6A
7A
3F
3B/W2
W1
LEGEND
Point Mugu Sea Range
Control Area Extensions
12nm Boundary
Channel Islands National Marine Sanctuary Boundary
PACIFIC OCEAN
0 Kilometers 80
0 Miles 55
Enclosure 1
Regional Location
Point Mugu Sea Range

Enclosure (1)



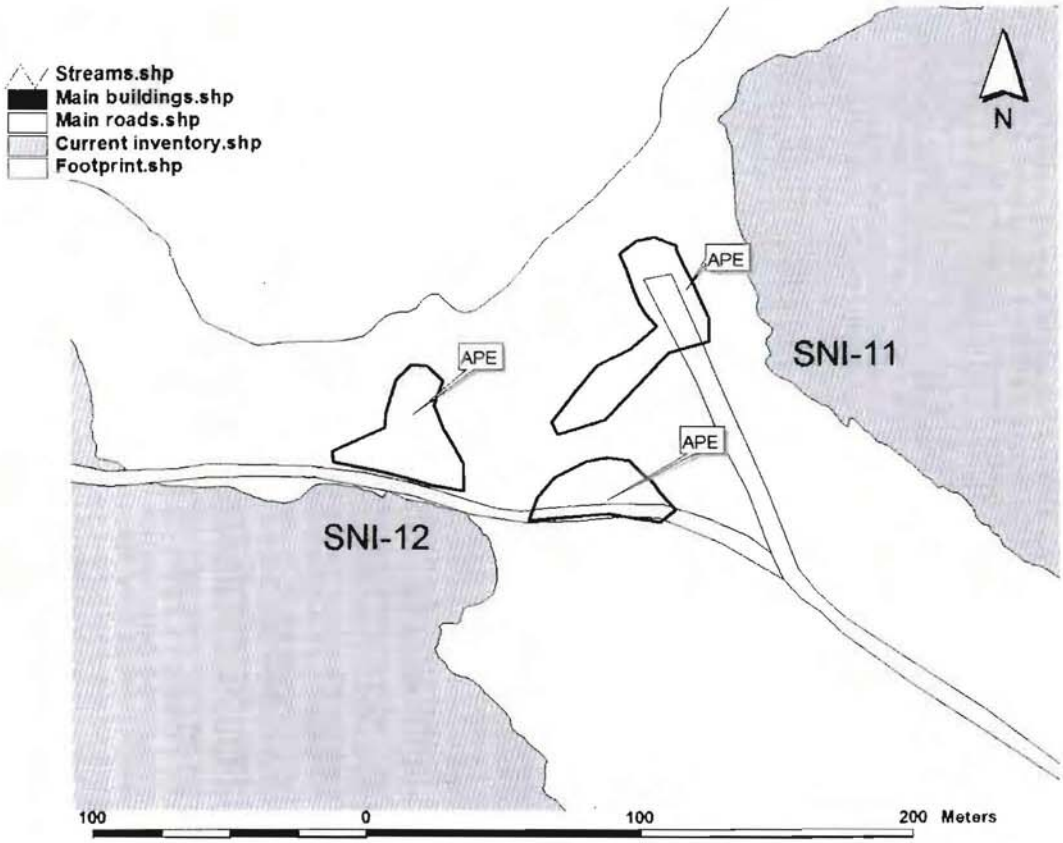
Enclosure 2
Laser Platform and Target Locations On and Near San Nicolas Island

Enclosure (2)

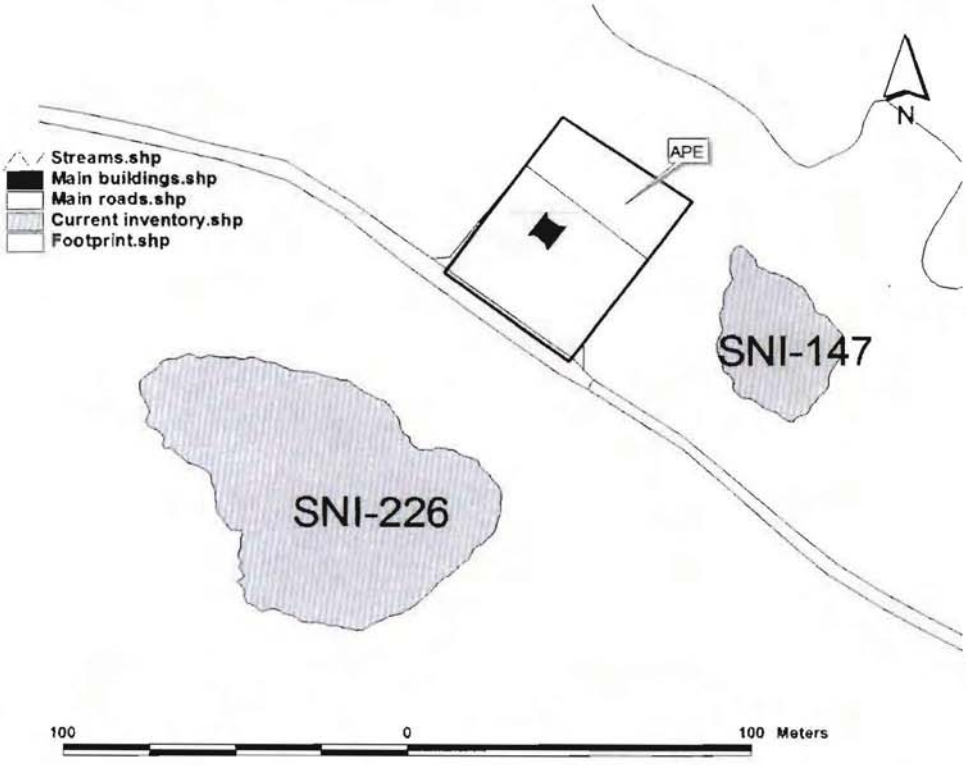


Enclosure 3
Hydrogen Fuel Tank Location

Enclosure (3)

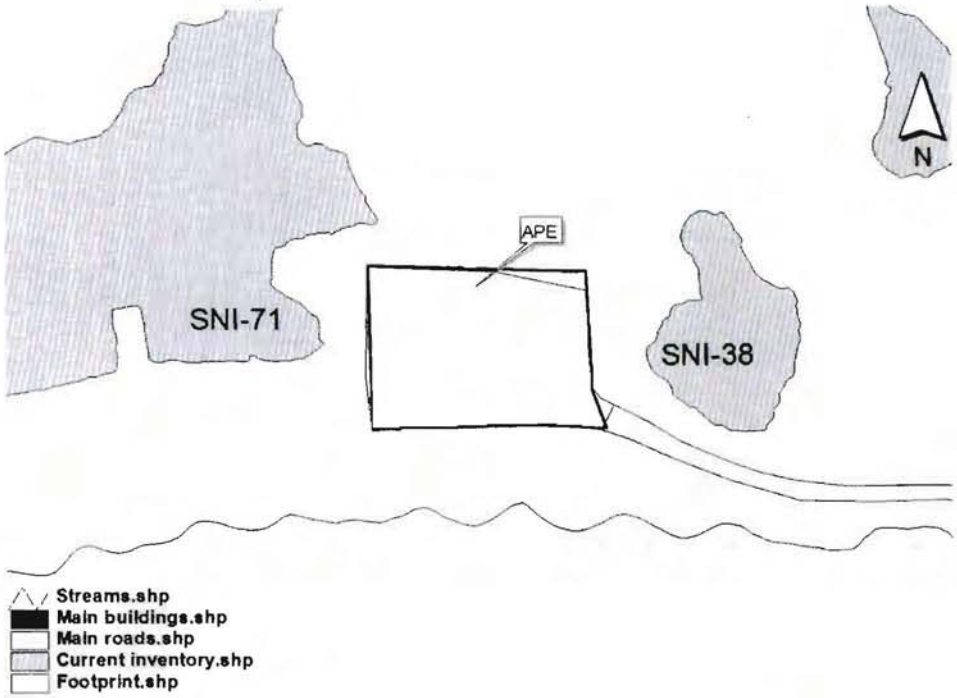


Inventory Results - Thousand Springs Area, SNI

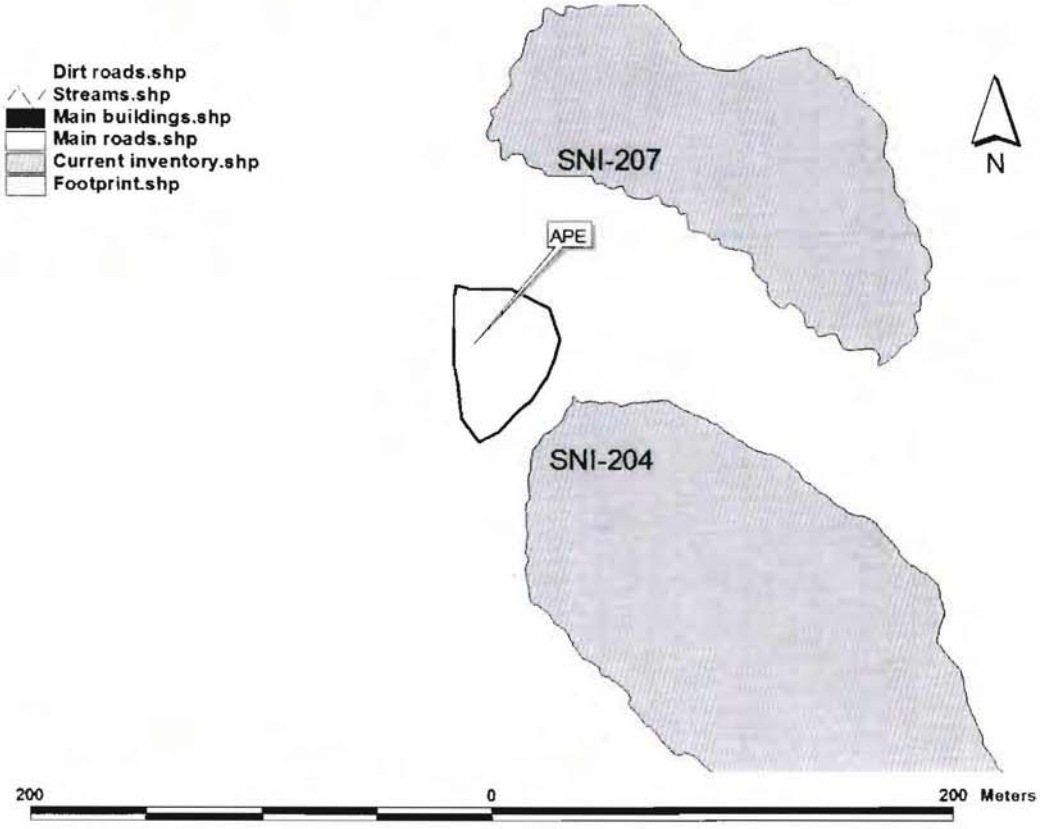


Inventory Results - Balloon Launch Area, SNI

Enclosure (4)

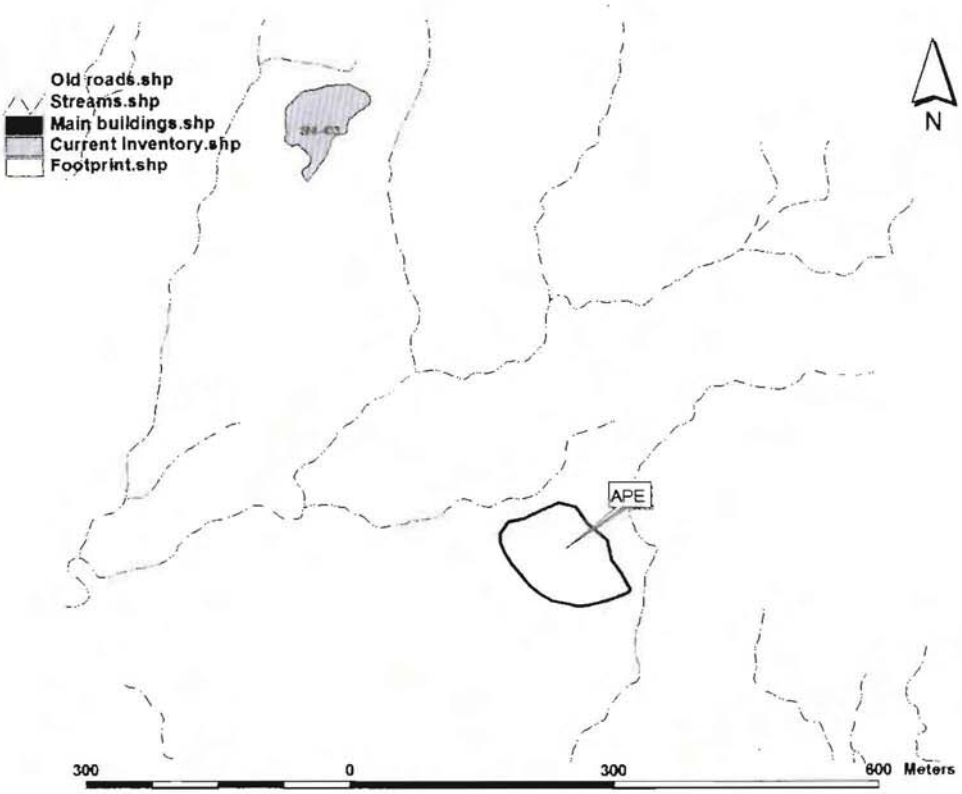


Inventory Results - Barge Landing Area, SNI

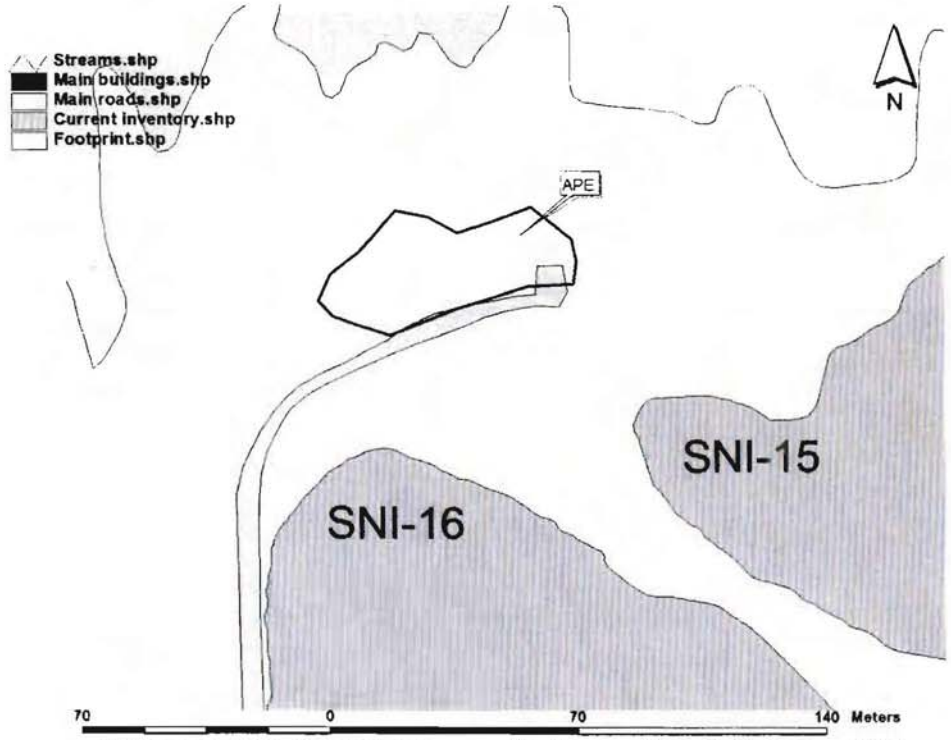


Inventory Results - Caliche Road Area, SNI

Enclosure (5)

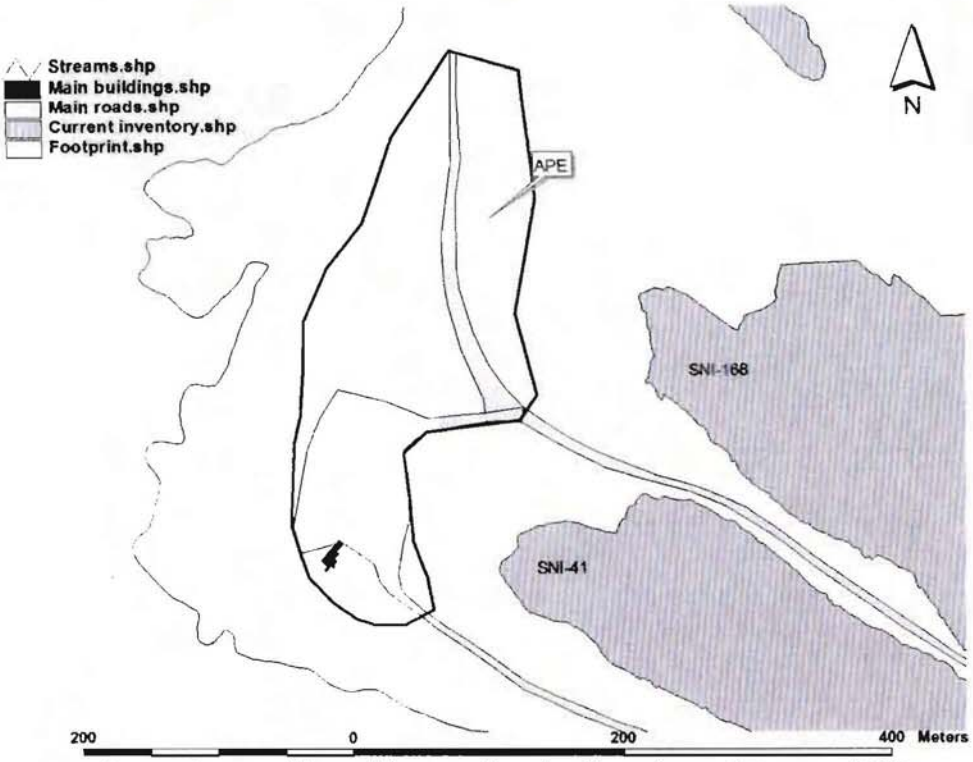


Inventory Results - Laser Target Area, SNI

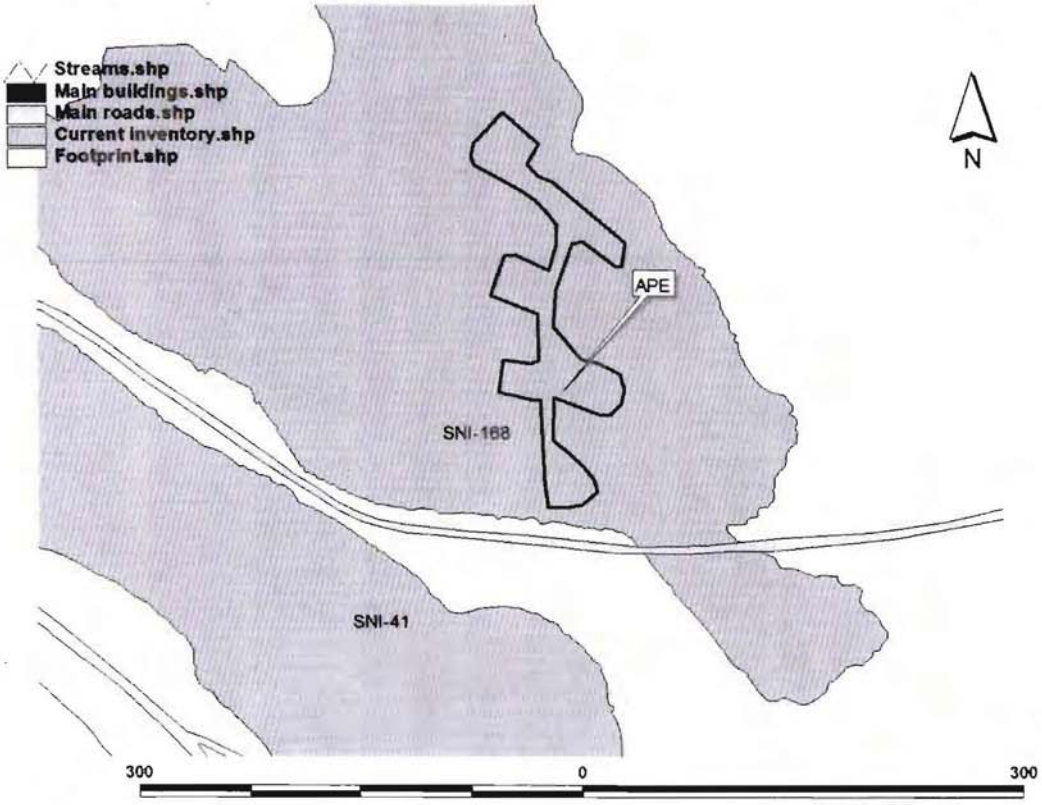


Inventory Results - Redeye Road Area, SNI

Enclosure (6)

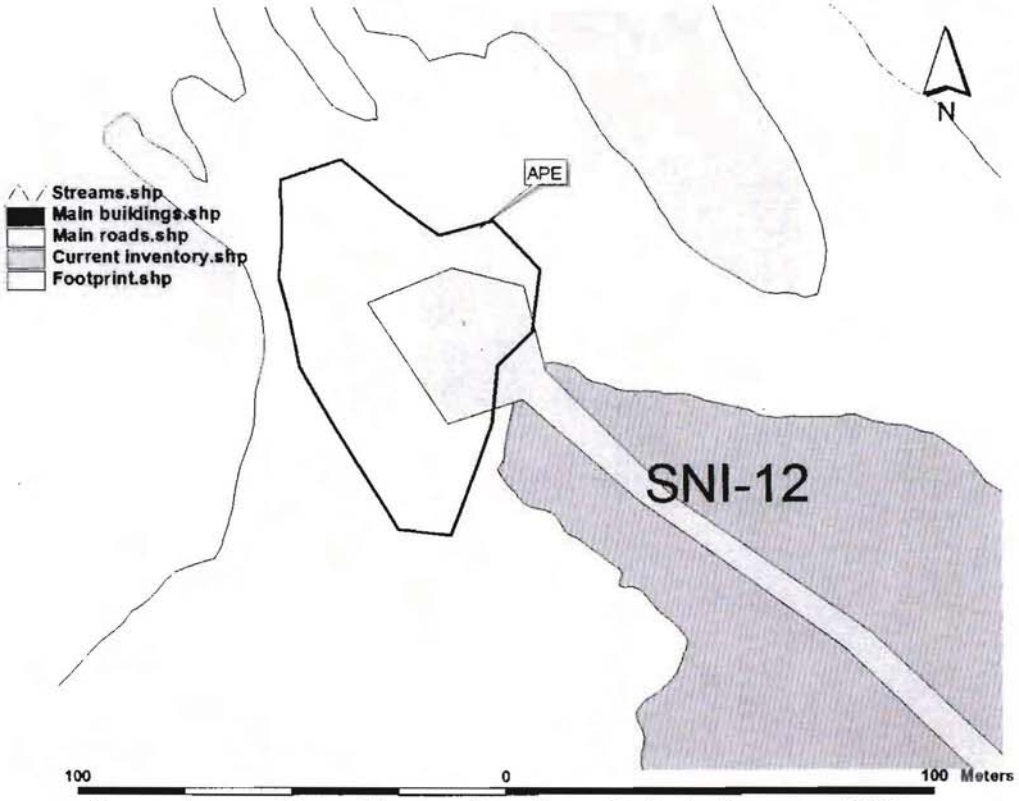


Inventory Results - Rock Crusher Area, SNI

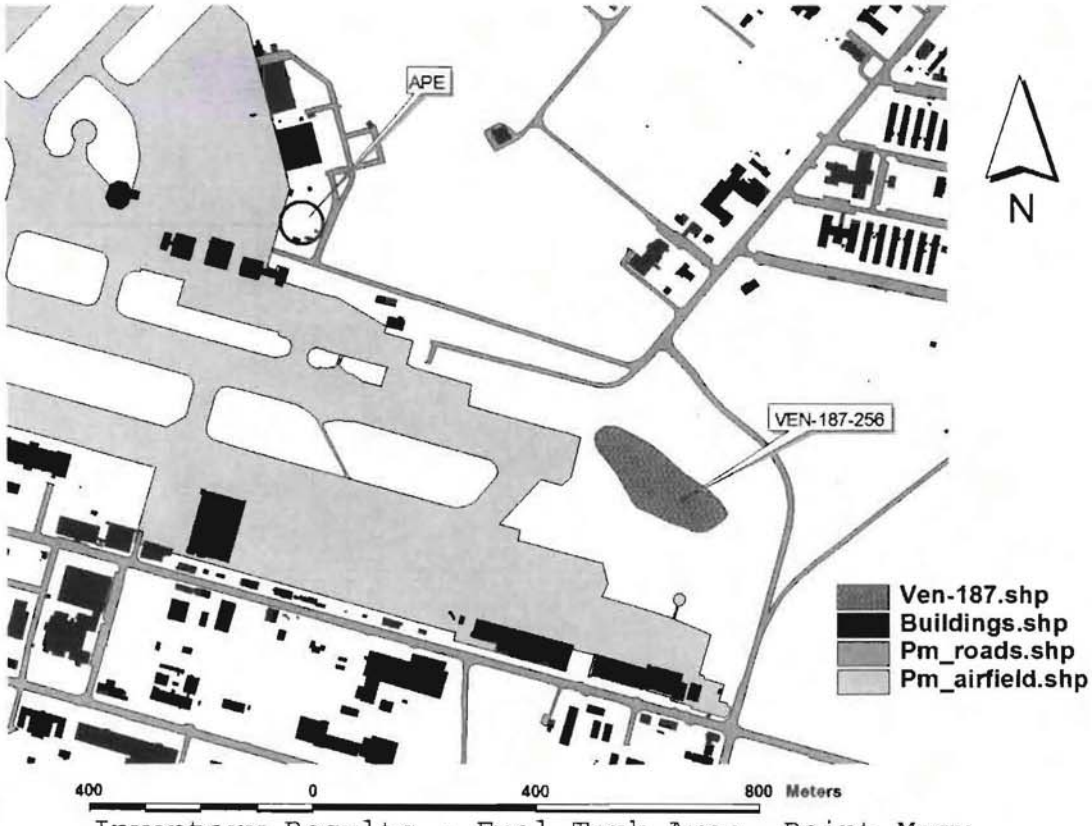


Inventory Results - SNI-168 Area, SNI

Enclosure (7)



Inventory Results - Tender Point Area, SNI



Inventory Results - Fuel Tank Area, Point Mugu

Enclosure (8)