Final
ENVIRONMENTAL ASSESSMENT

Directed Energy Test Facilities at San Nicolas Island

NAVAIR Range Sustainability Office
Naval Air Warfare Center, Weapons Division
Point Mugu, California

June 2015

Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
ac	acre(s)
ACHP	Advisory Council on Historic Preservation
ADS	Active Denial System
A/m	amperes per meter
ANSI	American National Standards Institute
APE	Area of Potential Effect
ASBS	Area of Special Biological Significance
BA	Biological Assessment
BMPs	Best Management Practices
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
cm	centimeter(s)
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide-equivalent
CONEX	container express
CW	continuous waves
CWA	Clean Water Act
DoD	Department of Defense
EA	Environmental Assessment
EFH	essential fish habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPCRA	Emergency Planning and Community Right to Know Act
ESA	Endangered Species Act
FAA	Federal Aviation Administration
ft	foot/feet
ft^2	square foot/feet
GHGs	greenhouse gasses
GHz	gigahertz
ha	hectare(s)
HERF	Hazards of Electromagnetic Radiation to Fuel
HERO	Hazards of Electromagnetic Radiation to Ordnance
HERP	Hazards of Electromagnetic Radiation to Personnel
HPM	high-power microwave
IEEE	Electrical and Electronics Engineers
INRMP	Integrated Natural Resources Management Plan
kHz	kilohertz
km	kilometer
km^2	square kilometer
kV	kilovolt
kVA	kilovolt-amp
kV/m	kilovolt per meter
laser	light amplification by stimulated emission of radiation
LNTL	lead Navy technical laboratory
LSRB	Laser Safety Review Board
m	meter
m^2	square meter
mg/m^3	milligrams per cubic meter
MHz	megahertz
MW	megawatt
mW/cm^2	milliwatts per square centimeter
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NAWCWD	Naval Air Warfare Center Weapons Division
NBVC	Naval Base Ventura County
NEPA	National Environmental Policy Act
NHPA	National Historic Prevention Act
nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
NO_x	nitrogen oxides
NSWCDL	Naval Surface Warfare Center Dahlgren Laboratory
O_3	ozone
OEA	Overseas Environmental Assessment
OEIS	Overseas Environmental Impact Statement
OPNAVINST	Chief of Naval Operations Instruction
OPNAVM	Chief of Naval Operations Manual
PEL	permissible exposure limit
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns and greater than 2.5 microns in diameter
ppm	parts per million
R	Restricted Area
RDAT&E	Research, Development, Acquisition, Test, and Evaluation
RF	radio frequency
RMS	root-mean square
RONA	Record of Non-Applicability
SAR	specific absorption rate
SCB	Southern California Bight
Sea Range	Point Mugu Sea Range
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SNI	San Nicolas Island
SO_2	sulfur dioxide
SOP	Standard Operating Procedure
SO_x	sulfur oxides
SPCC	spill prevention, control, and countermeasure
SUA	special use airspace
SWPPP	storm water pollution prevention plan
SWRCB	State Water Resources Control Board
U.S.	United States
USC	U.S. Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UWB	ultra-wide-band
VCAPCD	Ventura County Air Pollution Control District
VOCs	volatile organic compounds
$\mu g/m^3$	micrograms per cubic meter
µJ	microjoules
µm	micrometer

FINAL ENVIRONMENTAL ASSESSMENT

Lead Agency for the EA: United States Department of the Navy

Title of Proposed Action: Directed Energy Test Facilities at San Nicolas Island

Designation: Environmental Assessment

Abstract

The Naval Air Warfare Center Weapons Division is located at Point Mugu in Ventura County along the Pacific Coast of Southern California. The adjacent Point Mugu Sea Range spans 36,000 square miles (93,000 square kilometers) of open ocean and includes several of the nearby Channel Islands. This Environmental Assessment has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code 4321, as amended); regulations implemented by the Council on Environmental Quality (Title 40 Code of Federal Regulations [CFR] Parts 1500-1508); Navy Procedures for Implementing NEPA (32 CFR Part 775); and Chief of Naval Operations Manual 5090.1, *Environmental Readiness Program Manual*. 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 geology and soils; air quality; marine sediments and water quality; airspace, land, and water use; biological resources, cultural resources, public safety, and hazardous materials. No impacts are associated with other environmental resources or issues. No significant environmental impacts have been identified for the implementation of Alternative 1, Alternative 2, or for the No-Action Alternative.

Prepared By: Naval Air Warfare Center Weapons Division

Point of Contact: John Ugoretz
Range Sustainability Office, Building 53A
575 "I" Avenue, Suite 1
Point Mugu, CA 93042-5049
Email: John.Ugoretz@Navy.Mil
Tel: (805) 989-4852

June 2015

This Page Intentionally Blank

EXECUTIVE SUMMARY

The Naval Air Warfare Center Weapons Division (NAWCWD) Point Mugu Sea Range (Sea Range) is located in Ventura County along the Pacific Coast of Southern California and includes 36,000 square miles (sq mi, 93,200 square kilometers [km^2]) of ocean space; land areas at Naval Base Ventura County (NBVC) Point Mugu, San Nicolas Island, and Santa Cruz Island; and the special use airspace overlying the Sea Range. The Sea Range currently supports test and evaluation of sea, land, and air weapons systems as well as various categories of training activities. Training for the purpose of this document is generally defined as the practical application of previously developed processes, equipment and systems to ensure fleet and warfighter readiness. This testing and training is addressed in the March 2002 Environmental Impact Statement/Overseas Environmental Impact Statement for the Point Mugu Sea Range. The Navy subsequently prepared an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) (January 2010) to extend its test, evaluation, and training capability to include laser operations on the Sea Range, including San Nicolas Island (SNI). Directed energy can include lasers and high-power microwave systems. All directed energy operations are scheduled and managed by NAWCWD. The proposed action in this EA is to create Directed Energy Test Facilities on the west end of SNI to enhance directed energy testing and personnel training on the Sea Range.

In order to propagate directed energy at a distance of several miles 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 condition affecting a tightly focused, coherent beam of directed energy. Testing and personnel training related to directed energy systems must therefore occur in a maritime environment such as that which exists at the Sea Range.

This EA addresses the potential environmental impacts of constructing and operating the proposed Directed Energy Test Facilities (also referred to in this EA as the "test facilities"). This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code 4321, as amended); regulations implemented by the Council on Environmental Quality (Title 40 Code of Federal Regulations [CFR] Parts 1500-1508); Navy Procedures for Implementing NEPA (32 CFR Part 775); and Chief of Naval Operations Manual 5090.1, *Environmental Readiness Program Manual* (Navy 2014a).

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Directed Energy Test Facilities proposed by NAWCWD, the action proponent, is to support Department of Defense directives on the development of directed energy applications vital to the National Defense through Research, Development, Acquisition, Testing, and Evaluation (RDAT&E) and training applications. The directed energy test program requirement is for operationally realistic engagements in both maritime and land environments with an over-the-ocean shot from a land-based shooter site to a land-based target. The proposed Directed Energy Test Facilities are needed to support this requirement.

The Sea Range provides the combination of accessible land, air, and 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 and personnel training of directed energy systems.

The mission of NAWCWD includes operating the Sea Range to support the RDAT&E and training use of advanced weapons technology, helping to ensure the battlespace dominance of our military forces. The proposed Directed Energy Test Facilities are needed to support this mission.

PROPOSED ACTION AND ALTERNATIVES

The consideration of viable action alternatives focused on means to achieve the purpose and need. Two action alternatives were identified. Both alternatives include a "shooter site" at Tender Point, four calibration targets and one of the following: a target site at Bomber Cove (Alternative 1 or the Preferred Alternative) or a target site at Vizcaino Point (Alternative 2). The over-the-water distance from the shooter site (Tender Point) to the preferred target site at Bomber Cove is approximately 12,000 feet (ft) (3,660 meters [m]). The over-the-water distance from the shooter point to the alternative target site at Vizcaino Point is approximately 13,300 ft (4,050 m). Construction would be required for each of these project components. This includes widening existing roads and constructing new roads to provide sufficient access to the various sites, as well as concrete pads and supporting infrastructure. In response to consultation with the State Historic Preservation Officer, an originally proposed two-story building was removed from the Proposed Action. Alternative 2 includes additional construction activities associated with the target site as well as access roads to Vizcaino Point. Construction supplies, test equipment, and personnel would be transported to SNI via regularly scheduled aircraft and barge visits.

Once operational, test events would be conducted at the proposed test facilities. Each test event would involve the directed energy system at the shooter site being aimed and shot at one or more of the calibration target sites. Once the system is calibrated, it would be aimed at a target in order to conduct system tests. Siting “shooter” systems at Tender Point would allow a system to attack airborne or seaborne targets as well as targets at Bomber Cove or Vizcaino Point.

ENVIRONMENTAL CONSEQUENCES

Resources analyzed in this EA include: geology and soils; air quality; marine sediments and water quality; airspace, land, and water use; biological resources; cultural resources; public safety; and hazardous materials. The environmental consequences associated with implementation of the proposed Directed Energy Test Facilities and No-Action Alternative are presented in Table ES-1. As shown in Table ES-1, implementation of Alternative 1, Alternative 2, or the No-Action Alternative would not result in significant impacts to any resource area. The No-Action Alternative, however, would not meet the purpose and need for the proposed action.

Table ES-1. Environmental Consequences of Alternatives

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

Notes: **o** = No significant impact.

FINAL ENVIRONMENTAL ASSESSMENT
DIRECTED ENERGY TEST FACILITIES AT SAN NICOLAS ISLAND

TABLE OF CONTENTS

APPENDICES

List of Figures

Figure **Page**

List of Tables

CHAPTER 1
PURPOSE AND NEED

1.1 INTRODUCTION

The Naval Air Warfare Center Weapons Division (NAWCWD) Point Mugu Sea Range (Sea Range) is located in Ventura County along the Pacific Coast of Southern California and includes 36,000 sq mi (93,200 km^2) of ocean space; land areas at Naval Base Ventura County (NBVC) Point Mugu, San Nicolas Island, and Santa Cruz Island; and the special use airspace overlying the 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. Training for the purpose of this document is generally defined as the practical application of previously developed processes, equipment and systems to ensure fleet and warfighter readiness. This testing and training is addressed in the March 2002 Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for the Point Mugu Sea Range (Navy 2002). The United States (U.S.) Department of the Navy (Navy) subsequently prepared an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) (Navy 2010) to extend its test, evaluation, and training capability to include laser operations on the Sea Range, including SNI. Directed energy can include light amplification by stimulated emission of radiation (laser) and high-power microwave (HPM) systems. All directed energy operations are scheduled and managed by NAWCWD. The proposed action in this EA is to create Directed Energy Test Facilities on the west end of SNI (entirely within the 12 nm Territorial Sea boundary) to enhance directed energy testing and personnel training on the Sea Range.

In order to propagate directed energy at a distance of several miles 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 condition affecting a tightly focused, coherent beam of directed energy. Testing and personnel training related to directed energy systems must therefore occur in a maritime environment such as that which exists at the Sea Range.

This EA addresses the potential environmental impacts of constructing and operating the proposed Directed Energy Test Facilities (also referred to in this EA as the "test facilities"). This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code [USC] 4321, as amended); regulations implemented by the Council on Environmental Quality (CEQ) (Title 40 Code of Federal Regulations [CFR] Parts 1500-1508); Navy Procedures for Implementing NEPA (32 CFR Part 775); and Chief of Naval Operations Manual (OPNAVM) 5090.1, *Environmental Readiness Program Manual* (Navy 2014a).

1.2 PURPOSE AND NEED

1.2.1 Purpose

The purpose of the Directed Energy Test Facilities proposed by NAWCWD, the action proponent, is to support Department of Defense (DoD) directives on the development of directed energy applications vital to the National Defense through Research, Development, Acquisition, Testing, and Evaluation (RDAT&E) and training applications. The directed energy test program requirement is for operationally realistic engagements in both maritime and land environments with over-the-ocean shots from a land-based shooter site to a land-based target. The proposed Directed Energy Test Facilities would support this requirement.

Figure 1-1
Regional Location
Point Mugu Sea Range

The Sea Range provides the combination of accessible land, air, and 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 and personnel training of directed energy systems.

1.2.2 Need

In order to effectively defend against modern weapons systems and the possibility of adversarial attacks by land, sea, or air, the Navy must continually develop and maintain state-of-the-art weapons that can be deployed in realistic threat environments. The mission of NAWCWD includes operating the Sea Range to support the RDAT&E and training use of advanced weapons technology, helping to ensure the battlespace dominance of our military forces. The proposed Directed Energy Test Facilities are needed to support this mission.

1.2.2.1 Lasers

Lasers have already proven to be critical communications and targeting tools. A laser is a speed of light weapon. It is used to heat the surface of a target to the point that it fails or until energetic components ignite. It offers the potential to accomplish area defense, aircraft self-protection, strategic and tactical missile defense, and precision strike. 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 augment 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 personnel training in a realistic environment with different types of lasers, using different frequencies and power levels, and 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 RDAT&E 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 to support RDAT&E of laser operations.

1.2.2.2 High-power Microwave

HPM is a directed energy weapon technology. It generates a very short, intense energy pulse producing a transient surge of thousands of volts that overload the circuits of semiconductor devices causing catastrophic failure. HPM can disable non-shielded electronic devices (including most modern electronic devices) within the effective range of the weapon. Average power levels are similar to many conventional military radar systems, although peak power levels can be higher. HPM typically operate with up to 200 pulses per second with a maximum of 30 seconds every 5 minutes. HPM offers the potential to deny, disrupt, disable, or destroy target electronics by disabling the internal semiconductors that run them.

HPM can also provide a non-lethal anti-personnel capability. This non-lethal capability works by firing a high-power beam of electromagnetic radiation in the form of high-frequency waves at 95 gigahertz (GHz; a wavelength of 3.2 millimeters). The high-frequency waves excite the water and fat molecules in the body, instantly heating it and causing intense pain. The high-frequency waves used are blocked by cell density and only penetrate the top layers of skin, so it will not damage human flesh. Two basic types of HPM systems would be tested at the proposed Test Facilities: narrow-band and transient wave, also known as ultra-wide-band. Narrow-band devices generate a radio frequency (RF) signal made up of sine (S-shaped) waves either in a group or "pulse" of a few to many or, in some cases, continuous waves (CW). Transient wave signals do not radiate sine waves but rather an electromagnetic spike-like waveform of very narrow width. The transient waveform occupies a rather large, but instantaneous spectral bandwidth. For this reason it is generally referred to as an ultra-wide-band (UWB) signal.

1.3 NEPA DOCUMENTS INCORPORATED BY REFERENCE

Material relevant to an EA may be incorporated by reference in accordance with CEQ regulations (40 CFR 1502.21) and with the intent of reducing the document's size. The documents listed below are incorporated by reference due to their relevance to the actions addressed in this EA. A brief description of the contents of each NEPA document is also included.

- Point Mugu Sea Range EIS/OEIS (Navy 2002). This document addresses all activities and their associated environmental impacts within the Point Mugu Sea Range as of 2002. The proposed action included Theater Missile Defense testing and training, accommodating an increase in the level of both Fleet training exercises and special warfare training, and modernizing facilities at Point Mugu and SNI to enhance the Sea Range's capability to support existing and future operations. No significant, unmitigable environmental impacts of the Preferred Alternative were identified.
- EA/OEA for Laser Testing/Training, Point Mugu Sea Range (Navy 2010). This document addresses laser testing and training and associated environmental impacts at SNI. The proposed action involved directing laser energy at various types of fixed or dynamic targets from fixed or dynamic laser sources. Lasers could 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 included laser systems at wavelengths from 180 to 14,000 nanometers (0.18 to 14.0 micrometers [μm]) and at power levels up to a maximum of 1 megawatt. The proposed testing, evaluation, and training activities would be supported by NAWCWD personnel and facilities at NBVC. All proposed use of lasers on the Sea Range would conform to the safety and procedural requirements established in the Point Mugu Sea Range EIS/OEIS (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. No significant environmental impacts of the Preferred Alternative were identified.
- Point Mugu Sea Range Countermeasures Testing and Training EA (Navy 2014b). This document addresses the use of lasers and other systems designed to function in a defensive or pre-emptive manner, to intercept, deflect, deceive, deactivate, or destroy approaching threats, commonly termed countermeasures. Countermeasures also include systems that utilize more conventional weaponry, including small arms. The proposed action in this EA is to conduct additional types of countermeasures testing and training on the Sea Range, at Point Mugu, and at SNI. Effective countermeasures systems testing and training requires realistic conditions such as those that exist on the Sea Range over land, in littoral (i.e., nearshore) environments, and in the open ocean. All

project operations are scheduled and managed by NAWCWD. No significant environmental impacts of the Preferred Alternative were identified.

- EA/OEA, Sea Range Expansion of Unmanned Systems Operations (Navy 2015). This document addresses the extension of the Navy's Unmanned Aircraft Systems RDAT&E operations and training capability, and the introduction of unmanned maritime system operations are proposed for the Sea Range, the R-2519 and the R-2535 Restricted Airspace, and the associated SUA over the Sea Range. The proposed action includes construction of new support facilities at SNI. These facilities would include new hangars for the storage and maintenance of unmanned systems and launching/recovering platforms for unmanned systems. Unmanned systems capabilities support the following military missions: reconnaissance and surveillance; command, control, and communications support; security; combat support; attack; and sustainment. No significant environmental impacts of the Preferred Alternative were identified.

1.4 SCOPE OF THE EA

CEQ regulations and Navy policy for implementing NEPA specify that an EA 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 and additional personnel at SNI. Considering the nature of the proposed action, there would be negligible and insignificant impacts to the following resource/issue areas:

- Onshore Water Quality. All construction activities on SNI would occur on dry land and would disturb more than two acres (ac) (0.8 hectare [ha]), requiring permit coverage under the State Water Resources Control Board's (SWRCB) NPDES permit CAS000002 General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. Site development would be consistent with the requirements of Section 438 of the Energy Security and Independence Act for federal agencies to manage and reduce stormwater runoff. All necessary permits would be acquired prior to commencing construction. A Project Storm Water Pollution Prevention Plan (SWPPP) with project and site-specific construction best management practices (BMPs) would be developed and implemented during the course of construction. All NAWCWD activities would conform to the installation storm water pollution prevention plan and associated BMPs, which include eliminating discharges of sediment and other pollutants that could affect water quality.
- Marine environment and Essential Fish Habitat (EFH). As described above, onshore water quality would not be impacted by the proposed project activities. As such, there would be no downstream impacts to the marine environment, including EFH. Surface targets would not be located within intertidal zones of SNI and, therefore, the proposed action would not impact the intertidal zone where invertebrate and marine plant and algae densities are typically high. The proposed airborne and seaborne activities have been previously analyzed and would be consistent with other activities that currently occur within the Sea Range. 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 damage to kelp plants, especially considering the strong surge to which SNI kelp beds are normally exposed. Therefore, the proposed action would have no effect on the marine environment, including EFH. Potential impacts to species that occur on beaches, such as marine mammals and seabirds, are fully discussed in Chapter 3.

- Aesthetics and Visual Resources. Construction at the proposed shooter and target sites would be minimal. It would involve the addition of paved surfaces, and equipment,. Although there are currently relatively few buildings outside of Nicktown at SNI, the proposed shooter site would be consistent with other structures located intermittently along the northwestern portion of the island. As an intermittent activity involving Navy vehicles and personnel where these types of activities are routine, the proposed action would have no effect on aesthetics and visual resources.
- Socioeconomics. The proposed action would bring a small number of new personnel to Ventura County on a temporary basis to support the program. These individuals can be accommodated without impacts to socioeconomic indicators such as population, employment, income, housing, or schools. New facilities are not necessary to accommodate participants in directed energy RDAT&E activities. 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 (Executive Order [EO] 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*). Economic aspects of recreation, traffic, and fisheries are considered under Airspace, Land, and Water Use.
- Infrastructure and Utilities. Minimal new infrastructure is needed to support the proposed Directed Energy Test Facilities, which would use relatively small amounts of water during its operation, and have negligible effects on other users of base infrastructure and utilities. The shooter site would be connected to the existing base utility infrastructure. Electricity would be needed at the proposed shooter site, either 1,000 kilovolt-amps (kVA) or 1,500 kVA. The latter would require replacement of approximately 18,300 linear ft of power cable that serves the Thousand Springs area. However, the Power Plant on SNI can support either of these loads and any new cable would be pulled through existing underground conduit, not requiring trenching or digging. The proposed target site would rely on the use of a generator. Construction of a new roadway to the target site would be required, and widening of existing roads would be required at the proposed shooter and target sites. 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 proposed action and associated personnel.
- Noise. Intermittent aircraft and vessel noise associated with the proposed action is a routine occurrence on the Sea Range. Noise associated with construction of the shooter site, calibration sites, target site, and associated roads would be temporary and all such activity would be far from sensitive human populations. No other sources of sound, such as sonar, are proposed. The potential for noise from project activities to disturb wildlife is considered under Biological Resources.

The above resource/issue areas will not be discussed further in this EA. The resource/issue areas to be addressed in this EA include:

- Geology and Soils
- Air Quality
- Marine Sediments and Water Quality
- Airspace, Land, and Water Use
- Biological Resources
- Cultural Resources

- Public Safety
- Hazardous Materials

1.5 DOCUMENT ORGANIZATION

The organization of this EA is as follows:

- Chapter 1 (this chapter) defines the purpose of and need for the proposed action.
- Chapter 2 describes the proposed action and alternatives, the No-Action Alternative, and alternatives considered but dropped from further consideration.
- Chapter 3 describes the affected environment and environmental consequences associated with the implementation of each action alternative or the No-Action Alternative.
- Chapter 4 analyzes the potential cumulative impacts associated with the proposed action.
- Chapter 5 addresses other considerations required by NEPA.
- Chapter 6 contains all references cited in the EA.
- Chapter 7 provides the list of preparers.
- Appendix A provides the Record of Non-Applicability (RONA) and additional air quality data.
- Appendix B contains agency correspondence related to the EA.
- Appendix C contains a summary of public comments on the Draft EA.

1.6 REGULATORY COMPLIANCE

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

- Clean Air Act (CAA) (42 USC 7401 et seq.)
- Clean Water Act (CWA) (33 USC 1251 et seq.)
- Endangered Species Act (ESA) (16 USC 1531 et seq., as amended)
- Marine Mammal Protection Act (16 USC 1361 et seq., as amended)
- Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq.)
- Migratory Bird Treaty Act (16 USC 703 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.)
- Section 438 of the Energy Security and Independence Act (42 USC 17094)

Each of the above regulatory requirements is addressed within the context of the relevant section of the EA. The proposed action would require a permit under the State Water Resources Control Board's (SWRCB) National Pollutant Discharge Elimination System (NPDES) permit CAS000002 General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. Consultation with the U.S. Fish and Wildlife Service (USFWS) was completed in accordance with Section 7 of the federal ESA. Consultation with the National Marine Fisheries Service (NMFS) was not required. In addition, consultation with the State Historic Preservation Office (SHPO) was completed in accordance with Section 106 of the National Historic Preservation Act (NHPA). Compliance with the

federal Coastal Zone Management Act was accomplished through consultation with the California Coastal Commission (see Appendix B).

CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

2.1.1 Proposed Action

The proposed action is to construct and operate Directed Energy Test Facilities at SNI. Components of the proposed action include:

- *Shooter Site* – location where directed energy equipment would be placed for testing and personnel training.
- *Target Site* – location of directed energy targets.
- *Calibration Sites* – four calibration target sites.

Construction in either existing disturbed areas or previously undisturbed areas would be required for each of these project components. This includes widening existing roads and constructing new roads to provide sufficient access to the various sites, as well as supporting infrastructure and facilities. Construction supplies, test equipment, and personnel would be transported to SNI via regularly scheduled aircraft and barge visits.

Once operational, test events would be conducted at the proposed test facilities. Each test event would involve the directed energy system at the shooter site being aimed and shot at one or more of the calibration target sites. Once the system is calibrated, it would be aimed at a target in order to conduct system tests. The "shooter" systems siting would allow a system to attack airborne or seaborne targets as well as land-based targets. Tempo of these test events would be consistent with that described in the Point Mugu Sea Range Testing and Training Environmental Assessment (125 days/year, Navy 2014b)

2.1.2 Construction

The following sections summarize the major elements of the Proposed Action. Construction would last approximately 4 months and is proposed to begin in 2015. Construction would involve grading, compacting, and installation of pads/structures. The total land area disturbed would require permit coverage under the SWRCB's NPDES permit CAS000002 General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. Site development would be consistent with the requirements of Section 438 of the Energy Security and Independence Act for federal agencies to manage and reduce stormwater runoff. All necessary permits would be acquired prior to commencing construction. BMPs would be implemented to reduce stormwater runoff, avoid unnecessary vegetation removal, introduction of invasive species, pollution, contamination, and erosion.

2.1.2.1 Shooter Site

The shooter site is where directed energy equipment would be placed for testing and personnel training. The directed energy equipment would not be permanently installed at the site but would be transported to the site via tractor trailer truck and parked on a concrete pad at the site. The directed energy equipment would be housed within and operated from the tractor trailer truck. Directed energy systems could also be off-loaded from a truck for operation. The shooter site would require a road and utility infrastructure (electrical and communication lines) and a concrete pad. The existing base water infrastructure would not be modified.

2.1.2.2 Target Site

The target site would contain the targets used for directed energy testing and personnel training. The target site could be used by directed energy systems located at the shooter site as well as by systems integrated onto airborne or seaborne platforms.

2.1.2.3 Calibration Sites

As part of pre-event procedures, targets at these sites would be used to verify the aim point and target tracking capability of the directed energy system before its operation.

2.1.3 Operations

A summary of proposed test systems, directed energy types, and associated test activities at the proposed test facilities is provided in Table 2-1 and discussed in detail below. All classes of laser would be utilized. Power levels are expected up to and including 1 megawatt (MW) (average) at wavelengths from 0.18 μm to 14.0 μm. HPM is similar to a laser and is a form of directed energy.

Electric field tables for wideband and narrowband HPM are presented in Tables 2-2 and 2-3, respectively. Table 2-4 briefly describes the effects that such systems would have on people or other electronic systems. Importantly, since RF energy decreases exponentially with distance, relatively small distances from the source can lead to significant drops in energy level. A person or animal inadvertently within the beam at the target location could experience pain, but U.S. Air Force studies test subjects within the beam path did not encounter burns (see Section 3.7, Public Safety). As such, neither counter-electronics HPM nor non-lethal anti-personnel effects on people at or near the target would be lethal. In addition, non-lethal anti-personnel HPM systems such as the Active Denial System utilize a high-power beam of electromagnetic radiation in the form of high-frequency millimeter waves at 95 GHz.

Table 2-1. Proposed Activities

Activity	Laser	HPM
GENERAL		
System Parameters	• Power: Up to and including 1 MW (average). • Wavelength: 180 to 14,000 nanometers (0.18 to 14.0 µm). • General: Class 1, 2, 3, and 4 lasers. Laser types operated would include: solid-state, fiber, carbon dioxide, free electron, and closed-cycle chemical, including CW, pulsed, and ultra-short pulse.	• Power and frequency: refer to Table 2-2 and Table 2-3. • Non-lethal anti-personnel HPM systems utilize a frequency of approximately 95 GHz. The combination of power density and shot duration will not exceed 12 Joules per square centimeter at the target for any single shot. This could be tested on human targets as it poses no long-term threat (see Section 3.7.2). • Transmitter Operating Mode: CW or pulsed. • Antenna types: various including both narrow band and impulse radiating designs.
Personnel	10-30 during each event.	10-30 during each event.
OPERATION		
Tempo	Up to 125 days/year.	Included within Laser Tempo.
Event Duration	4-9 hours	Same as laser testing and personnel training.
Usage per Event	40 times Multiple pulses, typically < 15 seconds but may be up to 1 minute	40 times Multiple pulses, typically < 15 seconds but may be up to 1 minute.
Test Event Activities	Pre-event • Range Safety Approval • Transportation of system, CONEX boxes, and instrumentation to test facilities via tractor-trailer. • Unloading of system, CONEX boxes, and instrumentation using a crane or forklift. • System alignment, calibration, and check-out using calibration sites and/or the target site (approximately 2 hours per event) • Communications and instrumentation checks. Event • Clearance of any hazard areas through use of boundary boats and/or helicopters. Operations of the system-under-test until test objectives have been achieved. Personnel associated with test within safe facility during testing and personnel training; personnel not participating in test excluded from the area. Post-event • De-install and package system, CONEX boxes, and instrumentation for transport on tractor-trailers, and depart site.	Same as laser testing and personnel training.
Generator Use	One 20 kV generator (or multiple smaller generators) at target site, for pre-event, event, and post-event activities, up to 10 hours/day.	Same as laser testing and personnel training.
Vehicle Use	• Two tractor trailers to transport the system and instrumentation to the site (pre-event set-up and post-event tear-down). • Four pick-up trucks for personnel and equipment transportation pre-event, during the event, and post-event. • One 4-wheel drive forklift for loading and unloading. • One crane for loading and unloading.	Same as laser testing and personnel training.
Maintenance	Miscellaneous maintenance activities include road grading and preparing infrastructure at shooter site, target site, and calibration test sites. Maintenance activities are estimated at 15 times per year.	Same as laser testing and personnel training.

Table 2-2. Electro-Magnetic Environment for Narrowband HPM

Frequency Range (MHz)	Electric Field at Target (kV/m @ 1 km)	Peak Radiated Power (GW)	Practical Antenna Gain (dB)	Equivalent Isotropically Radiated Power (EIRP) (TW)
400 – 1000	100	33	40	333
1000 – 4000	400	169	45	5333
4000 – 5999	1000	105	55	33333
6000 – 13999	2500	659	55	208328
14000 – 27999	2500	659	55	208328
28000 – 40000	500	8	60	8333

Notes: MH_z = megahertz, kV/m = kilovolts per meter, km = kilometer, GW = gigawatt, dB = decibel.

Table 2-3. Electro-Magnetic Environment for Wideband HPM

Frequency Range (MHz)	Broad-Band Electric Field Distribution at Target (mV/m/MHz @ 100 m)	Peak Radiated Power (GW)	Practical Antenna Gain (dB)
30 – 150	33000	5	20
150 – 225	7000		
225 – 400	7000		
400 – 700	1330		
700 – 790	1140		
790 – 1000	1050		
1000 – 2000	840		
2000 – 2700	240		
2700 – 3000	80		

MH_z = megahertz, mV/m = megavolts per meter, m = meter, GW = gigawatt, dB = decibel.

Table 2-4. Potential Electro-Magnetic Effects on People

Distance to Source	Counter-Electronics HPM	Non-lethal Anti-Personnel HPM
Small	RF (including microwave) energy proposed for use would impart large amounts of energy into a person within the beam's path. This microwave energy would be absorbed and converted to thermal energy, causing tissue damage which could include skin burns and cataracts of the eye.	
Large	Although the long-wavelength beam would disrupt the signals of electronic systems, it would pass through a person standing in the beam without imparting any measurable amount of energy.	All of the beam's energy would be absorbed within the first few millimeters of a person's skin, causing pain. If forced to remain in place, prolonged exposure could lead to burns. Tests would be short-term in nature and would not lead to burn-inducing situations.

Source: LeVine 2009.

Before each event, one or more of the four proposed calibration target sites would be used to verify the directed energy system's aim point and target tracking capability before operating the system. This would confirm that energy would be confined to the pre-defined hazard area (the area that could be affected by the energy system) cleared for the test event. For lasers, the aim point would typically be verified visually by utilizing a lower power laser to ensure the laser is properly aligned before emitting higher energy at the target. Target tracking capability would be similarly verified.

During events, directed energy systems would first be set at a low power setting as an additional safety precaution to further ensure proper alignment and target tracking. It 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 directed energy system has been properly aligned with the target and the system's target tracking capability is verified, higher power settings and longer durations of use would take place.

2.1.3.1 Personnel

The number of personnel required for each event would vary by the type of test. Similar to the previous EA for laser testing (Navy 2010), project personnel at SNI during test events could include approximately 40 persons currently working at NAWCWD Point Mugu and residing locally, plus an additional 10-30 temporary personnel during testing and personnel training activities that would reside in military housing or local rental accommodations.

2.1.3.2 Safety Procedures

The Sea Range has established safety procedures as described in the Sea Range EIS (Navy 2002), and these procedures would be followed for directed energy testing and personnel training. Potential hazards would vary with each scenario, so each test event would be managed on a case-by-case basis to eliminate or reduce any potential risks. All test events requiring directed energy operations would require the approval of the Range Safety Officer for range operations and must be done in accordance with an approved standard operating procedure (SOP). A SOP would be prepared for each directed energy system for each type of operation.

To allow a full evaluation of risks and safety considerations and permit the planning and preparation for directed energy operations, the following data would be provided for each test event: a written description of test objectives, how directed energy systems would be used, people involved, and required data. Safety specifications for directed energy testing and personnel training at the proposed Directed Energy Test Facilities include:

- Planned barricades or gates at roads leading to the proposed shooter site, target site, and calibration sites;
- Each proposed test of a directed energy system would follow the protocols of *DoD Instruction 6055.11, Protecting Personnel from Electromagnetic Fields* (19 August 2009). This would include a detailed test plan(s) with a description of the objectives and risks, and a calculation of hazard zones that would need to be cleared; coordination with the Federal Aviation Administration (FAA), and U.S. Coast Guard; and the issuance of Notice to Airmen (NOTAM) and Notice to Mariners (NOTMAR), as appropriate, to the operating parameters of the directed energy system to be tested; and coordination with the DoD Laser Clearing House in the event that a directed energy system will be fired at or above the horizon. This includes coordinating Altitude Reservations with the FAA;
- Layout diagram(s), if applicable, of the test scenario showing the shooter site, target site, and time lines;
- SOPs governing the use of the system during the test 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 directed energy system(s).

Once all information is provided and successfully analyzed, the Range Safety Officer will generate a Range Safety Approval for each test event.

The proposed action would include monitoring, reconnaissance, and range clearance procedures as needed to ensure there are no hazards to people, ships, or aircraft downrange of the target, including beyond the boundaries of the Sea Range. For small hazard areas, helicopters and/or boundary boats would be used to clear sea areas. For distances out to 200 miles, existing radar stations would be used to ensure that the airspace is clear of non-participating aircraft. The standard protocol of publishing a NOTMAR and NOTAM and the use of marine radio channels for communicating would ensure that aircraft and vessels avoid these areas while Navy activities are underway.

2.2 ALTERNATIVES DEVELOPMENT

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

2.2.1 Siting Process

Proposed directed energy testing and personnel training activities require an over-the-ocean shot from a land-based shooter site to a land-based target. The operational components determined the type of site necessary to accomplish testing and personnel training objectives for directed energy systems. These components are summarized below:

- Systems need to be tested in a realistic maritime environment, i.e., across water to a land-based target at a realistic engagement distance.
- Need to provide a venue within which directed energy systems could be tested that are not yet ready for integration aboard a ship. Therefore, a land shooter site and a land target site with ocean in between are necessary.
- A minimum engagement distance (i.e., distance between the shooter site and the target site) for directed energy systems to be used at the test facilities is 9,000-12,000 ft (2,743-3,658 m).

2.3 ALTERNATIVES

The consideration of viable action alternatives focused on means to achieve the purpose and need. This, along with the siting criteria, limited potential shooter and target locations to areas on the west end of SNI, the only place within the Sea Range in which the curvature of the coastline allows for this type of line-of-sight shot over water with the minimum engagement distance (Figure 2-1). In each alternative the proposed shooter site is located at Tender Point approximately 1,000 ft (305 m) northwest of the existing Thousand Springs West Target Site (Figure 2-2). Tender Point was selected as the shooter site because access is more readily available to install the systems and because the over-the-water distance to potential target sites meets the minimum engagement requirement. No other potential shooter locations on SNI met these requirements.

Two action alternatives were identified. The primary difference between Alternative 1 (the Preferred Alternative) and Alterative 2 is the location of the target site - Bomber Cover and Vizcaino Point, respectively (Figures 2-3 and 2-4) and associated access roads.

Two of the proposed calibration sites (Targets A and B) would be accessible by existing gravel access roads that would not need improvement. Proposed Target sites C and D would require construction of a 500 ft^2 (46 m^2) access road (Figure 2-5)

2.3.1 Alternative 1 (Preferred Alternative)

Under Alternative 1, the target site would be placed at Bomber Cove (Figure 2-3). The over-the-water distance from the shooter site (Tender Point) to this alternative location is approximately 11,900 ft (3,627

m). The total disturbed ground area would be approximately 2.27 ac (0.92 ha). Proposed construction is summarized in Table 2-5.

2.3.1.1 Shooter Site – Tender Point

The shooter site would include:

- permanent 55-ft (17-m) radius concrete truck turnaround area and an adjacent 15-by-122 ft (5-by-37 m) concrete pad with line of sight across ocean waters to the target site;
- relocation of two range marker poles;
- widening approximately 3,196 ft (974 m)of an existing 8-ft (2-m) wide dirt/gravel access road to 18-ft (5-m) wide with a concrete apron to connect to the concrete truck turnaround area (the road would be constructed away from unstable slopes and soils); and
- installation of an underground conduit for power and communications utilities within the footprint of the widened portion of the existing road.

2.3.1.2 Target Site

The target site would include:

- construction of a permanent 40-by-40 ft (12-by-12 m) concrete pad;
- widening approximately 2,215 ft (675 m) of an existing 8-ft (2-m) wide gravel access road to 12 ft (4 m);
- construction of a 12-ft (3-m) wide, 2,885-ft (879-m) long gravel access road; and
- installation of a portable 20-kilovolt (kV) generator.

2.3.1.3 Calibration Sites

Calibration sites would be located in each of the following locations (Figures 2-1 and 2-5):

- Target A would be located 817 ft from the Tender Point shooter site along the dirt access road;
- Target B would located approximately 1,778 ft from the Tender Point shooter site along the dirt access road;
- Target C would be located approximately 5,715 ft from the Tender Point shooter site at an existing turn-out off Shannon Road; and
- Target D would be located approximately 6,112 ft from the Tender Point shooter site at an existing road turnout off Tufts Road.

Each of the proposed four calibration sites would include:

- construction of a permanent 15-by-15 ft (5-by-5 m) concrete pad, and
- placement of a temporary target (e.g., 8-ft (2-m) long container express [CONEX] box or a target board constructed for the test operation). The size of target board might be 6-by-8 ft (1.8-by-2 m) but would vary, as would the size of the CONEX box. Calibration targets would likely be system-specific. Video cameras might be located to view effects of directed energy on calibration targets. Small generators or solar cells might be used to power video cameras and associated communications equipment. System Parameters and Activities

2.3.2 Alternative 2

Under Alternative 2, the target site would be placed at Vizcaino Point (Figure 2-4). The over-the-water distance from the shooter site (Tender Point) to this alternative location is approximately 12,000 ft (3,658 m). The proposed shooter site and calibration target sites as described above would be implemented under Alternative 2. However, the proposed use of a target site at Vizcaino Point would include additional construction activities, particularly related to access roads (see Table 2-5 and Section 2.3.2.1, below). Alternative 2 would include additional conservation measures, as described in Section 2.3.3.1. The total land area disturbed would be approximately 2.38 ac (0.96 ha), approximately 0.11 ac (0.04 ha) greater than that for Alternative 1.

2.3.2.1 Target Site – Vizcaino Point

The Alternative 2 target site at Vizcaino Point (Figure 2-5) would include:

- construction of a permanent 40-by-40 ft (12-by-12 m) concrete pad;
- widening approximately 5,017 ft (1,529) of an existing 8-ft (2-m) wide gravel access road to 12 ft (4 m);
- construction of a 12-ft (4-m) wide, 2,340-ft (713-m) long gravel access road; and
- installation of a portable 20- kV generator.

2.3.3 Conservation Measures

Directed energy testing and personnel training activities are proposed to occur near concentrations of sensitive wildlife species. Wildlife protection measures will be required during testing and personnel training operations depending on the type of activity, location of the activity, and the time of year. The path from the directed energy system to the target will be monitored by observers with binoculars or remote cameras as necessary to ensure that the directed energy system is not fired if and when wildlife is within the nominal hazard zone (i.e., area potentially affected by the system), which is specific to the directed energy system. Targets will not be placed on horizontal surfaces where sea lions are hauled out, and surfaces near the target will have "bird spikes" (www.nixalite.com) attached to discourage perching. Proposed conservation measures are summarized below.

General Conservation Measures

In addition to the above, the Navy proposes the following general conservation measures:

- All portable equipment will be removed upon test completion.
- Upon completion of the proposed road construction, project vehicles and equipment will be restricted to existing concrete pads, leveled surfaces, and paved or dirt access roads.
- Vehicles will not be allowed to drive onto any beaches.
- Testing and personnel training activities will be minimized during the night.
- Surface targets will not be located within intertidal zones of SNI.

Western Snowy Plovers (*Charadrius alexandrinus nivosus*) at Tender Point

In September 2012, the USFWS issued a Biological Opinion for the project that authorized the flushing of western snowy plovers within the action area during project activities provided that all terms and conditions are implemented. As required under the Biological Opinion, the Navy would reinitiate

consultation with the USFWS if one western snowy plover is found dead or injured within the action area throughout duration of the project (USFWS 2012a).

The Navy proposes the following conservation measures during the construction phase, which are consistent with the USFWS Biological Opinion for the project (USFWS 2012a):

- As needed, a qualified biologist will oversee avoidance and minimization measures described below. Where a qualified biologist is needed (such as construction and/or operation and maintenance activities) in western snowy plover habitat or near sensitive biological resources, the biologist will: (1) be familiar with the federally listed species and associated habitats that require survey or monitoring; (2) have a bachelor's degree with an emphasis in ecology, wildlife biology, or related science; and (3) have previous experience with applying the terms and conditions of a Biological Opinion. In addition, the qualified biologist will be authorized by the USFWS to conduct the activities pursuant to the Biological Opinion.
- Construction activities at Tender Point will be conducted during the non-breeding season for western snowy plovers (September 16 – February 28).
- Construction and staging areas along with potential western snowy plover habitat will be delineated by a qualified biologist with bright flagging or fencing to minimize the amount of potential habitat damaged and lost. Equipment will not operate outside these delineated areas. All material used for delineating the project area will be removed immediately upon completion of activities.
- Road material that may encourage nesting will not be used at Tender Point.
- Barriers will be placed along the outside edge of Tender Point Road and the turnaround to reduce the nesting appeal for western snowy plovers.
- As feasible, structures that may be used as perches by predators will be rendered unsuitable (e.g., fitted with nixalite) for that purpose.
- Best Management Practices will be implemented to avoid unnecessary vegetation removal, introduction of invasive species, pollution, contamination, and erosion.

The Navy proposes the following conservation measures during the operational phase:

- Avoid activities when western snowy plovers are present, if operational parameters allow.
- For operations occurring during the snowy plover nesting season (March 1 – September 15), a qualified biologist will: (a) educate operational personnel about sensitive habitats and how to implement avoidance and minimization measures, (b) delineate any areas adjacent to a site that should be avoided, and (c) attend operationally related meetings as needed.
- During the snowy plover nesting season, a biologist will conduct regular surveys of the affected area. When operational activities are scheduled to occur within 1,000 ft of a known or suspected snowy plover nest location and which may potentially disturb nesting snowy plovers, the biologist will observe the nest location prior to the operation to determine nesting status, during the operation to determine if disturbance is occurring, and after operations to determine the status of the nest. After the operational activity is completed, the nests will be observed again to ascertain whether the status of the nests has been permanently altered by the activity. Observations will be made as close to the activity as operational and safety constraints allow and that will also allow a complete view of the plover nest.

- The results of biological monitoring will be included in an annual report that will be submitted to the appropriate USFWS contact summarizing activities related to this project on SNI.
- During the snowy plover nesting season (March 1 – September 15), access to the test facilities will be restricted to operational activities only and recreational use of the facilities (fishing, picnicking, beach-combing, etc.) will be prohibited.
- Unless operationally necessary, personnel will not occupy the site between dusk and dawn and the area will remain dark (no artificial lighting) to reduce the potential for adverse impacts on snowy plovers in adjacent natural habitat.
- If night-time operations are necessary, outdoor lighting will include shielding designs to ensure light entering adjacent snowy plover nesting habitat is minimized.
- At all times, trash collection containers will not be placed on site and the area will be maintained trash free to reduce attracting predators (primarily island foxes [*Urocyon littoralis dickeyi*]).
- Maintenance will be conducted between September 16 and February 28, outside the snowy plover breeding season (see Table 2-5).
- A Spill Prevention, Control, and Countermeasure (SPCC) Plan will be in place to minimize the potential for an oil or hazardous substance spill, to prevent any spill from leaving the confines of the area, and to ensure that the cause of any spill is corrected.

Marine Mammals at Tender Point and Bomber Cove (or Vizcaino Point)

The Navy recommends the following conservation measures during the construction phase:

- All construction will be conducted outside of marine mammal breeding and pupping seasons (see Table 2-5).
- In accordance with the Marine Mammal Protection Act (16 USC, 1379 Sec. 109(h)), a qualified biologist will be present prior to commencement of construction activities and will move marine mammals from the area if required for the protection or welfare of the mammal, the protection of the public health and welfare, or the nonlethal removal of nuisance animals.
- If feasible, permanent barriers (e.g., concrete K-rails) will be installed around concrete pads and work areas to discourage marine mammals from using these areas as haulouts.

The Navy recommends the following conservation measures during the operational phase:

- Prior to scheduling the use of a particular site, NAWCWD will contact the Navy's Natural Resources staff at Point Mugu or SNI for current information regarding the occurrence of marine mammals at sites under consideration. Within 24 hours prior to commencing testing or training activities at these sites, a qualified biologist familiar with the behavior of marine mammals and their use of shoreline habitats in the testing or training area will search for marine mammals within and adjacent to the testing or training area. Test activities will be postponed, relocated, and/or monitored by the qualified biologist as necessary to ensure that the activities are unlikely to result in any "take" (as defined under the Marine Mammal Protection Act) of marine mammals.
- Testing and personnel training activities will be avoided during the marine mammal breeding and pupping seasons unless operationally necessary.
- Missiles and/or targets (e.g., drone aircraft) will not be launched at low elevation on low azimuths that pass close to beach haulout sites.

- Multiple missile and/or target (e.g., drone aircraft) launches in quick succession over haulout sites will be minimized, especially when young are present.
- The results of biological monitoring will be included in an annual report that will be submitted to the appropriate NMFS contact summarizing activities related to this project on SNI.
- Maintenance will be conducted outside marine mammal breeding/pupping seasons (see Table 2-5).

Biosecurity Measures

Construction materials will be transported to SNI via regularly scheduled barges. Transport, use, and storage of construction materials on site will be in accordance with NBVC biosecurity measures to minimize the potential occurrence of invasive species. This includes a requirement that all gravel be certified weed-free.

2.3.3.1 Additional Alternative 2 Conservation Measures

In addition to the conservation measures included in Section 2.3.3, the Navy proposes the following conservation measures during the construction phase to further protect Brandt's cormorants at Vizcaino Point:

- Road widening, target pad installation, and installation of any other infrastructure such as calibration boards and communication and power lines would be conducted outside of the Brandt's cormorant nesting period (generally late February through late August).
- The limits of all construction and staging areas and cormorant nesting areas would be delineated by a qualified biologist with bright flagging or fencing to minimize the amount of potential habitat damage and loss. Equipment would not operate beyond the limits defined by the flagging or fencing. Materials used to delineate the construction area boundaries would be removed immediately after completion of construction activities.
- Road placement would be designed to avoid passing directly through prime cormorant nesting habitat, especially existing raised berms.
- Appropriate barriers would be placed along the outside edge of the Vizcaino Point target site as well as the new road leading to the target site to reduce the appeal of the site as a potential Brandt's cormorant nesting location.
- Best Management Practices would be implemented to avoid unnecessary vegetation removal, introduction of invasive species, pollution, contamination, and erosion.

In addition to the conservation measures included in Section 2.3.3, the Navy proposes the following conservation measure during the operational phase of Alternative 2 to further protect Brandt's cormorants:

- A qualified biologist would survey the target area for nearby cormorant nests before commencing testing and personnel training activities and would survey the area after testing and personnel training activities ceased to determine and record any migratory bird take associated with operations.
- No operations requiring transit through the cormorant breeding colony would occur during the cormorant nesting season.

2.3.4 Alternatives Dropped from Further Consideration

There are no other areas within the Sea Range that could be used for an over-water operation from a land-based shooter site to a land-based target. Since the purpose and need are to construct Directed Energy Test Facilities and conduct these types of operations, locations other than SNI were not considered. No other locations on SNI with appropriate target distances exist.

2.3.5 No-Action Alternative

Under the No-Action Alternative, the proposed Directed Energy Test Site would not be constructed and associated testing and training activities would not occur. While existing activities would continue, there would be no ability to test from shore-to-shore over water. This is not a viable alternative because the purpose and need for the proposed action would not be met. The consequences of the No-Action Alternative would be to lessen the capabilities for Directed Energy testing and training. This would slow the development of Directed Energy technology, which is needed to counter increasingly sophisticated threats to military and non-military assets in coastal environments. Since other nations are rapidly developing these technologies for military applications, the No-Action Alternative would compromise the technological advantage of the U.S. military and put our forces at greater risk. The No-Action Alternative would erode the RDAT&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.

Table 2-5. Proposed Construction under Alternatives 1 and 2

Component	Description	Seasonal Construction Constraints
SHOOTER SITE (ALTERNATIVES 1 AND 2)		
	•	•
Truck Turnaround and Shooter Site	• Approximately 13,811 ft^2 (1,283 m^2) concrete turnaround area and pad. • The entire area shown in gray in Figure 2-2, which includes the test facility and driveway, covers approximately 19,850 ft^2 (1,844 m^2).	Snowy Plover Breeding • No construction March 1 – September 15.
Access Road	• Widen 3,196 ft (974 m) of existing 8-ft wide gravel road to 18 ft (5 m) wide gravel road, increased footprint by approximately 31,960 ft^2 (2,969 m^2).	Snowy Plover Breeding • No construction Past Thousand Springs Graded Turnout - March 1 – September 15. • Biological survey required for construction between Shannon Road and Thousand Springs Graded Turnout form March 1 to September 15.
TARGET SITE – BOMBER COVE (ALTERNATIVE 1)		
Target Pad	• 1,600 ft^2 (149 m^2) concrete pad.	California Sea Lions • No construction May 1 – July 30.
Access Road	• 2,885 ft (879 m) of new, 12-ft (4-m) wide gravel road totaling 34,620 ft^2 (268 m^2). • Widen 2,215 ft (675 m) of existing 8-ft (2-m) wide gravel road to 12 ft (4 m) wide; increased footprint of approximately 8,860 ft^2 (823 m^2).	California Sea Lions • No constraints for area between Redeye Road and 0.25 mile (0.40 km) of Target Pad. • Biological survey required for construction of new road within 0.25 mile (0.40 km) of Target Pad from May 1 – to July 30.
TARGET SITE – VIZCAINO POINT (ALTERNATIVE 2)		
Target Pad	• 1,600 ft^2 (149 m^2) concrete pad.	California Sea Lions • No construction May 1 – July 30. Brandt's Cormorants • No construction during nesting periods (generally late February through late August).

TARGET SITE – VIZCAINO POINT (ALTERNATIVE 2, CONTINUED)

Table 2-5. Proposed Construction under Alternatives 1 and 2

Component	Description	Seasonal Construction Constraints
Access Road	• 2,340 ft (713 m) of new 12-ft (4-m) wide gravel road totaling 28,080 ft^2 (2,609 m^2). • Widen 5,017 ft (1,529 m) of existing 8-ft wide gravel road to 12 ft (4 m) wide; increased footprint of approximately 20,068 ft^2 (1,864 m^2).	California Sea Lions • No constraints for area between Redeye Road and the end of the improved road. • Biological survey required for construction of the new road leading to the Target Pad from the end of the widened road during May 1 – July 30. Brandt's Cormorants • No construction of the new road leading to the target site from the end of the widened road during nesting periods (generally late February through late August).
CALIBRATION SITES (ALTERNATIVES 1 AND 2)		
Target A	• 15 x 15-ft (225 ft^2) concrete pad. • Adjacent to existing road, no access road needed.	• No Constraints.
Target B	• 15 x 15-ft (225 ft^2) concrete pad. • Adjacent to existing road, no access road needed.	• No Constraints.
Target C	• 15 x 15-ft (225 ft^2) concrete pad. • 500 ft^2 (46 m^2) of access road.	Island Night Lizards • Biological survey prior to commencement of construction.
Target D	• 15 x 15-ft (225 ft^2) concrete pad. • 500 ft^2 (46 m^2) of access road.	• No Constraints.

Notes: ft = feet, m = meter, ft^2 = square feet, m^2 = square feet, km = kilometer.

Figure 2-1
Proposed Action (Alternatives 1 and 2)

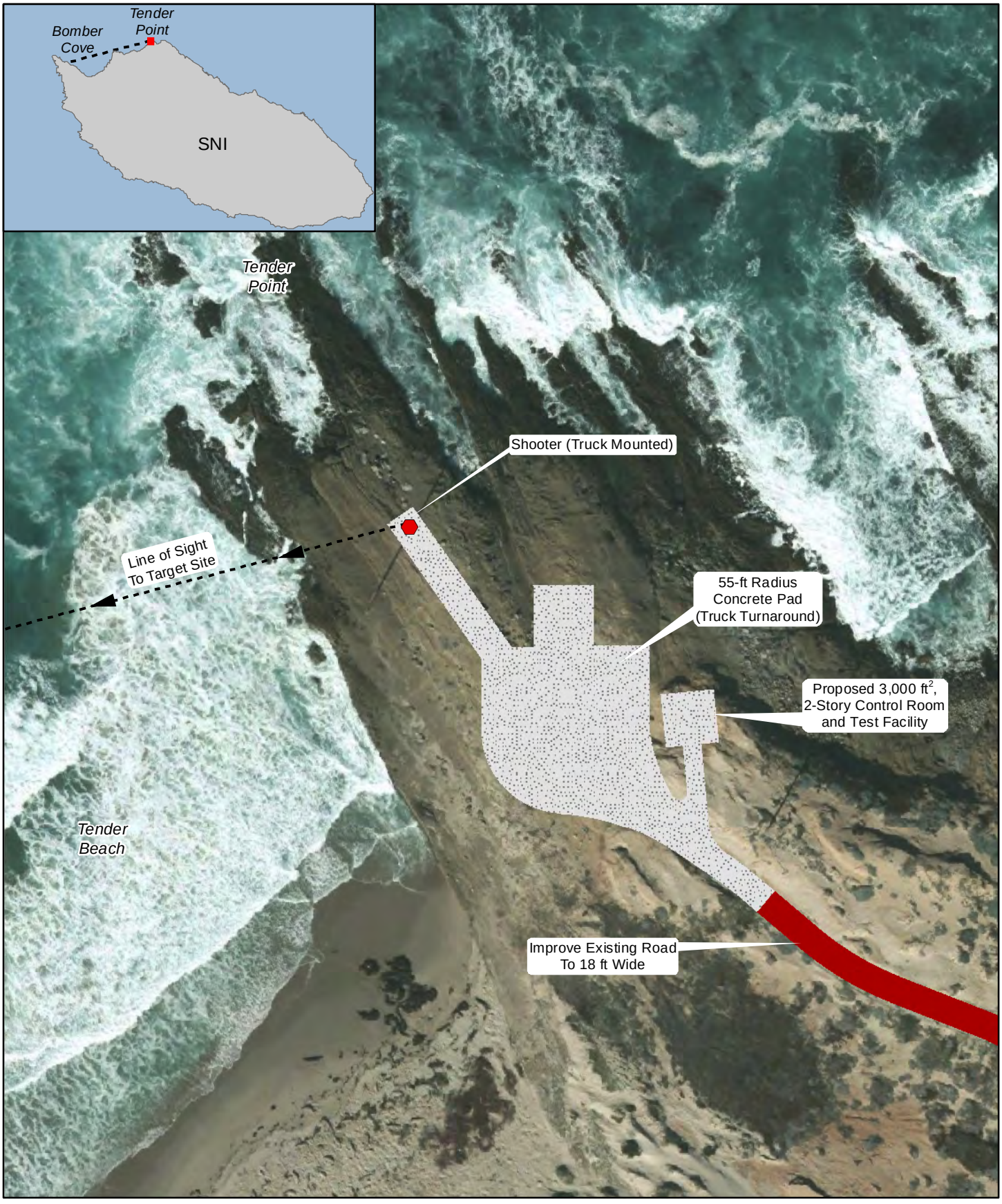
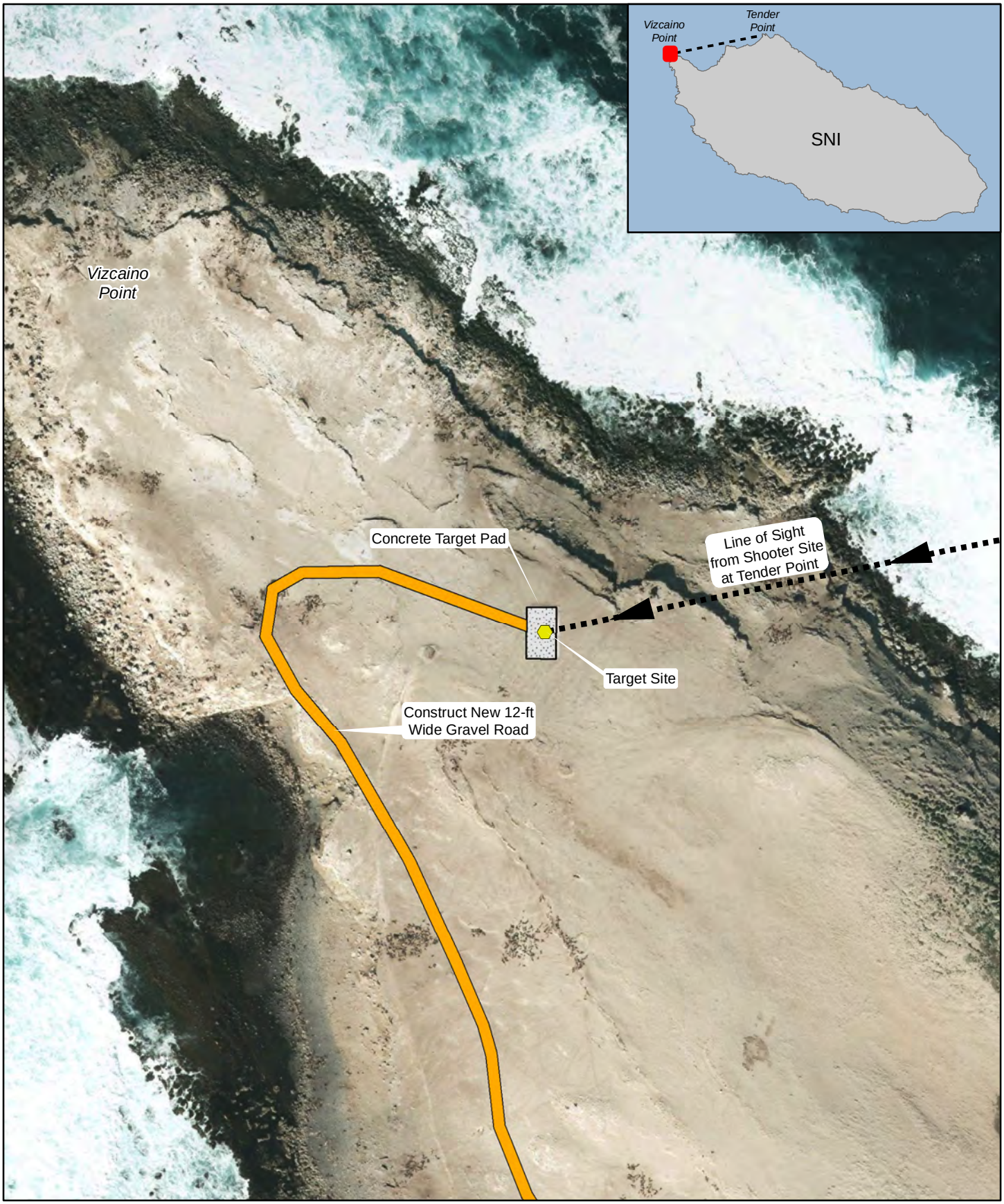


Figure 2-2
Proposed Shooter Site

0 12.5 25
Meters
Feet
0 25 50

Figure 2-3
Proposed Target Site (Alternative 1)

N



0 25 50 Meters

0 50 100 Feet

N

Figure 2-4
Proposed Target Site (Alternative 2)

Figure 2-5
Proposed Calibration Target Sites

This Page Intentionally Blank

CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter includes a description of the existing environmental conditions at SNI. Information presented in this chapter serves as baseline data to identify and evaluate any potential impacts that could result from the various action alternatives or the No-Action Alternative. The resource descriptions in this chapter are subdivided into three distinct areas to facilitate consistency with the proposed project components. These three areas, shown earlier in Figure 2-1, are:

- *Shooter Site* – location where the directed energy equipment would be placed for testing and personnel training.
- *Target Site* – location of directed energy system targets.
- *Calibration Sites* – location of the four calibration target sites.

Unless otherwise specified, the resources description generally applies to the shooter and target sites, and all four calibration target sites. Also, background and site-specific information presented for each resource section has been focused to describe only those resource components addressed in the analysis of potential impacts.

3.1 GEOLOGY AND SOILS

3.1.1 Affected Environment

3.1.1.1 Definition of Resource

Geological resources are generally defined as the geology, soils, and topography of a given area. The geology of an area includes bedrock materials and mineral deposits. Soil refers to unconsolidated earthen materials overlying bedrock or other parent material. Topography is typically described with respect to the elevation, slope, aspect, and surface features found within a given area.

3.1.1.2 Existing Conditions

The island is a mesa that slopes gently upward from the northern end of the island. The mountains and hills at SNI trend northwest with broad, gently sloping main ridges and moderately steep side slopes. The average surface elevation is 500 ft (152 m) above mean sea level, with a maximum elevation of 908 ft (277 m) above mean sea level.

Soils are predominantly sedimentary in origin with sandstone as their major constituent; the soils also tend to contain a large concentration of ocean salts. Soils at the shooter and target sites are classified as beach and duneland, collectively referred to as "sandy beach." These soils are composed of wind-deposited, quartzitic sands that are highly prone to both water erosion from coastal waves and alluvial processes and wind (eolian) erosion. Duneland soils occur on unvegetated upland areas and are characterized by an undulating or wavelike appearance with moderately steep slopes. The calibration sites are located on the slopes down to the western end of the island. Soils at the calibration sites are primarily dune sand deposits.

The Navy prepared an Integrated Natural Resources Management Plan (INRMP) for SNI (NBVC 2010) that includes management objectives and strategies for soil conservation, construction, and facilities maintenance. In accordance with the 2010 SNI INRMP, any project that may disturb the soil must go through a screening process with the Site Approval and Project Review Board, under NBVC Instruction 11010.1, in order to receive a site approval from local and regional Navy (NBVC 2010). This includes any soil disturbing activities such as digging, grading, stockpiling, dumping, staging, or establishing a laydown area (NBVC 2010). As necessary, BMPs are required of the project in order to protect the soil from erosion by wind and water (NBVC 2010). This project screening process is a streamlined means for project sponsors to comply with NEPA, as well as the laws, regulations and guidelines described above. The site-specific erosion control provisions, as well as guidelines for site revegetation requirements, provide the means to control and manage site-specific erosion at SNI (NBVC 2010).

3.1.2 Environmental Consequences

3.1.2.1 Approach to Analysis

The protection of unique geological features, minimization of soil erosion, and changes to sediment quality are considered when evaluating the potential impacts of an action on geological resources. Generally, geological resource impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering components are incorporated into project design.

3.1.2.2 Alternative 1

The shooter site at Tender Point would be located on windblown sand partially anchored by coastal vegetation in an area that has been previously disturbed. Soil would be further disturbed by grading needed to level portions of the site for placement of the concrete pad and turnaround for the shooter truck.

However, grading and dirt moving activities would not involve major cut and fill due to the relatively level topography of the proposed project area. Constructing the shooter facilities would disturb no more than 19,850 ft^2 (1,844 m) for the pad, and truck turnaround, permanently covering that area of permeable soil with artificial surfaces that could change infiltration and runoff patterns at the site. Heavy equipment operating in the work area would temporarily disturb soil around the perimeter of the facilities under construction. An originally proposed two-story control building was removed from the Proposed Action and all action alternatives pursuant to consultation with SHPO.

Approximately 0.61 mile (1.0 kilometer [km]) of road at the shooter site would be expanded from 8 to 18 ft (2 to 5 m) wide, disturbing 31,960 ft^2 (2,969 m^2) of soil. No additional soil area would be disturbed to install the underground conduit for power and communications utilities because the conduit would be placed within the footprint of widened portion of the existing road.

Work at the Bomber Cove target site would include constructing a 1,600 ft^2 (149 m^2) concrete pad, expanding approximately 0.55 mile (0.89 km) of road from 8 to 12 ft (2 to 4 m) wide, and constructing approximately 0.43 mile (0.69 km) of new gravel road. These activities would disturb a total of 45,080 ft^2 (4,188 m^2) of soil. The new road would likely pass through previously undisturbed areas. Use of heavy equipment for road construction would damage soil though compaction and breaking surface crusts to expose the soil below. Construction at the calibration sites would be minimal, consisting of grading and construction of a 225-ft^2 (21-m^2) concrete pad at each calibration site. Total project construction would disturb approximately 2.27 ac (0.92 ha).

In accordance with the 2010 SNI INRMP, soil conservation would be considered in all site feasibility studies and project planning, design and construction (NBVC 2010). Appropriate conservation work and associated funding would be included in project proposals and construction contracts and specifications (NBVC 2010). As per OPNAVM 5090.1 (Navy 2014a), BMPs for soil conservation would be incorporated in the preliminary engineering, design, and construction of project facilities involving ground disturbance (NBVC 2010). The Water Quality Program Manager would enforce the SWPPP and any other requirements determined by the Project Review Board to prevent erosion and repair any damage that occurs during construction or maintenance activities. Soil disturbance would be minimized during construction by locating staging areas in disturbed areas only (NBVC 2010). Staging areas would be delineated on the grading plans and reviewed by NBVC Environmental and project biological monitors prior to start of construction. Vehicular traffic associated with the construction activities and operational support activities would remain on established roads to the maximum extent practicable (NBVC 2010). Areas with highly erodible soils would be given special consideration when designing the proposed project to ensure incorporation of various erosion control techniques, including but not limited to straw bales, silt fencing, aggregate materials, wetting compounds, and rehabilitation, where possible, to decrease erosion (NBVC 2010).

The Navy would prepare a project-specific construction SWPPP for project coverage under the statewide General Construction National Pollutant Discharge Elimination System Storm Water Permit (NBVC 2010). The SWPPP would apply to the shooter site, the target site, and the calibration target sites. Guidance would be followed for selecting BMPs as specified in the 2010 SNI INRMP (NBVC 2010), with the following strategy:

- Minimize site disturbance
- Stabilize site disturbance
- Protect slopes and channels
- Control site perimeter

- Control internal erosion.

Operations would involve placement of static targets at requisite sites and periodic maintenance or replacement of the targets. Maintenance activities would include road grading and preparing infrastructure at the shooter site, target site, and calibration test sites 15 times per year, on average. The operational phase of Alternative 1, therefore, would cause minimal soil disturbance.

In summary, the proposed facilities would be designed and constructed with engineering controls for soil conservation, stabilization, and erosion prevention. Construction activities would be short-term and a construction SWPPP would be implemented to minimize erosion during the construction period. Construction of concrete pads and new roads would be a permanent impact. However, the overall project area is more than two ac (0.8 ha), most of it comprising linear gravel roads. Project design would include erosion controls to stabilize the roadways and their shoulders and to minimize impacts to soils. The operational phase of the project would cause minimal soil disturbance. Therefore, implementation of Alternative 1 would not have a significant impact to geology and soils.

3.1.2.3 Alternative 2

Alternative 2 is identical to Alternative 1, except that under Alternative 2 the proposed target site would be located at Vizcaino Point rather than at Bomber Cove. Target site construction at Vizcaino Point would include constructing a 1,600 ft^2 (149 m^2) concrete pad; expanding approximately 0.95 mile (1.23 km) of road from 8 to 12 ft (2 to 4 m) wide, and constructing approximately 0.44 mile (0.71 km) of new gravel road. Due to the greater length of the road, these temporary activities would disturb a total of 49,748 ft^2 (4,622 m^2) of soil as compared with 45,080 ft^2 (4,188 m^2) that would be disturbed under Alternative 1. The proposed facilities would be designed and constructed with engineering controls for soil conservation, stabilization, and erosion prevention, the same as for Alternative 1. Construction activities would be short-term and a construction SWPPP would be implemented to minimize erosion during the construction period. Construction of concrete pads and new roads would be a permanent impact. However, the overall project area is approximately 2.38 ac (0.96 ha), most of it comprising linear gravel roads, and very similar to that of Alternative 1. Project design would include erosion controls to stabilize the new roadways and their shoulders and to minimize impacts to soils. The operational phase of the project would cause minimal soil disturbance. Therefore, implementation of Alternative 2 would have the same impacts to geology and soils as Alternative 1 and would be less than significant.

3.1.2.4 Mitigation Measures

Implementation of either Alternative 1 or Alternative 2 would not result in significant impacts to geological resources; therefore, no mitigation measures are proposed or required.

3.1.2.5 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and existing conditions would remain unchanged. Therefore, no significant impacts to geological resources would occur.

3.2 AIR QUALITY

3.2.1 Affected Environment

3.2.1.1 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 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 while still protecting public health and welfare with a reasonable margin of safety. The national standards, established by the U.S. Environmental Protection Agency (USEPA), are termed the National Ambient Air Quality Standards (NAAQS) (Table 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 but greater than 2.5 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, since 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 NO_2) have no established ambient standards, they are important as precursors to O_3 formation.

Table 3-1. California and National Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS[1]	NAAQS[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 standard
	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 (57µg/m^3)	0.053 ppm (100 µg/m^3)	Same as primary standard
	1 hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 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 (1,300 µg/m^3)
	1 hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	†
PM_{10}	Annual arithmetic mean	20 µg/m^3	†	Same as primary standard
	24 hour	50 µg/m^3	150 µg/m^3	
$PM_{2.5}$	Annual arithmetic mean	12 µg/m^3	15 µg/m^3	Same as primary standard
	24 hour	No separate standard	35 µg/m^3	
Sulfates	24 hour	25 µg/m^3	†	†
Lead	30 day average	1.5 µg/m^3	†	†
	Calendar quarter	†	1.5 µg/m^3	Same as primary standard
Hydrogen Sulfide	1 hour	0.03 ppm (42 µg/m^3)	†	†
Vinyl Chloride (chloroethene)	24 hour	0.01 ppm (26 µg/m^3)	†	†

Notes: [1] CAAQS for CO, SO_2, NO_2, O^3, and PM_{10} are not to be exceeded. All other CAAQS are not to be equaled or exceeded.
[2] NAAQS are not to be exceeded more than once per year except for annual standards.
ppm = parts per million; µg/m^3 = micrograms per cubic meter; mg/m3 = milligram per cubic meter; † = no standard established.
Sources: CARB 2012; USEPA 2011a.

3.2.1.2 Regulatory Setting

Federal Requirements

The General Conformity Rule, as established in 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 Act and with federally enforceable air quality management plans. The 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 General 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.

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 plan.

3.2.1.3 Existing Conditions

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 photo-chemically modified in the abundant sunshine. During the winter months, the moderating influences of the ocean together with a protective ring of mountains inland insulate much of southern California from very cold air except 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 5.23 inches per year. The dry season occurs between May and September. The rainy season occurs between November and March when SNI receives 77% of its total annual rainfall. The month of highest average precipitation is typically December. The average mean monthly temperature on land is 59 degrees Fahrenheit (°F), with a seasonal variation (January to July) of approximately 9 °F. Temperatures during the coolest month average 54.7 °F and during the warmest month average 65.4 °F (Western Regional Climate Center 2011). Prevailing winds are northwesterly, with an average speed from that direction of 11.3 knots (13 miles per hour) (Windfinder.com 2011).

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, which includes the Ventura County Air Pollution Control District (VCAPCD). SNI is in attainment/unclassified of the NAAQS for all criteria pollutants (USEPA 2011b); therefore, the provisions of the General Conformity Rule and *de minimis* thresholds do not apply

(VCAPCD 2008). 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.

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).

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 (drone aircraft) from SNI. Emissions are associated with combustion of propellants and/or fuels used to propel the missiles and targets.

3.2.1.4 Greenhouse Gas Emissions

Greenhouse gases (GHGs) are pollutants of concern for air quality and climate change. GHGs include water vapor, carbon dioxide (CO_2), methane (CH_4), NO_x, O_3, and several chlorofluorocarbons. Water vapor is a naturally occurring GHG and accounts for the largest percentage of the greenhouse effect. Next to water vapor, CO_2 is the second-most abundant GHG and is typically produced from human related activities. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. Additionally, a number of specialized industrial production processes and product uses such as mineral production, metal production and the use of petroleum-based products can also lead to CO_2 emissions.

Although regulatory agencies are taking actions to address GHG effects, there are currently no state or federal standards or regulations limiting CO_2 emissions and concentrations in the ambient air. In response to the *FY2008 Consolidated Appropriations Act* (H.R. 2764; Public Law 110–161), USEPA issued the *Final Mandatory Reporting of Greenhouse Gases Rule* (GHG Reporting Rule), which became effective on December 29, 2009. The GHG Reporting Rule requires annual reporting of GHG emissions to USEPA from large sources and suppliers in the U.S., including suppliers of fossil fuels or industrial GHG; manufacturers of vehicles and engines; and facilities that emit greater than 25,000 metric tons per year (27,558 tons per year) each of CO_2 and other GHGs. The intent of the rule is to collect accurate and timely emissions data to inform future policy decisions and programs to reduce emissions, as well as fight against the effects of climate change.

In a draft guidance document, the CEQ proposes that federal agencies consider, in scoping their NEPA analyses, whether analysis of the direct and indirect GHG emissions from their proposed actions may provide meaningful information to decision makers and the public. Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons per year or more of CO_2-equivalent (CO_{2e}) GHG emissions, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. For long-term actions that have annual direct emissions of less than 25,000 metric tons of CO_{2e}, the CEQ encourages federal agencies to consider whether the action's long-term emissions should receive similar analysis. Furthermore, the CEQ does not propose this as an indicator of a threshold of significant effects, but rather

as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs (CEQ 2014).

Federal agencies are, on a national scale, addressing emissions of GHGs by reductions mandated in federal laws and EOs, most recently, EO 13693. Several states have promulgated laws as a means to reduce statewide levels of GHG emissions. In particular, the California Global Warming Solutions Act of 2006 directs the State of California to reduce statewide GHG emissions to 1990 levels by the year 2020. In addition, groups of states formed regionally-based collectives to jointly address GHG pollutants.

GHG emissions for an action can be inventoried, based on methods prescribed by state and federal agencies. However, the specific contributions of a particular project to global or regional climate change generally cannot be identified based on existing scientific knowledge, because individual projects typically have a negligible effect. Also, climate processes are understood at only a general level.

3.2.2 Environmental Consequences

3.2.2.1 Approach to Analysis

Criteria pollutant emissions resulting from proposed directed energy testing and personnel 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 exceedance of *de minimis* criteria pollutant thresholds, or contribution to a violation of the NAAQS.

Since SNI and the offshore region proposed for the directed energy testing and personnel training are considered in attainment/unclassified for the NAAQS, the provisions of the General Conformity Rule do not apply. However, emissions estimates for the proposed action have been compared to *de minimis* thresholds of a basic nonattainment area for planning purposes.

3.2.2.2 Alternative 1

Air quality impacts from the proposed directed energy testing and personnel training program would occur from the use of support vehicles, portable generators, and heavy construction equipment all of which are mobile emission sources. The operation of the directed energy systems could lead to the release of toxic or hazardous emissions, but closed-loop systems would be used to reduce the possibility of release.

Portable generators greater than or equal to 50 brake horsepower are required to either be registered as Portable Equipment Registration Program (PERP), qualified and reported as tactical support equipment (TSE) or permitted as a stationary source by the VCAPCD. Equipment that will reside at the same location for more than 12 consecutive months does not meet the requirements of portability and must be permitted. It has been assumed that only generators that are less than or equal to 50 brake horsepower, or generators that are greater than or equal to 50 brake horsepower and registered as PERP, reported as TSE, or are appropriately permitted would be used for proposed land-based testing and personnel training events. 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 directed energy systems and targets and would only operate for the duration of the testing and personnel training event, and will reside at the same location for no more than 12 consecutive months.

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 A. Emission calculations for all project activities are provided in Appendix A.

Table 3-2 provides a summary of the emissions resulting from actions associated with Alternative 1. Such emissions do not occur now, as no Directed Energy Test facility exists. 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 RONA has been prepared by the Navy (Appendix A). Implementation of Alternative 1 would conform to the VCAPCD SIP and would not trigger a conformity determination under Section 176(c) of the CAA.

Table 3-2. Total Emissions – Alternative 1

Emission Source	Pollutant (tons/year)						
	VOC	NO_X	CO	SO_X	PM_{10}	CO_2 [1]	CH_4 [1]
Construction Emissions [2]	0.24	1.53	0.91	0.00226	0.094	196	0.022
Operational Emissions [3]	0.25	1.47	1.00	0.0022	0.082	191	0.023
Total	**0.49**	**3.00**	**1.91**	**0.0045**	**0.176**	**386**	**0.045**
de minimis threshold [4]	100	100	100	100	100	NA	NA

Notes: [1] CO_2 and CH_4 emission estimates provided for GHG analysis.

[2] Construction emissions include fugitive dust emissions, emissions due to construction equipment, and emissions from construction vehicles.

[3] Operational emissions are those used to support the operational phase of the directed energy testing and personnel training. These emissions include vehicles, support equipment, and generators.

[4] *de minimis* thresholds do not apply to actions taken on SNI since SNI and the offshore region proposed for the directed energy testing and personnel training are considered in attainment/unclassified for the NAAQS. However, emissions estimates for the proposed action have been compared to *de minimis* thresholds of a basic nonattainment area for planning purposes.

NA = Not Applicable.

Greenhouse Gases

Currently, there are no formally adopted or published NEPA thresholds for GHG emissions. On 18 December 2014, the CEQ released draft guidance for addressing climate change in NEPA documents (CEQ 2014). The draft guidance, which has been issued for public review and comment, recommends quantification of GHG emissions, and proposes a reference point of 25,000 metric tons of CO_{2e} emissions. The CEQ indicates that use of 25,000 metric tons of CO_{2e} emissions as a reference point would provide federal agencies with a useful indicator, rather than an absolute standard of significance, for agencies to provide action-specific evaluation of GHG emissions and disclosure of potential impacts.

Formulating such thresholds is problematic, as it is difficult to determine what level of proposed emissions would substantially contribute to global climate change. In the absence of formally-adopted thresholds of significance, this EA compares GHG emissions that would occur with Alternative 1 actions to the 25,000 metric ton level, as well as comparing the net GHG emissions associated with Alternative 1 to the U.S. GHG baseline inventory of 2009 of 5.5×10^9 metric tons (USEPA 2011c) to determine the relative increase in proposed GHG emissions. Table 3-3 summarizes the annual GHG emissions associated with implementation of Alternative 1. Appendix A presents estimates of GHG emissions generated by Alternative 1. These data show that the CO_{2e} emissions associated with Alternative 1 would amount to approximately 0.0000073% of the total CO_{2e} emissions generated by the U.S. Emissions under Alternative 1 are also below the 25,000 metric tons of CO_{2e} level proposed in the draft NEPA guidance by the CEQ.

Therefore, for the reasons above, implementation of Alternative 1 would have no significant impacts to air quality.

Table 3-3. GHG Emissions for Alternative 1

Pollutant	Actual emissions (metric tons/year)	CO2e emissions (metric tons/year)
CO_2	386	386
CH_4	0.045	0.94
Total		**387**
% U.S. emissions		**7.03×10^{-6}**

3.2.2.3 Alternative 2

Construction emissions associated with Alternative 2 would be slightly higher than Alternative 1. The operational emissions with implementation of Alternative 2 actions would be the same as those estimated for Alternative 1. Table 3-4 provides a summary of the emissions resulting from actions associated with Alternative 2. Therefore, implementation of Alternative 2, as with Alternative 1, would have no significant impact on air quality.

Table 3-4. Total Emissions – Alternative 2

Emission Source	Pollutant (tons/year)						
	VOC	NO_X	CO	SO_X	PM_{10}	CO_2[1]	CH_4[1]
Construction Emissions [2]	0.25	1.57	0.93	0.0023	0.082	201	0.022
Operational Emissions [3]	0.25	1.47	1.00	0.0022	0.102	191	0.023
Total	**0.50**	**3.04**	**1.94**	**0.0045**	**0.184**	**392**	**0.045**
de minimis threshold [4]	100	100	100	100	100	NA	NA

Notes: [1] CO_2 and CH_4 emission estimates provided for GHG analysis.

[2] Construction emissions include fugitive dust emissions, emissions due to construction equipment, and emissions from construction vehicles.

[3] Operational emissions are those used to support the operational phase of the directed energy testing and personnel training. These emissions include vehicles, support equipment, and generators.

[4] *de minimis* thresholds do not apply to actions taken on SNI since SNI and the offshore region proposed for the directed energy testing and personnel training are considered in attainment/unclassified for the NAAQS. However, emissions estimates for the proposed action have been compared to *de minimis* thresholds of a basic nonattainment area for planning purposes.

NA = Not Applicable.

Greenhouse Gases

Table 3-5 summarizes the annual GHG emissions associated with implementation of Alternative 2. Appendix A presents estimates of GHG emissions generated by the actions associated with Alternative 2. These data show that the CO_{2e} emissions associated with Alternative 2 would amount to approximately 0.0000065% of the total CO_{2e} emissions generated by the U.S. Emissions under Alternative 2 are also below the 25,000 metric tons of CO_{2e} level proposed in the draft NEPA guidance by the CEQ.

Table 3-5. GHG Emissions for Alternative 2

Pollutant	Actual emissions (metric tons/year)	CO_{2e} emissions (metric tons/year)
CO_2	392	392
CH_4	0.045	0.94
Total		**393**
% U.S. emissions		**7.14×10^{-6}**

3.2.2.4 Mitigation Measures

Implementation of either Alternative 1 or Alternative 2 would not result in significant impacts to air quality; therefore, no mitigation measures are proposed or required.

3.2.2.5 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and existing conditions would remain unchanged. Therefore, no significant impacts to air quality would occur.

3.3 MARINE SEDIMENTS AND WATER QUALITY

3.3.1 Affected Environment

3.3.1.1 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.

3.3.1.2 Regulatory Setting

Water resource regulations focus on the right to use water and protection of water quality. The principal federal laws protecting water quality are the 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 SWRCB and nine Regional Water Quality Control Boards 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. However, the SWRCB may grant exceptions to allow a discharge into an Area of Special Biological Significance provided that the exception would not compromise protection of ocean waters for beneficial uses, and that the public interest would be served (Regional Water Quality Control Board 1994).

3.3.1.3 Existing Conditions

<u>Oceanic Conditions</u>

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. It 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 bight and strongly influence patterns of ocean water circulation and temperatures.

<u>San Nicolas Island</u>

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), while the warmest temperatures occur in September (66 °F). 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). 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. Freshwater resources include all surface water and groundwater at SNI (Navy 2002).

SNI is part of Ventura County and is situated in Watershed 11 which also includes Anacapa, Santa Barbara, San Clemente, and Santa Catalina Islands (Regional Water Quality Control Board 1994). Ocean waters surrounding SNI and Begg Rock to a distance of 1 nautical mile (nm) (1.9 km) offshore or to the 300-ft (91-m) isobath, whichever is greater, have been designated as an Area of Special Biological Significance (ASBS) based on their relatively pristine water quality. Discharges incidental to military research, development, testing, and evaluation of, and training with, guided missiles and other weapons systems, fleet exercises, small-scale amphibious warfare training, and special warfare training are allowed within the ASBS (SWRCB 2012). Testing and personnel training areas overlap the SNI and Begg Rock ASBS.

Nearshore Marine Water Quality

The project location is on the western end of the island between Tender Point Vizcaino Point (including either Vizcaino Point or Bomber Cove). Water quality data offshore from this location are not available. However, as discussed above, the quality of ocean water in the immediate area of SNI is relatively pristine, and SNI's distance from both the mainland and oil and gas developments in the SCB, combined with the large diluting volume of the ocean and the shelves and basins near the mainland where many pollutants settle, ensures high water quality at the island.

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 (Navy 2002).

Freshwater

No freshwater or drinking water sources are present in the proposed testing and personnel training areas at Tender Point or Bomber Cove. However, the proposed calibration test sites are located in the groundwater recharge area for Thousand Springs, and portions of the proposed road construction/improvements to Bomber Cove are located in the groundwater recharge area for Zitnic Springs.

3.3.2 Environmental Consequences

3.3.2.1 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 Alternative 1 (e.g., directed energy testing and personnel training, 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 which identify numerical maximum concentration levels for contaminants in discharges to surface waters for the protection of both ecological and human health (Table 3-6). Factors considered in determining whether construction or operational activities associated with 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 these standards. There would be no impact on freshwater or drinking water sources because no such resources are present in the proposed testing and personnel training areas at Tender Point, Vizcaino Point, Bomber Cove, or the calibration test sites.

Table 3-6. Marine Water and Sediment Quality Standards

Contaminant[1]	National Ambient Water Quality Criteria (µg/L)		Federal 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.

3.3.2.2 Alternative 1

As described in Section 3.1, erosion control measures would be in place during construction at Tender Point and Bomber Cove. All construction activities on SNI would occur on dry land and would disturb approximately two acres (ac) (0.8 hectare [ha]), requiring permit coverage under the State Water Resources Control Board's NPDES permit CAS000002 General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. Site development would be consistent with the requirements of Section 438 of the Energy Security and Independence Act for federal agencies to manage and reduce stormwater runoff. All necessary permits would be acquired prior to commencing construction. A SWPPP with project and site-specific construction best management practices (BMPs)

would be developed and implemented during the course of construction. All NAWCWD activities would conform to the installation storm water pollution prevention plan and associated BMPs, which include eliminating discharges of sediment and other pollutants that could affect water quality. Therefore, no increase in sedimentation within the groundwater recharge areas or discharges into the nearshore waters would occur. Land surface targets at Bomber Cove would include target board, beam profiling equipment, vehicles, and simulated military infrastructure. During the proposed directed energy testing and personnel training activities, these targets would release no constituents that would impact surface or marine water quality. As such, water quality constituents would remain below criteria thresholds and there would be no long-term effects to aquatic resources. Furthermore, all necessary permits would be acquired prior to commencing construction. Therefore, implementation of Alternative 1 would have no significant impacts to marine sediment and water quality.

3.3.2.3 Alternative 2

Under Alternative 2, the access road construction footprint would be larger than for Alternative 1, but the effects would be similar. All necessary permits would be acquired prior to commencing construction and impacts would be identical to Alternative 1. Therefore, implementation of Alternative 2 would have no significant impacts to marine sediment and water quality.

3.3.2.4 Mitigation Measures

Implementation of either Alternative 1 or Alternative 2 would not result in significant impacts to marine sediments and water quality; therefore, no mitigation measures are proposed or required.

3.3.2.5 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and existing conditions would remain unchanged. Therefore, no significant impacts to marine sediments and water quality would occur.

3.4 AIRSPACE, LAND, AND WATER USE

3.4.1 Affected Environment

3.4.1.1 Definition of Resource

Special use airspace 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 special use airspace (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 contain activities that may be hazardous to nonparticipating aircraft. The purpose of such warning areas is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both.

Land and water use compose 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.

3.4.1.2 Regulatory Setting

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 flights outside of U.S.-controlled airspace, such as flights 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.

3.4.1.3 Existing Conditions

Airspace

Point Mugu Sea Range

Air traffic routes for civilian aircraft with instrument flight rules clearances run north and south along the coast and do not enter the Sea Range. There are corridors for aircraft to cross the Sea Range while under FAA control. These are important corridors because they allow air traffic to approach or leave the Los Angeles Area enroute to Hawaii or other transpacific destinations (Navy 2002). Eight Warning Areas comprise the majority of the airspace over the Sea Range. All or part of the Warning Areas lie in international airspace and are activated on an intermittent basis. The public is notified that the Navy requires exclusive use of a Warning Area through issuance of a NOTAM by the FAA 24 hours in advance (Navy 2002).

Military aircraft routinely operate in international airspace over the Sea Range (see Figure 1-1). Areas of concentrated and regular military training tend to be located away from heavily used offshore areas to ensure public safety. Areas most frequently used for aircraft operations and missile activities are Range Areas 4A/B and 5A/B (refer to Figure 1-1). These ranges are part of the Outer Sea Range and are located west (seaward) of an imaginary line between the eastern tip of SNI and the southern tip of Santa Rosa Island. This imaginary line is about 45 nm (83 km) southwest of Point Mugu.

Point Mugu and Restricted Area (R)-2519

The Los Angeles Air Route Traffic Control Center has delegated control of aircraft into and out of Point Mugu airfield to NBVC Airfield Air Traffic Services, which operates the radar air traffic control facility and the control tower at the airfield. Thus NBVC Point Mugu has responsibility for the control of all civilian and military aircraft operating on instrument flight rules clearances within its designated airspace. Military aircraft take off and land from the airfield at NBVC Point Mugu or from other locations. In addition, during major exercises at the Sea Range, aircraft would take off from and land on an aircraft carrier. More than 40,000 military and 5,000 civilian air operations are expected to occur annually at the Point Mugu Airfield (Navy 2012a).

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. The term "hazardous" implies, but is not limited to, firing of weapons, aircraft training and testing, and other specialized events from which it is prudent to exclude civil air traffic. R-2519 includes the majority of NBVC Point Mugu, a portion of the Ventura County Game Reserve, and extends southwest and southeast into the Santa Barbara Channel (Figure 3-1).

San Nicolas Island and R-2535

The SNI Airfield is owned, operated, and maintained by the Navy. It consists of a single 10,000 ft (3,050 m) long runway that can accommodate aircraft as large as a C-5 cargo plane and is located on the southeast portion of the island. The airfield is primarily used for the transport of personnel and supplies. The only authorized air traffic into the airfield are those approved by Point Mugu and generally include aircraft involved in test and evaluation activities, training on the Sea Range, and scheduled contract passenger flights which bring duty personnel, researchers, or other permitted visitors to the island. On an average busy day, there are approximately seven arrivals and seven departures at the airfield. R-2535 includes all of SNI and the coastal waters within approximately 2 to 3 nm (3.7 to 5.6 km) of the island's shoreline (Figure 3-2).

Land Use

Located approximately 57 nm (106 km) southwest of NBVC, 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 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) concrete runway and facilities to support testing and personnel training 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.

Laser testing is currently conducted at various locations on the island, including Tender Point.

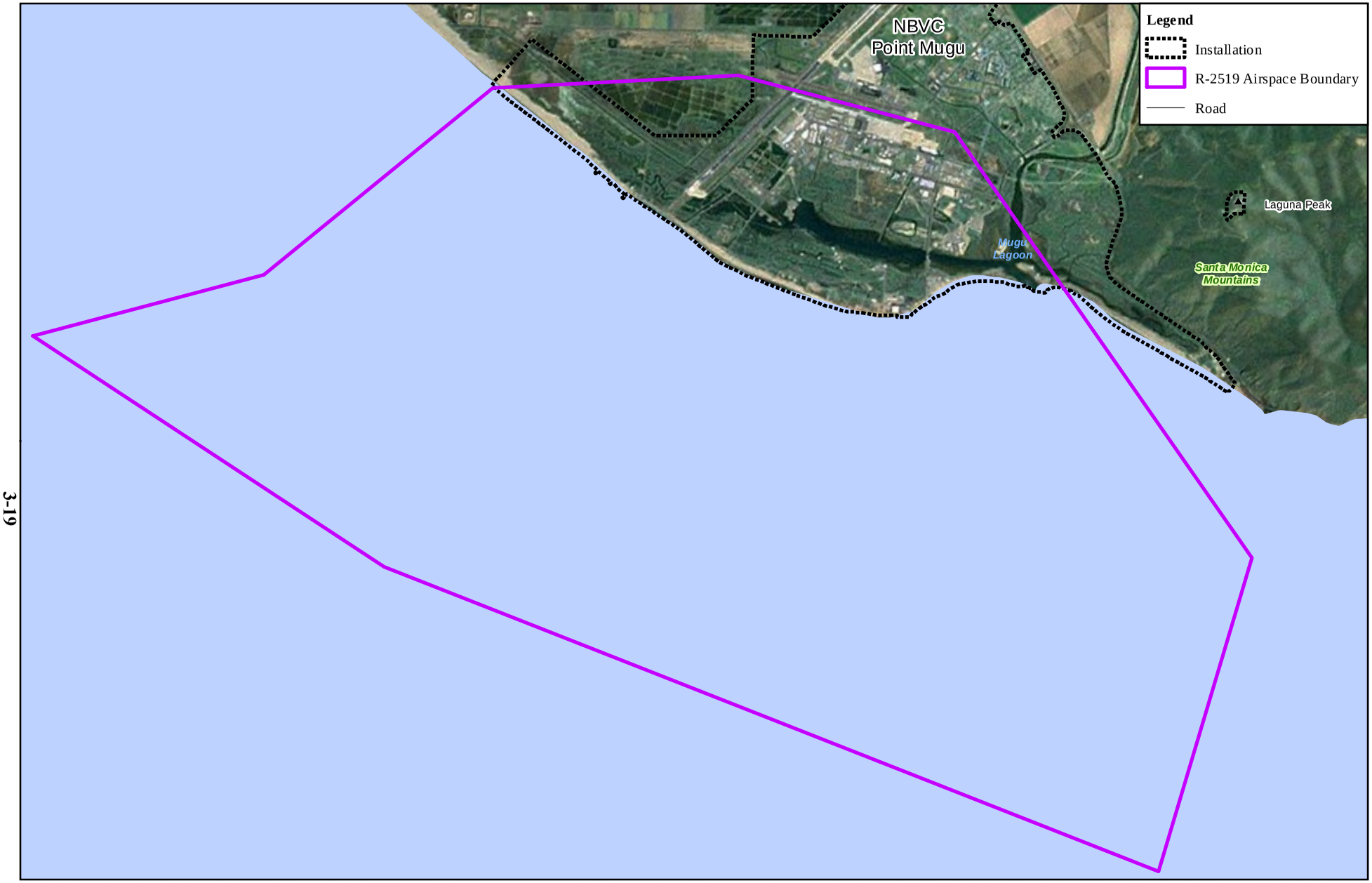


Figure 3-1
Restricted Airspace (R-2519) at Point Mugu

Figure 3-2
Restricted Airspace (R-2535) at San Nicolas Island

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 around 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.

DoD employees, base contractors, and active duty personnel launch recreational fishing boats from Cissy Cove and fish in nearby areas. 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, rockfish, white seabass, and kelp (calico) bass. Fishermen must have a California ocean-fishing license to fish on SNI and abide by bag and size limits. The California Department of Fish and Wildlife is responsible for the enforcement of fishing regulations on SNI. Fishermen must also abide by SNI area closures for security reasons, environmental protection of certain wildlife, and the conservation of cultural resource areas such as prehistoric archaeological sites located near coastal areas. 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 (NBVC 2010). Furthermore, restrictions are enacted to clear the appropriate range areas of non-participants before military operations are conducted.

Coastal Zone Management Act 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 Coastal Zone Management Act (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." SNI is wholly owned and operated by the Navy and, therefore, is excluded from the coastal zone. However, potential effects of the proposed action could occur in offshore areas within the coastal zone. Therefore, 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 (6 km) from the shore. The Navy seeks to manage its coastal properties within the environmental programs of the Coastal Zone Management Act and California Coastal Act. The DON prepared a detailed Coastal Consistency Negative Determination analysis and submitted it to the California Coastal Commission for concurrence with the DON's conclusion that the implementation of the Proposed Action is consistent to the maximum extent practicable with the Coastal Zone Management Act. The California Coastal Commission concurred with this determination (17 August 2013, ref. ND-0213-13, Appendix B).

3.4.2 Environmental Consequences

3.4.2.1 Approach to Analysis

Factors used to assess the significance of impacts on airspace 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.

3.4.2.2 Alternative 1

Airspace

Proposed activities at the Tender Point, Bomber Cover or Vizcaino Point would be similar to laser testing activities currently conducted at Tender Point. Although HPM testing and personnel training does not currently occur, the types of safety issues and procedures that could affect airspace use are similar (see Section 3.7, Public Safety). Furthermore, Alternative 1 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. The airspace over and out to approximately 3 nm (5.6 km) around SNI is restricted; only authorized air traffic into the SNI 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 directed energy operations that have the potential of creating hazards to aircraft shall be coordinated with the FAA to ensure that when the directed energy system is fired no non-participating aircraft are in the hazard area. Similar coordination with the Laser Clearinghouse would occur whenever directed energy testing and personnel training creates potential hazards to satellites. Therefore, implementation of Alternative 1 would not have significant impacts to airspace.

Land and Water Use

Land use associated with Alternative 1 would be consistent with current land uses and designations at SNI. Project activities would take place at locations previously designated for laser testing. In accordance with existing safety procedures, access to portions of SNI and Sea Range would be temporarily restricted during testing and personnel training operations. SNI lies in an area on the Sea Range that is designated for these testing and personnel training 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 and personnel training activities would be allowed to continue during testing and personnel training operations.

All proposed testing and personnel training activities would occur within 3 nm (5.6 km) of SNI. Public access of the waters within 300 yards (274 m) of SNI is denied. Waters within 3 nm (5.6 km) of SNI are divided into three zones: Alpha, Bravo, and Charlie (Figure 3-3). These areas may be closed to all access on an as-needed basis.

For safety, areas beneath or near target flight paths would be cleared of non-participating vessels for each event and military training, fishing, and recreational uses within the vicinity of the test site would be limited during testing and personnel training activities. These area closures are consistent with existing closures during other Sea Range events and would not increase the annual number of closure days. This could temporarily interrupt commercial and recreational fishing in the area but would not preclude

fishermen from access or from maximizing revenues over the course of the fishing season (Navy 2002). Furthermore, Alternative 1 is limited in total area and would not affect any fish populations or fish habitat, including EFH, and all offshore uses associated with the proposed testing and personnel training are consistent with military testing and personnel training activities.

NAWCWD personnel have implemented successful communication procedures with commercial fishermen at SNI to minimize effects to commercial activities (Navy 2002), including the publication of a NOTMAR 15 days prior to the offshore activities. 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 and personnel training activities are underway (Section 3.7, Public Safety).

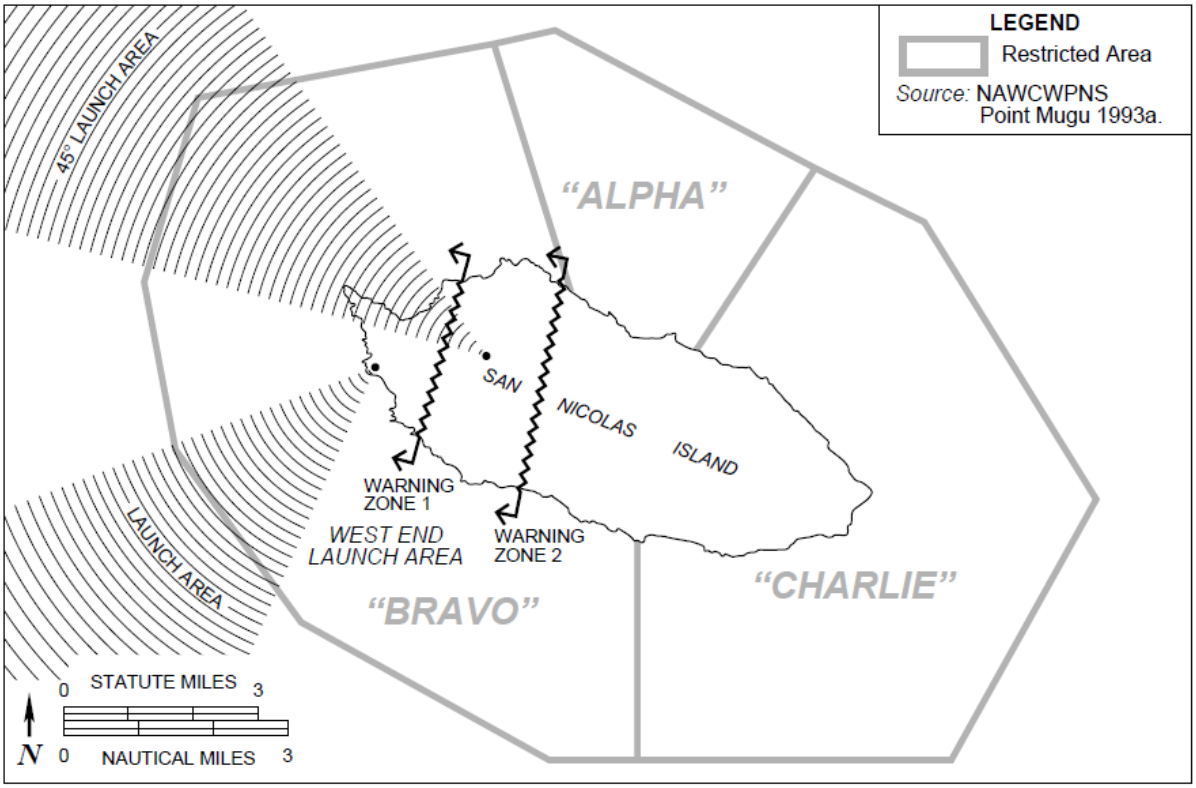


Figure 3-3 Restricted Areas around San Nicolas Island

Therefore, for reasons described above, the implementation of Alternative 1 would be consistent with applicable land and water use plans and policies, would not preclude the viability of existing land and water use activities, would not preclude continued use of the area, would not threaten public health or safety, and would not conflict with airfield planning criteria. Therefore, implementation of Alternative 1 would not have significant impacts to land and water use.

3.4.2.3 Alternative 2

The configuration of the target facility and access roads would be different for Alternative 2. However, the general locations would not be substantially different, and the types of activities proposed to occur would be the same. Therefore, implementation of Alternative 2 would not have significant impacts to airspace, land or water use.

3.4.2.4 Mitigation Measures

Implementation of either Alternative 1 or Alternative 2 would not result in significant impacts to airspace or land and water use; therefore, no mitigation measures are proposed or required.

3.4.2.5 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and existing conditions would remain unchanged. Therefore, no significant impacts to airspace or land and water use would occur.

3.5 BIOLOGICAL RESOURCES

Biological resources include plants and animals and the habitats within which they occur within the defined test sites and associated supporting infrastructure (e.g., roads) that may be affected directly or indirectly by the proposed action. Since all activities under the proposed action and alternatives would be located on land within the nearshore environment, the following discussion focuses on those species that use the nearshore environment for feeding, resting, or breeding. For purposes of the EA, these resources are divided into three major categories: vegetation communities, wildlife, and special-status species.

3.5.1 Affected Environment

3.5.1.1 Vegetation Communities

SNI has been heavily disturbed by past land uses and exploitation, especially sheep grazing, which caused the removal of native vegetation and subsequent erosion, and contributed to the introduction and spread of non-native plants. Approximately 273 vascular plant species have been documented on SNI. SNI has strong floristic affinities with nearby geographic regions, sharing 86% of its native plants with the southern California mainland, 85% with the four Northern Channel Islands, 84% with the other three Southern Channel Islands, and 53% with islands off the Pacific coast of Baja California, Mexico. 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 (NBVC 2010).

Approximately 11% of the island's native vascular plant taxa are endemic to the Channel Islands, ranking it in the middle amongst other Channel Islands. Two vascular plant taxa found only on SNI are the SNI buckwheat (*Eriogonum grande* var. *timorum*) and the SNI malacothrix (*Malacothrix foliosa* ssp. *polycephala*). SNI has no federally listed endangered or threatened plant species (NBVC 2010).

Figure 3-4 shows the vegetation within the region of interest based on classification and mapping by Halvorson et al. (1996). Unvegetated (barren) and developed areas are included. Vegetation communities include coastal and inland dune, coastal scrub, *Coreopsis* scrub, and barren and developed areas. The vegetation of SNI is dominated by scrub communities which occur over approximately 52% of the island (Table 3-7). Barren areas and grasslands are the next two dominant communities, comprising approximately 24% and 12% of the island, respectively. Barren areas do not support vegetation cover.

Table 3-7. Vegetation Communities of SNI

Vegetation Type	Area (ac)	%
Coastal scrub*	6,006	42
Barren	3,470	24
Grassland	1,739	12
Coreopsis scrub	1,349	9.5
Inland dunes	783	5.5
Developed	325	2.3
Beach	234	1.6
Riparian	201	1.4
Coastal dunes	139	0.9
Coastal marsh	9.1	<0.1
Pine trees (planted)	2.7	<0.1
Vernal pools	0.8	<0.1
Total	14,259	

Note: *Includes caliche scrub, goldenbush scrub, coyote-bush scrub, lupine scrub, and annual iceplant. *Source*: NBVC 2010.

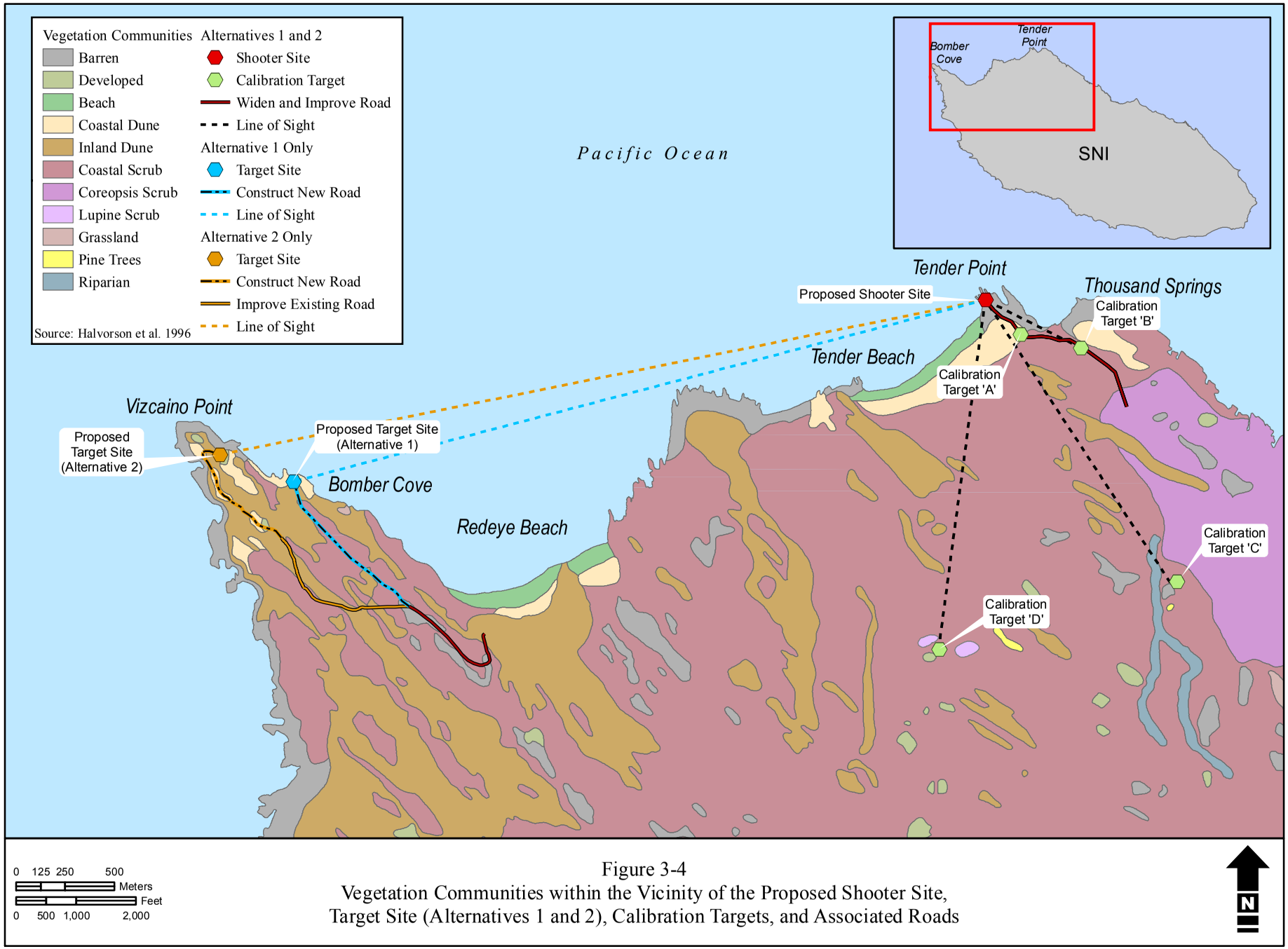


Figure 3-4
Vegetation Communities within the Vicinity of the Proposed Shooter Site, Target Site (Alternatives 1 and 2), Calibration Targets, and Associated Roads

3.5.1.2 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. Nevertheless, over 200 species of invertebrates have been documented on SNI, including 13 species of terrestrial snails. Reptiles on SNI include three species of lizards: side-blotched lizard (*Uta stansburiana*), southern alligator lizard (*Elgaria multicarinatus*), and the federally threatened island night lizard (*Xantusia riversiana 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 (NBVC 2010). Bats appear to be rare on SNI, with a few recent observations due to efforts to determine bat use of the island, as well as to provide data for a wind energy project (NBVC 2010).

SNI's beaches, nearshore, and offshore areas provide foraging opportunities for a variety of shorebirds and pelagic seabirds. In the area immediately surrounding SNI, seabird densities have been estimated at 0.1 bird/ac (Navy 2002). Seabirds include various species of gulls, terns, murres, auklets, cormorants, shearwaters, petrels, and the California brown pelican (*Pelecanus occidentalis californicus*) (State of the California Current 2007).

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. Twenty species of birds regularly breed on SNI, including the western gull (*Larus occidentalis*), Brandt's cormorant (*Phalacrocorax penicillatus*), and black oystercatcher (*Haematopus bachmani*), as well as three non-native species. Gulls and cormorants establish large seasonal breeding colonies on the west end of SNI. Numbers of nesting birds have increased in recent years due to protection from human activities (NBVC 2010). Nesting areas for Brandt's cormorants are shown on Figure 3-5. Of the bird species breeding on SNI, the western snowy plover (*Charadrius alexandrinus nivosus*) is the only species protected by the federal ESA; the plover is listed as threatened and is discussed in further detail below.

The California brown pelican 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 the western tip of SNI and at several other areas around the island (NBVC 2010) (Figure 3-5). They are expected to be present foraging in the shallow water and offshore of the project areas. Previously listed as threatened under ESA, the brown pelican was removed from the Federal List of Threatened and Endangered Wildlife in 2009 due to its successful and sustained recovery following the implementation of bans on the use of organochlorine pesticides (USFWS 2009). The brown pelican was similarly removed from the California ESA in 2009.

Three Channel Island endemic bird subspecies occur on SNI: island horned lark (*Eremophila alpestris insularis*), San Clemente Island house finch (*Carpodacus mexicanus clementis*), and orange-crowned warbler (*Oreothlypis celata sordida*). Raptors are uncommon visitors to SNI, with the exception of American kestrels (*Falco sparverius*) and barn owls (*Tyto alba*), which are permanent residents. In addition, SNI also supports a wintering population of burrowing owls (*Athene cunicularia*) (NBVC 2010). All migratory birds in the project area are protected by the Migratory Bird Treaty Act 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 (NBVC 2010).

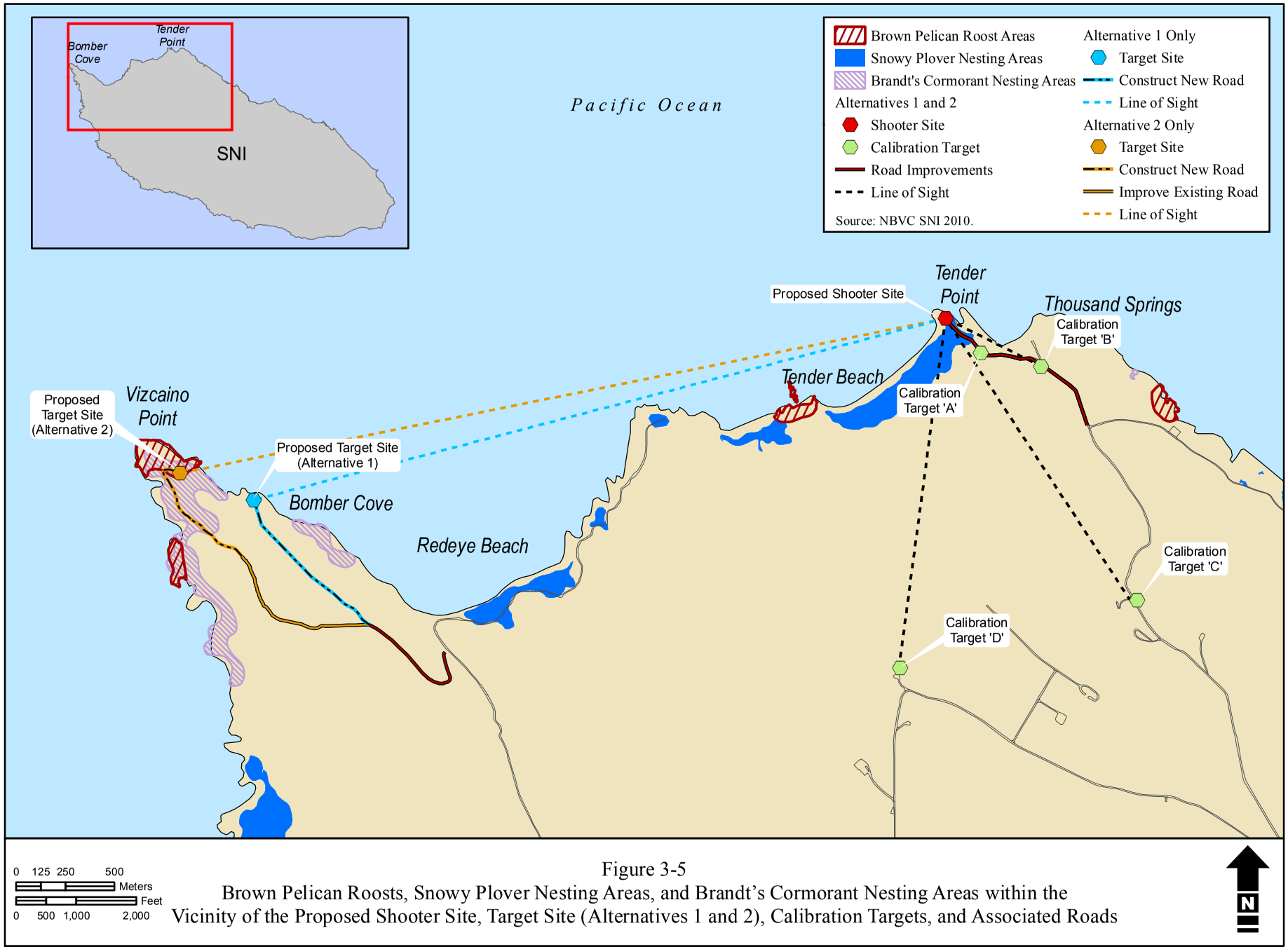


Figure 3-5
Brown Pelican Roosts, Snowy Plover Nesting Areas, and Brandt's Cormorant Nesting Areas within the Vicinity of the Proposed Shooter Site, Target Site (Alternatives 1 and 2), Calibration Targets, and Associated Roads

3.5.1.3 Special-Status Species

ESA-listed Species

The 2010 SNI INRMP (NBVC 2010) and the Biological Opinion for Activities on SNI, California (USFWS 2001) were the basis of island-wide information on the status, distribution, and known locations of federally listed species. Additionally, annual in-house Navy environmental reports were the primary source of data pertaining to species presence or potential occurrence within the project areas. Pursuant to Section 7 of the ESA, the Navy has prepared a Biological Assessment (BA) and consulted with the USFWS regarding potential impacts to federally listed species (NBVC 2011).

SNI has no federally listed endangered or threatened plant species. Special-status plants on SNI include one state endangered (SNI buckwheat [E*riogonum grande* var. *timorum*]), one state threatened (beach spectacle-pod [*Dithyrea maritima*]), and one state rare (Trask's milkvetch [*Astragalus traskiae*]). In addition, the California Native Plant Society considers five plant species as sensitive and 20 plant species as rare (NBVC 2010). The only terrestrial special-status wildlife species that may occur in the vicinity of the onshore project areas are the island night lizard, the western snowy plover, and the SNI fox, discussed below. The threatened southern sea otter are discussed below. The endangered black abalone (*Haliotis cracherodii*) occurs in rocky intertidal environments. 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 2008, 2009). However, since the proposed construction and operations would occur completely outside black abalone habitat, and since NMFS has exempted SNI from critical habitat designation due to benefits provided by the 2010 SNI INRMP (NBVC 2010), black abalone will not be discussed further.

Island Night Lizard[1]

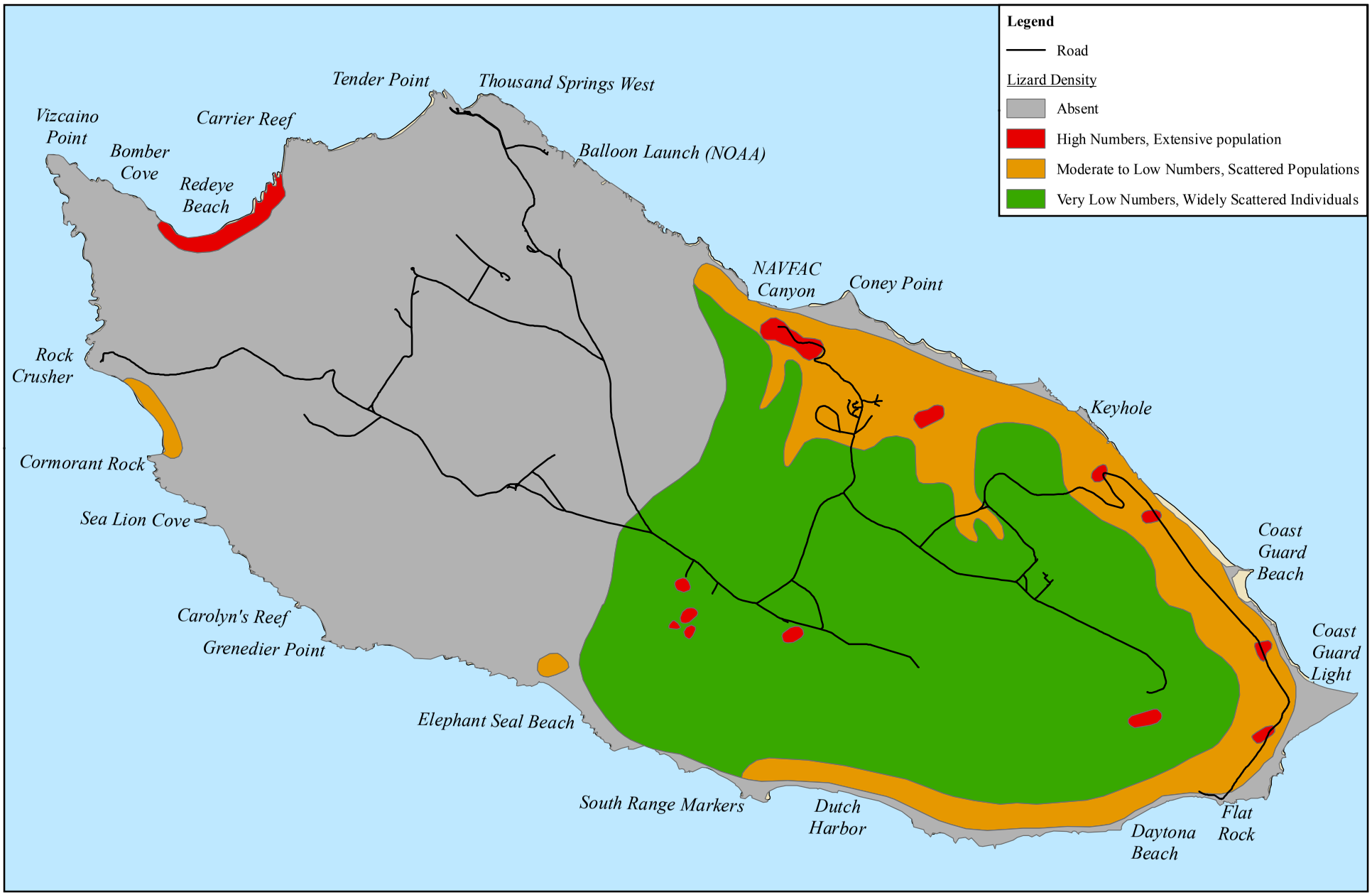
The island night lizard is a medium-sized, cryptically patterned lizard endemic to San Clemente Island, Santa Barbara Island, and SNI. Prior to 1 May 2014 it was a federally threatened species with no designated critical habitat. The USFWS delisted this species because populations appear to be stable and of adequate size, all substantial threats have been ameliorated, all remaining potential threats apart from climate change are currently managed, and climate change is not considered a substantial threat to the species at this time (Ruane 2012, USFWS 2013).

On SNI, island night lizards are generally distributed only over the eastern half of the island with the exception of a few isolated populations along the western and northern shores, away from the project area (Figure 3-6). 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).

Feral cats were removed from the island in 2011, leaving the SNI fox the only remaining predator of island night lizard. Introduced southern alligator lizards may compete for burrows and food. Critical Habitat for the island night lizard has not been designated (NBVC 2010).

[1] The island night lizard was delisted from the Endangered Species Act on 1 May 2014. It is included here due to its status as a listed species when the Draft EA for this project was prepared and due to its continued importance as a species of special concern.

As described above, night lizards are generally found on the eastern portion of the island, and the proposed action area does not provide suitable habitat for the island night lizard. With the exception of one very small, isolated population approximately population 550 ft (168 m) from Calibration Target C, island night lizards are more than 1 mile removed from any portion of the proposed Directed Energy Test Facilities project area. Searches of vegetative and other cover surrounding Calibration Target C have produced no evidence of island night lizards at the proposed site or elsewhere in the surrounding area. Since Island night lizards are sedentary, have very small home ranges averaging about 185 ft^2 (17.2 m^2)



0 0.5 1 Kilometers

0 0.5 1 Miles

Source: Fellers *et al.* 1998

Figure 3-6
Island Night Lizard Density at SNI

(Fellers et al. 1998) and the habitat quality at Calibration Target C is poor, night lizards are not expected to occur there. Thus, coupled with the fact that night lizards have been delisted, they will not be discussed further.

Western Snowy Plover

The Pacific coast population of the western snowy plover was federally listed as threatened in 1993. Critical habitat was designated in 2005 and SNI beaches were exempt from critical habitat designation due to the protections afforded the species through the 2010 SNI INRMP (USFWS 2012b). Members of this population breed on beaches along most of the west coast of the U.S. and south through Baja California, Mexico. Breeding occurs seasonally from March through September (USFWS 2007).

Western snowy plovers prefer nearshore habitats that are relatively free from human disturbance and predation. They nest on unvegetated to moderately vegetated beaches, sand spits, salt pans and rocky shelves adjacent to beaches. Most snowy plovers are site-faithful and return to the same breeding site in subsequent years (USFWS 2007). Western snowy plovers forage in dry sand areas above the high tide, along the beach wrack line, and in the wet sand and amongst surf-cast kelp in the intertidal zone. Their food sources consist primarily of immature and adult forms of aquatic and terrestrial invertebrates. They probe for prey in the sand and sometimes take insects from beach vegetation (USFWS 2007).

Although snowy plovers are year-round residents of SNI, population numbers are lowest at the beginning of the breeding season and increase in fall as wintering birds arrive. Nesting generally occurs between March 1 and September 15 of each year, though egg laying in southern California has been documented as early as mid-February, and continues through late July (NBVC 2010). Snowy plovers are known to nest and forage on beaches and in the intertidal zone at SNI (see Figure 3-5). Tender Beach and Tender Point provide high-quality plover habitat regularly used by plovers for breeding and non-breeding activities and historically has consistently had the highest number of snowy plovers on the island, especially late in the season. Tender Beach is approximately 0.9 miles (1.4 km) long and is backed by a relatively extensive dune system dominated by native plant species. The beach is about 60-75 ft (18-23 m) wide between the base of the dunes and the mean high tide line in many areas. The beach proper is relatively flat and lacking in vegetation; however, it has a substantial amount of driftwood which provides cover for chicks (NBVC 2011).

The results of surveys from 2005 through 2011 are shown in Table 3-8. During the snowy plover breeding season surveys, an average of 35% of the plovers on SNI are observed on Tender Beach (average based upon full surveys only). In the winter, use of Tender Beach by snowy plovers increases. During the winter season surveys, approximately 35 – 55% of SNI plovers occur on Tender Beach (excluding high and low outliers).

Table 3-8. Adult Snowy Plovers Observed on SNI during Winter and Breeding Season Surveys, 2005 – 2011

Year	Winter Survey (total count)			Breeding Survey (total count)		
	SNI	Tender Beach	Tender %	SNI	Tender Beach	Tender %
2005	243	105	43.2	62	20	32.3
2006	212	116	54.7	96	34	35.4
2007	182	78	42.9	68	30	44.1
2008*	138	49	35.5	45	17	37.8
2009	86	1	1.2	69	22	31.9
2010*	99	64	64.6	50	17	34.0
2011*	129	80	62.0	42	23	54.8

*2008 and 2011 breeding surveys and 2010 winter survey incomplete.

Source: NBVC 2011.

Monitoring efforts occur more regularly at the Tender Point area, with less frequent survey efforts on Tender Beach as no military operations occur there. Observations from 2006 through 2010 documented 12 nesting attempts, with only 4 that successfully hatched; all others failed due to predation or unknown reasons (NBVC 2011). Since 2009, nesting surveys of Tender Beach have shown relatively low nest success due to depredation, tides, winds, and abandonment (Ruane 2012).

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 federally endangered due to precipitous declines in their populations. SNI foxes are omnivorous, foraging on insects, vegetation, mice, lizards (including island night lizards), 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. Island fox may be present, but are not common within any of the proposed project areas. The SNI fox population appears to be at a high but decreasing density with an estimated population over 400 animals. The SNI fox population is affected by disturbance from humans, primarily from vehicle strikes, and was affected by competition with feral cats until their eradication from the island in 2011 (NBVC 2010).

Marine Birds

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 (311 miles) 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 (Navy 2008).

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. In 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 responded to by commencing a status review to see if the petition request is warranted. 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 (Navy 2008). On October 21, 2013 the USFWS completed a status review of the ashy storm-petrel and concluded it does not warrant additional protection.

Marine Mammals

Pinnipeds (Seals and Sea Lions)

Three species of pinnipeds are seen regularly on SNI: California sea lion (*Zalophus californianus californianus*), northern elephant seal (*Mirounga angustirostris*), and Pacific harbor seal (*Phoca vitulina richardsi*). 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 a haulout on Bomber Cove within the vicinity of the proposed action (Figure 3-7). California sea lions are known to haulout along the western shore of SNI, particularly on Vizcaino Point (Figure 3-7). The closest elephant seal haulout to the proposed action is along Redeye Beach (Figure 3-8). Table 3-9 summarizes the seasonal use patterns of pinnipeds on 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 (NBVC 2010). There are no known rookeries or haul-out sites in California for the Guadalupe fur seal, and the few observations of non-breeding

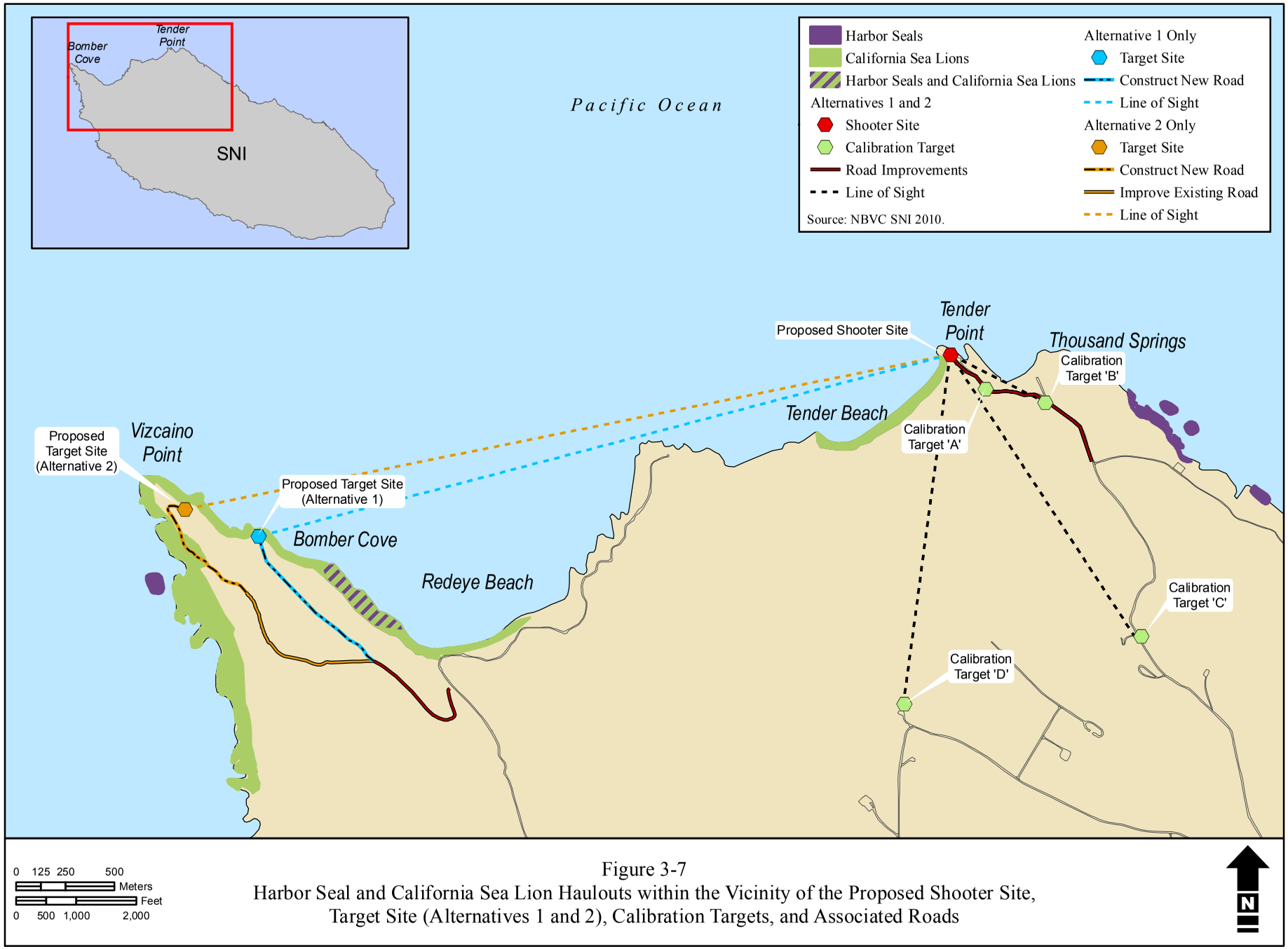


Figure 3-7
Harbor Seal and California Sea Lion Haulouts within the Vicinity of the Proposed Shooter Site, Target Site (Alternatives 1 and 2), Calibration Targets, and Associated Roads

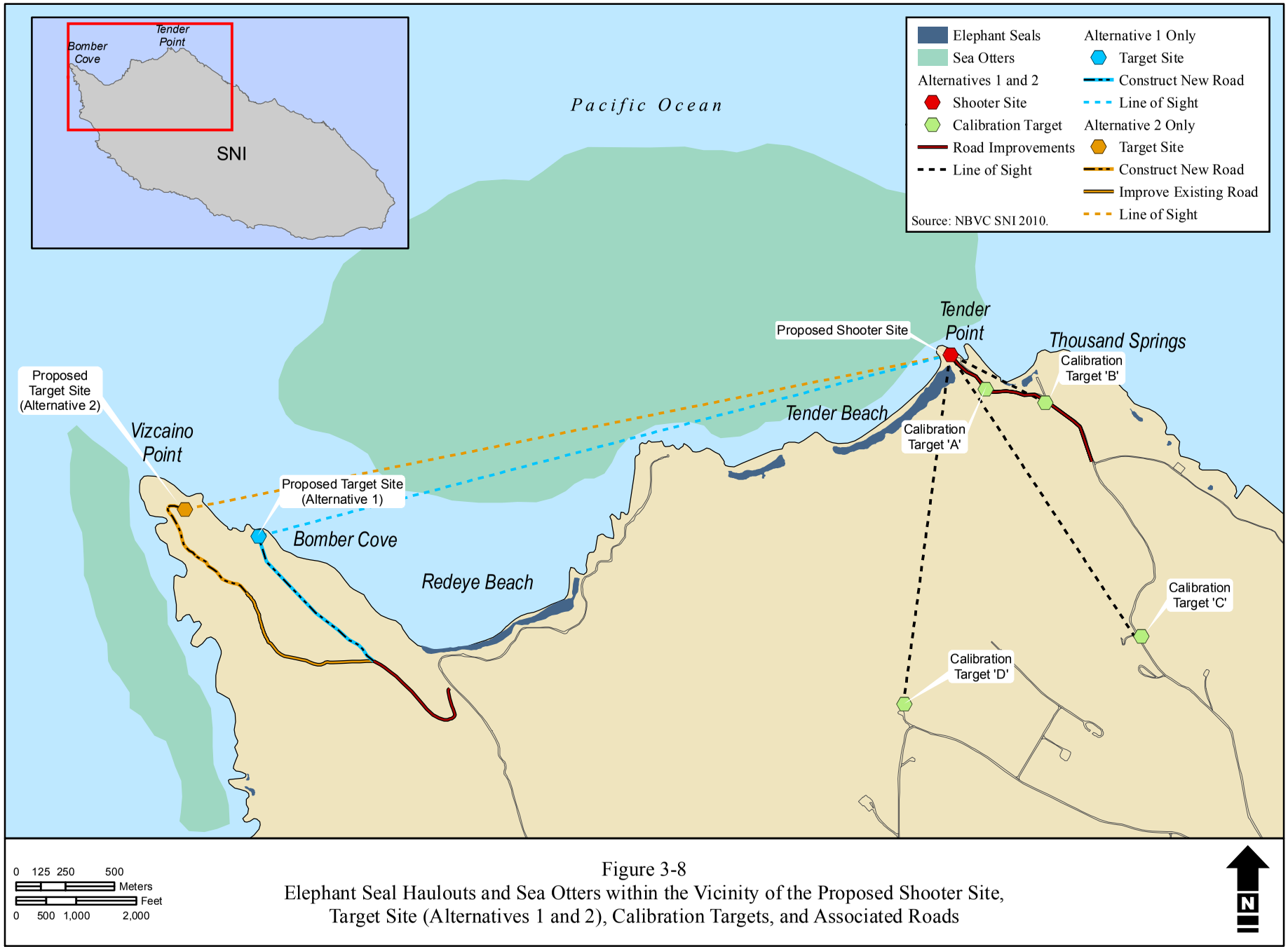


Figure 3-8
Elephant Seal Haulouts and Sea Otters within the Vicinity of the Proposed Shooter Site, Target Site (Alternatives 1 and 2), Calibration Targets, and Associated Roads

individuals made in recent years have been on the southern portions of the island (Carretta et al. 2007; NBVC 2011). As such, these two species will not be discussed further.

Table 3-9. Seasonal Use Patterns of Pinnipeds on SNI

Species	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Elephant Seal	Adult Males											
	At sea		Breed			At sea			Molt		At sea	
	Adult Females											
	At sea		Breed/Pup/Nurse		At sea		Molt		At sea			
	Pups and Weaners											
	At sea			Hauled out			At sea					
Harbor Seal	At sea/Hauled out				Breed/Pup/Nurse		Molt		At sea/Hauled out			
California Sea Lion	Adult Males											
	At sea							Breed		At sea		
	Adult Females											
	At sea/Hauled out							Breed/Pup/Nurse		At sea/Hauled out		

Source: NBVC 2010.

Southern Sea Otter

The southern sea otter (*Enhydra lutris nereis*) is a federally listed threatened species with the majority of the population occurring north of Point Conception. Between 1987 and 1990, USFWS conducted a translocation program governed by Public Law 99-625 and established a small, translocated colony of southern sea otters at SNI (USFWS 2003). The translocation program was terminated in December 2012 (USFWS 2012c). As of 2012, population counts yielded a total of 58 individuals (Hatfield 1997). 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, particularly around Rock Crusher (NBVC 2010) (Figure 3-8). Individuals are seen swimming along the kelp beds that line the coast of SNI on rare occasions (USFWS 2003).

3.5.2 Environmental Consequences

3.5.2.1 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. Potential environmental consequences of both direct and indirect impacts are considered.

3.5.2.2 Alternative 1

Vegetation Communities

Shooter Site and Calibration Targets

The Preferred Alternative, as shown in Figure 2-2 would disturb approximately 0.5 ac (0.2 ha) of unvegetated, barren land (Figure 3-4 and Table 3-10). Proposed Calibration Target A is located within coastal dune habitat; Targets B, C, and D are located within coastal scrub habitat. Construction of each of these sites would result in the loss of less than 0.1 ac (0.04 ha) of these habitats at each site. Access road improvements for the shooter site and for calibration targets C and D would result in the loss of approximately 0.7 ac (0.3 ha) of habitat, the majority of which would be coastal scrub (~0.5 ac [0.2 ha]) and 0.3 ac (0.1 ha) would be comprised equally of coastal dune, Coreopsis scrub, and inland dune.

Table 3-10. Acreage of Potential Disturbance to Vegetation Communities under Alternative 1 (the Preferred Alternative)

Vegetation Community	Shooter Site	Shooter Site Access Road	Target Site – Bomber Cove	Target Site Access Road	Calib. Target A*	Calib. Target B*	Calib. Target C*	Calib. Target D*	Total
Barren	0.5	0.1	-	0.1	-	-	-	-	0.7
Coastal Dune	-	0.1	<0.1	<0.1	<0.1	-	-	-	0.2
Coastal Scrub	-	0.5	-	0.6	-	<0.1	<0.1	<0.1	1.1
Coreopsis Scrub	-	0.1	-	-	-	-	-	-	0.1
Inland Dune	-	-	-	0.2	-	-	-	-	0.2
Total	**0.5**	**0.7**	**<0.1**	**1.0**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**2.3**

Notes: Any summation errors in the "Total" column or row are due to rounding; the total impact of 2.27 ac reported in Chapter 2 is accurate.
*Disturbance associated with Calibration Targets A and B includes only the proposed pads (225 ft^2 each); access roads are not necessary. Disturbance associated with Calibration Targets C and D includes the proposed pads (225 ft^2 each) and access roads (725 ft^2 each).

Target Site (Bomber Cove)

The proposed target site at Bomber Cove would include the concrete pad for the target, new access road, and improvements to the existing access road. Construction of these improvements would result in the loss of <0.1 ac (0.04 ha) of coastal dune habitat at the target site, as well as the loss of 1.0 ac (0.4 ha) of inland and coastal dune, barren, and coastal scrub habitat from the road improvements (see Table 3-9 and Figure 3-4).

A total of approximately 2.3 ac (0.9 ha), only 1.6 ac (0.6 ha) of which is vegetated, would be impacted. The majority of the proposed activities occur on and adjacent to previously developed or disturbed areas that are regularly used. Therefore, implementation of Alternative 1 would have no significant impact to vegetation communities.

Wildlife

Construction proposed under Alternative 1 would not have significant impacts on wildlife due to the facility's location in barren, previously disturbed, or actively used areas of SNI. Construction of the target site, shooter site, calibration targets, and associated access roads may temporarily displace wildlife typically found in the immediate vicinity of the proposed construction areas. However, after construction activities are complete, wildlife are expected to return and use the areas in the vicinity of the project. Only approximately 1.6 ac (0.6 ha) of vegetated habitat would be impacted from proposed construction activities and these activities would be immediately adjacent to previously developed and disturbed lands that do not provide high quality habitat.

Before directed energy 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 between the directed energy system and the target. The likelihood of a bird passing through the narrow directed energy beam in the exact moment it is fired is extremely low and can be discounted. In addition, a bird would have to remain in the fixed beam for many seconds before it could experience any potential impact. This is also discountable as any bird that may pass through the beam would continue flying and would receive less than a second of exposure. The area surrounding Bomber Cove has been used by Brandt's cormorants for nesting, although the nearest nesting area boundary is more than 300 ft (100 m) from the target area (see Figure 3-5). Construction activities at Bomber Cove will be scheduled to avoid Brandt's cormorant nesting periods. Project activities are not expected to lead to substantial disruption of important nesting,

resting or foraging activities. Therefore, there would be no significant impacts to wildlife with implementation of the proposed construction and operational activities under Alternative 1.

Terrestrial wildlife, particularly birds, may be temporarily displaced to nearby areas by noise or visual stimuli associated with project activities. However, SNI is currently utilized for various military training activities and Alternative 1 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 highly localized and temporary. Therefore, implementation of Alternative 1 would have no significant impact on terrestrial wildlife.

Special-Status Species

No ESA-listed species occur at the Bomber Cove Target Site, near the access road to the target site, or any of the four target calibration sites. There would be no impacts to ESA-listed species with implementation of the proposed construction and operational activities associated with the Bomber Cove target site, associated access road, and target calibration sites under Alternative 1.

Western Snowy Plover

Western snowy plovers are year-round residents on SNI and are sensitive to nest and habitat disturbances. Nesting and foraging behavior of snowy plovers can be affected by noise and human activity (Lafferty 2001; USFWS 2007). Potential impacts to snowy plovers would occur within the proposed Tender Point shooter site area (see Figure 3-5). The only permanent disturbance would be from the access roadand truck turnaround area, resulting in the reduced suitability of those areas as potential nesting habitat. Additional potential impacts would result from proposed operational activities on snowy plover nesting activities. As a result of the consultation with SHPO the construction of the two-story support facility building at Tender Point has been removed from the Proposed Action in both alternatives.

In general, the closer humans approach nesting snowy plovers, the more likely the birds are to (temporarily) leave the nest in response, although there is some evidence that birds exposed to prolonged human activity become accustomed to it and are less likely to be disturbed (USFWS 2007). Channel Islands National Park advises visitors that snowy plovers will generally flush from nests when people come within 328 ft (100 m) (http://www.nps.gov/chis/naturescience/snowy-plover.htm). Increased vehicle and human activity can result in nests being abandoned or chicks becoming separated from adults. Nests, eggs, and chicks can be crushed by humans or vehicles. Human activity may increase visitation by predators, resulting in increased predation on the species (USFWS 2007).

Nesting or roosting snowy plovers would potentially be impacted as a result of proposed activities at Tender Point/Beach. Foraging and nesting behavior may potentially be disrupted and plovers displaced, leading to potential loss of nests. To minimize potential impacts to snowy plovers, the Navy has incorporated within Alternative 1 a number of conservation measures that will be implemented during the construction and operational phases of the Tender Point shooter site (refer to Section 2.3.3, *Conservation Measures*). Potential disturbance of western snowy plovers during the Tender Point shooter site construction phase will be minimized or avoided by restricting construction, access road improvements, and utilities installation activities to outside the snowy plover breeding season. Disturbance to the western snowy plover during the shooter site operational phase will be minimized by implementation of conservation measures designed to make the area less attractive to nesting and monitoring of activity impacts. During the operational phase of directed energy testing and personnel training, the likelihood of a snowy plover passing through the directed energy beam in the exact moment it is fired is extremely low and can be discounted, particularly since plovers spend the majority of their time on the ground.

Under the ESA, the Navy has formally consulted with the USFWS for this project (USFWS 2012a). With implementation of the proposed conservation measures, the USFWS does not anticipate that any of the activities would result in injury to or mortality of adult western snowy plovers and therefore does not expect that the proposed activities would substantially reduce the reproduction, numbers, or distribution of the species.

San Nicolas Island Fox

Impacts to the SNI fox would occur from implementation of Alternative 1 from construction and the associated loss of habitat, although this would be of limited extent (2.3 ac) (0.9 ha) and would be partially located on poor-quality (i.e., barren) fox habitat. The likelihood of a fox passing through the narrow directed energy beam in the exact moment it is fired is extremely low and can be discounted. It is likely that visual disturbance from increased personnel would temporarily displace individuals, but such an impact would be localized and inconsequential. Therefore, with implementation of the proposed general and biosecurity conservation measures (Section 2.3.3), implementation of Alternative 1 would have no significant impacts to SNI fox.

Marine Mammals

To minimize potential impacts to marine mammals (pinnipeds) within the vicinity of the Preferred Alternative (see Figures 3-7 and 3-8), the Navy has incorporated within Alternative 1 a number of conservation measures that will be implemented during the construction and operational phases of the Tender Point shooter site and Bomber Cove target site (refer to Section 2.3.3, *Conservation Measures*).

The potential for harm to marine mammals is greatest during the marine mammal breeding/pupping season and will be largely avoided by restricting construction, access road improvements, utilities installation activities, and maintenance activities to outside the pinniped breeding and pupping seasons. Unless operationally necessary, testing and personnel training activities will also be avoided during the marine mammal breeding/pupping seasons. If feasible, permanent barriers (e.g., concrete K-rails) will be installed around concrete pads and work areas to discourage marine mammals from using these areas. The path from the directed energy system to the target will be monitored by observers with binoculars or remote cameras as necessary to ensure that the directed energy system is not fired if and when wildlife is within the nominal hazard zone (i.e., area potentially affected by the system), which is specific to the directed energy system. Prior to scheduling the use of a particular site, NAWCWD will 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 and personnel training activities at these sites, a qualified biologist familiar with the habits and identification of marine mammals and their use of shoreline habitats in the testing and personnel training area will search for marine mammals within and adjacent to the testing and personnel training area. Test activities will be postponed, relocated and/or monitored by the qualified biologist as necessary to ensure that the activities are unlikely to result in any "take" (as defined under the Marine Mammal Protection Act) of marine mammals.

Sea otters would not be impacted by proposed activities since they are found offshore and on or beneath the water surface (see Figure 3-8). The proposed directed energy activities would be above the water surface with no potential of impacting a sea otter.

Harbor seals do not haulout within the vicinity of Alternative 1. The nearest haulout is located on the beach below a cliff approximately 600 ft (180 m) to the northeast of the proposed road leading to the Bomber Cove target site and is well removed from the target site (see Figure 3-7). The proposed directed energy activities would have no potential of impacting a harbor seal.

Elephant seals haulout on the beach below a steep cliff that is approximately 80 ft (24 m) to the northeast of the road leading to the proposed Tender Point shooter site (see Figure 3-8). The cliff is expected to screen noise and visual cues associated with human activities on the road above, and construction will not occur during the breeding/pupping season. Elephant seals also haulout on the approximately 0.9-mile-long (1.4-km-long) Tender Beach, the nearest edge of which is located approximately 100 ft (30 m) southwest of the proposed shooter site and is well removed from the proposed path of the directed energy beam. Therefore, with implementation of the proposed conservation measures, Alternative 1 would be very unlikely to result in any harm or harassment of an elephant seal and no "takes" of elephant seals as defined by the Marine Mammal Protection Act are anticipated.

California sea lions also haulout on Tender Beach and occur throughout the Bomber Cover beach area (see Figure 3-7). Alternative 1 would be unlikely to result in any harm or harassment of sea lions on Tender Beach for the same reasons as described for elephant seals. Proposed conservation measures would minimize the potential for harm to sea lions on and near Bomber Cove and include avoiding operations during the marine mammal breeding/pupping season unless operationally necessary, the cessation of construction and maintenance activities during the breeding/pupping season, monitoring the target site with binoculars or remote cameras as necessary to ensure that the directed energy system is not fired if and when sea lions are within the nominal hazard zone, and installing permanent barriers around the concrete pads as feasible. Safety procedures will also ensure that the directed energy system 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 system is triggered is considered remote and discountable. Therefore, with implementation of the proposed conservation measures, Alternative 1 would be unlikely to result in any harm or harassment to California sea lions and no "takes" of California sea lions as defined by the Marine Mammal Protection Act are anticipated.

Accordingly, implementation of Alternative 1 would be unlikely to result in any harm or harassment of marine mammals, no "takes" of marine mammals as defined by the Marine Mammal Protection Act are anticipated, and no significant impacts would occur with implementation of Alternative 1.

Therefore, for the reasons described above, implementation of Alternative 1 would not have significant impacts on wildlife, special status species or marine mammals.

3.5.2.3 Alternative 2

Impacts associated with the proposed shooter site, calibration targets, and associated access road improvements would be the same between the Preferred Alternative and Alternative 2. The following discussion focuses on those aspects of Alternative 2 with potentially different impacts to biological resources than those discussed under Alternative 1.

Vegetation Communities

Target Site (Vizcaino Point)

The proposed target site at Vizcaino Point would include the concrete pad for the target, concrete backstop, new access road, and improvements to the existing access road. Construction of these improvements would result in the modification of <0.1 ac (0.04 ha) of developed area at the target site, as well as the loss of 1.1 ac (0.4 ha) of inland and coastal dune, barren, developed and coastal scrub habitat from the road improvements (Table 3-11 and Figure 3-4).

A total of approximately 2.4 ac (1.0 ha), only 1.7 ac (0.7 ha) of which is vegetated, would be impacted. The majority of the proposed activities occur on and adjacent to previously developed or disturbed areas that are regularly used. Therefore, implementation of Alternative 2 would have no significant impact to vegetation communities.

Wildlife

Impacts to wildlife under Alternative 2 would be similar to those previously discussed for Alternative 1. Implementation of Alternative 2 would not significantly increase the overall intensity or geographic extent of military activities presently conducted in the area. Before directed energy 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 between the system and the target. The likelihood of a bird passing through the narrow directed energy beam in the exact moment it is fired is extremely low and can be discounted. In addition, a bird would have to remain in the fixed beam for many seconds before it could experience any potential impact. This is also discountable as any bird that may pass through the beam would continue flying and would receive less than a second of exposure.

Table 3-11. Acreage of Potential Disturbance to Vegetation Communities under Alternative 2

Vegetation Community	Shooter Site	Shooter Site Access Road	Target Site – Viz. Pt	Target Site Access Road	Calib. Target A*	Calib. Target B*	Calib. Target C*	Calib. Target D*	Total
Barren	0.5	0.1	-	0.1	-	-	-	-	0.7
Coastal Dune	-	0.1	-	0.3	-	-	-	-	0.4
Coastal Scrub	-	0.5	-	0.2	<0.1	<0.1	<0.1	<0.1	0.7
Coreopsis Scrub	-	0.1	-	-	-	-	-	-	0.1
Developed	-	-	<0.1	<0.1	-	-	-	-	<0.1
Inland Dune	-	-	-	0.5	-	-	-	-	0.5
Total	**0.5**	**0.7**	**<0.1**	**1.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**2.4**

Notes: Any summation errors in the "Total" column or row are due to rounding; the total impact of 2.38 ac reported in Chapter 2 is accurate.

*Disturbance associated with Calibration Targets A and B includes only the proposed pads (225 ft^2 each); access roads are not necessary. Disturbance associated with Calibration Targets C and D includes the proposed pads (225 ft^2 each) and access roads (725 ft^2 each).

Vizcaino Point is used by Brandt's cormorants for nesting and by brown pelicans for roosting (see Figure 3-5). Construction activities for the backdrop at Vizcaino Point will be scheduled to avoid Brandt's cormorant nesting periods. With implementation of the additional conservation measures for Alternative 2 (refer to Sections 2.3.3 and 2.3.3.1), including the provisions that the directed energy system will not be fired if and when wildlife is within the nominal hazard zone specific to the directed energy system and that access to Vizcaino Point will be restricted during nesting. Therefore, implementation of Alternative 2 would have no significant impact to wildlife.

Special-Status Species

With implementation of the proposed conservation measures (Section 2.3.3 and 2.3.3.1), including the cessation of operations requiring access through the breeding colony during the cormorant nesting season, impacts to special-status species under Alternative 2 would be similar to those previously discussed for Alternative 1. Therefore, implementation of Alternative 2 would have no effect on ESA listed species and no significant impacts to other special status species.

3.5.2.4 Mitigation Measures

Implementation of either Alternative 1 or Alternative 2 would not result in significant impacts to biological resources; therefore, no mitigation measures are proposed or required.

3.5.2.5 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and existing conditions would remain unchanged. Therefore, no significant impacts to biological resources would occur.

3.6 CULTURAL RESOURCES

3.6.1 Affected Environment

3.6.1.1 Definition of Resource

Cultural resources include prehistoric and historic sites, structures, artifacts, districts that depict evidence of human activity considered important to any culture, subculture, or community. Cultural resources, as defined in the EA, consist of archaeological resources, architectural resources, and traditional cultural properties.

Archaeological resources consist of the material remains of prehistoric and/or historic human activity. The Archaeological Resources Protection Act of 1979 defines archaeological resources as "pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal materials, or any portion or piece of any of the foregoing items" (16 USC 470bb).

Architectural resources include manmade structures including, but not limited to, standing buildings, dams, bridges, and canals. Under the NHPA of 1966 (Public Law 89-665, as amended by Public Law 96-515; 16 USC 470 et seq.), only architectural resources over the age of 50 years are considered for protection; however, younger structures can be afforded the same protection under special circumstances.

Traditional cultural properties may include archaeological resources, architectural resources, topographic features, plant and animal habitat, and any other inanimate object deemed essential to the continuance of a traditional culture by Native Americans and other groups.

3.6.1.2 Regulatory Setting

The National Historic Preservation Act provides for establishment of the National Register of Historic Places (or National Register) to include districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture. Section 106 of the Act requires federal agencies with jurisdiction over a proposed federal project to take into account the undertaking's effect on cultural resources listed or eligible for listing in the National Register, and affords the SHPO and the Advisory Council on Historic Preservation (ACHP) an opportunity to comment with regard to the undertaking. The National Register eligibility criteria have been defined by the Secretary of the Interior's Standards for Evaluation (36 CFR 60). Cultural resources are considered to be National Register-eligible if they display the quality of significance in American history, architecture, archaeology, engineering, and culture that is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, workmanship, feeling, and association, and meet the following criteria:

- **Criterion A:** The resources are associated with the events that have made a significant contribution to the broad patterns of American history;
- **Criterion B:** The resources are associated with the lives of persons significant in our past; or
- **Criterion C:** The resources embody the distinctive characteristic of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant or distinguishable entity whose components may lack individual distinction; or
- **Criterion D:** The resources have yielded or may likely yield information important in prehistory or history.

The process of agency review and assessment of the effect of an undertaking on cultural resources is set forth in the implementing regulations formulated by the ACHP (36 CFR 800, Protection of Historic Properties). Other applicable laws and guidelines include the following:

- EO 11593, Protection and Enhancement of Cultural Environment (16 USC 470 [Supp. 1, 1971]).
- Native American Graves Protection and Repatriation Act (Public Law 101 – 601,
- USC 3001 – 3013).
- Determination of Eligibility for Inclusion in the National Register (36 CFR 63).
- Curation of Federally Owned and Federally Administered Archaeological Collections (36 CFR 79).
- DoD Directive 4710.1 (outlines the policy to incorporate historic preservation requirements into all DoD activities).

Section 101(d)(6)(B) of the Act requires federal agencies to consult with Indian tribes that attach religious or cultural significance to historic properties. Compliance with 36 CFR 800.2, which implements consultations with Native Americans, may be conducted by federal agencies as part of a government-to-government undertaking.

In accordance with Section 101(b)(3) of the Act, the SHPOs advise and assist federal agencies in carrying out their Section 106 responsibilities and assist agencies, organizations, and individuals to ensure that historic properties are taken into consideration at all levels of planning and development.

In California, the SHPO is the head of the Office of Historic Preservation of the Department of Parks and Recreation.

3.6.1.3 Existing Conditions

Much of SNI has been inventoried for historic-era buildings and structures. These investigations have resulted in the identification of one building that has been determined eligible for the National Register. This building is not in the proposed action area.

SNI has been completely surveyed for archaeological resources. The multiple investigations conducted over the previous 100 years have revealed more than 530 prehistoric sites and 48 historic sites (Reinman and Lautner 1984, Schwartz and Rossback 1993, Schwartz 1995).

Prehistoric sites at SNI consist primarily of middens (food processing or shellfish remains) within 984 ft (300 m) of the shoreline (Martz 2002). Middens on SNI typically contain the remains of fish, marine mammals, shellfish, and food processing tools (bifaces, scrapers, and milling equipment). Middens are often associated with other prehistoric site types commonly encountered on SNI, including habitations, lithic reduction sites, rock art, thermal features, and human burials.

Historic sites on SNI include the remnants of fishing and ranching activities that occurred on the island from the 1850s until the Navy took ownership of the island in 1933. Fishing camps on SNI are typically found on the northwestern and southeastern tips of the island while evidence of ranching activities is generally encountered on the terraces above NAVFAC Beach (NAWCWD 1997).

Site CA-SNI-12, located near the northern-most point of SNI at Thousand Springs, consists of a habitation area with multiple middens (processing, shellfish, and fish), a lithic component, shell beads, fishing equipment, milling equipment, and human burials. Depth of CA-SNI-12 ranges from no depth to 30 centimeters (cm) (12 inches) below surface depending on the presence of middens, burials, or caches (Kritzman 1977). CA-SNI-12 has been determined as eligible for listing to the National Register of Historic Places.

Site CA-SNI-157, located southeast of Bomber Cove on the northwest corner of SNI, consists of a habitation with an associated lithic scatter and evidence of shellfish processing. Milling equipment, a black abalone concentration, and a red abalone concentration have also been noted at the site. Previous

investigations at site CA-SNI-157 yielded human remains (Martz 2002). A 1997 investigation by Petra Resources Inc. revealed a depth of 60-70 cm (24-28 inches) below surface for subsurface cultural deposits. Site CA-SNI-157 has been recommended as eligible for the National Register of Historic Places. The eligibility recommendation is pending concurrence from the SHPO.

3.6.2 Environmental Consequences

3.6.2.1 Approach to Analysis

Consideration must be afforded to proposed actions that may diminish the integrity of the resource or alter the eligibility of the resource for the National Register. In order to assess the effects of a proposed action, the area of potential effect (APE) requires definition.

The APE represents the geographic area within which an undertaking would take place and may cause an effect to the ambient environment, including historic properties. The proposed actions associated with the proposed Directed Energy Test Facilities at SNI include the onshore and offshore areas surrounding the Vizcaino Point, Bomber Cove, and Tender Point areas of the island. The APE for the Preferred Alternative includes a shooter site at Tender Point, a Target Site at Bomber Cove, and four calibration sites. The shooter site and target site are in proximity to cultural resources and would affect one eligible historic property (CA-SNI-12) for the National Register.

3.6.2.2 Alternative 1

The Navy has determined that areas proposed for construction would affect one intact eligible historic property. The shooter site requires the paving of a 55 ft (17 m) radius concrete turnaround area, a 15-by-122 ft (5-by-37 m) concrete pad, and the widening of 3,196 ft (974 m) of existing road from a width of 8 to 18 ft (2 to 5 m). The target site on Bomber Cove requires the construction a 1,600 ft^2 (149 m^2) concrete pad, a new 2,885-ft (879-m) gravel road 12-ft (4-m) wide, and the widening of 2,214 ft (675 m) of existing road from a width of 8 to 12 ft (2 to 4 m). Construction at Tender Point would cause disturbance to a portion of Site CA-SNI-12. Since CA-SNI-12 is an eligible resource for the National Register, impacts of construction at Tender Point would be potentially significant. Shovel test pits excavated in 2014, however, found no artifacts below the surface in the proposed road area (Appendix B).

Procedures to resolve adverse effects to historic properties are provided in 36 CFR 800.6, which requires the Navy to consult with the SHPO and other interested parties to seek methods to avoid, minimize, or mitigate adverse effects to historic properties. The Navy has consulted with SHPO and received their concurrence on this project (Appendix B). Consultation included a presentation of the APE and a description of the potential effects. As a result of the consultation with SHPO the construction of the two-story support facility building at Tender Point has been removed from the Proposed Action and all action alternatives. If funding becomes available for construction of the two-story building, a supplemental EA will be prepared and consultation with SHPO will be re-initiated prior to construction.

Construction of one 225-ft^2 (21-m^2) concrete pad would occur at each of the four calibration sites. No archaeological resources or historic properties are located at these sites. Therefore, ground disturbance at the proposed calibration sites under Alternative 1 would not have a significant impact to cultural resources.

Alternative 1 includes firing directed energy systems from Tender Point over 12,000 ft (3,658 m) of ocean to Bomber Cove. The directed energy testing and personnel training associated with Alternative 1 would not cause any onshore or offshore effects to cultural resources. Effects to cultural resources would occur

solely through the proposed road widening construction. The Navy has consulted with SHPO and has received concurrence on a determination of no adverse effect to historic properties.

3.6.2.3 Alternative 2

Impacts of Alternative 2 would be similar to those described for Alternative 1, with no adverse effect to historic properties.

3.6.2.4 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and existing conditions would remain unchanged. Therefore, no significant impacts to cultural resources would occur.

3.7 PUBLIC SAFETY

3.7.1 Affected Environment

3.7.1.1 Definition of Resource

Safety is defined as the protection of workers and the public from hazards. The total accident spectrum encompasses not only injury to personnel, but also damage or destruction of property or products. For worker safety, the boundary of the immediate work area defines the region of influence. For public safety, the region of influence varies depending on the nature of the operation; this area may extend for miles beyond the source of the hazard.

The primary safety issues associated with the proposed action include those inherent to directed energy operations, flight operations, missile firings, and operation of Navy vessels. The safety policy of NAWCWD is to take every reasonable precaution in the planning and execution of all operations that occur on the Sea Range to prevent injury to people and damage to property. This involves implementing extensive measures for risk mitigation as well as increased range control in the areas determined to have the highest risk to public safety.

3.7.1.2 Regulatory Setting

The Occupational Safety and Health Administration is responsible for protecting worker health and safety in non-military workplaces. Relevant regulations are found at 20 CFR 1910. Protection of public health and safety is a responsibility of the USEPA as mandated through a variety of laws, including the Resource Conservation and Recovery Act (42 USC §§ 6901 et seq.); the Comprehensive Environmental Response, Compensation, and Liability Act (42 USC §§ 9601 et seq., Sections 101[14] and 101[33]) and the Superfund Amendments and Reauthorization Act of 1986, (Public Law 99-499); the CWA; and the CAA. Additional safety responsibilities are mandated by the Department of Transportation, whose regulations can be found at 49 CFR.

The sections below provide an overview of existing safety and occupational health policies and procedures in place at the Sea Range, with specific directives and standards that apply to the testing and personnel training activities associated with the proposed action. Key among these directives, guidance documents, and standards are the following:

- OPNAVINST 5100.23G, *The Navy Safety and Occupational Health Program Manual* (30 Dec 2005).
- OPNAVINST 5100.27B/Marine Corps Order 5104.1C, *Navy Laser Hazards Control Program* (2 May 2008).
- DoD Directive 4540.01, *Use of International Airspace by U.S. Military Aircraft and for Missile/Projectile Firings* (28 Mar 2007).
- DoD Instruction 6055.11, *Protecting Personnel from Electromagnetic Fields* (19 Aug 2009).
- NAVSEA OP3565/NAVAIR 16-1-529, *Electromagnetic Radiation Hazards* (11 Sep 2008).
- MIL-HDBK-828B w/CHANGE1, *Department of Defense Handbook: Laser Safety on Ranges and in Other Outdoor Areas* (5 May 2011).
- American National Standards Institute (ANSI) Z136.1, *American National Standard for Safe Use of Lasers*.
- ANSI Z136.6, *Safe Use of Lasers Outdoors*.
- ANSI/Institute of Electrical and Electronics Engineers (IEEE) C95.1-1992, *Safety Levels with Respect to Human Exposure to Radio Frequency. Electromagnetic Fields, 3 kilohertz (kHz) to 300 GHz*.

- IEEE C95.3-1991, *Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave*.

3.7.1.3 Existing Conditions

Laser Safety

Before any lasers are used at the Sea Range, operations must comply with the joint OPNAVINST 5100.27B/Marine Corps Order 5104.1C Navy Laser Hazards Control Program and approved by NAWCWD Range Laser System Safety Officer. OPNAVINST 5100.27B incorporates the industry standard, ANSI Z136.1, *Safe Use of Lasers*. In addition to OPNAVINST 5100.27B, NAWCWD would implement a detailed range hazard assessment and SOP process prior to the use of a 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) would be used, and people involved. If it is determined that the Sea Range can support the test, then the following would 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 events; and
- qualification/certification statements for operators of the laser system(s).

A team of NAWCWD engineers, scientists, and the safety officer would review every step of planned laser tests, and if there were any unknown factors that had not been addressed or mitigated, the test would not proceed. If all information is provided and analysis indicates that the Sea Range could safely accommodate the proposed event, the safety officer would generate a range safety approval for the program.

Additionally, the Navy's Laser Safety Review Board (LSRB) provides a systems safety review of all Navy 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. Guidance relating to laser safety on military ranges is contained in MIL-HDBK-828B, Department of Defense Handbook: *Laser Safety on Ranges and in Other Outdoor Areas.* ANSI Z136.6 (2005), *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; 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 the Naval Surface Warfare Center Dahlgren Laboratory (NSWCDL), based on expertise in lasers and laser safety. NSWCDL's head of the LNTL is also a sitting member of multiple ANSI Z136 subcommittees focused on the safe use of lasers.

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 are described below and would apply to the proposed action.

- *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 and nominal hazard zone. Each laser system SOP must be submitted to the Navy's LSRB and the NAWCWD Range Laser System Safety Officer 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 and personnel training. 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 and personnel training 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. Hazard distances and zones 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. The efficacy of the safety interlock ensuring the correct beam path is tested through the use of lower power beams 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 would heat up the calorimeter sensors, which would 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 doorframe leading into the area where the laser system is operated. If this door is opened, electrical power would be disconnected from the system to ensure that 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 would 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.
- *Airspace 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 would occur whenever laser testing and personnel training creates potential hazards to satellites.

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*. Air contaminants may be generated when certain Class 4 laser beams interact with matter such as plastics, composites, metals, and tissues (ANSI 2007). Areas would be cleared of debris prior to testing and personnel training, and NAWCWD would ensure that appropriate industrial hygiene characterizations of exposure to these contaminants 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 would be within close proximity to the target impact area. Once lasing activities stop, collateral radiation (if any) would cease, and no residual collateral radiation would remain.

HPM Safety

Use of HPM systems poses hazards of electromagnetic radiation to fuels, electronic hardware, ordnance, and personnel. These hazards are generally segregated as follows:

- Hazards of Electromagnetic Radiation to Personnel (HERP).

- Hazards of Electromagnetic Radiation to Ordnance (HERO).
- Hazards of Electromagnetic Radiation to Fuel (HERF).

Current industrial specifications for radiation hazards are contained in ANSI/IEEE C95.1-1992 which was used as a reference to create the combined Navy regulation NAVSEA OP3565 / NAVAIR 16-1-529. Volume I contains HERP and HERF limits - its current version is REV 5. Volume II (REV 6) covers HERO. These limits are shown in Figure 3-9; all values have been converted to average power density.

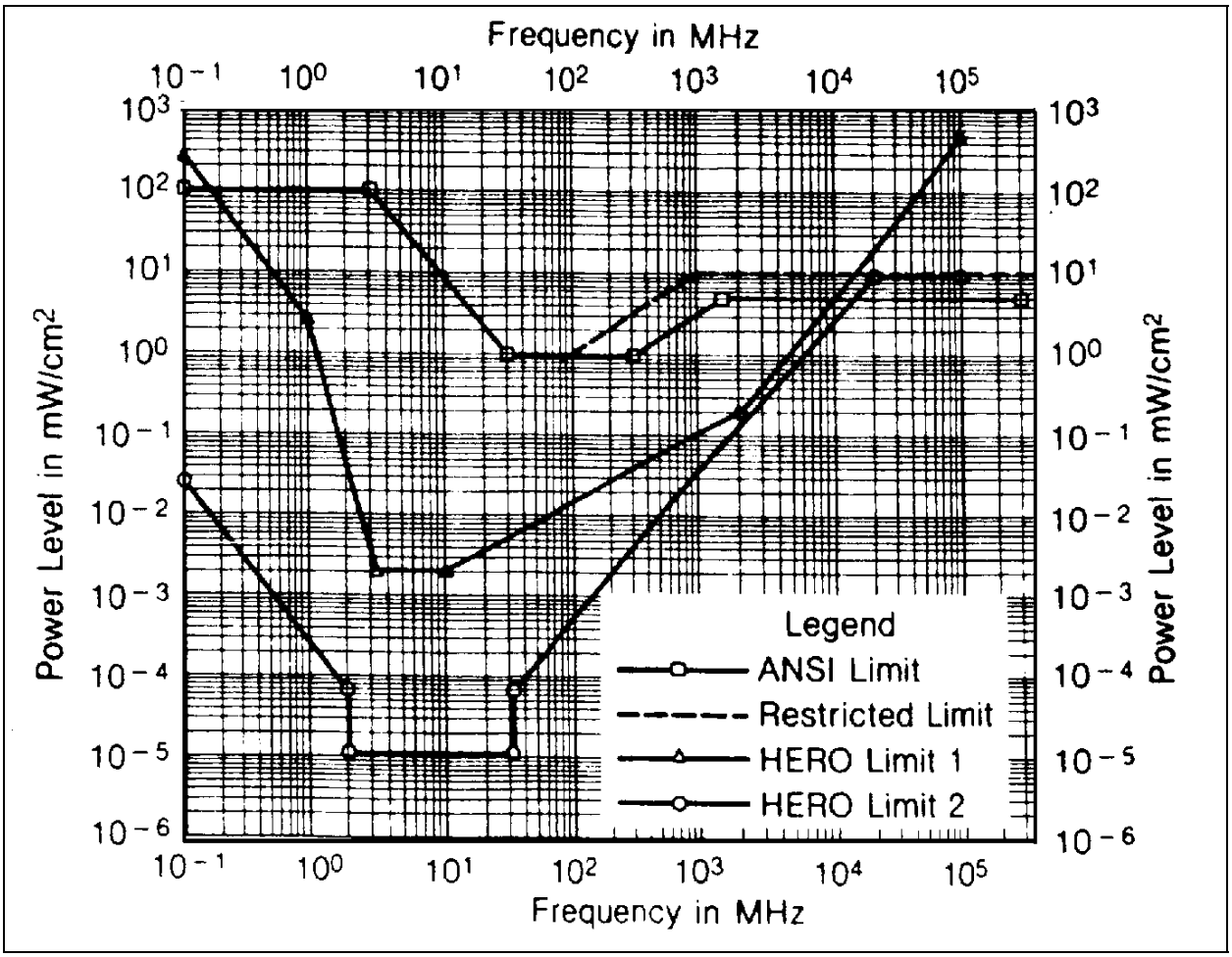


Figure 3-9. Radiation Hazards to Ordnance and Personnel

The potential dangers to ordnance and fuels are obvious because an explosion could set off an explosive "chain reaction"; consequently, these limits are generally lower than personnel limits. There are three HERO categories: HERO limit 2, HERO limit 1 and HERO safe. The HERO limit 2 is set for HERO "unsafe" or "unreliable" explosive devices with exposed wires arranged in optimum (most susceptible) receiving orientation. This usually occurs during the assembly/disassembly of ordnance, but also applies to new/untested ordnance until it is proven "safe" or "susceptible." The HERO limit 1 is for HERO susceptible ordnance that is fully assembled and undergoing normal handling and operations. HERO safe ordnance requires no RF radiation precautions.

The danger of HERP occurs because the body absorbs radiation and significant internal heating may occur without an individual's knowledge because the body does not have internal sensation of heat. Thus,

tissue damage may occur before the excess heat can be dissipated. As shown in Figure 3-10 the current "restricted" limit is for individuals with a minimum height of about 4 ft 7 inches (1.4 m) because they have more body mass. In other words, all people may be exposed to the lower limit, but only persons taller than 4 ft 7 inches may be exposed to the higher limit of milliwatts per square centimeter (mW/cm^2). Two maximum hazard limits are defined:

- *Controlled Environments* – Personnel are aware of the potential danger of RF exposure concurrently with employment, or exposure that may occur incidental to passage through an area.
- *Uncontrolled Environments* – A lower maximum level where there is no expectation that higher levels should be encountered, such as living quarters.

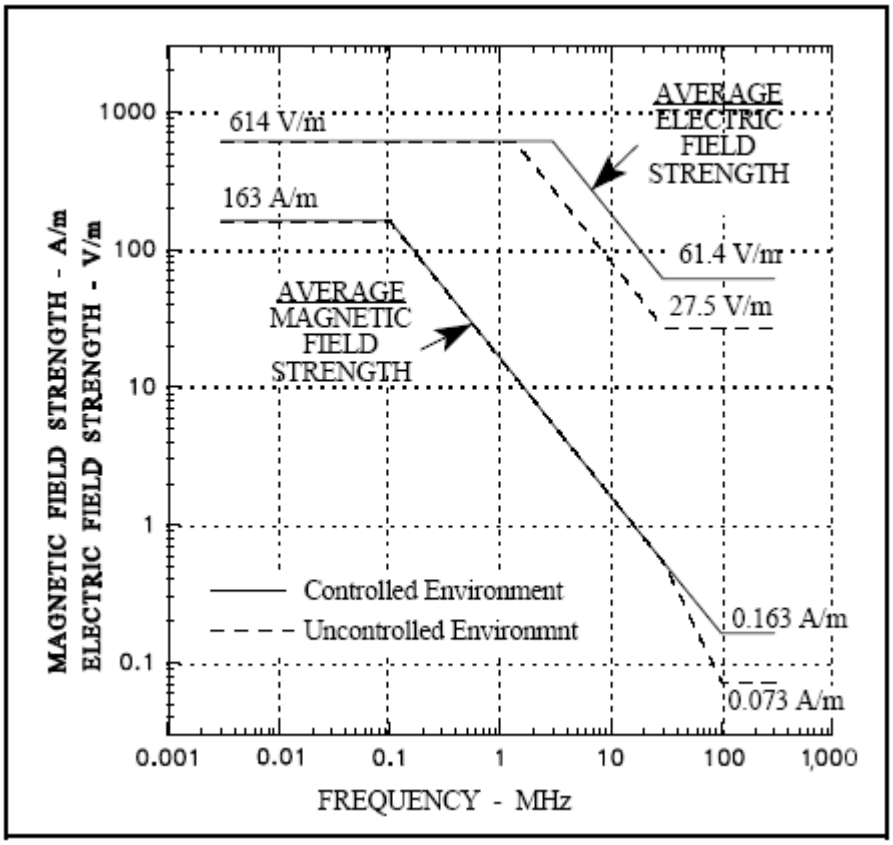


Figure 3-10. Lower Frequency HERP (from DoD INST 6055.11)

The permissible exposure limits (PELs) are based on a safety factor of ten times the specific absorption rate (SAR) which might cause bodily harm. The Federal Communication Commission has established SAR limits for localized exposure to RF as shown in Table 3-12.

Table 3-12. Specific Absorption Rates

Occupational/Controlled Exposure 100 kHz – 6 GHz	General Uncontrolled Exposure 100 kHz – 6 GHz
< 0.4 Watt/kilogram whole body	< 0.08 Watt/kilogram whole body
≤ 8 Watts/kilogram partial body	≤ 1.6 Watts/kilogram partial body

Source: Federal Communication Commission 1999.

The term PEL is equivalent to the terms "maximum permissible exposure" and "RF protection guidelines" found in other publications. There are several exceptions to the maximum limits in Figures 3-10 and 3-11 (in some cases higher levels are permitted):

- HPM systems exposure in a controlled environment which has a single pulse or multiple pulses lasting less than 10 seconds and has a higher peak E-field limit of 200 kilovolts per meter (kV/m). An E-field is the electric field component of an electromagnetic wave expressed in volt/meter.
- Electromagnetic pulse simulation systems in a controlled environment for personnel who are exposed to broadband RF limits are limited to a higher peak E-field of 100 kV/m.
- Electromagnetic pulse simulation systems in a controlled environment for personnel who are exposed to broad-band (0.1 megahertz [MHz] to 300 GHz) RF are limited to a higher peak E-field of 100 kV/m.
- The given limits are increased for pulsed RF fields. In this case the peak power density per pulse for pulse durations less than 100 milliseconds and no more than 5 pulses in the period is increased to: PEL = PEL x T Pulse AVG / 5 x Pulse Width, and the peak E-field is increased to 100 kV/m. If there are more than 5 pulses or they are longer than 100 milliseconds, a time averaged P should not exceed that shown in Figure 3-10.
- A rotating or scanning beam likewise reduces the hazard, so although an on-axis hazard might exist, there may be none with a moving beam. The power density may be approximated with:

  Power Density = Power Density (2 x Beam Width / scan angle) scan fixed.
- Many other special limitations also apply, such as higher limits for partial body exposure, additional information can be found in DoD Instruction 6055.11, *Protecting Personnel from Electromagnetic Fields*, in detail. Field measurements may be taken in accordance with IEEE C95.3-1991.

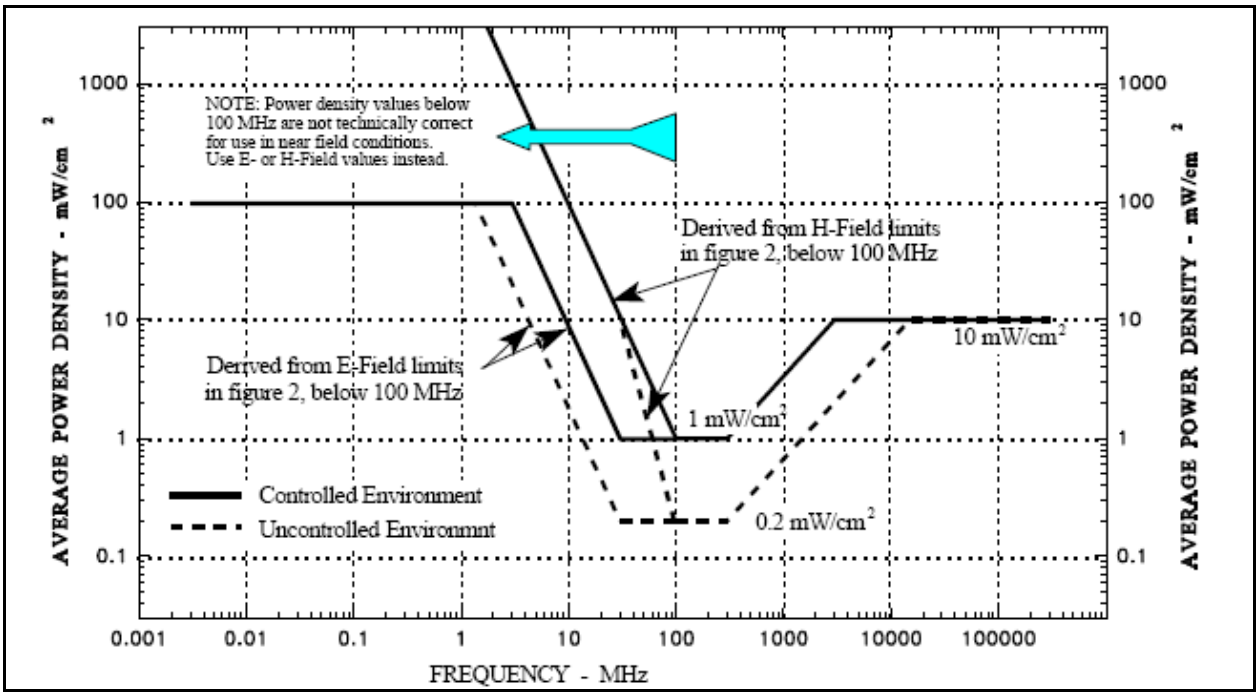


Figure 3-11. DoD INST 6055.11 HERP Limits

The PELs listed in Figures 3-10 and 3-11 were selected for an average RF exposure time at various frequencies. In a controlled environment, this averaging time was selected as 6 minutes for 0.003 to 15,000 MHz. If the exposure time is less than 6 minutes, then the level may be increased accordingly.

Similar time weighted averages apply to uncontrolled environments, but vary enough with frequency such that DoD Instruction 6055.11 should be consulted. Special training is required for individuals who work in areas which emit RF levels which exceed the uncontrolled levels. Warning signs are also required in areas which exceed either the controlled or uncontrolled limits.

Although E-Field, H-Field, and power density can be mathematically converted in a far-field plane wave environment, the relations provided earlier do not apply in the near field; consequently the E- or H-field strength must be measured independently below 100 MHz. An H-field is the magnetic field component of an electromagnetic wave expressed in units of amperes per meter. Lower RF limits in DoD Instruction 6055.11 on HERP are in average (root-mean square [RMS]) E-field values. Upper frequency restrictions are based on average (RMS) values of power density in both regulations except under certain circumstances. Table 3-13 shows the relationship of power density in commonly used units for free-space, far-field conditions. HERF precautions are of more general concern to fuel truck operators.

However, some general guidelines are as follows:

- Do not energize a transmitter (radar/communications) on an aircraft or motor vehicle being fueled or on an aircraft or vehicle adjacent to a fueling.
- Do not make or break any electrical, ground wire, or tie-down connector while fueling.
- Radars capable of illuminating fueling areas with a peak power density of 5 watts per centimeter should be shut off.
- Antennas radiating 250 watts or less should be installed at least 50 ft (15 m) from fueling areas.
- For antennas that radiate more than 250 watts, the power density at 50 ft (15 m) from the fueling operation should not be greater than the equivalent power density of a 250 watt transmitter located at 50 ft (15 m).

Table 3-13. Power Density Conversion Table for Free-Space Far-Field Conditions

W/m^2	mW/cm^2	$\mu W/cm^2$	V/m	A/m
0.01	0.001	1	2	0.005
0.1	0.01	10	6	0.015
1.0	0.1	100	20	0.005
10	1.0	1,000	60	0.15
100	10	10,000	200	0.5
1,000	100	100,000	600	1.5
10,000	1,000	1,000,000	2,000	5

Notes: W/m^2 = watts per square meter, mW/cm^2 = milliwatts per square centimeters, $\mu W/cm^2$ = microwatts per square centimeter, V/m = volts per meter, A/m = amperes per meter.

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 square miles (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 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 directed energy testing and personnel training scenarios would take place within Sea Range boundaries where NAWCWD controls the airspace. Any directed energy operations that have the potential of creating hazards to aircraft shall be coordinated with the FAA to ensure that when the directed energy system 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 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 (30,480 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. Aircraft surveillance 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 (Navy 2002).

When the Sea Range is used for military testing and personnel training operations, the Navy notifies commercial, civilian, and other military aviation through a NOTAM. This 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 would 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 would delay, cancel, or move the test to a clear area. A test would not be initiated if a nonparticipating vessel were present in the clearance area (Navy 2002).

3.7.2 Environmental Consequences

3.7.2.1 Approach to Analysis

This section evaluates potential human health and safety effects associated with the proposed action. This includes the construction and operational phases of Alternative 1 or Alternative 2. It is anticipated that any construction activity would be conducted in accordance with Navy, NAWCWD, and NBVC regulations and plans. No impacts to the human health of personnel or members of the public are expected due to construction activities.

With one exception discussed below, no proposed directed energy systems testing and personnel training would be intentionally directed at military or civilian personnel at SNI or within surrounding restricted areas. Therefore, the safety and occupational health concerns discussed would focus on the potential impacts outside the target area, impacts created by the directed energy systems and power source, and potential effects that may impact the personnel involved in directed energy tests.

For one class of testing and personnel training, non-lethal millimeter wave (95 GHz) directed energy beams could be tested on human targets. This weapon called the Active Denial System (ADS) has been field tested on military land bases and has been shown to be an effective deterrent that poses no long-term effect on its targets (LeVine 2009). Rigorous studies of the ADS have revealed the following (Human Effects Advisory Panel 2008):

- The millimeter wave energy's primary interaction is in the outer $1/64^{th}$ of an inch of the skin and cornea,
- The principal effect is thermal in nature,
- Prolonged millimeter wave exposure can cause thermal injury, but for most the repel response makes such exposure unlikely (injury occurred in less than one-tenth of one percent of exposures), and
- Exposure to ADS is unlikely to initiate cancer or have deleterious effect on fetal development.

3.7.2.2 Alternative 1

Laser Operations

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) (Goldman et al. 1989; University of California 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 25degrees Celsius (°C) [50 to 77°F]) for short periods of time, typically less than a minute (Goldman et al. 1989). A photochemical injury results from impact of light particles (photon) on skin molecules, altering the molecule's chemical composition, and resulting in minor to severe sunburn. 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 cannot be accounted for by thermal injury alone (University of California Berkeley 2001).

Laser retinal injury can be severe because of the focal magnification (optical gain) of the eye that is approximately 10^5. This means that an irradiance of 1 mW/cm^2 entering the eye would be effectively increased to 100 watts per square centimeter when it reaches the retina (University of California 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. Class 4 lasers pose the same hazards as Class 3 lasers, but they may also cause injury to the eye when viewing a diffuse reflection and may present a hazard to the skin due to their increased beam power (greater than 500 MW).

Pulsed lasers are also proposed to be tested at SNI. The average power of a pulsed laser would usually be less than that of a CW 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 (University of California 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).

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, laser-generated air contaminants, and collateral radiation – as a result of laser operations. The non-beam control measures in place, as well as strict adherence to the health and safety program, minimize the health and safety risks associated with non-beam effects of laser activities on the Sea Range and at SNI.

Laser operations would include systems at wavelengths from 180 to 14,000 nanometers (0.18 to 14.0 μm) and at average powers up to a maximum of 1 MW. 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 worker and public safety on the Sea Range and at SNI are considered negligible with implementation of Alternative 1.

By implementing strict health and safety procedures, NAWCWD personnel conducting high energy laser testing and personnel training would be located well beyond distances that could result in injury from either CW or pulsed lasers, and the distance to the general public would be even further away from testing and personnel training. In addition, the laser control measures that would be in place during testing and personnel training as part of NAWCWD's Health and Safety Program minimize the potential for exposure to lasers that could result in injury and provide automatic and manual mechanisms to cease testing and personnel training. Therefore, implantation of Alternative 1 would have negligible impacts on safety and occupational health.

HPM Operations

The effects of electromagnetic radiation on humans depend on the frequency, strength, and form of the signal. Strength and form are dependent on the transmitter power. The effect of microwave radiation may or may not result in an impact. Health effects have been observed in the resonance range from 30 MHz to 400 MHz (the frequency where the wavelength of the radiation is approximately equal to the length of the human body). At higher frequencies (400 MHz to 300 GHz) penetration of the body occurs. The depth of penetration depends upon the energy of the radiation and the type of tissue involved. Generally, it can be said that the longer the wavelength the greater the depth of penetration. Wavelengths of 3 cm or less (10 GHz or higher) are absorbed by the skin. Regardless of the frequency, the heating induced by RF energy produces normal physiological adjustments like sweating and vasodilation. If effective dissipation of heat were prevented by biological or environmental factors, the exposed tissue would be heated and possibly damaged.

Human perception of pulses of RF energy is a well-established phenomenon that is not necessarily considered an adverse effect. Radio-frequency induced sounds are similar to other common sounds such

as a click, buzz, hiss, knock, or chirp (Air Force 2009). Furthermore, the phenomenon can be characterized as the perception of subtle sounds because, in general, a quiet environment is required for the sounds to be heard. To hear these sounds, an individual must be capable of hearing high-frequency acoustic waves in the kHz range and the exposure to a pulsed RF field must be in the MHz range. The effective radio frequencies that can be heard are reported in literature to range from 216 to 10,000 MHz. Hearing RF energy depends on a single pulse and not on average power density. Guy and Chou (1975) found that the threshold for RF-induced hearing of pulsed 2,450 MHz radiation was related to an energy density of 40 microjoules per square centimeter ($\mu J/cm^2$) per pulse, or energy absorption per pulse of 16 microjoules per gram ($\mu J/g$). Audible sounds are produced by rapid thermal expansion, resulting from only a 5×10^{-6} degrees Centigrade temperature rise in tissue due to the absorption of the energy from an RF pulse. There is no evidence to suggest that direct stimulation of the central nervous system occurs from RF pulses. When compared to routine ultrasound pressures during medical diagnosis, including exposure of the fetus, research suggests that RF-induced pressures more than about five orders of magnitude greater than the pressure at the hearing threshold would be unlikely to cause significant biological effects (Elder and Chou 2003).

Radio frequency energy has been shown to produce cataracts in experimental animals when the exposure is sufficient to raise the temperature of the lens to around 41 °C. Localized exposure in rabbits, involving exposure to 2,450 MHz at 100 mW/cm^2 for one hour, is sufficient to induce a cataract. However, these experiments produced burns to the skin surrounding the eye before a cataract was formed. Whole body exposures did not produce the same results as localized exposures to the eyes because test animals expired before the end of the experiment (Air Force 1997).

Electronic medical devices such as artificial cardiac pacemakers can respond to pulsed RF radiation fields. Significant disruption of normal pacemaker function requires RF energy at frequencies between 0.1 and 5 GHz with pulse widths of greater than 10 microseconds, and electric field strengths greater than 2,200 volts per meter (Air Force 1976).

Non-beam effects of HPM operations can include fire shock, RF burns, and electrocution. Burns and electric shock could be experienced in very near vicinity of HPM sources that emit RF fields of 100 MHz or lower (Elder et al. 1989). To receive a shock or RF burn, an individual must be in contact with a conductive surface. Primary factors determining the occurrence and intensity of shock or RF burn include:

- Strength of the electric field;
- Frequency of the beam;
- Grounding of the person involved; and
- Surface area in contact with the conductive surface.

The non-beam effects pose real hazards to personnel involved in HPM tests. However, all Sea Range personnel working with HPM systems would be well-trained in how to avoid and minimize hazards associated with laser and high energy laser tests. Implementation of SOPs and adherence to standards and regulations provided in Section 3.7.1.2 would reduce the risks associated with these hazards significantly.

By implementing strict health and safety procedures, NAWCWD personnel conducting HPM testing and personnel training would be located well beyond distances that could result in injury associated with beam and non-beam effects, and the general public would be even farther away from testing and personnel training. In addition, the HPM system control measures that would be in place during testing and personnel training as part of NAWCWD's Health and Safety Program minimize the potential for

exposure to HPM that could result in injury and provide automatic and manual mechanisms to cease testing and personnel training. Therefore, implementation of Alternative 1 would not have significant impacts to public safety.

3.7.2.3 Alternative 2

Safety and occupational health impacts under Alternative 2 would be similar to those analyzed under Alternative 1. The scenarios proposed under Alternative 2 would include the same actions to reduce or eliminate impacts to safety and health as described under Alternative 1. Therefore, implementation of Alternative 2 would have no significant impacts on safety and occupational health.

3.7.2.4 Mitigation Measures

Implementation of either Alternative 1 or Alternative 2 would not result in significant impacts to public safety or occupational health; therefore, no mitigation measures are proposed or required.

3.7.2.5 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and existing conditions would remain unchanged. Therefore, the no action alternative would not have significant impacts to public safety.

3.8 HAZARDOUS MATERIALS

3.8.1 Affected Environment

3.8.1.1 Definition of Resource

Hazardous materials addressed in this EA 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 directed energy produce hazardous or toxic materials during operations, 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 (42 USC §§ 6901 et seq.).

3.8.1.2 Regulatory Setting

As defined by the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (42 USC §§ 9601 et seq., Sections 101[14] and 101[33]) and the Superfund Amendments and Reauthorization Act of 1986, (Public Law 99-499), a hazardous material is a substance, pollutant, or contaminant that, due to its quantity, concentration, or physical and chemical characteristics, poses a substantial present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials are managed in accordance with Title III of the Superfund Amendments and Reauthorization Act, also known as the Emergency Planning and Community Right to Know Act (EPCRA). The EPCRA establishes different reporting and planning requirements for businesses that handle, store, or manufacture certain hazardous materials. These plans and reports provide federal, state, and local emergency planning and response agencies with information about the amounts of chemicals that businesses use, routinely release, and spill. Specific requirements of EPCRA include the following:

- Planning for emergency response (Sections 301-303);
- Reporting chemical inventory (Sections 311 and 312);
- Reporting ongoing releases of toxic chemicals (Section 313); and
- Reporting leaks and spills (Section 304).

Navy policy is to comply with EPCRA as required by EO 13693 and to encourage compliance with state and local EPCRA programs to the extent that resources allow and where such compliance does not interfere with command mission accomplishment or other legal obligations.

3.8.1.3 Existing Conditions

To the extent possible, maintenance of weapons systems is performed at NVBC. However, some hazardous materials are shipped to and stored on SNI. Hazardous materials used on SNI are ordered

through and tracked by the NVBC Point Mugu Hazardous Material Center. These materials are shipped to the island via barge or aircraft and stored in storage lockers. The largest quantity of hazardous materials stored is in the form of fuel. About 680,000 gallons (2,600,000 liters) of jet fuel are shipped to the island by tanker barge each year. Approximately 5,000 gallons (19,000 liters) of unleaded fuel are shipped by freight barge approximately once a month (Navy 2002). The barge is scheduled to deliver freight to the island every two weeks but often does not meet the schedule due to inclement weather conditions or not having enough freight to fill the barge.

There are three satellite hazardous waste storage areas on SNI. Hazardous wastes are stored at these satellite accumulation areas prior to being transported to the less-than-90-day accumulation area on the island. From this accumulation area, the waste is shipped via freight barge to Port Hueneme. After arrival at Port Hueneme, the waste is transported to an approved treatment, storage, and disposal facility (Navy 2002).

3.8.2 Environmental Consequences

3.8.2.1 Approach to Analysis

Terminology used in this section has specific definitions. "Hazardous materials" refers to chemical substances prior to use, and "hazardous constituents" are the chemical contaminants associated with debris. The use of hazardous materials and any hazardous and solid wastes resulting from implementing Alternative 1 or Alternative 2 would be limited to occurrences on SNI (except for air emissions, which are addressed in Section 3.1.2). All normal construction, setup, testing, training, and cleanup activities would occur at SNI.

3.8.2.2 Alternative 1

Construction

As part of Alternative 1, new concrete pads and graded roads would be constructed on SNI. Any hazardous materials used or hazardous constituents generated through these construction activities would be handled in compliance with existing NBVC and NAWCWD standard operating procedures. Pollution prevention measures would be implemented, reducing the amount of wastes generated and handled. A Spill Prevention, Control, and Countermeasure (SPCC) Plan will be in place to minimize the potential for an oil or hazardous substance spill, to prevent any spill from leaving the confines of the area, and to ensure that the cause of any spill is corrected.

Operations

Hazardous constituents are an inherent part of the directed energy testing and personnel training activities of Alternative 1. 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 programs to minimize and manage their effects throughout the acquisition process.

Certain types of laser systems contain hazardous materials or produce hazardous constituents during lasing. All laser systems used in Alternative 1 would be required to be self-contained and would not release any hazardous materials or hazardous constituents into the environment. Chemical oxygen iodine lasers contain effluents that are toxic, but a closed-cycle chemical oxygen iodine laser has been developed to contain the effluents and would be used on the Sea Range and at SNI. The operation of free electron

lasers releases X-rays but a laser system using a free electron laser would be required to contain all X-rays.

Hazardous materials associated with HPM operations are primarily used as coolants. These hazardous materials could include transformer oil, sulfur hexafluoride, or hydrogen gas and would be used in closed loop systems. Sections 301–304 of the EPCRA require the community to be informed of the storage and use of certain chemicals and chemical compounds. Copies of material safety data sheets for these and all other hazardous materials would be maintained at operations offices, and all involved personnel would be trained regarding the hazards associated with these materials as well as the materials proper management practices. Depending on the quantity of a chemical used, an annual summary of toxic release inventory chemicals (EPCRA Section 313) may also be required. However, it is unlikely that activities associated with Alternative 1 would approach the reporting threshold requirements (10,000 pounds [chemicals consumed or otherwise used] or 25,000 pounds [chemicals manufactured/processed]).

Surface targets would be stripped of unnecessary hazardous constituents and other augmentation and made environmentally clean; therefore, only minimal amounts of hazardous constituents would be present at the target and calibration sites and hazardous wastes or materials managed and generated under Alternative 1 would pose no significant impacts. Therefore, implementation of Alternative 1 would have no significant impacts from hazardous materials.

3.8.2.3 Alternative 2

Alternative 2 would involve the same type and quantity of hazardous materials and constituents associated with the operational phase of Alternative 1. The scenarios proposed under Alternative 2 would include the same actions to reduce or eliminate impacts due to hazardous materials and constituents management as described under Alternative 1. There could be a negligible increase of hazardous constituents associated with construction activities (primarily due to a longer length of new road construction). Therefore, implementation of Alternative 2 would have no significant impacts from hazardous materials.

3.8.2.4 Mitigation Measures

Implementation of either Alternative 1 or Alternative 2 would not result in significant impacts from hazardous materials and constituents; therefore, no mitigation measures are proposed or required.

3.8.2.5 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and existing conditions would remain unchanged. Therefore, hazardous wastes or materials managed and generated under the No-Action Alternative would pose no significant impacts.

This Page Intentionally Blank

CHAPTER 4
CUMULATIVE IMPACTS

Federal law (42 USC 4321 et seq.) and Navy regulations for implementing NEPA (32 CFR 775), as described in OPNAVM 5090.1 (Navy 2014a), 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 (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

4.1 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. The cumulative effects region addressed in this EA is limited to 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 directed energy testing and personnel training in space and/or time, or have otherwise affected (or would affect) the condition of environmental resources in the test area.

4.2 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

4.2.1 Point Mugu Sea Range Training and Operations

The Navy has prepared an EIS/OEIS (Navy 2002) addressing test and training operations on the Point Mugu Sea Range. The geographic scope of this document includes the 36,000 square mile (93,000 km^2) Sea Range, which encompasses 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.

4.2.2 Laser Testing

An EA/OEA was prepared for use of laser technology on the Sea Range (Navy 2010). This involves laser testing and personnel training under various weather conditions on the Point Mugu Sea Range and SNI (including Tender Beach), and includes lasers integrated onto aircraft, ships, and land-based platforms. Project components involve directing laser energy at various types of fixed or dynamic targets from fixed or dynamic laser sources. Lasers are operated on surface craft at sea, on aircraft, or on land at SNI. Likewise, targets can be at sea, in the air, or on SNI. The testing, evaluation, and training activities are supported by NAWCWD personnel and facilities at NBVC.

4.2.3 SNI 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 design is currently being evaluated. An EA will be prepared once the proposed action and alternatives have been determined.

4.2.4 NBVC and SNI Natural Resource Management Programs

The NBVC and SNI INRMPs established a management framework for natural resources and Navy training at NBVC and on SNI. The plans describe existing and anticipated Navy operations and recommendations to protect and enhance environmental resources (NBVC 2002, 2010). The proposed action follows the management guidelines provided in the plans. Countermeasures 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.

4.2.5 Development of Wind Energy Facilities on SNI

An EA was prepared for the Navy proposal to construct up to 11, 155-ft (47-m) tall, 100-kilowatts wind turbines; an energy storage system; and underground utility conduit connections on SNI. The project will be constructed in up to four phases and will be completed in 2015 (NAVFAC Southwest 2010). Energy generated by the wind turbines will serve to supplement energy demands currently met by JP-5 fueled generators. The proposed wind turbine corridor will be along Skyline Drive in the southeastern portion of the island. The total area of the wind turbine corridor in which permanent and temporary impacts could occur is 32 ac (13 ha). No significant impacts were identified; adverse but less than significant impacts to island night lizards were identified.

4.2.6 SSM-1 KAI Missile Testing at San Nicolas Island

An EA was prepared to accommodate testing of the surface-to-surface missile (the SSM-1 KAI missile) at SNI. The project includes testing of the sea-shore interface capabilities of the SSM-1 KAI missile. Missile testing includes five missile tests, including launches from SNI and missile flights over varied terrain at the island, the sea-shore interface, and open water. Three primary phases of the testing consist of pre-test site preparation activities, missile launch and flight, and post-test activities. This EA utilized analysis from the Point Mugu Sea Range EIS/OEIS to address components of SSM-1 KAI testing that would occur at least 1 nm (1.9 km) offshore. The EA provided additional analysis for those components of the proposed SSM-1 KAI missile testing that would occur less than 1 nm offshore from the island, including missile and aircraft overflights of the island. No significant impacts were identified in this EA.

4.2.7 SNI FOCUS Cable Repair

An EA was prepared for proposed repair activities on the existing Fiber-Optic Communications Underwater System (FOCUS) at SNI. The cable system comprises the critical communications component for NAWCWD Point Mugu Sea Range operations. Radar and telemetry data signals collected at the island are transmitted via the FOCUS cables back to Point Mugu where activities throughout the entire Sea Range are coordinated. Two FOCUS cables extend from Point Mugu to SNI, and the cable segments in the nearshore waters off SNI were in serious disrepair resulting from exposure to dynamic nearshore current and wave action. This EA addressed the potential impacts associated with the cable repair activities. No significant environmental impacts were identified for the action alternatives. One adverse but not significant impact was identified for the No-Action Alternative, as the decision to not repair the cable would likely lead to short-term cessation of military land use on SNI due to cable failure.

4.2.8 Countermeasures Testing on the Sea Range

The Navy proposes to implement testing of countermeasures systems at the Point Mugu Sea Range. These countermeasures are designed to function in a defensive or pre-emptive manner, to intercept, deflect, deceive, deactivate, or destroy approaching threats. The proposed countermeasures testing would include four test scenarios: 1) air-to-air operations, 2) air-to-surface operations, 3) surface-to-air operations, and 4) surface-to-surface operations. Components of the proposed action include: 1) directed energy systems; 2) small arms; 3) missiles; 4) flares; and 5) electronic support systems. An EA was completed in July 2014.

4.2.9 Sea Range Expansion of Unmanned Systems Operations

An extension of the Navy's Unmanned Aircraft Systems RDAT&E operations and training capability, and the introduction of unmanned maritime system operations are proposed for the Sea Range, the R-2519 and the R-2535 Restricted Airspace, and the associated SUA over the Sea Range. The proposed action includes construction of new support facilities at SNI. These facilities would include new hangars for the storage and maintenance of unmanned systems and launching/recovering platforms for unmanned systems. Unmanned systems capabilities support the following military missions: reconnaissance and surveillance; command, control, and communications support; security; combat support; attack; and sustainment. An EA was completed in February 2015.

4.2.10 SNI Roads and Airfield Repairs Project

NBVC proposes to perform a maintenance and mission-critical infrastructure project at NBVC SNI, which includes repairing the roads and the airfield (NBVC 2012). A large amount of aggregate would need to be delivered to the island as part of this project. The NBVC supply pier at Daytona Beach is currently used to transfer supplies to the island but is not designed to handle large volumes of heavy aggregate. The Navy, therefore, proposes to use barge beach landings for offloading materials and equipment needed to complete this maintenance and mission-critical infrastructure project. No significant impacts were identified for the proposed action, either of the action alternatives, or the No-Action Alternative. An EA was completed for this project in June 2012.

4.2.11 Collection of Sea Lions from SNI

An EA was prepared for the Naval Sea Systems Command Explosive Ordnance Disposal/Counter Radio-Controlled Improvised Explosive Device Electronic Warfare Program Office to obtain a sufficient number of suitable California sea lions to support the mission requirements of the Navy Marine Mammal Program. The reasonable action alternatives were developed after careful consideration of a suite of potential alternatives discussed in detail in the EA. The action alternatives carried forward for analysis involve collecting young sea lions from SNI, or obtaining releasable sea lions from stranding networks. The number of animals obtained each year would vary, but by statute not more than 25 sea lions would be obtained for the Navy Marine Mammal Program each year (10 U.S.C. § 7524). In order to reduce the need to collect sea lions or obtain releasables from stranding networks, the Navy would continue to seek available non-releasable sea lions from stranding networks, as well as sea lions from zoos and aquariums. However, the number of suitable sea lions available from these sources has been unpredictable and inadequate for the requirements of the Navy Marine Mammal Program. The collection from SNI is selected, sea lions would be collected each fall beginning in October of 2012, and continue every year thereafter as needed to satisfy Navy requirements. No significant impacts were identified in the EA. While the proposed action of the EA would involve capture of marine mammals (sea lions), 10 U.S.C. §7524 governs the action without regard to the MMPA.

4.2.12 Fiber Optic Communications Underwater System (FOCUS) Replacement NAVAIR Sea Range, Point Mugu, California

An EA is being prepared for the replacement of the existing Fiber Optic Communications Underwater System-I (FOCUS-I) between Point Mugu and SNI and the microwave communications system link between Point Mugu and Santa Cruz Island (SCI) with a single new system. This new FOCUS, FOCUS-II, will connect Point Mugu, SNI, and SCI via new undersea fiber optic cables. A draft EA is anticipated in May, 2015. Potential impacts of this project have not been determined, but the project area does not overlap any of the areas proposed for construction or operation within this EA. Significant impacts to resources are not anticipated.

4.3 CUMULATIVE IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

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

4.3.1 Geology and Soils

Implementation of Alternative 1 or Alternative 2 would have only short-term, localized effects, if any, on geology and soils. Such effects are limited to ground disturbance during construction and occasional maintenance activities. Areas with highly erodible soils would be given special consideration when designing the proposed project to ensure incorporation of various erosion control techniques, including but not limited to straw bales, silt fencing, aggregate materials, wetting compounds, and rehabilitation, where possible, to decrease erosion (NBVC 2010). Previous, ongoing, and proposed future actions in support of training and RDAT&E are not expected to significantly affect geology and soils. Due to the limited scope of potential impacts associated with Alternative 1 or Alternative 2, the action would have only minor, temporary effects, if any, and would not measurably add to effects from other activities. Hence there would be no cumulative impact on geology and soils.

4.3.2 Air Quality

Implementation of Alternative 1 or Alternative 2 would conform to the applicable SIP and would not trigger a conformity determination under Section 176(c) of the CAA. The Navy has prepared a RONA for CAA Conformity in the South Central Coast Air Basin (Appendix A). 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 or Alternative 2 on SNI, along with other pending Navy actions, have been largely accounted for in RDAT&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. As a result, the emissions associated with the proposed action or Alternative 2 would not have a cumulative impact on air quality.

4.3.3 Marine Sediments and Water Quality

Implementation of Alternative 1 or Alternative 2 would have only short-term, localized effects, if any, on sediment and water quality. As described in the Point Mugu Sea Range EIS/OEIS, previous, ongoing, and

proposed future actions in support of training and RDAT&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 and Alternative 2, 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.

4.3.4 Airspace, Land and Water Use

Implementation of Alternative 1 or Alternative 2 would not result in significant airspace or land and water use impacts. Existing airspace and land use designations would not change as a result of the proposed action or Alternative 2, and the existing airspace and land uses within the project area would continue to be used for the same purposes. The proposed action or Alternative 2 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 proposed action would not affect coastal resources and their uses. Therefore, implementation of the proposed action or Alternative 2 in conjunction with other past, present, and foreseeable actions would not result in cumulative impacts to airspace, land, or water use.

4.3.5 Biological Resources

Implementation of Alternative 1 or Alternative 2 would have no significant effects on biological resources because of the proposed conservation measures and 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 significant effect to threatened or endangered animals. Hence there is no potentially significant interaction with the effects of land-based actions on the native plants and animals of SNI. Conservation measures would be implemented to minimize effects to biological resources and to minimize the potential occurrence of invasive species. When combined with the effects of other past, present, and foreseeable project activities, implementation of the proposed action or Alternative 2 is unlikely to have any additional cumulative effect on plant and animal populations on SNI.

4.3.6 Cultural Resources

Implementation of Alternative 1 or Alternative 2 would impact two prehistoric archaeological sites eligible for listing in the National Register under Criterion D for their ability to provide data that could potentially be used to answer questions regarding topics such as site usage, site chronology, diet, paleoenvironmental conditions, technology, cultural affiliation, and paleopathology. Pending SHPO concurrence, data recovery efforts conducted prior to any construction impacts will reduce the impacts to less than significant. No other actions are planned for either of these 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, subject to concurrence the , the proposed action or Alternative 2, in conjunction with other past, present, and foreseeable activities, would not result in cumulative impacts to cultural resources.

4.3.7 Public Safety

Scheduling procedures associated with Implementation of Alternative 1 or Alternative 2 would be in accordance with existing Sea Range coordination procedures to ensure the safety of participants as well as non-participants. These procedures ensure that the directed energy testing and personnel training would

not be scheduled to occur when another test or training event is scheduled in the same area. As a result, implementation of Alternative 1 or Alternative 2 would not have a cumulative effect on public safety.

4.3.8 Hazardous Materials

Implementation of Alternative 1 or Alternative 2 would have no impacts with respect to hazardous materials. Because the proposed action or Alternative 2 would not cause releases of hazardous materials or constituents to the environment of SNI, there would be no cumulative impact with respect to hazardous materials.

CHAPTER 5
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.

5.1 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, directed energy testing and personnel training would be conducted at the proposed Directed Energy Test Facilities. The test program would not result in a significant irreversible or irretrievable commitment of resources. Human labor and fossil fuel used during project construction and operations would be a commitment of resources; however, implementation of the proposed project would have a negligible impact on the human labor and fossil fuel available for Navy operations and training.

5.2 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

The proposed directed energy testing and personnel training would occur at SNI, 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 as part of the Navy's national security mission; 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.

This Page Intentionally Blank

CHAPTER 6
REFERENCES

Air Force. 1976. The Biological Significance of Radiofrequency Radiation Emission on Cardiac Pacemaker Performance. U.S. Air Force School of Aerospace Medicine, Brooks AFB, Texas, January.

Air Force. 1997. Radio Frequency (RFR) Safety Program, Air Force Occupational Safety and Health Standard 48-9. U.S. Air Force, Brooks AFB, Texas. August.

Air Force. 2009. Review of Literature on High Power Microwave Pulse Biological Effects. U.S. Air Force Directed Energy Bioeffects Division, Brooks City-Base, Texas. August.

ANSI. 2005. ANSI Z136.6 - Safe Use of Lasers Outdoors.

CARB. 2012. Ambient Air Quality Standards. http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Last updated 7 June 2012, accessed 13 June 2013.

Carretta, J.V., K.A. Forney, M.M. Muto, J. Barlow, J. Baker, B. Hanson, and M.S. Lowry. 2007. U.S. Pacific Marine Mammal Stock Assessments: 2006. U.S. Department of Commerce. NOAA Technical Memorandum. NOAA-TM-NMFS-SWFSC-398. 312 pp.

CEQ. 2014. Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions. Washington, DC. December.

Elder, J.A. and C.K. Chou. 2003. Auditory Response to Pulsed Radiofrequency Energy. Bioelectromagnetics Supplement 6:S162-S173. Motorola Florida Research Laboratories, Fort Lauderdale, FL.

Elder, J.A., P.A. Czerski, M.A. Stuchly, K.H. Mild, and A.R. Sheppard. 1989. Radio Frequency Radiation. Chapter 4 *in* M.J. Suess and D.A. Benwell-Morison, eds. Nonionizing Radiation Protection, Second Edition. WHO Regional Publications, European Series, No. 25. World Health Organization, Regional Office for Europe, Copenhagen, Denmark.

Engle, J.M. 1994. Perspectives on the structure and dynamics of nearshore marine assemblages of the California Channel Islands. Pages 13-26 *in* W.L. Halvorson and G.J. Maender, eds. The Fourth California Islands Symposium: Update on the Status of Resources. Santa Barbara Museum of Natural History. Santa Barbara, CA.

Fellers, G.M., C.A. Drost, W.J. Mautz, and T. Murphey. 1998. Ecology of the Island Night Lizard, *Xantusia riversiana*, on San Nicolas Island, California. Prepared for the U.S. Navy by the USGS, Western Ecological Research Center, Pt. Reyes Field Station, Pt. Reyes National Seashore, CA. 18 December.

Goldman, L., S.M. Michaelson, R.J. Rockwell, D.H. Sliney, B.M. Tengroth, and M.L. Wolbarsht. 1989. Optical Radiation, with Particular Reference to Lasers. Chapter 2 in M.J. Suess and D.A. Benwell-Morison, eds. Non-Ionizing Radiation Protection. Second Edition. WHO Regional Publications, European Series, No. 25. World Health Organization, Regional Office for Europe, Copenhagen, Denmark.

Guy, A.W. and C.K. Chou 1975. Microwave Induced Acoustic Effects in Mammalian Auditory Systems. AGARD Radiation Hazards. August.

Halverson, W.L., S. Junak, C. Schwemm, and T. Keeney. 1996. Plant communities of San Nicolas Island, California. Technical Report No. 55. National Biological Service, Mid-Continent Region, Cooperative Park Resources Studies Unit, University of Arizona, Tucson. September

Hatfield, B. 1997. Unpublished data re: pinnipeds at San Nicolas Island.

Human Effects Advisory Panel. 2008. A Narrative Summary of Independent Assessment of the Active Denial System. Penn State Applied Research Laboratory, State College, PA. February.

Kritzman, G. 1977. Unpublished field notes regarding surveys of archaeological sites on San Nicolas Island. Copy in San Nicolas Island curation facility records.

Lafferty, K.D. 2001. Disturbance to wintering western snowy plovers. Biological Conservation 101:315-325.

LeVine, S. 2009. The Active Denial System – A Revolutionary, Non-Lethal Weapon for Today's Battlefield. Center for Technology and National Security Policy, National Defense University, Washington, DC. June.

Martz, P. 2002. San Nicolas Island Prehistoric Archaeological Sites Mapping and Recordation Project. Prepared by California State University, Los Angeles, CA for Naval Air Weapons Station, China Lake, CA.

NAVFAC Southwest. 2010. Final Environmental Assessment for the Development of Wind Energy Facilities on San Nicolas Island, Ventura County, California. Delivery Order 0003. San Diego. August.

Navy. 2002. Final Environmental Impact Statement/Overseas Environmental Impact Statement, Point Mugu Sea Range. Naval Air Systems Command, NAWCD, Point Mugu, CA. March.

Navy. 2008. Marine Resources Assessment for the Southern California and Point Mugu Operating Areas. Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawaii. Contract # N62470-02-D-9997, CTP 120. Prepared by Geo-Marine, Inc., Plano, Texas.

Navy. 2010. Environmental Assessment/Overseas Environmental Assessment, Laser Testing/Training, Point Mugu Sea Range. January.

Navy. 2012a. Baseline Annual Operations at Naval Base Ventura County, Point Mugu, CA. Excel spreadsheet, 2011-2012, 19 v. 2.

Navy. 2012b. Brandt's cormorant, snowy plover, and elephant seal GIS data. Provided 23 July.

Navy. 2014a. "Environmental Readiness Program Manual," OPNAVM 5090.1, Washington, D.C., January.

Navy. 2014b. Point Mugu Sea Range Countermeasures Testing and Training Environmental Assessment. July.

Navy 2015. Environmental Assessment/Overseas Environmental Assessment, Point Mugu Sea Range Expansion of Unmanned Systems Operations. February.

NAWCWD. 1997. Cultural Resources Summary Report: Point Mugu Sea Range. Naval Air Warfare Center Weapons Division, Point Mugu, CA. October.

NBVC. 2010. Integrated Natural Resources Management Plan, Naval Base Ventura County, San Nicolas Island, California. Prepared for NBVC SNI, Environmental Division, NAS Point Mugu, CA and

NAVFAC Southwest, Coastal Integrated Products Team, San Diego, CA by Tierra Data, Inc., Escondido, CA. December.

NBVC. 2011. Biological Assessment, Construction and Operation of a Directed Energy Test Site at Naval Base Ventura County San Nicolas Island. Submitted by Naval Base Ventura County to U.S. Fish and Wildlife Service Ventura Field Office, 6 December.

NBVC. 2012. Final Environmental Assessment for the San Nicolas Island Roads and Airfield Repairs Project, Naval Base Ventura County, California. June.

NBVC. 2013. Draft Environmental Assessment for the West Coast Home Basing of the MQ-4C Triton Unmanned Aircraft System at Naval Base Ventura County Point Mugu, California. February.

NMFS. 2008. Endangered and Threatened Wildlife and Plants; Proposed Endangered Status for Black Abalone. Federal Register 73:1986-1999.

NMFS. 2009. Endangered and Threatened Wildlife and Plants; Endangered Status for Black Abalone. Federal Register 74:1937-1946.

NOAA. 1999. Sediment Quality Guidelines developed for the National Status and Trends Program. http://response.restoration.noaa.gov/book_shelf/121_sedi_qual_guide.pdf. 12 June.

NOAA. 2009. Channel Islands National Marine Sanctuary Final Management Plan/Final Environmental Impact Statement. Volume I of II: Final Management Plan. National Marine Sanctuary Program. Silver Spring, MD. January.

Regional Water Quality Control Board. 1994. Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties. California Regional Water Quality Control Board. Los Angeles, CA.

Reinman, F.M. and G.A. Lauter. 1984. San Nicolas Island Cultural Resource Survey Report. 3 vols. Prepared by F.M. Reinman & Associates for Pacific Missile Test Center, Point Mugu, CA.

Ruane, M. 2012. Comments on the Directed Energy Test Site at San Nicolas Island, Draft Final. Personal Communication.

Schwartz, S.J. 1995. A Preliminary Survey of Chinese Abalone Processing Site on San Nicolas Island. Pacific Coast Archaeology 31(4):49-58.

Schwartz, S.J. and K.A. Rossback. 1993. A Preliminary Survey of Historic Sites on San Nicolas Island. Proceedings of the Society for California Archaeology 6:189-198.

State of the California Current. 2007. The State of the California Current, 2009-2007: Regional and Local Processes Dominate. CalCOFI Reports. 48: 33-66.

SWRCB. 2012. Resolution No. 2012-0012: approving exceptions to the California ocean plan for selected discharges into areas of special biological significance, including special protections for beneficial uses, and certifying a program environmental impact report. 20 March.

University of California Berkeley. 2001. USB Laser Safety Program – Laser Safety Training Supplement. University of California Berkeley, Berkeley, California. November.

USEPA. 1986. National Ambient Water Quality Criteria (NAWQC) ("Gold Book"). http://www.epa.gov/waterscience/criteria/goldbook.pdf.

USEPA. 2006. National Recommended Water Quality Criteria. Office of Water, Office of Science and Technology (4304T). http://www.epa.gov/waterscience/criteria/wqctable/nrwqc-2006.pdf.

USEPA. 2011a. National Ambient Air Quality Standards (NAAQS). Website accessed 25 July 2011. http://www.epa.gov/air/criteria.html.

USEPA. 2011b. Criteria Pollutant Area Summary Report (as of April 21, 2011). U.S. Environmental Protection Agency, Washington, D.C. Website accessed 12 July 2011. http://www.epa.gov/air/oaqps/greenbk/ancl2.html.

USEPA. 2011c. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009. EPA 430-R-11-005. Washington, DC. April.

USFWS. 1984. Recovery Plan for the Endangered and Threatened Species of the California Channel Islands. Portland, OR.

USFWS. 2001. Biological Opinion for Activities on San Nicolas Island, California (5090 Ser 8G0000D/7284) (1-8-01-F-14). October 15.

USFWS. 2003. Final Revised Recovery Plan for the Southern Sea Otter (*Enhydra lutris nereis*). Portland, Oregon. 24 February.

USFWS. 2007. Recovery Plan for the Pacific Coast Population of the Western Snowy Plover (*Charadrius alexandrinus nivosus*). 2 Volumes. Sacramento, CA.

USFWS. 2009. Endangered and Threatened Wildlife and Plants; Removal of the Brown Pelican (*Pelecanus occidentalis*) from the Federal List of Endangered and Threatened Wildlife. Federal Register 74:59444-59472.

USFWS 2012a. Biological Opinion for the Construction and Operation of a Directed Energy Test Site at Naval Base Ventura County, San Nicolas Island, Ventura County, California (8-8-12-F-28). Ventura Fish and Wildlife Office. Diane K. Noda, Acting Field Supervisor. 5 September.

USFWS. 2012b. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Pacific Coast Population of the Western Snowy Plover; Final Rule. Federal Register; Vol 77, No. 118. 19 June. Available online at: http://www.gpo.gov/fdsys/pkg/FR-2012-06-19/pdf/2012-13886.pdf.

USFWS. 2012c. Endangered and Threatened Wildlife and Plants; Termination of the Southern Sea Otter Translocation Program. Federal Register; Vol 77, No. 244. 19 December.

USFWS. 2013. Endangered and Threatened Wildlife and Plants; Removing the Island Night Lizard From the Federal List of Endangered and Threatened Wildlife; Proposed Rule. Federal Register; Vol 78, No. 23. 4 February.

VCAPCD. 2007. Part 70 Permit, Number 1207, Permit Term: January 1, 2007 to December 31, 2011. Ventura, California. December.

VCAPCD. 2008. Final Ventura County 2007 Air Quality Management Plan. Ventura County Air Pollution Control District, Ventura, California. May.

Ventura County Commercial Fisherman's Association. 1997. Personal communication, Mr. Jim Colomy, President. 8 October. Ventura, CA.

Western Regional Climate Center. 2011. 1971-2000 Monthly Climate Summary – San Nicolas Island, California (047870). Desert Research Institute Western Regional Climate Center, Reno, Nevada. www.wrcc.dri.edu. Accessed 12 July.

Windfinder.com. 2011. Wind & Weather Statistic – San Nicolas Island (SNICOLAS). www.windfinder.com/windstats/. Accessed 12 July.

This Page Intentionally Blank

CHAPTER 7
PREPARERS

This report was prepared for NAWCWD by Cardno TEC, Inc. under contract with Epsilon Systems Solutions, Inc. under Contract Number N68936-02-D-0017-0001 and under Delivery Order 87. Members of the professional staff are listed below:

Navy Preparers

Steven Schwartz, NAVAIR Range Sustainability Office

Grace Smith, NAVAIR Range Sustainability Office

John Ugoretz, NAVAIR Range Sustainability Office

Navy Reviewers

Allen Adams, NBVC Environmental Division

Catherine Girod, NBVC Environmental Division

Steve Granade, NBVC Environmental Division

Lieutenant Commander Heather Henderson, Region Legal Service Office Southwest

Joseph Montoya, NBVC Environmental Division

Martin Ruane, NBVC Environmental Division

Dan Shide, NBVC Environmental Division

Suzanne Smith, Navy Region Southwest

Lieutenant Commander Gretchen Sosbee, Region Legal Service Office Southwest

Christopher Stathos, Navy Region Southwest

Valerie Vartanian, NBVC Environmental Division

Walter Wilson, Navy Region Southwest

Project Management and Quality Assurance (Cardno TEC, Inc.)

Peer Amble

Mike Dungan

Technical Analysts (Cardno TEC, Inc. and Epsilon Systems Solutions, Inc.)

Margaret Bach

Christine Davis

Bo DeBoer

Mark Dimsha

Chris Duran

Erica Mignone

Christopher Noddings

Rick Spaulding

GIS & Graphic Design (Cardno TEC, Inc.)

Shannon Brown

Jason Harshman

Technical Editors (Cardno TEC, Inc.)

Claudia Tan

Jackie Brownlow

Appendix A

Record of Non-Applicability & Air Quality Data

DEPARTMENT OF THE NAVY
NAVAL AIR WARFARE CENTER WEAPONS DIVISION
1 ADMINISTRATION CIRCLE
CHINA LAKE, CA 93555-6100
575 I AVENUE SUITE 1
POINT MUGU, CA 93042-5049

IN REPLY REFER TO:
5090
Ser 52F00ME/024
12 Sep 13

MEMORANDUM

From: Head, NAVAIR Ranges Sustainability Office

Subj: DIRECTED ENERGY TEST SITE AT SAN NICOLAS ISLAND - RECORD OF NON-APPLICABILITY (RONA) FOR CLEAN AIR ACT CONFORMITY

Ref: (a) U.S. Environmental Protection Agency, Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule, published in the Federal Register on 30 November 1993 (40 CFR Parts 6, 51, and 93)

(b) U.S. Environmental Protection Agency, Revisions to the General Conformity Regulations; Final Rule, published in the Federal Register on 5 April 2010 (40 CFR Parts 51 and 93)

(c) OPNAVINST 5090.1C (Appendix F)

Encl: (1) Directed Energy Test Site at San Nicolas Island Emissions Analysis for Clean Air Act Conformity Applicability

1. References (a), (b), and (c) provide implementing guidance for documenting Clean Air Act (CAA) Conformity Determination requirements. The General Conformity Rule applies to federal actions proposed within areas which are designated as either non-attainment or maintenance areas for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants.

2. The Proposed Action would occur at San Nicolas Island (SNI). Although part of Ventura County, SNI has been determined to be separate and distinct from the South Central Coast Air Basin (SCCAB). 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 SNI in conjunction with predominantly strong winds from the northwest, the likelihood of

Subj: DIRECTED ENERGY TEST SITE AT SAN NICOLAS ISLAND - RECORD OF NON-APPLICABILITY (RONA) FOR CLEAN AIR ACT CONFORMITY

3. An emissions analysis for the construction and operation of a directed energy test site on SNI is presented in the pages below. *de minimis* thresholds do not apply to actions taken on SNI since the island and the offshore region proposed for the laser testing and training are considered in attainment/unclassified for the NAAQS. However, emissions estimates for the proposed action have been compared to *de minimis* thresholds of a basic nonattainment area for planning purposes. *de minimis* thresholds for criteria pollutants would not be exceeded as a result of implementation of the Proposed Action and a formal Conformity Determination is not considered necessary.

4. 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.

A.M. PARISI

DIRECTED ENERGY TEST SITE AT SAN NICOLAS ISLAND

EMISSIONS ANALYSIS FOR CLEAN AIR ACT CONFORMITY APPLICABILITY

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 Federal Register on 30 November 1993 (40 CFR Parts 6, 51, and 93). USEPA published *Revisions to the General Conformity Regulations; Final Rule,* in the Federal Register on 5 April 2010 (40 CFR Parts 51 and 93). The U.S. Navy published *Interim Guidance on Compliance with the Clean Air Act (CAA) General Conformity Rule* in Appendix F, OPNAVINST 5090.1C, dated 30 October 2007. These publications provide implementing guidance to document Clean Air Act Conformity Determination requirements. Regulations within the General Conformity Rule 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 51.850[a]).

The General Conformity Rule applies to federal actions proposed within areas which are designated as either non-attainment or maintenance areas for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants. Former non-attainment 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.

The Proposed Action would occur at SNI. Although part of Ventura County, SNI has been determined to be separate and distinct from the South Central Coast Air Basin (SCCAB). San Nicolas Island (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 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.

An emissions analysis for the construction and operation of a directed energy test site on SNI is provided below. Emissions estimates for the proposed action have been compared to *de minimis* thresholds of a nonattainment area. *de minimis* thresholds for criteria pollutants would not be exceeded as a result of implementation of the Proposed Action and a formal Conformity Determination is not considered necessary.

PROPOSED ACTION

Action Proponent: Naval Air Warfare Center Weapons Division (NAWCWD).

Location: SNI, California.

Proposed Action Name: Directed Energy Test Site, SNI

Proposed Action Summary: The purpose of the Directed Energy Test Site proposed by NAWCWD is to support DoD directives on the development of laser and HPM applications vital to the National Defense through research, development, acquisition, testing, and evaluation (RDAT&E) and training applications. The directed energy test program requirement is for operationally realistic engagements in both maritime and land environments. The proposed Directed Energy Test Site would support this requirement. This RONA focuses on the construction activities and operations of the Directed Energy Test Site.

Air Emissions Summary: Emission sources associated with the Proposed Action involve construction activities and operations. Annual emissions from all construction activities were calculated by assuming that all activities would occur within one 12-month period. The operational activities are assumed to occur within this same 12-month period. Based on the air quality analysis for the Proposed Action, the maximum estimated emissions would be below conformity *de minimis* levels (Table 1).

Affected Air Basin: South Central Coast Air Basin

Table 1. Estimated Emissions Resulting from Implementation of the Proposed Action

Emission Source	Pollutant (tons/year)				
	VOC	**NO_X**	**CO**	**SO_X**	**PM_{10}**
Construction Emissions [1]	0.24	1.53	0.90	0.0026	0.094
Operational Emissions [2]	0.25	1.47	1.00	0.0022	0.082
Total	**0.49**	**3.00**	**1.91**	**0.0045**	**0.176**
de minimis threshold [3]	100	100	100	100	100

Notes:

1. Construction emissions include fugitive dust emissions, emissions due to construction equipment, and emissions from construction vehicles.
2. Operational emissions are those used to support the operational phase of the laser and HPM testing. These emissions include vehicles, support equipment, and generators.
3. *de minimis* thresholds do not apply to actions taken on SNI, since SNI and the offshore region proposed for laser and HPM testing and training are considered in attainment/unclassified for the NAAQS. However, emission estimates for the Proposed Action have been compared to *de minimis* thresholds of basic nonattainment areas for planning purposes.

Emission Calculations – Proposed Action

Graded acres	3.33
Bulldozer acres	2.11
Grading days	12
Bulldozing days	12
Hours/day	8
Soil percent silt, s	15
Soil percent moisture, M	2
Fraction of TSP, J	0.5
Mean vehicle speed, S	5
Dozer path width (ft)	10

OP	Equation	Units
Grading	$0.0306 \times S^2$	lb/VMT
Dozing	$0.75 \times s^{1.5}/M^{1.4}$	lb/hr

PM-10 Emission Factors

OP

Grading	0.765	lb/hr	1.84	hr/acre	1.41	lb/acre
Dozing	16.51	lb/VMT	0.83	VMT/acre	13.62	lb/acre

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	**MaxHP**	**ROG**	**CO**	**NOX**	**SOX**	**PM**	**CO2**	**CH4**
Grader	175	0.1386	0.7331	1.0511	0.0014	0.0577	124	0.0125
Dozer	175	0.0924	0.5857	0.7161	0.0011	0.0380	101	0.0083

				Total Emissions (lb)			
	ROG	**CO**	**NOX**	**SOX**	**PM**	**CO2**	**CH4**
Grader	13.31	70.38	100.91	0.13	5.54	11896.46	1.20
Dozer	8.87	56.22	68.74	0.11	3.65	9733.14	0.80
Total (lb)	22.18	126.60	169.65	0.24	9.19	21629.60	2.00
Total (ton)	1.11E-02	6.33E-02	8.48E-02	1.22E-04	4.60E-03	1.08E+01	1.00E-03

Construction 87 days (1/3 of regular year)

	no. of equip.	hours/ day	days of service	MaxHP	ROG	CO	NOX	SOX	PM	CO2	CH4
excavator	1	6	20	250	0.1180	0.3480	1.0099	0.0018	0.0333	159	0.0106
dump truck	1	6	40	250	0.1326	0.3761	1.1048	0.0019	0.0368	167	0.0120
roller	1	6	40	120	0.0921	0.4030	0.5906	0.0007	0.0494	59.0	0.0083
paver	1	6	40	175	0.1695	0.7742	1.3079	0.0014	0.0720	128	0.0153

air compressor	1	8	87	50	0.0831	0.2446	0.2134	0.0003	0.0201	22.3	0.0075
generator	2	10	87	50	0.0785	0.2545	0.2731	0.0004	0.0213	30.6	0.0071
concrete truck	1	6	40	175	0.1457	0.8685	1.2772	0.0018	0.0645	160	0.0131
concrete pump truck	1	6	40	250	0.1175	0.4096	1.4689	0.0023	0.0416	201	0.0106
water truck	1	6	80	250	0.1326	0.3761	1.1048	0.0019	0.0368	167	0.0120
forklift (heavy duty)	1	6	40	175	0.1265	0.7246	0.9750	0.0014	0.0534	125	0.0114

Construction Emissions

	ROG	**CO**	**NOX**	**SOX**	**PM**	**CO2**	**CH4**
excavator	1.42E+01	4.18E+01	1.21E+02	2.14E-01	4.00E+00	1.90E+04	1.28E+00
dump truck	3.18E+01	9.03E+01	2.65E+02	4.50E-01	8.84E+00	4.00E+04	2.87E+00
roller	2.21E+01	9.67E+01	1.42E+02	1.66E-01	1.18E+01	1.42E+04	1.99E+00
paver	4.07E+01	1.86E+02	3.14E+02	3.46E-01	1.73E+01	3.08E+04	3.67E+00
air compressor	5.78E+01	1.70E+02	1.49E+02	2.00E-01	1.40E+01	1.55E+04	5.22E+00
generator	1.37E+02	4.43E+02	4.75E+02	6.89E-01	3.71E+01	5.33E+04	1.23E+01
concrete truck	3.50E+01	2.08E+02	3.07E+02	4.33E-01	1.55E+01	3.84E+04	3.16E+00
concrete pump truck	2.82E+01	9.83E+01	3.53E+02	5.44E-01	9.99E+00	4.83E+04	2.54E+00
water truck	6.36E+01	1.81E+02	5.30E+02	8.99E-01	1.77E+01	7.99E+04	5.74E+00
forklift	3.04E+01	1.74E+02	2.34E+02	3.37E-01	1.28E+01	3.00E+04	2.74E+00
Total (lb)	4.60E+02	1.69E+03	2.89E+03	4.28E+00	1.49E+02	3.69E+05	4.15E+01
Total (ton)	2.30E-01	8.44E-01	1.44E+00	2.14E-03	7.45E-02	1.85E+02	2.08E-02
total from grading	1.11E-02	6.33E-02	8.48E-02	1.22E-04	4.60E-03	1.08E+01	1.00E-03
TOTAL (ton)	2.41E-01	9.08E-01	1.53E+00	2.26E-03	7.91E-02	1.96E+02	2.18E-02

Vehicle EFs (lb/mile)

HHDT-DSL (pounds/mile)	
CO	8.464E-03
NOx	2.418E-02
ROG	2.016E-03
SOx	4.092E-05
PM10	1.185E-03
PM2.5	1.006E-03
CO2	4.213E+00
CH4	9.261E-05

Passenger Vehicles (pounds/mile)	
CO	6.604E-03
NOx	6.548E-04
ROG	7.023E-04
SOx	1.069E-05
PM10	9.185E-05
PM2.5	5.939E-05
CO2	1.103E+00
CH4	6.312E-05

Operations (up to 165 days/year)				MaxHP	ROG	CO	NOX	SOX	PM	CO2	CH4
	#	hrs/day	days								
generator	2	10	165	50	0.0785	0.2545	0.2731	0.0004	0.0213	30.6	0.0071
forklift (heavy duty)	1	6	165	175	0.1265	0.7246	0.9750	0.0014	0.0534	125	0.0114
crane	1	6	165	250	0.0979	0.2817	0.9088	0.0013	0.0317	112	0.0088

	#	mi/day	days	ROG	CO	NOX	SOX	PM	CO2	CH4
Pick-up truck	4	25	165	7.02E-04	6.60E-03	6.55E-04	1.07E-05	9.18E-05	1.10E+00	6.31E-05
semi-trailer	2	20	165	2.02E-03	8.46E-03	2.42E-02	4.09E-05	1.18E-03	4.21E+00	9.26E-05

Operations Emissions

	ROG	CO	NOX	SOX	PM	CO2	CH4
generator	2.59E+02	8.40E+02	9.01E+02	1.31E+00	7.04E+01	1.01E+05	2.34E+01
forklift (heavy duty)	1.25E+02	7.17E+02	9.65E+02	1.39E+00	5.28E+01	1.24E+05	1.13E+01
crane	9.70E+01	2.79E+02	9.00E+02	1.25E+00	3.14E+01	1.11E+05	8.75E+00
Pick-up truck	1.16E+01	1.09E+02	1.08E+01	1.76E-01	1.52E+00	1.82E+04	1.04E+00
semi-trailer	1.33E+01	5.59E+01	1.60E+02	2.70E-01	7.82E+00	2.78E+04	6.11E-01
Total (lb)	5.06E+02	2.00E+03	2.94E+03	4.39E+00	1.64E+02	3.82E+05	4.51E+01
Total (ton)	2.53E-01	1.00E+00	1.47E+00	2.20E-03	8.19E-02	1.91E+02	2.25E-02
Total from construct	2.41E-01	9.08E-01	1.53E+00	2.26E-03	7.91E-02	1.96E+02	2.18E-02
TOTAL	4.94E-01	1.91E+00	3.00E+00	4.46E-03	1.61E-01	3.86E+02	4.43E-02

Appendix B

Agency Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
08EVEN00-2012-F-0385

September 5, 2012

Captain J.J. McHugh
Naval Base Ventura County
311 Main Road, Suite 1
Point Mugu, California 93042-5033

Subject: Biological Opinion for the Construction and Operation of a Directed Energy Test Site at Naval Base Ventura County, San Nicolas Island, Ventura County, California (8-8-12-F-28)

Dear Captain McHugh:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the Navy's proposed Construction and Operation of a Directed Energy Test Site at Naval Base Ventura County, San Nicolas Island (SNI), and its effects on the federally threatened western snowy plover (*Charadrius alexandrinus nivosus*), in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your December 6, 2011, request for formal consultation was received on December 12, 2011.

This biological opinion is based on information which accompanied your December 6, 2011, request for consultation, including the biological assessment (Navy 2011a), electronic and telephone communications between our staffs, and information in our files. A complete record of this consultation can be made available at the Ventura Fish and Wildlife Office.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

San Nicolas Island is owned by the Navy and operated to support various types of training, as well as to test and evaluate sea, land, and air weapons systems. The Navy is proposing to establish a Directed Energy Test Site to support the Department of Defense directives on the development of laser and high-powered microwave (HPM) applications vital to the National Defense through Research, Development, Acquisition, Testing, and Evaluation and Training applications (Navy 2011a). The Navy has identified SNI's west end as the location to enhance directed energy testing on the Sea Range. Within this area, the Navy's proposed project would include the following three components: 1) Shooter Site – location where laser and HPM equipment would be placed for testing; 2) Target Site – location of laser and HPM targets; and 3) Calibration Sites – four calibration target sites (see figure 2 in Navy 2011a). Construction

associated with the proposed project includes grading, compacting, and installation of pads and structures. Construction for the proposed project is estimated to last 4 months and is scheduled to begin in 2014.

More specifically, the biological assessment (Navy 2011a) describes the proposed project construction activities as follows:

Component construction

1) Tender Point Shooter Site Construction

The Navy is proposing to construct a support facility, road and utility infrastructure, and a concrete pad at Tender Point for laser and HPM equipment. The Navy has specifically identified the following construction activities:

- Construction of a 2-story 3,000 square foot (ft^2) support/operations facility and concrete driveway;
- Approximately 10,000 ft^2 (55-ft. radius) turnaround area including a 1,200 ft^2 concrete pad;
- Removal of two range marker poles;
- Widen 2,850 ft. of an existing 8-ft. wide unpaved access road to 18-ft. wide with a concrete apron connecting to the turnaround area; and
- Installation of underground conduit for power and communications utilities within the footprint of the widened portion of the existing road.

2) Bomber Cove Target Site Construction

The target site contains the targets used for laser and HPM testing.

- Construction of a 1,600 ft^2. concrete pad;
- Widen 2,700 ft. of an existing 8-ft. wide unpaved access road to 12-ft. wide;
- Construction of a 12-ft. wide 2,700 ft. long gravel access road; and
- Installation of a portable 20-kilovolt generator.

3) Calibration Sites Construction

Prior to operation of the directed energy system, targets located at the calibration sites would be used to verify the aim point and target tracking capability. Two of the proposed calibration sites (Targets A and B) would be accessible by existing gravel access roads. Proposed Target sites C and D would require construction of 500 ft^2 of access road. Each calibration site would include:

- Construction of a 225 ft^2 concrete pad; and
- Placement of a temporary target. The size of the target board would be approximately 6 x 8 ft. but may vary. Video cameras may be used to view laser energy calibration. Small generators or solar cells may be used to power video cameras and associated communications equipment.

Operation and Maintenance

Tests associated with the directed energy operation are not expected to be continuous. Prior to each test event, the directed energy system at the shooter site would be aimed and shot at one or more of the calibration target sites. Once the system is calibrated, it would be aimed at the target

site. In addition to the target site, the shooter site could be used to shoot at a sea or aerial platform (unmanned surface or aerial vehicle) to conduct system tests.

According to the biological assessment (Navy 2011a), the proposed project's specific operation and maintenance activities include:

- Personnel – 10 to 30 personnel during each event for both laser and HPM activities
- Tempo – Up to 100 days per year for laser and up to 65 days per year for HPM
- Event Duration – 4-9 hours
- Usage per event – 40 times for laser and 30 times for HPM
- Pre-event Activities - Transportation of equipment (e.g., system, targets, etc.,) to test site via tractor-trailer; Use of crane or forklift to unload equipment; and system checks.
- Event Activities – Clear hazard areas and conduct system tests
- Post-event – Remove and transport via tractor trailer system test associated equipment away from test site.
- Maintenance – road grading and preparation of infrastructure at shooter site, target site, and calibration test sites is estimated to occur 15 times per year.

In addition to implementing conservation measures as part of the Integrated Natural Resource Management Plan (Tierra Data, Inc. 2010), we have summarized below the measures proposed by the Navy to avoid and minimize impacts to the western snowy plover, as described in the Biological Assessment (Navy 2011a):

<u>Measures to avoid and minimize effects on western snowy plovers during construction</u>

1. As needed, a qualified biologist will oversee avoidance and minimization measures described below. Where a qualified biologist is needed (such as construction and/or operation and maintenance activities) in western snowy plover habitat or near sensitive biological resources, the biologist will: (1) be familiar with the federally listed species and associated habitats that require survey or monitoring; (2) have a bachelor's degree with an emphasis in ecology, wildlife biology, or related science; and (3) have previous experience with applying the terms and conditions of a Biological Opinion. In addition, the qualified biologist will be approved by the Service to conduct the activities pursuant to this Biological Opinion (pers. comm, Martin Ruane 2012).

2. Construction activities at Tender Point will be conducted during the non-breeding season for western snowy plover (September 16 – March 1).

3. Construction and staging areas along with potential western snowy plover habitat will be delineated by a qualified biologist with bright flagging or fencing to minimize the amount of potential habitat damaged and lost. Equipment will not operate outside these delineated areas. All material used for delineating the project area will be removed immediately upon completion of activities.

4. Road material that may encourage nesting will be avoided at Tender Point.

5. Barriers will be placed along the outside edge of Tender Point Road and the turnaround to reduce the nesting appeal for western snowy plovers.

6. As feasible, structures that may be used as perches by predators will be rendered unsuitable for that purpose.

7. Best Management Practices will be implemented to avoid unnecessary vegetation removal, introduction of invasive species, pollution, contamination, and erosion.

Measures to avoid and minimize effects on western snowy plovers during operation and maintenance activities

8. Avoid activities when western snowy plovers are present, if feasible.

9. During plover nesting season (March 1 – September 15), a qualified biologist will: (1) educate operational personnel about sensitive habitats and how to implement avoidance and minimization measures, (2) delineate any areas adjacent to the site that should be avoided, and (3) attend operation related meetings as needed.

10. During plover nesting season, if plovers are present within 1,000 feet of the action area, a qualified biologist will remain on site during activities (if safety constraints allow) to monitor movement and behavior of western snowy plovers.

11. During plover nesting season, access to the test site will be restricted to operational activities only.

12. Unless operationally necessary, personnel will not occupy the site between dusk and dawn. No artificial lighting will be used.

13. If night-time activities are necessary, lighting will be shielded.

14. The project area will be kept free of trash.

15. Routine maintenance will be conducted outside the breeding season.

16. A Spill Prevention, Control, and Countermeasure Plan will be in place.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that

reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 Code of Federal Regulations 402.02).

The jeopardy analyses in this biological opinion rely on four components: (1) the *Status of the Species*, which describes the range-wide condition of the western snowy plover**,** the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the condition of the western snowy plover in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the western snowy plover; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the western snowy plover; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the western snowy plover.

In accordance with policy and regulation, the jeopardy determinations are made by evaluating the effects of the proposed federal action in the context of the current status of the western snowy plover, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the western snowy plover in the wild.

STATUS OF THE SPECIES

The Pacific Coast population of the western snowy plover was federally listed as threatened on March 5, 1993 (58 FR 12864), and critical habitat was designated on September 29, 2005 (70 FR 56970). The proposed project site is not within designated critical habitat for the western snowy plover, and thus we do not address project effects to western snowy plover critical habitat in this biological opinion. We issued a recovery plan for the western snowy plover in September 2007 (Service 2007).

The western snowy plover, a small shorebird in the family Charadriidae, weighs from 1.2 to 2 ounces and ranges in length from 5.9 to 6.6 inches (Page et al. 1995). It is pale gray-brown above and white below, with a white hindneck collar and dark lateral breast patches, forehead bar, and eye patches. The bill and legs are blackish. In breeding plumage, males usually have black markings on the head and breast; in females, usually one or more of these markings are dark brown. Early in the breeding season, a rufous crown may be evident on breeding males, but it is not typically seen on females. In non-breeding plumage, sexes cannot be distinguished because the breeding markings disappear. Fledged juveniles have buffy edges on their upper parts and can be distinguished from adults until approximately July through October, depending on when in the nesting season they hatched. After this period, molt and feather wear makes fledged juveniles indistinguishable from adults. Individual birds 1 year or older are considered to be breeding adults. The mean annual life span of western snowy plovers is estimated at about 3 years, but at least one individual was at least 15 years old when last seen (Page et al. 1995).

Western snowy plovers are primarily visual foragers, using the run-stop-peck method of feeding typical of *Charadrius* species. They forage on invertebrates in the wet sand and amongst surf-cast kelp within the intertidal zone, in dry sand areas above the high tide, on salt pans, on spoil sites, and along the edges of salt marshes, salt ponds, and lagoons. Western snowy plovers sometimes probe for prey in the sand and pick insects from low-growing plants. Their food sources consist of immature and adult forms of aquatic and terrestrial invertebrates. Little quantitative information is available on food habits.

The Pacific Coast population of western snowy plovers nests near tidal waters along the mainland coast and offshore islands from Damon Point, Washington, to Bahía Magdelena, Baja California, Mexico. Most nesting occurs on unvegetated to moderately vegetated, dune-backed beaches and sand spits. Other less common nesting habitats include salt pans, dredge spoils, and salt pond levees. Nests consist of a shallow scrape or depression, sometimes lined with beach debris (e.g., small pebbles, shell fragments, plant debris, and mud chips); nest lining increases as incubation progresses. Nests are usually located within 328 feet of water, but can be farther away when there is no formative vegetative barrier between the nest and water (Page and Stenzel 1981). The majority of western snowy plovers are site-faithful (returning to the same breeding area in subsequent breeding seasons); some also disperse within and between years (Warriner et al. 1986, Stenzel et al. 1994).

The nesting season of the western snowy plover extends from early March through late September. Generally, the breeding season may be 2 to 4 weeks earlier in southern California than in Oregon and Washington. The earliest nests on the California coast occur during the first week of March in some years and by the third week of March in most years (Page et al. 1995). Peak initiation of nesting is from mid-April to mid-June (Warriner et al. 1986; Powell et al. 1997). On the Oregon coast, nesting may begin as early as mid-March, but most nests are initiated from mid-April through mid-July (Wilson-Jacobs and Meslow 1984). Peak nest initiation occurs from mid-May to early July (Stern et al. 1990). On the Washington coast, most adults arrive during late April, with maximum numbers present from mid-May to late June.

The typical clutch size of western snowy plovers is three with a range from two to six (Warriner et al. 1986, Page et al. 1995). Both sexes incubate the eggs, which take about 27 days to hatch, with the female tending to incubate during the day and the male at night (Warriner et al. 1986). After losing a clutch or brood or successfully hatching a nest, western snowy plovers may re-nest at the same site or move up to several hundred kilometers (1 kilometer equals 0.62 mile) to nest at other sites (Stenzel et al. 1994, Powell et al. 1997). Re-nesting occurs 2 to 14 days after failure of a clutch, and up to five re-nesting attempts have been observed for a pair (Warriner et al. 1986).

Western snowy plover chicks are precocial (capable of a high degree of independence from hatching), feeding on their own within hours of hatching. However, they are unable to fly until 1 month after hatching. Females generally desert males and broods by the sixth day, and thereafter the chicks are typically accompanied by only males. Females obtain new mates and initiate new nests while males rear the broods (Page et al. 1995).

During the non-breeding season western snowy plovers may remain at breeding sites or may migrate to other locations. In western North America, the western snowy plover winters mainly in coastal areas from southern Washington to Central America (Page et al. 1995); however, the majority of birds winter south of Bodega Bay, California (Page et al. 1986). Many birds from the interior population winter on the central and southern coast of California. In winter, western snowy plovers are found on many of the beaches used for nesting, as well as some beaches where they do not nest. They also occur in man-made salt ponds and on estuarine sand and mud flats. In California, the majority of wintering western snowy plovers congregate on sand spits and dune-backed beaches. Some also occur on urban and bluff-backed beaches, which are rarely used for nesting (Page et al. 1986). Both coastal and inland-breeding western snowy plovers are very site-faithful to wintering sites.

Historical records indicate that nesting western snowy plovers were once more widely distributed and abundant in coastal Washington, Oregon, and California. Prior to 1970, western snowy plovers bred at 53 coastal locations in California. Between 1970 and 1981, western snowy plovers stopped breeding in parts of San Diego, Ventura, and Santa Barbara counties, most of Orange County, and all of Los Angeles County (Page and Stenzel 1981). In 2007, there were two nesting attempts documented on Los Angeles County beaches (SWCA 2007).

On the Washington coast, western snowy plover populations appear to have increased overall since the early 1990s, although consistent, intensive surveys have been conducted only since the mid-1990s (Service 2007). In Oregon, western snowy plovers historically nested at more than 20 sites on the coast, but only seven core nesting sites are consistently used (Lauten et al. 2006a, 2006b). Populations reached a low from 1991 to 1993 but have generally increased from 1994 to 2006 due to the implementation of management actions for the benefit of western snowy plovers and California least terns, including predator management and protection and restoration of suitable habitat (Service 2007).

The current Pacific Coast population of the western snowy plover is sparse in Washington, Oregon, and northern California. In 2006, estimated populations were 70 adults along the Washington coast (Pearson et al. 2006), 177 to 179 adults along coastal Oregon (Lauten et al. 2006b), and 2,231 adults in coastal California and San Francisco Bay (window survey including correction factor) (Page 2006, Service 2006). The California population of western snowy plovers comprises at least 90 percent of the listed Pacific Coast population. Eight geographic areas support over three-quarters of the California coastal breeding population: San Francisco Bay, Monterey Bay, Morro Bay, the Callendar-Mussel Rock Dunes area, the Point Sal to Point Conception area (VAFB), the Oxnard lowland, Santa Rosa Island, and San Nicolas Island (Page et al. 1991). A recent population estimate suggests the Baja California, Mexico population is approximately 1,000 breeding adults (E. Palacios, pers. comm. 2008).

Western snowy plover habitat is subject to erosion and accretion and is highly susceptible to degradation by mechanized beach cleaning; construction of seawalls, breakwaters, jetties, piers, homes, hotels, parking lots, access roads, trails, bike paths, day-use parks, marinas, ferry terminals, recreational facilities; and associated support services that may cause direct and

indirect losses of breeding and wintering habitat for the western snowy plover. Urban development has permanently eliminated valuable nesting habitat on beaches in southern Washington (Brittell et al. 1976), Oregon (Oregon Department of Fish and Wildlife 1994), and California (Page and Stenzel 1981). Increased development increases human use of the beach, thereby increasing disturbance to nesting plovers. Human activities such as walking, jogging, fishing, fireworks, unleashed pets, horseback riding, and off-road vehicles can destroy the western snowy plover's cryptic nests and chicks.

In addition to causing direct loss of habitat, urban development can result in additional adverse impacts to western snowy plovers. Human activities can interfere with foraging activities by disrupting the ability of adults and chicks to get to the wet beach to feed and return to the dunes or their nest (Burger and Fry 1993). Chicks can also become separated from their parents as a result of human disturbance of broods. Such disturbance could cause or contribute to chick mortality by interfering with essential chick-rearing behaviors or by causing intolerable stresses directly to the chicks (e.g., chicks separated from their parents are more susceptible to predation and exposure) (Cairns and McLaren 1980). For example, separation of chicks and their parent can lead to lethal exposure to wind and cold temperatures or disturbance that interferes with foraging could result in the starvation of western snowy plover chicks. In some instances, disturbance associated with these types of recreational activities is expected to temporarily flush western snowy plovers and not affect the birds in such a substantial manner. In other cases, such disturbance could interfere with the metabolism and thermoregulation of western snowy plover chicks and migrating or wintering adults such that they starve or egg production is impaired during the subsequent nesting season (Cairns 1982).

West Nile virus, a mosquito-borne disease which can infect birds, reptiles, and mammals, has spread rapidly across the United States from the initial introduction in New England (National Audubon Society 2006). In 2004 to 2006 the disease was reported from two coastal counties (Lane and Lincoln) in Oregon but has not been reported from any coastal counties in Washington (U.S. Geological Survey 2006). The virus has been identified in dead piping plovers and killdeer (*Charadrius vociferus*), both of which are closely related to the western snowy plover (Center for Disease Control 2004). We are not aware of any western snowy plover deaths attributable to West Nile virus, but such mortalities are possible.

Predator density is an important factor affecting the quality of western snowy plover nesting habitat (Stenzel et al. 1994). The presence of humans near western snowy plover nesting areas can increase the presence of predators due to improper disposal of trash. Predation can result in the loss of adults, chicks, or eggs. Predators can also separate chicks from adults, which can lead to chick mortality. Predation by both native and non-native species limits western snowy plover reproductive success at many Pacific Coast sites. Non-native predators include eastern red foxes (*Vulpes vulpes regalis*), domestic and feral cats (*Felis catus*) and dogs (*Canis lupus familiaris*), and Virginia opossums (*Didelphis virginiana*). Coyotes (*Canis latrans*), American crows (*Corvus brachyrhynchos*), common ravens (*Corvus corax*), American kestrels (*Falco sparverius*), loggerhead shrikes (*Lanius ludovicianus*), and several gull species (*Larus* spp.) are native predators of the western snowy plover. The threat of predation by domestic cats

intensifies when housing is constructed near western snowy plover breeding habitat. In addition, unnatural habitat features such as landscaped vegetation (e.g., palm trees), telephone poles, transmission towers, fences, buildings, and landfills near western snowy plover nesting areas attract both native and non-native predators (Service 2007).

Habitat loss for coastal breeding western snowy plovers has also resulted from the encroachment of non-native plant species that tend to stabilize dunes and grow too densely to accommodate their nesting. These include European beachgrass (*Ammophila arenaria*), American beachgrass (*Ammophila breviligulata*), Scotch broom (*Cytisus scoparius*), gorse (*Ulex europaeus*), South African iceplant (*Carpobrotus edulis*), pampas grass (*Cortaderia selloana*), jubata grass (*Cortaderia jubata*), iceplant (*Mesembryanthemum* sp.), and other non-native weed species (Service 2007). These species may also reduce the diversity and abundance of western snowy plover food sources (Slobodchikoff and Doyen 1977), and provide habitat for western snowy plover predators that historically would have been largely precluded by the lack of cover in the dune community (Stern et al. 1991). Shore pine (*Pinus contorta*) is a native plant species that has invaded coastal dunes and resulted in similar impacts to western snowy plovers (Schwendiman 1975, California Native Plant Society 1996, Powell 1996).

The Pacific Coast population of western snowy plovers has experienced widespread loss of nesting habitat and reduced reproductive success at many nesting locations. The reasons for the decline and degree of threats vary by geographic location; however, the primary threat is habitat destruction and degradation. Habitat loss and degradation can be primarily attributed to human disturbance, urban development, introduced plants, and expanding predator populations. Natural factors, such as inclement weather, have also affected the quality and quantity of western snowy plover habitat (Service 1993).

Recovery of the western snowy plover

The primary objective of the recovery plan (Service 2007) is to remove the Pacific coast population of the western snowy plover from the list of endangered and threatened wildlife and plants by: (1) increasing population numbers distributed across the range of the Pacific coast population of the western snowy plover; (2) conducting intensive ongoing management for the species and its habitat and developing mechanisms to ensure management in perpetuity; and (3) monitoring western snowy plover populations and threats to determine success of recovery actions and refine management actions.

ENVIRONMENTAL BASELINE

The implementing regulations for section 7(a)(2) of the Act define the “action area” as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For the purposes of this biological opinion and based on information provided by the Navy, the action area includes the Tender Point Shooter Site and adjacent Tender Beach. No listed species occur at Bomber Cove Target Site or any of the four calibration sites; therefore, these locations will not be discussed any further.

Additional detail about the environmental baseline, other than what is provided below, is available in the biological assessment (Navy 2011a).

San Nicolas Island typically supports between 80 and 250 wintering and between 40 and 100 breeding western snowy plovers (Volume 2, Table B-1 in Service 2007) in any given year. Surveys conducted on SNI in winter 2009/2010 found 99 plovers (Service 2010), and breeding season surveys in 2010 found 50 plovers (Navy 2011a). The major threats to mainland coastal western snowy plovers (i.e., non-native plants and predators, human activities) are not considered a substantial threat to the species on San Nicolas Island. On San Nicolas Island, typical predators include island foxes, gulls, American kestrels, and feral cats. However, non-native predators are no longer considered a threat to the species on San Nicolas Island, as there are no records of black rats on the island and the Navy's monitoring phase to ensure no cats remain on SNI has been completed, with no cats known or suspected to be on the island (Ruane, U.S. Navy, pers. comm. 2012). A recently emerging threat to the western snowy plover on San Nicolas Island is increasing pinniped populations which can overwhelm plover breeding beaches and force western snowy plovers to nest further from the beach in less typical habitat (Ruane, pers. comm. 2010).

Within the action area, high quality habitat for snowy plovers exists at Tender Beach and is regularly used by plovers for breeding and non-breeding activities. Tender Beach is approximately 1.5 km long and about 60-75 feet wide between the base of the dunes and mean high tide line. The beach between the mean high tide line and the base of the dunes is relatively flat and contains large amounts of driftwood and kelp used by plovers. While this area is nearly devoid of vegetation, the extensive dune system is dominated by native plants. Tender Point provides nesting habitat within close proximity to a high quality brood area. In general, as marine mammal numbers continue to increase on the island, suitable habitat for plover breeding and foraging such as Tender Beach may be decreasing.

Winter surveys on San Nicolas Island in 2010 documented 99 individual western snowy plovers with 64 individuals on Tender Beach, and in 2011, 129 individuals with 80 individuals located on Tender Beach (Navy 2011a). Summer surveys during 2010 documented 50 individuals on San Nicolas Island with 17 at Tender Beach, and in 2011 documented 42 individuals on San Nicolas Island with 23 individuals on Tender Beach (Navy 2011a). Between 2006 and 2010, surveys conducted at Tender Point documented up to 4 nests in 2009 and 1 nest for 2007 and 2008. Of the 12 nests documented between 2006 and 2010, 4 nests showed sign of hatching, one nest's outcome is unknown, and the remaining 7 nests failed as a result of environmental conditions (e.g., wind) or predation.

The October 15, 2001, the programmatic biological opinion for ongoing activities on San Nicolas Island (1-8-01-F-14) addressed impacts from Navy activities on the western snowy plover. The three most recent end-of-year reports (Navy 2009, 2010, 2011c) pursuant to this biological opinion indicate that the ongoing activities appear to have relatively minor effects on the western snowy plover.

Recovery of the western snowy plover
The San Nicolas Island sub-population of western snowy plovers belongs to Recovery Unit 5. While no specific goals are identified for San Nicolas Island, the primary objective of the recovery plan (Service 2007) is to remove the Pacific coast population of the western snowy plover from the list of endangered and threatened wildlife and plants by: (1) increasing population numbers distributed across the range of the Pacific coast population of the western snowy plover; (2) conducting intensive ongoing management for the species and its habitat and developing mechanisms to ensure management in perpetuity; and (3) monitoring western snowy plover populations and threats to determine success of recovery actions and refine management actions.

The Navy has implemented conservation measures for the western snowy plover on San Nicolas Island that are compatible with the goals stated above. For example, the following is an excerpt from the Navy's Integrated Natural Resource Management Plan for San Nicolas Island (Tierra Data, Inc. 2010):

> "Support recovery plan efforts to establish stable western snowy plover (Charadrius alexandrinus nivosus) populations and eventual delisting by closing nesting areas to recreational activity during the March 1 - September 15 breeding season and by removing unnecessary structures in nesting areas.
>
> Support recovery plan efforts to establish stable western snowy plover populations and eventual delisting by monitoring the effects of Navy activities on snowy plovers through conducting island-wide snowy plover censuses twice annually, once during the breeding season and once during the winter season, and through monitoring snowy plover nests during missile or target launches, general operations, and other activities that may disturb nesting behaviors."

Additionally, the Navy has completed a final monitoring phase to ensure no cats remain on SNI and as a result of this survey; no cats are known or suspected to be on island at this time (Ruane, U.S. Navy, pers. comm. 2012).

EFFECTS OF THE ACTION

Within the proposed action area, snowy plovers could nest, forage, and roost at Tender Beach and Tender Point. All other proposed activities within the action area occur outside western snowy plover habitat. The number of western snowy plovers that could be affected is dependent upon the number of nests and young present, adults foraging and/or roosting, and conditions during monitoring and project activities.

As a result of project activities, both indirect and direct effects to snowy plovers are possible. Effects associated with project activities include: loss of breeding habitat at Tender Point, disruption of breeding and non-breeding season activities by noise and human activity which may cause plovers to leave foraging, nesting and/or roosting areas; being flushed from nest sites

during periods of human activity which may result in the loss of eggs or young (this is more of a problem during inclement weather (*e.g.*, cold, windy, hot)); structures left adjacent to nesting areas may serve as perches for predators and increase predation on eggs or nestlings; and disturbance may cause the separation of young from adults and may make the young susceptible to predation. Additional effects include eggs, nestlings, and adults being trampled or crushed by humans and motorized equipment resulting in eggs, nestlings, and/or adults being lost.

The Navy proposes to minimize the above effects by: 1) conducting project activities primarily during the non-breeding season when snowy plovers are less likely to be nesting in these areas (when operationally feasible); 2) rendering all predator perches unsuitable, as feasible; 3) using non-favorable breeding substrate material for road pack to discourage nesting; 4) using a qualified biologist during plover nesting season (March 1 – September 15) to (a) educate operational personnel about sensitive habitats and how to implement avoidance and minimization measures; and, (b) delineate any areas adjacent to the site that should be avoided; 5) ensuring a qualified biologist is present during plover nesting season if plovers are within 1,000 feet of the action area. A qualified biologist will remain on site during activities (if safety constraints allow) to monitor movement and behavior of western snowy plovers; and 6) implementing additional avoidance and minimization measures, as stated above in the project description.

Overall, we expect that the presence of a Service-approved qualified biologist during project activities occurring within occupied habitat and the measures proposed by the Navy for this action will further avoid and minimize the effects to individuals of the species. Also, impacts to the wintering habitat in the action area would be temporary and periodic (i.e., the habitat conditions are predicted to remain stable). Therefore, we do not anticipate any of the activities to result in injury or mortality of western snowy plovers and therefore, we do not expect that the proposed activities will substantially reduce the reproduction, numbers, or distribution of the species.

Recovery of the western snowy plover

The effects to western snowy plovers and their habitat as a result of proposed project activities will not hinder the recovery efforts currently under way on San Nicolas Island. We believe the effects to individual plovers should not have an overall effect on the species' recovery as described in the recovery plan.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Because San Nicolas Island is a federal installation, we are not aware of any non-federal actions that are reasonably certain to occur in the action area.

CONCLUSION

After reviewing the current status of the western snowy plover, the environmental baseline for the action area, the effects of the proposed Construction and Operation of a Directed Energy Test Site at Naval Base Ventura County, San Nicolas Island, and the cumulative effects, it is the Service's biological opinion that the Construction and Operation of a Directed Energy Test Site at Naval Base Ventura County, San Nicolas Island, as proposed, is not likely to jeopardize the continued existence of the western snowy plover. We have reached this conclusion because:

1. The Navy has proposed measures to avoid and minimize adverse effects to the western snowy plover, such as conducting activities outside the nesting season (when feasible) and conducting regular surveys prior to and during operations, that should ensure there is no substantial reduction in the number or reproductive success of western snowy plover;

2. The western snowy plover population at San Nicolas Island represents a small portion of the subspecies' range-wide distribution and the local effects are not likely to reduce the overall population or degrade the status of the species at San Nicolas Island or the western snowy plover range-wide; and

3. The effects to western snowy plovers and their habitat as a result of proposed project activities should not have an overall effect on the species' recovery as described in the recovery plan. The Navy is also implementing measures that contribute to the species' recovery and these should offset most of the effects of the proposed action.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Navy for the exemption in section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activity covered by this incidental take statement. If the Navy fails to assume and implement the

terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Navy must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR 402.14(i)(3)]

Any western snowy plovers found within the action area may be flushed from the area during project activities. While such flushing could result in take in the form of harm, harassment, injury, or mortality, the birds are most likely to simply return to their activities and the flushing would not be repeated numerous times over an extended period, so any take that results would be very rare. Therefore, incidental take of western snowy plovers will be difficult to detect because of the potential difficulty in determining whether any dead bird found died of natural causes or as a result of the Navy's activities.

Because we anticipate that take is likely to be rare, and because what take does occur is likely to go undetected, if one (1) western snowy plover is found dead or injured within the action area throughout duration of the project, we consider such incidental take new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Navy must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

REASONABLE AND PRUDENT MEASURES

We believe the following reasonable and prudent measures are necessary and appropriate to minimize the impacts of the take of the western snowy plover:

1. Take of western snowy plovers during project activities must be reduced through well-defined operational procedures, and by using only qualified personnel to conduct activities related to the proposed avoidance and minimization measures.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Navy must comply with the following terms and conditions, which implement the reasonable and prudent measure described above and outline reporting and monitoring requirements. These terms and conditions are non-discretionary.

The Service anticipates that for the entire project duration, no more than 1 (one) western snowy plover will be found dead or injured as a result of project activities. The reasonable and prudent measure, with its implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

To be exempt from the prohibitions of section 9 of the Act, the Navy must comply with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are non-discretionary.

1. The following terms and conditions implement reasonable and prudent measure 1:

   a) No more than 3 days before the onset of ground disturbance, one or more Service-approved biologist(s) must survey the action area for western snowy plovers. If plovers are found, the Navy will implement the appropriate avoidance and minimization measures from the project description.

   b) We hereby authorize Francesca Ferrara, Grace Smith, Martin Ruane, and Rebecca Kelley to independently survey for western snowy plovers. Ms. Ferrara, Ms. Smith, Mr. Ruane, and Ms. Kelley have demonstrable experience with these activities and have previously been approved by the Service for similar work. This authorization is valid only for the subject project as described in Biological Opinion 8-8-12-F-28. If the Navy seeks additional individuals to be approved by the Service as authorized, the Navy must provide the name and qualifications of each individual that would be conducting these activities to the Service at least 15 days prior to project activities. No project activities will begin in areas that could support western snowy plovers until the Navy has received approval from the Service that the biologist(s) are qualified to conduct the work.

   c) One or more Service-approved biologists must conduct a training session for all project personnel prior to the onset of any activities within the action area during the western snowy plover nesting season (March 1 – September 15). At a minimum, this training must include a description of the western snowy plover and its habitat, the general provisions of the Act, the necessity for adhering to the provisions of the Act, the penalties associated with violating the provisions of the Act, and the specific measures that are incorporated into the description of the proposed action to avoid and (or) minimize the adverse effects to these species.

REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), the Navy must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement. The Navy must provide an annual report to the Service by March 31 following each year in which activities covered by this biological opinion occurred until final project completion. Interim reports are only necessary after incidental take occurs. The reports must document the number of western snowy plovers that were found and the number that were taken during the course of the project; a summary of the effectiveness of the terms and conditions of this biological opinion; a brief discussion of any problems encountered in implementing minimization measures; and any suggestions of how these measures could be changed to improve conservation of this species

while facilitating compliance with the Act. This document will assist the Service in evaluating appropriate measures for conservation of these species during future projects.

DISPOSITION OF DEAD OR INJURED SPECIMENS

As part of this incidental take statement and pursuant to 50 CFR 402.14(i)(1)(v), upon locating a dead or injured western snowy plover, initial notification within three working days of its finding must be made by telephone and in writing to the Ventura Fish and Wildlife Office (805-644-1766). The report must include the date, time, location of the carcass, a photograph, cause of death or injury, if known, and any other pertinent information.

Care must be taken in handling injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state. The finder of injured specimens has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed, unless to remove it from the path of further harm or destruction. Should any western snowy plover survive injury, the Service must be contacted regarding their final disposition. The remains must be placed with educational or research institutions holding the appropriate State and Federal permits, such as, but not limited to, the Santa Barbara Natural History Museum (Contact: Paul Collins, Santa Barbara Natural History Museum, Vertebrate Zoology Department, 2559 Puesta Del Sol, Santa Barbara, California 93460, (805) 682-4711, extension 321). The Navy must make arrangements with the Museum regarding proper disposition of potential museum specimens prior to implementation of any project actions.

REINITIATION NOTICE

This concludes formal consultation on the effects of the Construction and Operation of a Directed Energy Test Site at Naval Base Ventura County, San Nicolas Island. Reinitiation of formal consultation is required if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may adversely affect listed species or to an extent not considered in this biological opinion; (3) the agency action is subsequently modified in a manner that causes an effect to a listed species that was not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by this action (50 CFR 402.16). In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) will have lapsed and any further take would be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions regarding this consultation, please contact Robert McMorran of my staff at (805) 644-1766, extension 232.

Sincerely,

Diane K. Noda
acting Field Supervisor

LITERATURE CITED

Brittell, J.D., J.M. Brown, and R.L. Eaton. 1976. Marine shoreline fauna of Washington, Vol. II. Washington Department of Game and Ecology, Olympia, Washington. 341 pp.

Burger, A.E. and D.M. Fry. 1993. Effects of oil pollution on seabirds in the northeast Pacific. Pages 254-263 In: K. Vermeer, K.T. Briggs, K.H. Morgan, and D. Siegel-Causey, eds. The status, ecology, and conservation of marine birds of the North Pacific. Canadian Wildlife Service Special Publication, Ottawa.

Cairns, W.E. and I.A. MacLaren. 1980. Status of the piping plover on the east coast of North America. American Birds 34(2):206-208.

Cairns, W.E. 1982. Biology and behavior of breeding piping plovers. Wilson Bull. 94:531-545.

California Native Plant Society. 1996. Policy on invasive exotic plants. http://www.cnps.org/cnps/archive/exotics.php.

Centers for Disease Control. 2004. West Nile Virus. Retrieved from: http://www.cdc.gov/ncidod/dvbid/westnile/birdspecies.htm/. Accessed: January 2008.

Lauten, D.J., K.A. Castelein, E. Seckinger, and E.P. Gaines. 2006a. The distribution and reproductive success of the western snowy plover along the Oregon coast - 2005. The Oregon Natural Heritage Information Center Institute for Natural Resources, Portland, Oregon.

Lauten, D.J., K.A. Castelein, S. Weston, K. Eucken, and E.P. Gaines. 2006b. The distribution and reproductive success of the western snowy plover along the Oregon coast - 2006. The Oregon Natural Heritage Information Center Institute for Natural Resources, Portland, Oregon.

National Audubon Society. 2006. West Nile virus. Retrieved from: http://www.audubon.org/bird/wnv/. Accessed January 2008.

Oregon Department of Fish and Wildlife. 1994. Oregon conservation program for the western snowy plover (*Charadrius alexandrinus nivosus*). Final draft. Portland, Oregon. 56 pp.

Page, G.W. and L.E. Stenzel (eds.). 1981. The breeding status of the snowy plover in California. Western Birds 12(1):1-40.

Page, G.W., F.C. Bidstrup, R.J. Ramer, and L.E. Stenzel. 1986. Distribution of wintering snowy plovers in California and adjacent states. Western Birds 17(4):145-170.

Page, G.W., L.E. Stenzel, W.D. Shuford, and C.R. Bruce. 1991. Distribution and abundance of the snowy plover on its western North American breeding grounds. Journal of Field Ornithology 62(2):245-255.

Page, G.W., J.S. Warriner, J.C. Warriner, and P.W.C. Paton. 1995. Snowy plover (*Charadrius alexandrinus*). In The Birds of North America, No. 154 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington, D.C. 24 pp.

Page, G.W. 2006. Point Reyes Bird Observatory, Stinson Beach, California. Comparison of the 2005 and 2006 snowy plover surveys of the Pacific coast. Electronic file sent to U.S. Fish and Wildlife Service. 8 pp.

Pearson, S.F, C. Sundstrom, K. Brennan, and M. Fernandez. 2006. Snowy plover distribution, abundance, and reproductive success: 2006 research progress report. Washington Department of Fish and Wildlife, Olympia, Washington.

Powell, A.N. 1996. Western snowy plover use of state-managed lands in southern California, 1995. California Department of Fish and Game, Wildlife Management Division, Bird and Mammal Conservation Program Report 96-103. Sacramento, California. 14 pp.

Powell, A.N., J.M. Terp, C.L. Collier, and B.L. Peterson. 1997. The status of western snowy plovers (*Charadrius alexandrinus nivosus*) in San Diego County, 1997. Report to the California Department of Fish and Game, Sacramento, California, and U.S. Fish and Wildlife Service, Carlsbad, California, and Portland, Oregon. 34 pp.

Schwendiman, J.L. 1975. Coastal dune stabilization in the Pacific Northwest. International Journal of Biometeorology 21:281-289.

Slobodchikoff, C.N. and J.T. Doyen. 1977. Effects of *Ammophila arenaria* on sand dune arthropod communities. Ecology 58:1171-1175.

Stenzel, L.E., J.C. Warriner, J.S. Warriner, K.S. Wilson, F.C. Bidstrup, and G.W. Page. 1994. Long-distance breeding dispersal of snowy plovers in western North America. Journal of Animal Ecology 63:887-902.

Stern, M.A., J.S. McIver, and G.A. Rosenberg. 1990. Investigations of the western snowy plover at the Coos Bay North Spit and adjacent sites in Coos and Curry Counties, Oregon, 1990. Report to Oregon Department of Fish and Wildlife Nongame Program. 33 pp.

Stern, M.A., J.S. McIver, and G.A. Rosenberg. 1991. Nesting and reproductive success of snowy plovers along the south Oregon coast, 1991. Report to Oregon Department of Fish and Wildlife-Nongame, Roseburg, Oregon, and Coos Bay District, Bureau of Land Management, North Bend, Oregon. 18 pp.

SWCA. 2007. The western snowy plover in Los Angeles County, California: Winter- Spring 2007. Prepared for the California Department of Fish and Game, Office of Oil Spill Response. South Pasadena, California.

Tierra Data, Inc. 2010. *Integrated Natural Resources Management Plan San Nicolas Island, California*. Prepared for NAVFAC SW and NBVC.

U.S. Fish and Wildlife Service. 1993. Endangered and threatened wildlife and plants; determination of threatened status for the Pacific coast population of the western snowy plover; final rule. Federal Register 58(42):12864-12874.

U.S. Fish and Wildlife Service. 2001. Biological Opinion for Activities on San Nicolas Island, California (1-8-01-F-14). October 15, 2001.

U.S. Fish and Wildlife Service. 2006. Endangered and threatened wildlife and plants; 12-month finding on a petition to delist the Pacific coast population of the western snowy plover. Federal Register 71:20607-20624. April 21, 2006.

U.S. Fish and Wildlife Service. 2007. Recovery plan for the western snowy plover, Pacific coast population. Sacramento, California.

U.S. Fish and Wildlife Service. 2010. Western snowy plover species page on Arcata Fish and Wildlife Office website. Retrieved from http://www.fws.gov/arcata/es/birds/WSP/plover.html. Accessed August 2010.

U.S. Geological Survey. 2006. West Nile virus maps. Retrieved from: http://diseasemaps.usgs.gov/wnv_us_bird.html. Accessed January 2008.

U.S. Navy. 2009. Biological opinion 2008 annual report for San Nicolas Island, California. January 2009. Naval Base Ventura County, Point Mugu, California. 61 pp.

U.S. Navy. 2010. Biological opinion 2009 annual report for San Nicolas Island, California. February 2010. Naval Base Ventura County, Point Mugu, California. 23 pp. + appendix.

U.S. Navy. 2011a. Construction and Operation of a Directed Energy Test Site at Naval Base Ventura County, San Nicolas Island: biological assessment. Naval Base Ventura County, Point Mugu, California. 33 pp.

U.S. Navy. 2011b. San Nicolas Island Roads and Airfield Repairs Project: biological assessment. Naval Base Ventura County, Point Mugu, California. 39 pp. + appendix

U.S. Navy. 2011c. Biological opinion 2010 annual report for San Nicolas Island, California. February 2011. Naval Base Ventura County, Point Mugu, California. 19 pp.

Warriner, J.S., J.C. Warriner, G.W. Page, and L.E. Stenzel. 1986. Mating system and reproductive success of a small population of polygamous snowy plovers. Wilson Bulletin 98(1):15-37.

Wilson-Jacobs, R. and E.C. Meslow. 1984. Distribution, abundance, and nesting characteristics of snowy plovers on the Oregon coast. Northwest Science 58(1):40-48.

IN LITTERIS

Ruane, Martin. Ecologist. U.S. Navy. March 1, 2012, email regarding status of feral cats on San Nicolas Island.

Ruane, Martin. Ecologist. U.S. Navy. June 21, 2012, email regarding additional language to project description.

PERSONAL COMMUNICATIONS

Palacios, Eduardo. Biologist. Communication on January 16, 2008, regarding the population status of the Baja California, Mexico portion of Pacific Coast population of the western snowy plover.

Ruane, Martin. Ecologist, U.S. Navy. Telephone communication on July 8, 2010 regarding the San Nicolas Island wind energy project, feral cats on SNI, and the status of island night lizards and snowy plovers on the island.

CALIFORNIA COASTAL COMMISSION
45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105- 2219
VOICE (415) 904- 5200
FAX (415) 904- 5400
TDD (415) 597-5885

August 17, 2013

J.J. McHugh, Captain
Department of the Navy
Naval Base Ventura County
Attn: Suzanne Smith
311 Main Road, Suite 1
Point Mugu, California 93042-5033

Re: **ND-0213-13**, Navy Negative Determination, Directed Energy Test Facilities, San Nicolas Island, Naval Base Ventura County

Dear Captain McHugh:

The Coastal Commission staff has reviewed the above-referenced negative determination for the Navy's Directed Energy Test Facilities on the northwest end of San Nicolas Island. The project purpose is to support Navy training and testing directives to develop "operationally realistic engagements in both maritime and land environments with an over-the-ocean shot from a land-based shooter site to a land-based target." The activities would involve laser and high-powered microwave (HPM) equipment, and the establishment of shooter, target, and calibration sites. The shooter site would be at Tender Point, and the "shooting" would occur over water to the on-land target site at Bomber Cove. The four calibration sites used to verify testing accuracy would be located south and east of Tender Point. Once calibrated, system tests would be conducted to allow attack on airborne and seaborne targets, as well as at Bomber Cove.

Construction activities would commence in 2014 and would involve:

Shooter Site: constructing a 3,000 sq. ft. 2 story building, a 13,811 sq. ft. vehicle turnaround area/pad, and widening a 3,196 ft. long gravel access road by 10 ft. (from 8 ft. to 18 ft. wide);

Target Site: constructing a 1,600 sq. ft. concrete pad, constructing a new, 2,885 ft. long, 12 ft. wide gravel road, and widening 2,215 ft. (length) of an existing 8 ft. wide gravel road to 12 ft. wide; and

Calibration Sites: constructing four 15 ft. by 15 ft. concrete pads (one at each site), and constructing 500 ft. access road at two of the four sites.

Testing activities, frequencies, and durations would occur as summarized in Attachment A (Navy Environmental Assessment, Table 2-2). The project includes conservation measures to minimize effects on access and recreation, public safety, sensitive habitat, water quality, and cultural resources. Measures to protect public safety include:

Each proposed test of a directed energy system would follow the protocols of DoD Instruction 6055.11, Protecting Personnel from Electromagnetic Fields (19 August 2009). This would include a detailed test plan(s) with a description of the objectives and risks, and a calculation of hazard zones that would need to be cleared; coordination with the Federal Aviation Administration (FAA), and U.S. Coast Guard; and the issuance of Notice to Airmen (NOTAM) and Notice to Mariners (NOTMAR), as appropriate, to the operating parameters of the directed energy system to be tested; and coordination with the DoD Laser Clearing House in the event that a directed energy system will be fired at or above the horizon. This includes coordinating Altitude Reservations with the FAA;

SOPs governing the use of the system during the test 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 directed energy system(s).

Measures to protect environmentally sensitive habitat include the Conservation measures listed in Attachment B (Navy EA, pp. 2-13 to 2-15). The Conservation measures include monitoring and avoidance/minimization measures (including avoiding activities during sensitive periods, and avoiding any firing if wildlife is within the hazard path). No targets would be located on horizontal surfaces where sea lions might haul out. Surfaces near targets would include perch-discouraging features ("bird spikes"). Construction will be scheduled to avoid Brandt's cormorant nesting periods (generally late February through late August). As activities would occur on land, the activities would not affect sea otters. Moreover, the test areas would be sited within previously disturbed areas, and no sensitive plant or wildlife habitats would be affected. To protect snowy plovers, the Navy coordinated with the U.S. Fish and Wildlife Service, whose Biological Opinion states:

The Navy proposes to minimize the above effects by: 1) conducting project activities primarily during the non-breeding season when snowy plovers are less likely to be nesting in these areas (when operationally feasible); 2) rendering all predator perches unsuitable, as feasible; 3) using non-favorable breeding substrate material for road pack to discourage nesting; 4) using a qualified biologist during plover nesting season (March 1 – September 15) to (a) educate operational personnel about sensitive habitats and how to implement avoidance and minimization measures; and, (b) delineate any areas adjacent to the site that should be avoided; 5) ensuring a qualified biologist is present during plover nesting season if plovers are within 1,000 feet of the action area. A qualified biologist will remain on site during activities (if safety constraints allow) to monitor movement and behavior of western snowy plovers; and 6) implementing additional avoidance and minimization measures, as stated above in the project description.

Overall, we expect that the presence of a Service-approved qualified biologist during project activities occurring within occupied habitat and the measures proposed by the Navy for this action will further avoid and minimize the effects to individuals of the species. Also, impacts to the wintering habitat in the action area would be temporary and periodic (i.e., the habitat conditions are predicted to remain stable). Therefore, we do not

> *anticipate any of the activities to result in injury or mortality of western snowy plovers and therefore, we do not expect that the proposed activities will substantially reduce the reproduction, numbers, or distribution of the species.*

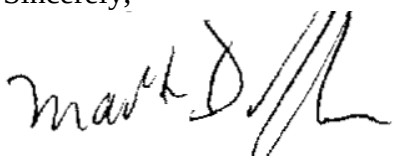
Marine resource and water quality effects would be minimized through implementing storm water controls and Best Management Practices during construction, and strict controls on releases of hazardous materials during operations (e.g., closed-cycle and closed loop systems, and stripping targets of unnecessary hazardous constituents). Finally, measures have also been included to protect cultural resources in the area during construction.

The Navy concludes:

> ***CONCLUSION***
>
> *The Navy has determined that the proposed directed energy facilities would not have an effect on the coastal zone. The project is consistent with existing land and water use on the Point Mugu Sea Range and at Navy-owned SNI. The project is also consistent with existing federal and state land use plans, policies, and controls. Further, the proposed test is similar to the activities addressed in existing environmental documentation prepared for the Sea Range.*

Under the federal consistency regulations (Section 930.35), a negative determination can be submitted for an activity "which is the same as or similar to activities for which consistency determinations have been prepared in the past." The Commission and its staff have concurred with the past Navy consistency and negative determinations for overall testing and training on the Sea Range (including San Nicolas Island (CD-002-01), and, since then, for more focused testing and training activities: Laser Testing and Training Program (ND-017-09), and Point Mugu Sea Range Countermeasures Testing and Training Program (ND-0207-13). With the measures incorporated into the activities to minimize effect on sensitive habitat, marine resources, water quality, public access and recreation, commercial and recreational fishing, and archaeological resources, the Commission staff **agrees** with the Navy that proposed activities would be similar to consistency and negative determinations with which we have previously concurred. We therefore **concur** with your negative determination made pursuant to 15 CFR 930.35 of the NOAA implementing regulations. Please contact Mark Delaplaine of the Commission staff at (415) 904-5289 if you have any questions regarding this matter.

Sincerely,



(for) CHARLES LESTER
Executive Director

Attachments

A. Table 2-2: Proposed Activities
B. Conservation Measures

cc: Ventura District Office

Table 2-2. Proposed Activities

Activity	Laser	HPM
GENERAL		
System Parameters	• Power: Up to and including 1 MW (average). • Wavelength: 180 to 14,000 nanometers (0.18 to 14.0 µm). • General: Class 1, 2, 3, and 4 lasers. Laser types operated would include: solid-state, fiber, carbon dioxide, free electron, and closed-cycle chemical, including CW, pulsed, and ultra-short pulse.	• Power and frequency: refer to Table 2-3 and Table 2-4. • Non-lethal anti-personnel HPM systems utilize a frequency of approximately 95 GHz. The combination of power density and shot duration will not exceed 12 Joules per square centimeter at the target for any single shot. This could be tested on human targets as it poses no long-term threat (see Section 3.7.2). • Transmitter Operating Mode: CW or pulsed. • Antenna types: various types. These include both narrow band and impulse radiating designs.
Personnel	10-30 during each event.	10-30 during each event.
OPERATION		
Tempo	Up to 100 days/year.	Up to 65 days/year.
Event Duration	4-9 hours	Same as laser testing and personnel training.
Usage per Event	40 times Multiple pulses, typically < 15 seconds but may be up to 1 minute	30 times Multiple pulses, typically < 15 seconds but may be up to 1 minute.
Test Event Activities	Pre-event • Transportation of system, CONEX boxes, and instrumentation to test facilities via tractor-trailer. • Unloading of system, CONEX boxes, and instrumentation using a crane or forklift. • System alignment, calibration, and check-out using calibration sites and/or the target site (approximately 2 hours per event) • Communications and instrumentation checks. Event • Clearance of any hazard areas through use of boundary boats and/or helicopters. Operations of the system-under-test until test objectives have been achieved. Personnel associated with test within safe facility during testing and personnel training; personnel not participating in test excluded from the area. Post-event • De-install and package system, CONEX boxes, and instrumentation for transport on tractor-trailers, and depart site.	Same as laser testing and personnel training.
Generator Use	One 20 kV generator (or multiple smaller generators) at target site, for pre-event, event, and post-event activities, up to 10 hours/day.	Same as laser testing and personnel training.
Vehicle Use	• Two tractor trailers to transport the system and instrumentation to the site (pre-event set-up and post-event tear-down). • Four pick-up trucks for personnel and equipment transportation pre-event, during the event, and post-event. • One 4-wheel drive forklift for loading and unloading. • One crane for loading and unloading.	Same as laser testing and personnel training.
Maintenance	Miscellaneous maintenance activities include road grading and preparing infrastructure at shooter site, target site, and calibration test sites. Maintenance activities are estimated at 15 times per year.	Same as laser testing and personnel training.

Attachment A

General Conservation Measures

In addition to the above, the Navy proposes the following general conservation measures:

- All portable equipment will be removed upon test completion.
- Upon completion of the proposed road construction, project vehicles and equipment will be restricted to existing concrete pads, leveled surfaces, and paved or dirt access roads.
- Vehicles will not be allowed to drive onto any beaches.
- Testing and personnel training activities will be minimized during the night.
- Surface targets will not be located within intertidal zones of SNI.

Western Snowy Plovers (*Charadrius alexandrinus nivosus*) at Tender Point

In September 2012, the USFWS issued a Biological Opinion for the project that authorized the flushing of western snowy plovers within the action area during project activities provided that all terms and conditions are implemented. As required under the Biological Opinion, the Navy would reinitiate consultation with the USFWS if one western snowy plover is found dead or injured within the action area throughout duration of the project (USFWS 2012a).

The Navy proposes the following conservation measures during the construction phase, which are consistent with the USFWS Biological Opinion for the project (USFWS 2012a):

- As needed, a qualified biologist will oversee avoidance and minimization measures described below. Where a qualified biologist is needed (such as construction and/or operation and maintenance activities) in western snowy plover habitat or near sensitive biological resources, the biologist will: (1) be familiar with the federally listed species and associated habitats that require survey or monitoring; (2) have a bachelor's degree with an emphasis in ecology, wildlife biology, or related science; and (3) have previous experience with applying the terms and conditions of a Biological Opinion. In addition, the qualified biologist will be authorized by the USFWS to conduct the activities pursuant to the Biological Opinion.
- Construction activities at Tender Point will be conducted during the non-breeding season for western snowy plovers (September 16 – February 28).
- Construction and staging areas along with potential western snowy plover habitat will be delineated by a qualified biologist with bright flagging or fencing to minimize the amount of potential habitat damaged and lost. Equipment will not operate outside these delineated areas. All material used for delineating the project area will be removed immediately upon completion of activities.
- Road material that may encourage nesting will not be used at Tender Point.
- Barriers will be placed along the outside edge of Tender Point Road and the turnaround to reduce the nesting appeal for western snowy plovers.
- As feasible, structures that may be used as perches by predators will be rendered unsuitable (e.g., fitted with nixalite) for that purpose.
- Best Management Practices will be implemented to avoid unnecessary vegetation removal, introduction of invasive species, pollution, contamination, and erosion.

The Navy proposes the following conservation measures during the operational phase:

- Avoid activities when western snowy plovers are present, if operational parameters allow.

Attachment B

- For operations occurring during the snowy plover nesting season (March 1 – September 15), a qualified biologist will: (a) educate operational personnel about sensitive habitats and how to implement avoidance and minimization measures, (b) delineate any areas adjacent to a site that should be avoided, and (c) attend operationally related meetings as needed.
- During the snowy plover nesting season, a biologist will conduct regular surveys of the affected area. When operational activities are scheduled to occur within 1,000 ft of a known or suspected snowy plover nest location and which may potentially disturb nesting snowy plovers, the biologist will observe the nest location prior to the operation to determine nesting status, during the operation to determine if disturbance is occurring, and after operations to determine the status of the nest. After the operational activity is completed, the nests will be observed again to ascertain whether the status of the nests has been permanently altered by the activity. Observations will be made as close to the activity as operational and safety constraints allow and that will also allow a complete view of the plover nest.
- The results of biological monitoring will be included in an annual report that will be submitted to the appropriate USFWS contact summarizing activities related to this project on SNI.
- During the snowy plover nesting season (March 1 – September 15), access to the test facilities will be restricted to operational activities only and recreational use of the facilities (fishing, picnicking, beach-combing, etc.) will be prohibited.
- Unless operationally necessary, personnel will not occupy the site between dusk and dawn and the area will remain dark (no artificial lighting) to reduce the potential for adverse impacts on snowy plovers in adjacent natural habitat.
- If night-time operations are necessary, outdoor lighting will include shielding designs to ensure light entering adjacent snowy plover nesting habitat is minimized.
- At all times, trash collection containers will not be placed on site and the area will be maintained trash free to reduce attracting predators (primarily island foxes [*Urocyon littoralis dickeyi*]).
- Maintenance will be conducted between September 16 and February 28, outside the snowy plover breeding season (see Table 2-1).
- A Spill Prevention, Control, and Countermeasure (SPCC) Plan will be in place to minimize the potential for an oil or hazardous substance spill, to prevent any spill from leaving the confines of the area, and to ensure that the cause of any spill is corrected.

Marine Mammals at Tender Point and Bomber Cove (or Vizcaino Point)

The Navy recommends the following conservation measures during the construction phase:

- All construction will be conducted outside of marine mammal breeding and pupping seasons (see Table 2-1).
- In accordance with the Marine Mammal Protection Act (16 USC, 1379 Sec. 109(h)), a qualified biologist will be present prior to commencement of construction activities and will move marine mammals from the area if required for the protection or welfare of the mammal, the protection of the public health and welfare, or the nonlethal removal of nuisance animals.
- If feasible, permanent barriers (e.g., concrete K-rails) will be installed around concrete pads and work areas to discourage marine mammals from using these areas as haulouts.

The Navy recommends the following conservation measures during the operational phase:

- Prior to scheduling the use of a particular site, NAWCWD will contact the Navy's Natural Resources staff at Point Mugu or SNI for current information regarding the occurrence of marine mammals at sites under consideration. Within 24 hours prior to commencing testing or training activities at these sites, a qualified biologist familiar with the behavior of marine mammals and their use of shoreline habitats in the testing or training area will search for marine mammals within and adjacent to the testing or training area. Test activities will be postponed, relocated, and/or monitored by the qualified biologist as necessary to ensure that the activities are unlikely to result in any "take" (as defined under the Marine Mammal Protection Act) of marine mammals.
- Testing and personnel training activities will be avoided during the marine mammal breeding and pupping seasons unless operationally necessary.
- Missiles and/or targets (e.g., drone aircraft) will not be launched at low elevation on low azimuths that pass close to beach haulout sites.
- Multiple missile and/or target (e.g., drone aircraft) launches in quick succession over haulout sites will be minimized, especially when young are present.
- The results of biological monitoring will be included in an annual report that will be submitted to the appropriate NMFS contact summarizing activities related to this project on SNI.
- Maintenance will be conducted outside marine mammal breeding/pupping seasons (see Table 2-1).

Biosecurity Measures

Construction materials will be transported to SNI via regularly scheduled barges. Transport, use, and storage of construction materials on site will be in accordance with NBVC biosecurity measures to minimize the potential occurrence of invasive species. This includes a requirement that all gravel be certified weed-free.

2.3 ALTERNATIVES DEVELOPMENT

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

2.3.1 Siting Process

Proposed directed energy testing and personnel training activities require an over-the-ocean shot from a land-based shooter site to a land-based target. The operational components determined the type of site necessary to accomplish testing and personnel training objectives for directed energy systems. These components are summarized below:

- Systems need to be tested in a realistic maritime environment, i.e., across water to a land-based target at a realistic engagement distance.
- Need to provide a venue within which directed energy systems could be tested that are not yet ready for integration aboard a ship. Therefore, a land shooter site and a land target site with ocean in between are necessary.
- A minimum engagement distance (i.e., distance between the shooter site and the target site) for directed energy systems to be used at the test facilities is 9,000-12,000 ft (2,743-3,658 m).

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov

December 2, 2014

Reply in Reference To: USN_2013_0814_001

Captain L.R. Vasquez
Department of the Navy
Naval Base Ventura County
311 Main Road, Suite 1
Point Mugu, CA 93042-5033

RE: Directed Energy Test Site Environmental Assessment, Naval Base Ventura County, San Nicolas Island, Ventura County, CA

Dear Captain Vasquez:

Thank you for consulting with me. Pursuant to 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act (NHPA), the Navy is requesting my concurrence with a finding of No Adverse Effect to Historic Properties.

In our previous round of consultation I could not concur with your Finding of Effect, as the documentation you provided did not address archaeological sites within and adjacent to the projects Area of Potential Effects (APE) in sufficient detail. You since provided this information. One prehistoric archaeological site, CA-SNI-12, is located within the APE and was determined eligible for listing on the National Register of Historic Places by consensus in 2010. The far northern end of the site will be affected by this undertaking. The Navy conducted subsurface archeological testing within this area to assess the level of effects to the site. The testing concluded that this portion of the site does not contain subsurface archeological deposits that contribute to the site's National Register eligibility. Regardless, the Navy plans to have an archaeological monitor on site to observe ground disturbing activity related to the undertaking.

Having reviewed this information, I concur with your Finding of Effect. Please be reminded that in the event of change in the scale or scope of the project, or in the event of an inadvertent discovery, you may have additional responsibilities under 36 CFR Part 800.

Thank you for considering historic properties as part of the project planning process. If you have any questions or concerns, please contact Tristan Tozer of my staff at (916) 445-7027 or at email at Tristan.Tozer@parks.ca.gov.

Sincerely,

Carol Roland-Nawi, Ph.D.

Carol Roland-Nawi, Ph.D.
State Historic Preservation Officer

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

IN REPLY REFER TO
5090
Ser N0000CV/1274
October 15, 2014

Dr. Carol Roland-Nawi
State Historic Preservation Officer
Department of Parks and Recreation
1725 23rd Street, Suite 100
Sacramento, CA 95816-7100

Dear Dr. Roland-Nawi:

SUBJECT: CONTINUATION OF SECTION 106 CONSULTATION, DIRECTED ENERGY TEST SITE ENVIRONMENTAL ASSESSMENT, NAVAL BASE VENTURA COUNTY, SAN NICOLAS ISLAND

The Navy proposes to construct a direct energy test site at Naval Base Ventura County (NBVC) San Nicolas Island (SNI). This letter is in reply to your comments in a letter dated August 4, 2014 (reference USN_2013_0814_001) and continues Section 106 consultation in accordance with 36 CFR 800.3(a), regulations implementing the National Historic Preservation Act of 1966, as amended (NHPA). In your letter, you expressed concern regarding road grading and construction of a building.

Your letter, stated several concerns regarding the demolition of the buildings. The answers to your comments are as follows:

a. The Navy is required to consult with Indian Tribes as defined in 36 CFR 800.16(m). Native Americans were not consulted for this undertaking, as there are no Federally recognized tribes for SNI. No non-recognized tribes have expressed interest in being included in consultations.

b. See enclosed site records for CA-SNI-12, as well as CA-SNI-11 and CA-SNI-201, the two closest sites to the proposed project area. Neither CA-SNI-11 nor CA-SNI-201 are within or close to the APE for this undertaking.

c. All in-house archaeological investigations were conducted under the 1994 research design. See Negative Archaeological Survey Report.

Consistent with the above considerations and 36 CFR 800.4(d)(1), the Navy finds that the proposed undertaking will cause no adverse effects to historic properties.

5090
Ser N0000CV/1274
October 15, 2014

The Navy respectfully requests your concurrence on its determination of No Adverse Effect to Historic Properties by the proposed undertaking at Tender Point and Bomber Cove within 30 days of receipt of this letter.

Should you have any questions or need further information, please contact Catherine Girod at catherine.girod@navy.mil or (805) 989-9249.

Sincerely,

L. R. VASQUEZ
Captain, U.S. Navy
Commanding Officer

Enclosures:
1. Response from SHPO, August 4, 2014 (reference USN_2013_0814_001)
2. California DPR523 Forms, CA-SNI-11, CA-SNI-12, CA-SNI-201
3. Martz 1994: A Research Design for Prehistoric Archaeological Sites, San Nicolas Island, California
4. Negative Archaeological Survey Report, Directed Energy Test Sites EA

Copy to:
Commander Navy Region Southwest, Environmental Department
Cultural Resources Management Program
San Diego, CA 92147

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

San Buenaventura Conservancy
P.O. Box 23263
Ventura CA 93002

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # _____
HRI # _____
Trinomial CA-SNI-11
NRHP Status Code 3. Appears eligible
Other Listings _____
Review Code _____ Reviewer _____ Date 09-May-2002

Page 1 of 5 *Resource Name or #: (Assigned by recorder) Thousand Springs Site

P1. Other Identifier: _____

*P2. Location: ☒ Not for Publication ☐ Unrestricted *a. County Ventura

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

*b. USGS 7.5' Quad San Nicolas Island Date 1956 T___; R_ _; ___ ¼ of ___ ¼ of Sec___; _____ B.M.

c. Address _____ City _____ Zip _____

d. UTM: (Give more than one for large and/or linear resources) Zone 11; 264,575 mE/ 3,685,561 mN (NAD83)

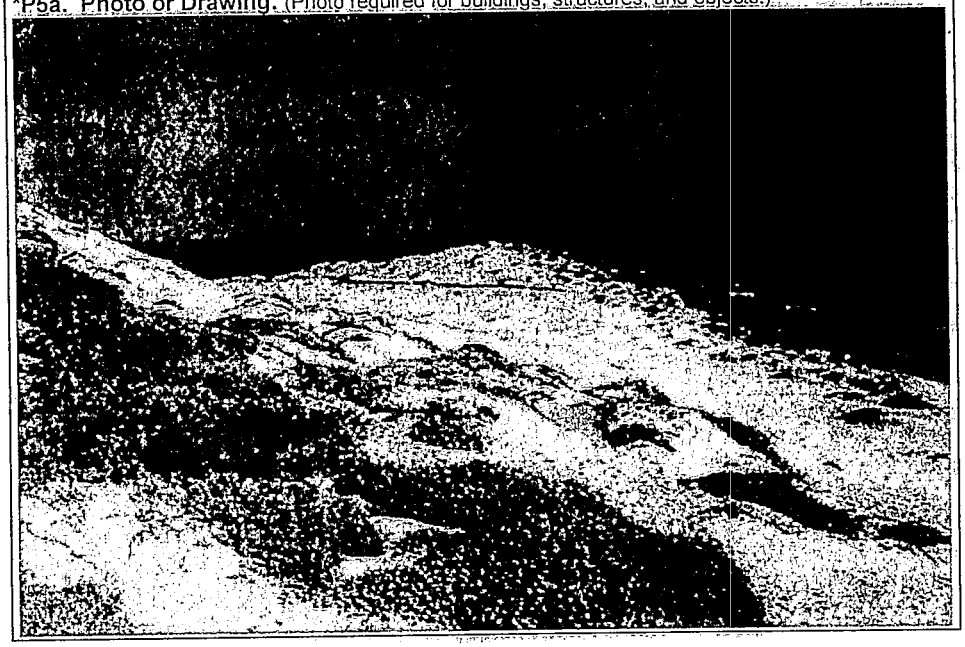
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the intersection of West NAVFAC Road, Shannon Road, and Thousand Springs Road, proceed north on Thousand Springs Road until you come to the end of the road. The site is located on the east side of the road at this point. The site is situated on and around a series of four partially stabilized dunes on a northward-projecting pointof the northern coastal terrace in the west end of the island.

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The site is a series of four deflated and eroding middens, situated on and around four partially stabilized longitudinal dunes. Each mound has a buried component, lithics, bone and shell. The site has probably been disturbed by the construction of Thousand Springs Road. The site is divided into four loci, with each mound as a locus (see Features). Each of the loci can be assumed to consist of the ususal shell and lithic assemblage, plus animal bone. There is a permanent geodetic survey marker on Mound A which serves as the site datum. Statistical Research Inc. took three carbon dating samples from this site in the Summer of 1997. Each sample area is designated a Locality. Locality 1 is located north of Locus B. Locality 2 and 3 are located just north of the datum (Locus A). Fifteen units were placed on this site by Reinman in 1982. However, these units could not be relocated. Previous records note that at least one of the units was at Locus B. Eleven radiocarbon samples from the 1977-79 excavations were submitted for dating (Martz et al. 1999).

*P3b. Resource Attributes: (List attributes and codes) AP16 Groundstone, AP16 Marine shell scatter, AP16 Shell midden, AP2 Lithic Scatter, AP16 Pebble concentration

*P4. Resources Present: ☐Building ☐Structure ☐Object ☒Site ☐District ☐Element of District ☐Other (Isolates, etc.)

*P5a. Photo or Drawing: (Photo required for buildings, structures, and objects.)



P5b. Description of Photo: (View, date, accession #) _____

*P6. Date Constructed/Age and Sources: ☐Historic ☒Prehistoric ☐Both

*P7. Owner and Address: _____ Naval Air Weapons Station, China Lake

*P8. Recorded by: (Name, affiliation, and address) GMU

*P9. Date Recorded: 10/05/199708:25:40

*P10. Survey Type: (Describe) Pedestrian using DGPS.

*P11. Report Citation: (Cite survey report and other sources, or enter "none") Martz 2002; Reinman and Lauter 1984; Martz, et al. 1999

*Attachments: NONE ☒Location Map ☒Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☒Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List) _____

DPR 523A (1/95) *Required information

Enclosure 2

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHAEOLOGICAL SITE RECORD

Primary # _____
Trinomial CA-SNI-11

*Resource Name or # (Assigned by recorder): Thousand Springs

*A1. Dimensions: a. Length: 534 (m) × b. Width: 192 (m); c. Area (m2): 55,615
Method of Measurement: ☐ Paced ☐ Taped ☒ Visual estimate ☒ Other: DGPS Measurement

Method of Determination (Check any that apply): ☒ Artifacts ☒ Features ☒ Soil ☐ Vegetation ☒ Topography ☒ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☐ Other (Explain):

Reliability of Determination: ☐ High ☒ Medium ☐ Low Explain: The site is disturbed, deflated and eroded.

Limitations (Check any that apply): ☐ Restricted access ☐ Paved/built over ☐ Site limits incompletely defined ☒ Disturbances ☐ Vegetation ☒ Other (Explain): Deflated, eroded and disturbed

A2. Depth: 190 cm (Mound B) ☐ None ☐ Unknown Method of Determination: Test Units 1959 (Reinman and Townsend 1960); CSULA 1977-79 (Reinman 1982).

*A3. Human Remains: ☐ Present ☐ Absent ☒ Possible ☐ Unknown (Explain):
Records indicate that 3 burials were recovered from this site. No remains were noted in 1997.

*A4. Features (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map):
The site contains four loci, designated Mound A through Mound D.
Mound A: An eroding buried midden. This is the northern most mound and has a permanent survey marker embedded in a cement post.
Mound B: Mound B is directly south of Mound A. It is also an eroding midden containing black, ashy soil, burnt bone, and shell.
Mound C: Mound C is located east of Mound B and is also a buried midden.
Mound D: Mound D is the eastern most mound. It is also the largest of the four mounds. It is a buried midden with the usual assemblage of artifacts.
There is a concentration of 50+ possible tarring pebbles on the north slope of Mound B.

*A5. Cultural Constituents (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with features):
The site contains thousands of lithics. Material and artifact types present are as follows: Metavolcanic and Quartzite - primary and secondary flakes, debitage, shatter, cores, retouched flakes and battered cobbles; Porphyritic metavolcanic, Metavolcanic porphyry, and Breccia - primary and secondary flakes, debitage, shatter, cores, and battered cobbles; Quartz - shatter; Chert (brown) - pieces of shatter and 1 battered cobble.
The groundstone component of the site consists of 1 whole pitted sandstone cobble. Numerous pieces of oxidized sandstone are present at this site as well.
The marine shell component of the site consists of whole and fragmented black abalone (Haliotis cracherodii), red abalone (Haliotis rufescens), owl limpet (Lottia gigantea), California mussel (Mytilus californianus), giant keyhole limpet (Megathura crenulata), Norris' top shell (Norrisia norrisi), Tegula (sp.), wavy turban (Astraea undosa), chiton, Cryptochiton, purple urchin (Strongylocentrotus purpuratus), and purple olive (Olivella biplicata). Olivella detritus was noted as well.
The animal bone component of the site of whole fragmented sea mammal bone (long bones, scapula, vertebrae and cranial), bird bone, and fish bone - whole and fragmented (ribs, vertebrae, and Sheephead mouth parts).
A red abalone rim tool was found at Mound B. A sea mammal bone implement, a sea mammal bone awl or punch, and 1 black abalone with asphaltum were found at Mound A. Two red abalone fishhook blanks, and 2 fragmented red abalone fishhooks ("J" shaped) were found at Mound C.

*A6. Were Specimens Collected? ☒ No ☐ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated)

*A7. Site Condition: ☒ Good ☐ Fair ☐ Poor (Describe disturbances): Site is deflating but is partially buried with some stabalization.

*A8. Nearest Water (Type, distance, and direction): Spring 150 meters west

*A9. Elevation: 85 (ft)

A10. Environmental Setting (Describe culturally relevant variables such as vegetation, fauna, soils, geology, landform, exposure, etc.): Approximately 10-15% of the site is vegetated. Plants present include grasses, sand verbena, coastal goldenbush, and burr weed. This area is highly exposed to the northwest prevailing winds more than most parts of the island. From this location you are able to view the ocean to the north, west, and east. SNI-12 is visible to the west. Thousand Springs is located ca. 100m to the west. The western edge of the site has a cobble quarry-like area. The slope of the site varies from dune to

dune, although the sides of each dune are steep. There is modern wood debris on the site. Soils on site are light gray sand (10 YR 7/2) to very pale brown sand (10 YR 7/3).

A11. Historical Information:

***A12. Age:** ☒ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848 ☐ 1848-1880 ☐ 1880-1914 ☐ 1914-1945 ☐ Post 1945 ☐ Undetermined **Describe position in regional prehistoric chronology or factual historic dates if known:**

A13. Interpretations (Discuss data potential, function[s], ethnic affiliation, and other interpretations):
Site appears to be a substantial habitation area where flaked stone maufacturing, fishing, animal food processing, and possibly shell bead manufacturing took place. The site has good potential to answer research questions regarding settlement systems, cultural chronology, subsistence strategies, regional trade, cultural affiliation, paleoenvironmental influences, post depositional processes, and lithic and shell bead manufacturing.

A14. Remarks: Recorded by C. Dowell, D. McIntosh and C. Harper on 9/12/97. Please refer to Reinman 1982 and Martz et al. 1999 for further information. Collection currently curated at California State University, Los Angeles. Updated by Martz 1999.

A15. References (Documents, informants, maps, and other references): Reinman 1964, Reinman 1982, Reinman and Lauter 1984, Martz et al. 2000, Martz 2002

A16. Photographs (List subjects, direction of view, and accession numbers or attach a Photograph Record):
Digital photos taken; on file at San Nicolas Island Curation Facility

***A17. Form Prepared by:** Dr. Patricia Martz and Scott Edmondson **Printed:** 23-May-2011
Affiliation and Address: CSU Los Angeles, 5151 State University Drive, Los Angeles, CA 90032

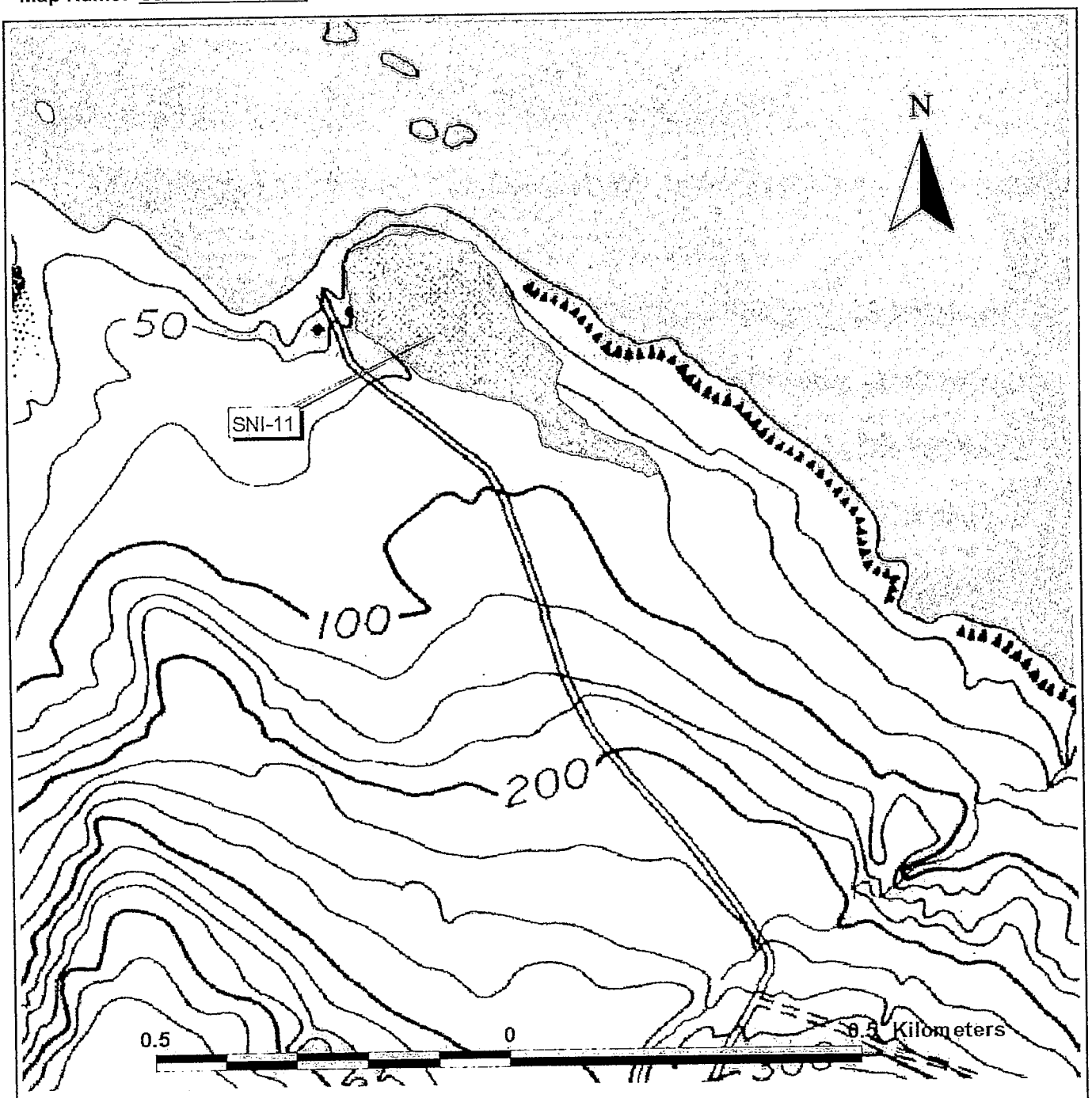
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # _____
HRI# _____
Trinomial CA-SNI-11

Page 4 of 5 *Resource Name or # (Assigned by recorder) _____

*Map Name: San Nicolas Island *Scale: 1:24,000 *Date of Map: 1956



*Required information

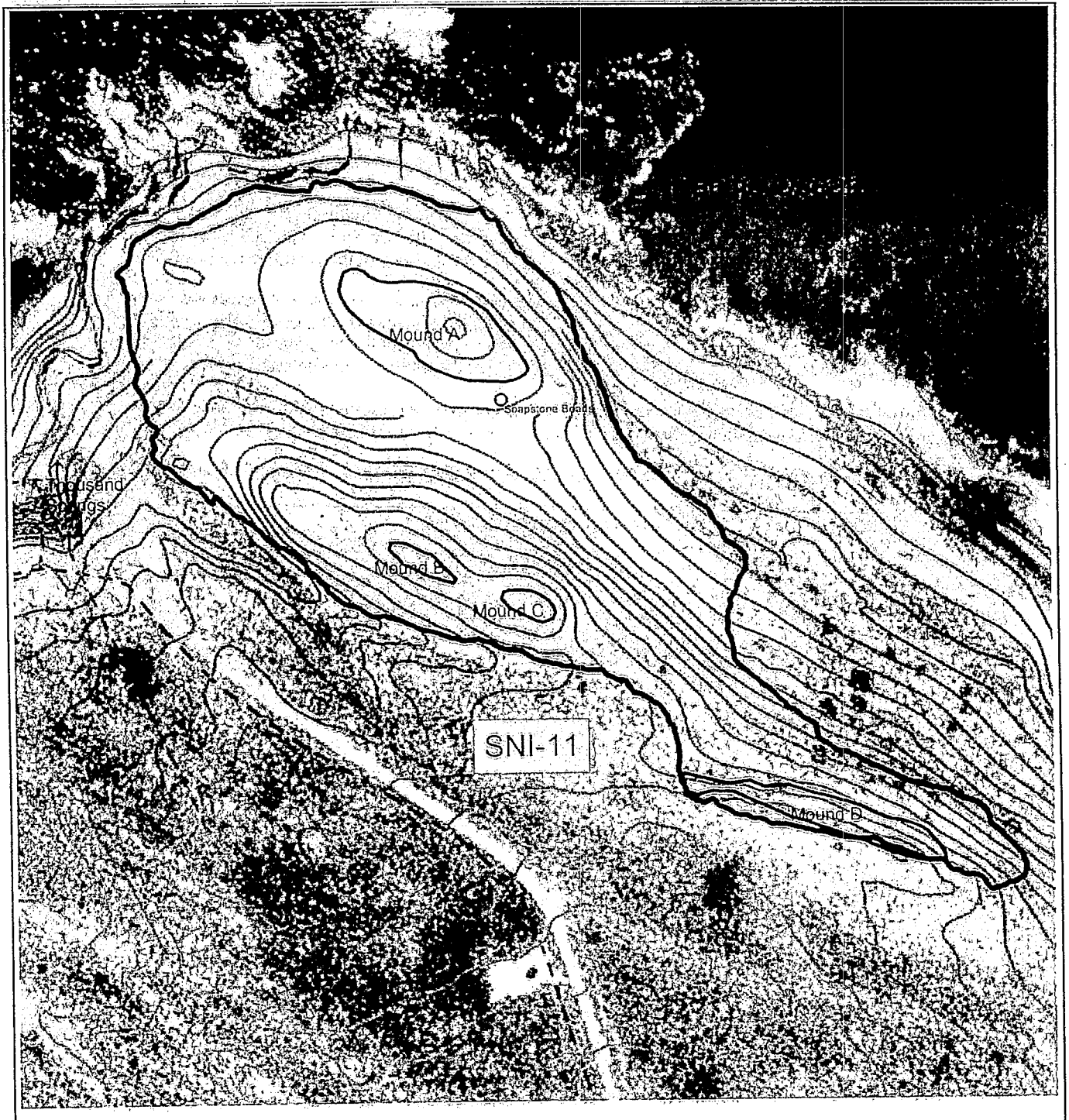
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary # _____
HRI# _____
Trinomial CA-SNI-11

Page 5 of 5 *Resource Name or # (Assigned by recorder) _____

*Drawn By: CSULA Archaeological Sites Mapping and Recordation Project *Date: 2002



5 ft. contours

100 0 100 200 Meters

N

DPR 523K (1/95)

*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # _____
HRI # _____
Trinomial CA-SNI-12
NRHP Status Code 3. Appears eligible
Other Listings _____
Review Code _____ Reviewer _____ Date 09-May-2002

Page 1 of 5 *Resource Name or #: (Assigned by recorder)

P1. Other Identifier: _____

*P2. Location: ☒ Not for Publication ☐ Unrestricted *a. County Ventura

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

*b. USGS 7.5' Quad San Nicolas Island Date 1956 T___; R___ ; ___ ¼ of ___ ¼ of Sec___; _____ B.M.

c. Address _____ City _____ Zip _____

d. UTM: (Give more than one for large and/or linear resources) Zone 11; 264.194 mE/ 3,685.447 mN (NAD83)

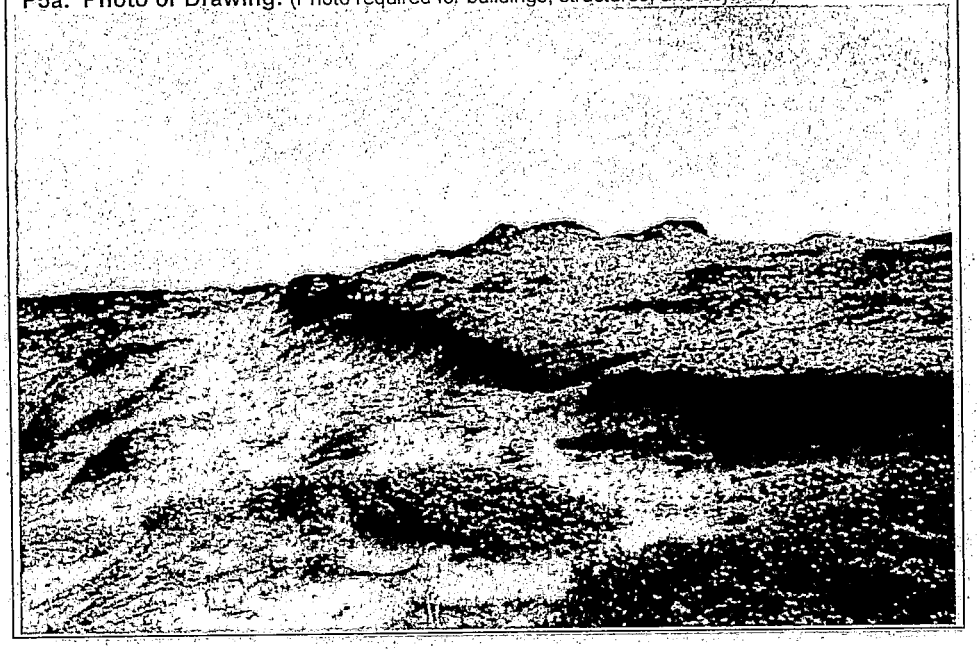
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
From the intersection of Shannon Road, West NAVFAC Road and Thousand Springs Road, proceed north on Thousand Springs Road to the end at Tender Beach. The road dissects the northern portion of the site at this point. The site is located on a coastal terrace with dunes and deflated areas in the northern portion of the West End region of San Nicolas Island.

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The site is a large eroding and deflating midden complex with several buried components. The site is heavely eroded and disturbed. Human skeletal remains are present. The southern portion of the site is mostly deflated and runs basically up to the base of the plateau. Main dune of the site runs parrellel to the south side of Thousand Springs Road.

*P3b. Resource Attributes: (List attributes and codes) AP16 Abalone, red concentration, AP16 Bird bone concentration, AP16 Fish bone concentration, AP16 Marine shell scatter, AP16 Sea urchin concentration, AP16 Shell midden, AP2 Lithic scatter, AP9 Burial

*P4. Resources Present: ☐Building ☐Structure ☐Object ☒Site ☐District ☐Element of District ☐Other (Isolates, etc.)

*P5a. Photo or Drawing: (Photo required for buildings, structures, and objects.)



P5b. Description of Photo: (View, date, accession #) _____

*P6. Date Constructed/Age and Sources: ☐Historic ☒Prehistoric ☐Both

*P7. Owner and Address: Naval Air Weapons Station, China Lake

*P8. Recorded by: (Name, affiliation, and address) CPD

*P9. Date Recorded: 10/06/199719:10:06

*P10. Survey Type: (Describe) Pedestrian using DGPS.

*P11. Report Citation: (Cite survey report and other sources, or enter "none") Martz 2002; Reinman and Lauter 1984

*Attachments: NONE ☒Location Map ☒Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☒Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List) _____

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHAEOLOGICAL SITE RECORD

Primary # _____
Trinomial CA-SNI-12

 *Resource Name or # (Assigned by recorder)

*A1. **Dimensions: a. Length:** 612 (m) × **b. Width:** 217 (m); **c. Area (m2):** 84,899
Method of Measurement: ☐ Paced ☐ Taped ☒ Visual estimate ☒ Other: DGPS Measurement

Method of Determination (Check any that apply): ☒ Artifacts ☒ Features ☒ Soil ☐ Vegetation ☒ Topography ☒ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☐ Other (Explain):

Reliability of Determination: ☐ High ☒Medium ☐ Low Explain: The site is disturbed, deflated and eroded.

Limitations (Check any that apply): ☐ Restricted access ☐ Paved/built over ☐ Site limits incompletely defined ☒ Disturbances ☐ Vegetation ☒ Other (Explain): Deflated , eroded and disturbed

A2. **Depth:** 20+ cm (in places) ☐ None ☐ Unknown **Method of Determination:** Cut banks

*A3. **Human Remains:** ☒ Present ☐ Absent ☐ Possible ☐ Unknown (Explain): 2 cemeteries. One is located in the northwest and one in the eastern portion of the site. See Features for contents. 6 burials were removed by early investigators.

*A4. **Features** (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map):
Aside from several purple urchin (Strongylocentrotus purpuratus) and red abalone (Haliotis rufescens) concentrations, there is also a concentration of fish bone in the northwest portion of the site. This concentration also has charcoal associated with it. There is also a bird bone concentration in this area.
There are 2 eroding buried midden areas in the northwest portion of the site, with lithics, bone, shell, and ashy soil. There is one eroding buried midden lens in the main dune on the site. There is also a patch of black soil eroding out of the top of the main dune, just south of the road.
The cemetary area in the in the northwestern portion of the site contains 4+ carpals or tarsals and longbone fragments.
The cemetary area in the eastern portion of the site has longbone fragments, enough for at least 5+ individuals.
Previous investigations state that 6 burials were present at this site.

*A5. **Cultural Constituents** (Describe and quantify artifacts, ecofacts, cultural residues, etc , not associated with features):
The lithic component of the site consists of thousands of lithics. Material and artifact types are as follows: Metavolcanic, Porphyritic metavolcanic, Metavolcanic porphyry, Quartzite and Breccia - primary and secondary flakes, debitage, shatter, cores, retouched flakes and battered cobbles; Chert - black and white banded shatter and tan shatter.
The groundstone component of the site consists of 1 whole pitted sandstone cobble, 1 sandstone mortar fragment, 1 sandstone pestle fragment, 1 sandstone metate fragment and 4 sandstone net sinkers. Oxidized sandstone is present, but no hearths were noted.
The marine shell component of the site consists of large amounts of whole and fragmented red abalone (Haliotis rufescens), black abalone (Haliotis cracherodii), owl limpet (Lottia gigantea), mussel (Mytilus californianus), giant keyhole limpet (Megathura crenulata), chiton, Cryptochiton, wavy turban (Astraea undosa), Norris' top shell (Norrisia norrisi), Tegula (sp.), and miscellaneous limpets and barnacles. Whole purple olives (Olivella biplicata) and detritus are present, as well as large quantities of purple urchin (Stongylocentrotus purpuratus).
The bone component of the site consists of the following: Sea mammal - Whole and fragmented whale and seal, long bones, scapula, vertebrae and craniums; Bird - whole and fragmented long bones, pelvis, and other fragments; Fish bone - whole and fragmented Sheephead mouth parts, swordfish vertebrea, and ribs.
Six borken sea mammal bone implements and 2 whole sea mammal bone implements were found at this site. One spire lopped olivella shell bead, 2 broken bird bone whistles, 1 whole bird bone whistle, and 1 Norrisia fishhook fragment were present as well. The whole bird bone whistle was collected (Flag 1). the fish hook was found next to the collected whistle.

*A6. **Were Specimens Collected?** ☐ No ☒ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated)
Bird bone whistle collected 9/17/1997. Curated at the San Nicolas Island Curation Facility.

*A7. **Site Condition:** ☐ Good ☒ Fair ☐ Poor (Describe disturbances): Site is disturbed, eroding, and dissected. There are areas that are partially buried and stabilized.

*A8. **Nearest Water** (Type, distance, and direction): Spring 100 meters northeast

*A9. **Elevation:** 75 (ft)

A10. **Environmental Setting** (Describe culturally relevant variables such as vegetation, fauna, soils, geology, landform, exposure, etc.): Approximately 10-15% of the site is vegetated. Plants present include grasses, sand verbena, coastal goldenbush, burr weed, lupine, ice plant, sea fig, and morning glory. This area is highly exposed to the northwest prevailing winds, more so

than most parts of the island. The ocean is visible to the north and west, SNI-11 to the east, and Tender Beach to the west. There is cobble quarry located in the northwestern portion of the site. Soils are pale brown sand (10 YR 6/3) and brown sandstone and hardpan (10 YR 5/3). Surrounding soils are the same.

A11. Historical Information:

***A12. Age:** ☒ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848 ☐ 1848-1880 ☐ 1880-1914 ☐ 1914-1945 ☐ Post 1945 ☐ Undetermined **Describe position in regional prehistoric chronology or factual historic dates if known:**

A13. Interpretations (Discuss data potential, function[s], ethnic affiliation, and other interpretations):
This site was probably a substantial habitation area, where numerous activities took place. It has good potential to address questions regarding settlement systems, lithic, shell bead, and fishing technology, social organization, cultural chronology, paleoenvironmental influences, subsistence strategies, regional trade, cultural affiliation, and post depositional processes.

A14. Remarks: Modern debris is noted throughout the site which consists of cables, glass, beer cans, nylon rope, bullet casings, rusted metal and wood. There are at least 2 dirt roads that dissect the site. One is located in the northern and the other in the northeastern portions of the site. Recorded on 9/17/97 by C. Dowell, G. Unzueta, and D. McIntosh. Please refer to Simmons 1994 for further information.

A15. References (Documents, informants, maps, and other references): Reinman and Lauter 1984, Simmons 1994, Martz 2002

A16. Photographs (List subjects, direction of view, and accession numbers or attach a Photograph Record):
Digital photos taken; on file at San Nicolas Island Curation Facility

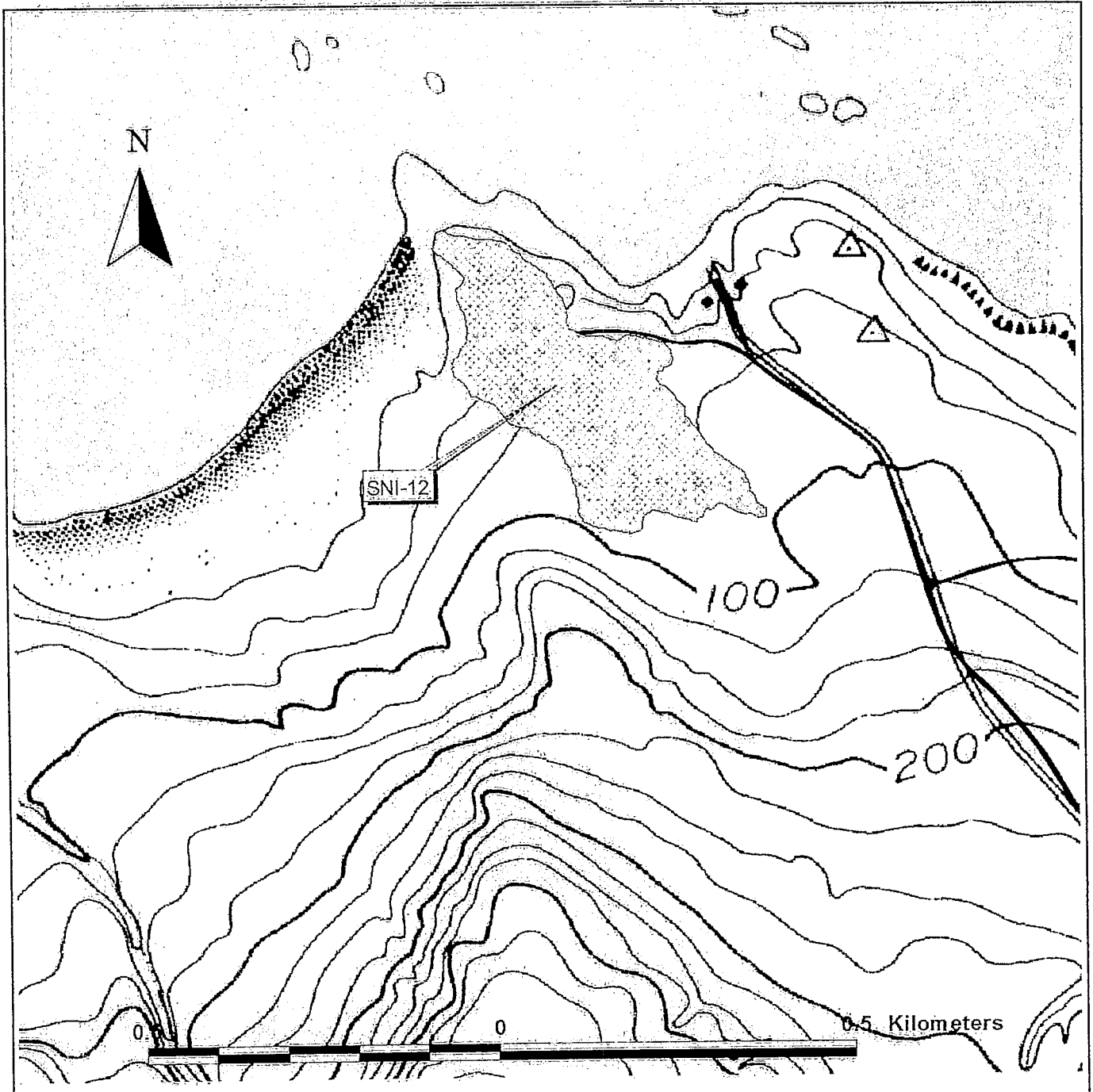
***A17. Form Prepared by:** Dr. Patricia Martz and Scott Edmondson **Printed:** 09-May-2011
Affiliation and Address: CSU Los Angeles, 5151 State University Drive, Los Angeles, CA 90032

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # _____
HRI# _____
Trinomial CA-SNI-12

Page 4 of 5 *Resource Name or # (Assigned by recorder) _____
*Map Name: San Nicolas Island *Scale: 1:24,000 *Date of Map: 1956



*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary # _____
HRI# _____
Trinomial CA-SNI-12

Page 5 of 5 *Resource Name or # (Assigned by recorder) _____

*Drawn By: CSULA Archaeological Sites Mapping and Recordation Project *Date: 2002

DPR 523K (1/95)

*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # _____
HRI # _____
Trinomial CA-SNI-201
NRHP Status Code 6Z. Ineligible
Other Listings _____
Review Code _____ Reviewer _____ Date 09-May-2002

Page 1 of 5 *Resource Name or #: (Assigned by recorder)

P1. Other Identifier: _____

*P2. Location: ☒ Not for Publication ☐ Unrestricted *a. County Ventura

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

*b. USGS 7.5' Quad San Nicolas Island Date 1956 T ___; R ___; ___ ¼ of ___ ¼ of Sec ___; ___ B.M.

c. Address _____ City _____ Zip _____

d. UTM: (Give more than one for large and/or linear resources) Zone 11; 263,961 mE/ 3,685,431 mN (NAD83)

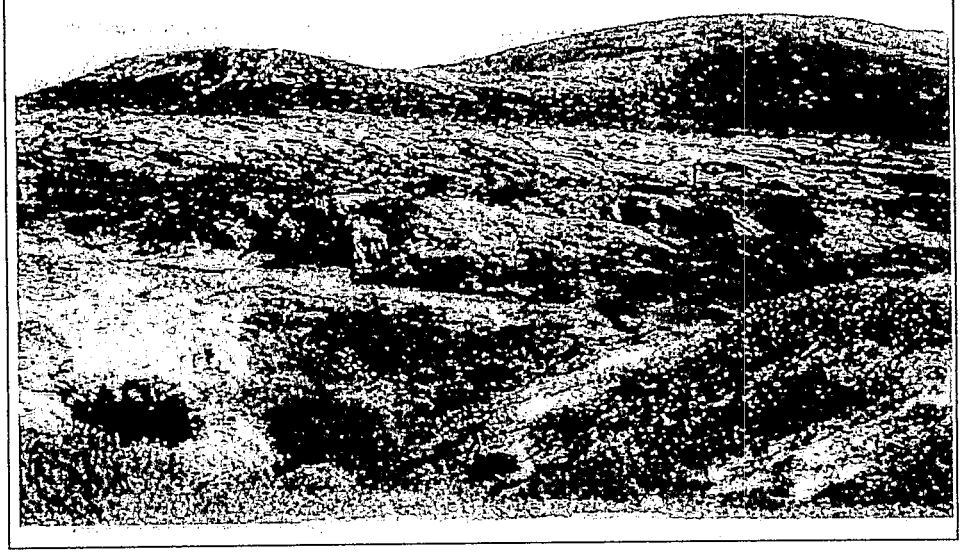
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
The site is located in an area of semi-stabilized dunes on the northeastern portion of the West End of the island. From the intersection of Shannon Road, West NAVFAC Road, and Thousand Springs Road, continue north on Thousand Springs Road to the end at Tender Beach. Park and walk approximately 240 meters south at 190 degrees to site.

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The site is a small destroyed midden which is eroding out of a small stabilized sand dune. The top of the dune has been flattened to form a landing. A wooden post with an electric outlet has been placed on the dune and serves as the datum. An old road borders the site.

*P3b. Resource Attributes: (List attributes and codes) AP16 Shell midden (destroyed), AP16 Sea mammal bone, AP16 Fish bone.

*P4. Resources Present: ☐Building ☐Structure ☐Object ☒Site ☐District ☐Element of District ☐Other (Isolates, etc.)

*P5a. Photo or Drawing: (Photo required for buildings, structures, and objects.)



P5b. Description of Photo: (View, date, accession #) _____

*P6. Date Constructed/Age and Sources: ☐Historic ☒Prehistoric ☐Both

*P7. Owner and Address: _____
Naval Air Weapons Station, China Lake

*P8. Recorded by: (Name, affiliation, and address) CDJ

*P9. Date Recorded: 10/09/199710:13:29

*P10. Survey Type: (Describe) Pedestrian using DGPS.

*P11. Report Citation: (Cite survey report and other sources, or enter "none") Martz 2002; Reinman and Lauter 1984

*Attachments: NONE ☒Location Map ☒Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☒Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List) _____

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHAEOLOGICAL SITE RECORD

Primary # _____
Trinomial CA-SNI-201

*Resource Name or # (Assigned by recorder)

*A1. Dimensions: a. Length: 64 (m) × b. Width: 37 (m); c. Area (m2): 1,471
Method of Measurement: ☐ Paced ☐ Taped ☒ Visual estimate ☒ Other: DGPS Measurement

Method of Determination (Check any that apply): ☒ Artifacts ☐ Features ☐ Soil ☐ Vegetation ☒ Topography ☐ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☒ Other (Explain):

Reliability of Determination: ☐ High ☒ Medium ☐ Low Explain. Severely disturbed and eroded

Limitations (Check any that apply): ☐ Restricted access ☐ Paved/built over ☐ Site limits incompletely defined ☒ Disturbances ☐ Vegetation ☒ Other (Explain): Severely disturbed (modern disturbance) and eroded. An old road borders the site.

A2. Depth: ☒ None ☐ Unknown Method of Determination: Eroded and disturbed.

*A3. Human Remains: ☐ Present ☒ Absent ☐ Possible ☐ Unknown (Explain)

*A4. Features (Number, briefly describe, indicate size list associated cultural constituents, and show location of each feature on sketch map): None noted.

*A5. Cultural Constituents (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with features): Flaked lithic materials and types: Metavolcanic - flakes and 2 pieces of shatter; Porphyritic metavolcanic - flakes and 1 piece of shatter; Metavolcanic porphyry - 1 flake. Groundstone: some reduced sandstone fragments. Marine shell: the majority of the shell consisted of whole and fragmented black abalone (Haliotis cracherodii), owl limpet (Lottia gigantea), and California mussel (Mytilus californianus). Some sea urchin (Stongylocentrotus purpuratus) fragments, Chiton fragments, Tegula, and leaf barnacles are also present. Bone: some whole and fragmented fish bone, and whole and fragmented sea mammal bone, including 1 seal femur.

*A6. Were Specimens Collected? ☒ No ☐ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated)

*A7. Site Condition: ☐ Good ☐ Fair ☒ Poor (Describe disturbances): Eroded and severely disturbed

*A8. Nearest Water (Type, distance, and direction): Spring 340 meters northeast

*A9. Elevation: 30 (ft)

A10. Environmental Setting (Describe culturally relevant variables such as vegetation, fauna, soils, geology, landform, exposure, etc.): The site is situated on a partially indurated dune on the west end. There is a gradual slope to the northwest. Approximately 70% of the site is obscured by vegetation. Plant species present include miscellaneous grasses, sand verbena, coastal goldenbush, coreopsis, and burr weed. The site is exposed to the prevailing northwest winds. There is a view of the ocean to the north and the west, CA-SNI-12 to the northeast, and the plateau to the south. The site is associated with a cobble quarry (located in CA-SNI-12 to the east. Site soils are pale brown sand (10YR 6/3) to hardpan (10YR 5/3). Surrounding soils are the same.

A11. Historical Information:

*A12. Age: ☒ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848 ☐ 1848-1880 ☐ 1880-1914 ☐ 1914-1945 ☐ Post 1945 ☐ Undetermined Describe position in regional prehistoric chronology or factual historic dates if known:

A13. Interpretations (Discuss data potential, function[s], ethnic affiliation, and other interpretations): This site was probably a flaked stone manufacturing and shellfish processing site. There is poor research potential to address questions regarding lithic technology, subsistence strategies, and post depositional processes due to disturbed context of the remaining cultural materials.

A14. Remarks: Recorded on 9/17/97 by C. Dowell, D. McIntosh, and G. Unzueta.

A15. References (Documents, informants, maps, and other references): Reinman and Lauter 1984

A16. Photographs (List subjects, direction of view, and accession numbers or attach a Photograph Record) Digital photos taken; on file at San Nicolas Island Curation Facility

*Required information

*A17. Form Prepared by: Dr. Patricia Martz and Scott Edmondson
Affiliation and Address: CSU Los Angeles, 5151 State University Drive, Los Angeles, CA 90032

Printed: 09-May-2011

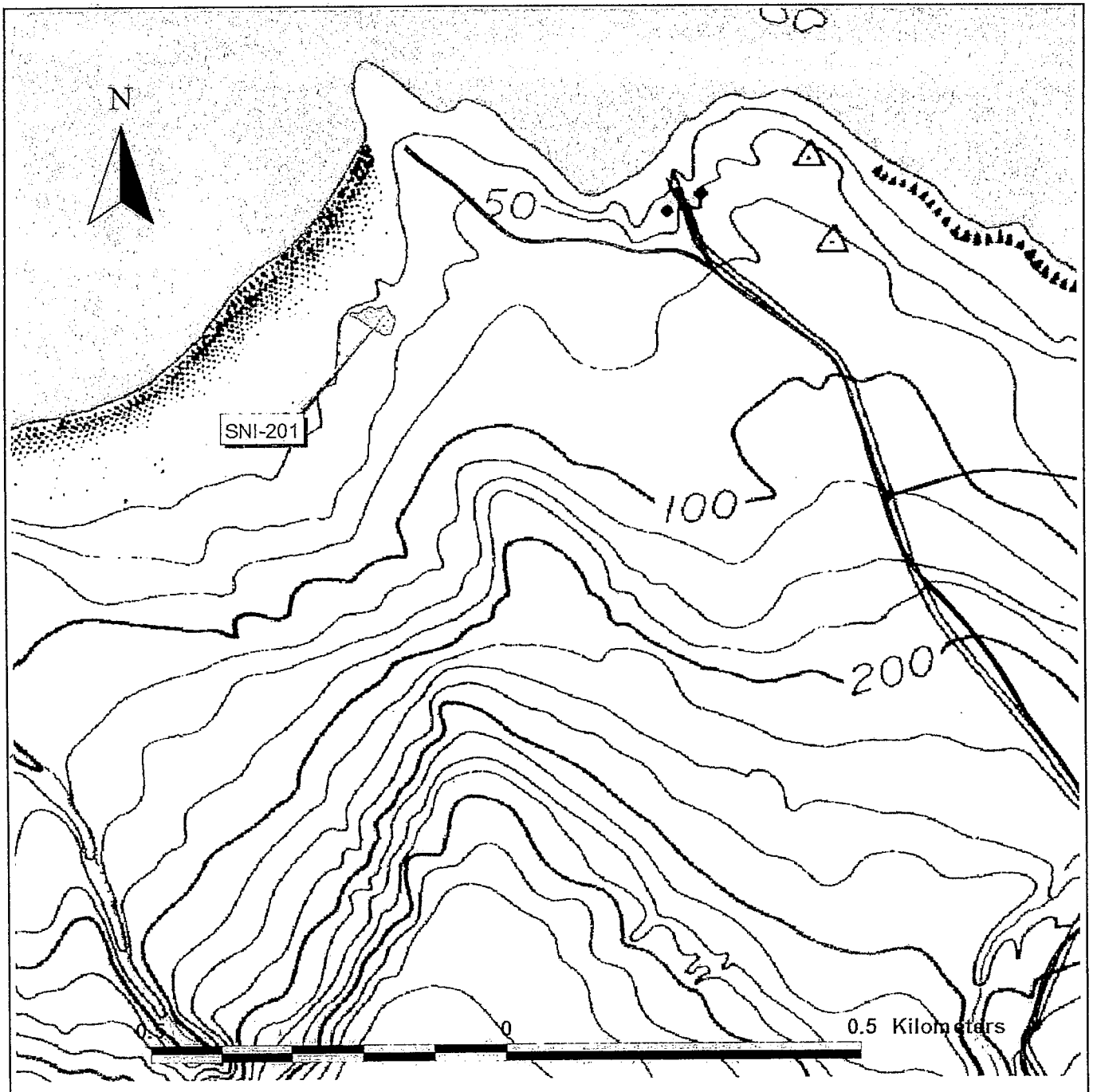
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # _____
HRI# _____
Trinomial CA-SNI-201

Page 4 of 5 *Resource Name or # (Assigned by recorder) _____

*Map Name: San Nicolas Island *Scale: 1:24,000 *Date of Map: 1956



*Required information

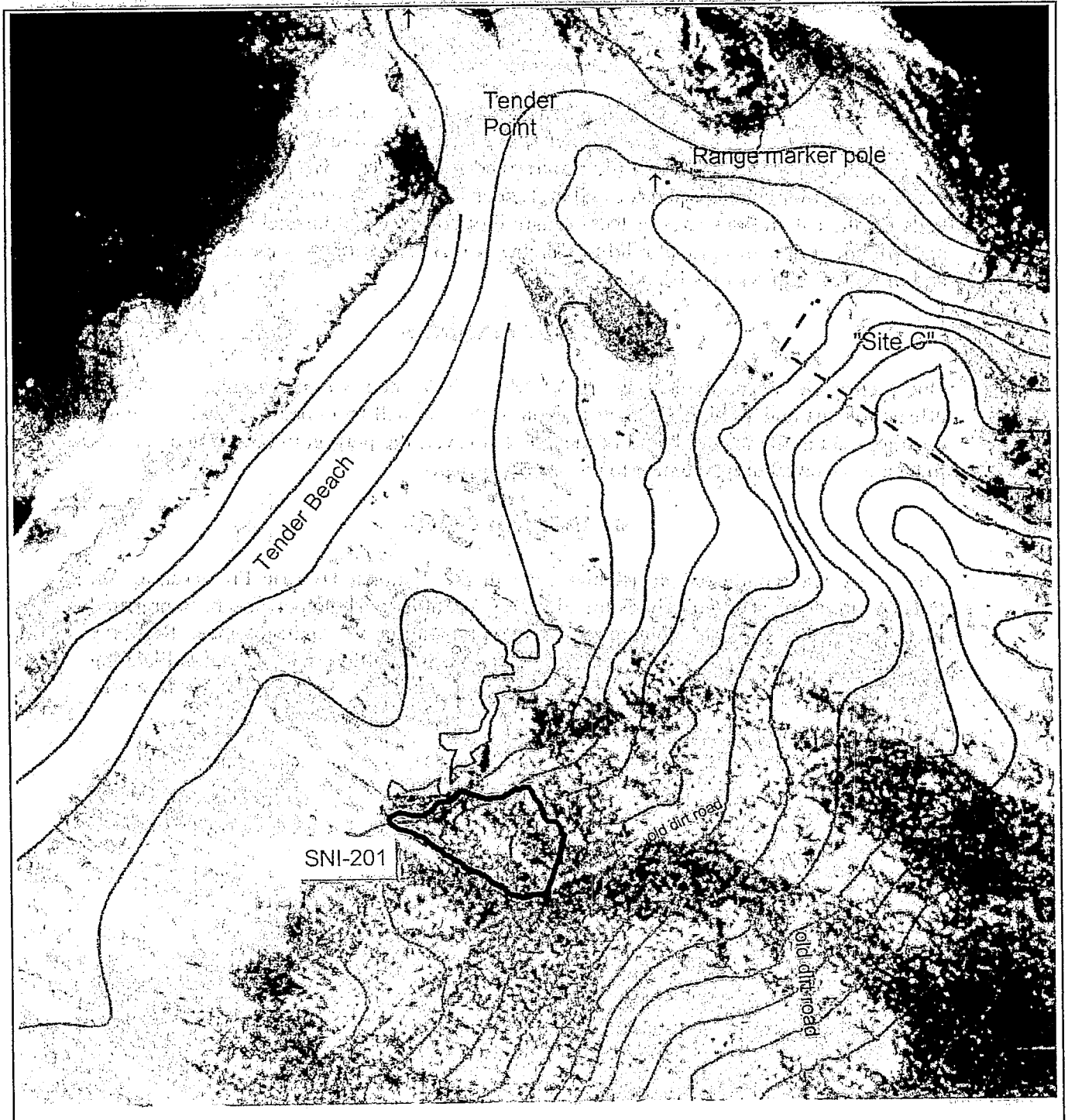
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary # _____
HRI# _____
Trinomial CA-SNI-201

Page 5 of 5 *Resource Name or # (Assigned by recorder) _____

*Drawn By: CSULA Archaeological Sites Mapping and Recordation Project *Date: 2002



DPR 523K (1/95)

*Required information

Negative Archaeological Report:
Phase II Archaeological Survey for Directed Energy Test Sites
Naval Base Ventura County San Nicolas Island, Ventura County, California

I. PROJECT LOCATION AND DESCRIPTION

Naval Base Ventura County (NBVC) San Nicolas Island will be constructing a directed energy test site, which includes a shooter site, a target site, four calibration sites, a truck turnaround, and access roads to the shooter and target sites. The project consists of a 1000 square foot concrete pad located at Tender Point (truck turnaround), four concrete pads for the calibrations sites, a 1600 square foot concrete pad located at Bomber Cove, and grading a new dirt/gravel road to Bomber Cove. The project is located on the west end of NBVC San Nicolas Island.

II. STUDY FINDINGS

One prehistoric archaeological site (CA-SNI-12) is located within the area of potential effects for this undertaking. A small portion of the site will be impacted by widening the existing road at the far north end of the site. However, the portion to be affected appears to be a non-contributing element to the site's eligibility.

III. INTRODUCTION

This study was conducted in accordance with the National Historic Preservation Act (NHPA) implementing guidelines found in 36 CFR 800.4. The report has been prepared in accordance with state guidelines for the preparation of Archaeological Resource Management Reports (ARMR), proposed in the State of California Preservation Planning Bulletin No. 4(a) (State of California 1989) entitled *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format*.

Name(s) of Surveyor(s)	Qualifications	Date(s) of Fieldwork
Catherine Girod	M.A. Anthropology, Cal State LA. 15 years of professional archaeological experience in California archaeology.	June 11, 2014 September 5-15, 2014
Lisa Thomas	M.A. Anthropology Cal State LA. 20 years of professional archaeological experience in California archaeology.	June 11,2014 September 5-15, 2014
Rene Vellanoweth	PhD Anthropology University of Oregon. 22	September 5-15, 2014

years of professional
archaeological experience
in California archaeology.

PRESENT ENVIRONMENT

The project area is located on the west end of NBVC San Nicolas Island, County of Ventura, California. The project consists of six separate location, is bounded on the north and west by the Pacific ocean, and on the south and east by open, relatively undeveloped area consisting of stabilized dunes. An existing road was graded through an archaeological site, CA-SNI-12, in 1976 and 1977. Vegetation in the project area is both native (*Isocoma menziesii, Lupinus albifrons, Acmispon glabra, Coreopsis gigantea*), and non-native (*Carpobrotus edulis., Mesembryanthemum crystallinum*). Soil is very light brown (10YR7/3) sand above concreted paleosol. Comprising 84,899 square meters, CA-SNI-12 contains literally thousands of lithics, with concentrations of red abalone, bird bone, fish bone, *Olivella* shell beads, and sea urchin. Human remains are present on the site. The site was determined eligible for the National Register of Historic Places by consensus in 2010.

PREHISTORY

Evidence of some of the earliest occupations in California comes from the northern California Bight. Among some of the oldest human remains found in North America are those of Arlington Springs Woman on Santa Rosa Island, with associated dates of approximately 10,000-12,000 B.P. (Oakley 1963; Johnson et al. 2002; Erlandson et al. 2007). The oldest date on San Miguel Island, from a cultural deposit at Daisy Cave, is approximately 12,000 cal B.P. (Erlandson et al. 1996:355). Paleo-Indian sites along the mainland coast have yielded dates as early as 8,000 cal B.C. (Glassow et al. 2007:192). Data from Eel Point (CA-SCLI-43) on San Clemente Island show that a maritime adaptation existed there by 8000 B.P. (Raab and Yatsko 2006:9). These sites are recognized as being part of the Paleo-Coastal Tradition, technologically related to the Western Pluvial Lakes Tradition found on inland fossil lakeshores throughout California and in the Great Basin (Moratto 1984:91). Subsistence during this period was based predominantly on hunting and collecting shellfish, with some shore fishing. The stone tool assemblage was rather limited, dominated by choppers, scrapers and fluted projectile points (Chartkoff and Chartkoff 1984:43). Milling implements, used for processing seeds and acorns, are conspicuously absent from sites of this period (Glassow et al. 2007). The Paleo-Indian Period came to an end, possibly as a result of environmental changes (Charkoff and Chartkoff 1984:47), approximately 10,000-9,000 B.P.

The Early Period (also known as the Millingstone Horizon in the northern Bight and as the La Jolla Culture in the southern Bight), what Chartkoff and Charkoff (1984:74) refer to as the Archaic Period, began in the northern Bight at approximately 9,000 B.P., and is characterized by large numbers of metates and manos, as well as hammerstones likely used to maintain the millingstones. During this period, the economic base became more diverse as new ecological niches were exploited, and new technologies were developed to

do so (Chartkoff and Chartkoff 1984). Projectile points are rarely found in Millingstone sites; however, flaked stone tools of other types (i.e., core tools, scrapers) are found. Subsistence consisted of collecting seeds and acorns, as well as collecting shellfish. Hunting and fishing, while known during this period, do not appear to have been significant sources of protein (Glassow et al. 2007:195). At some point during the Early Period, between 8,000 and 6,000 B.P., the islands were populated with larger groups (Chartkoff and Chartkoff 1984:138). Also during this period, shell beads were manufactured from locally available *Olivella biplicata* shells (Vellanoweth et al. 2003:26; Glassow et al. 2007:195). The earliest of these beads were made by grinding off the spire of the shell, and they were used as personal adornment. Several other styles of beads were subsequently produced in the region. Although originally used for ornamentation, these beads eventually were used in what were to become extensive trade networks reaching throughout western North America (Glassow et al. 2007:195). Maritime adaptations became well-established during the Early Period. Larger, more permanent settlements appeared in association with estuaries and bays, where resources were plentiful. Permanent residential areas with well-developed midden deposits date to at least 5,200 B.P. on San Clemente Island (Raab and Yatsko 2006:12). This period came to an end at approximately 5000 B.P.-3000 B.P. (Chartkoff and Chartkoff 1984:96; Glassow et al. 2007:192; Moratto 1984:125), when much of the shellfish populations declined as a result of estuarine silting along the mainland coast. Millingstones are not found at sites on the Channel Islands dating to this period (Glassow et al. 2007:196).

The Middle Period began at approximately 4000 B.P., and is characterized by the use of the mortar and pestle used to process a greater range of food items, as well as shell fishhooks, stone net weights, and contracting stem points (Glassow et al. 2007:197). More types of shell beads and ornaments were manufactured during this period (Moratto 1984:145). Offshore fishing became an important source of food, as represented by the increase in fish bone in midden deposits. It was during the early part of this period that social organization evolved from egalitarian to ranked based on wealth and achieved status. Exchange systems likely played an important role in this development (Glassow et al. 2007). Increased sedentism and larger settlements are also evident during this period, as are the development of formal cemeteries. The plank canoe was possibly developed as early as A.D. 500 (King 1990), which allowed for yet a greater increase in offshore, pelagic fishing. The bow and arrow were also introduced to the Bight at approximately that time, resulting in smaller projectile points. Chiefdoms based on ascribed status evolved out of the earlier ranked social groups. Beginning in approximately A.D. 1200, the manufacture of *Olivella* shell beads was occurring only on the islands, and the *Olivella* callus beads that were in use as currency at European contact began to be manufactured (Glassow et al. 2007).

The Tongva occupied the area from approximately Topanga Canyon south through Orange County and east to San Bernardino, as well as the southern Channel Islands, including SNI. The Tongva spoke one of several Uto-Aztecan languages and were a later arrival to the area, migrating from the Great Basin through the Mojave Desert to the coast, possibly as long ago as 2000 B.C. (Byrd and Raab 2007). Those in the Los Angeles area came to be known as the Gabrielino for their association with the Mission San

Gabriel in the 18th century. Like the Chumash, the coastal and island Tongva practiced a maritime subsistence pattern, utilizing canoes for travel between the islands and the mainland in order to maintain a large trade network. Tongva settlement patterns included villages made up of family lineages of 50 to 200 individuals, with major economic centers such as *Nájquqar* on Catalina Island and the religious/ceremonial center of *Povuu'nga* located at what was to become the Rancho Los Alamitos (McCawley 1996). These communities were headed by a chief, who controlled economic transactions. An extensive trade network linked the Tongva with the Chumash, the Cahuilla, the Serrano, and the Luiseño (McCawley 1996).

Similarities in material culture show that, despite the difference in languages, the Chumash and the Tongva did share social and economic relations (Byrd and Raab 2007). Chartkoff and Chartkoff (1984) lumped them together into a single large cultural entity known as the Canaliño. Even so, and despite the similarities in environmental adaptation, the two groups remained separate entities socially and politically. Each had its own ritual/religious practices, although there is evidence that there was also some shared ritual/religious behavior (Romani 1981).

ETHNOGRAPHY

At the time of European contact, the northern part of the California Bight, from Point Conception to approximately Malibu and including the northern Channel Islands, was occupied by the Chumash. *Chumashan* peoples historically occupied an area extending south and east along the California coast from San Luis Obispo County into Los Angeles County (including the Channel Islands of San Miguel, Santa Rosa, Santa Cruz and Anacapa), and north to the fringes of the San Joaquin Valley, and the headwaters of the Santa Clara River (Glassow 1980; Grant 1978a). They have been subdivided on the basis of linguistic deviations, rather than on any variance of social or economic organization (Grant 1978b). The Chumash consisted of several loosely confederated groups, each speaking a different dialect of the *Chumashan* language family. Material culture was similar throughout the area, and was shared by the Tongva to the south and east.

HISTORY

While it is possible that Cabrillo spotted SNI in 1542, there is no mention of it in his log. Vizcaíno spotted the island in 1602, though there is no written account indicating he landed there. There is an unsubstantiated rumor that historic glass trade beads were recovered from a site at Corral Harbor. These beads have not been seen by any researcher and are not included in any of the anthropological/archaeological literature for SNI (Steve Schwartz, personal communication 2010). The lack of data makes it unlikely that the early Spanish explorers had direct or indirect contact with the Nicoleños; therefore, little is known about the native Nicoleños.

In the early 1800s, Russian fur traders were attracted to SNI by large numbers of sea otters. Aleut hunters were brought from Alaska in 1811 to hunt the otters, which were quickly depleted by the successful techniques used to hunt them (Schwartz 1994). It is

possible that the Aleuts killed most of the male natives of the island (McCawley1996), leaving a small population of women and a few men. The Aleuts, as well as the Spanish, also may have brought diseases to which the Nicoleños had no natural resistance, thereby reducing the population. In 1835, the very small remaining population, with the exception of one woman, was removed from the island and taken to the mainland, most likely San Pedro, under the auspices of the padres of the Catholic missions.

The woman who was left alone on SNI remained there for 18 years, until her rescue in 1853. She was taken to Santa Barbara. All attempts to communicate with her were unsuccessful, as nobody was able to understand her language. Unfortunately, she became ill and died seven weeks after being rescued and is buried in an unmarked grave at the mission in Santa Barbara.

In the 1860s, Chinese abalone collectors arrived on SNI, setting up camps on the northwest end of the island. Although they were initially exploiting the abalone as a food source, they later returned to collect the shells that had been left behind. The shells, it turned out, were a viable commercial resource used in the manufacture of buttons, jewelry and tourist items (Schwartz 1994).

Ranching activities began on SNI in 1857, with the introduction of sheep ranching based at Corral Harbor on the north side of the island. Although initially a successful venture, the drought of 1862-1864 was devastating to the industry. The vegetation on the island was subsequently stripped by the sheep, causing a steep decline in the sheep population. Ranching was again successful in the 1920s and '30s; however, it ended permanently in 1942 with the United States' involvement in World War II and the Navy's takeover of SNI (Schwartz 1994).

The U.S. Navy gained control of the island in 1933, at which time a weather station was established. The Naval Air Missile Test Center (NAMTC) was established at Point Mugu in 1946, with construction of permanent facilities there beginning in 1948. SNI has been used as a support facility for the NAMTC since then.

IV. FIELD METHODS

Ground surface visibility is excellent, with low vegetation covering approximately 10% of the property. The entire area was surveyed on foot on 11 June 2014 and 5-15 September 2014.

One prehistoric archaeological site, CA-SNI-12, is located within the APE. This site was determined eligible for the National Register of Historic Places by consensus in 2010. One small corner at the far northern end of the site will be impacted by the undertaking. Artifacts on this part of the site have washed down from the top of the dune on which the main locus of the site is located. Further, Reinman and Lauter (1984) stated that the far northern portion of the site had been badly impacted by bulldozing and construction of a concrete pad.

Four shovel test pits were excavated in this area. Shovel test pits were 40 centimeters diameter. All soil was screened through a 1/8" mesh screen. There are shell fragments, bone fragments, and lithic debitage located on the surface, with no artifacts located below the surface. Soil consisted of loose beach sand, 10YR 7/4 very pale brown. The shovel test pits were excavated to a depth of 15 to 20 centimeters below the surface, at which point a layer of 10YR 5/8 yellowish brown semi-concreted paleosol was encountered.

V. REMARKS

One prehistoric-era archaeological site is located within the APE. A small portion of the site (approximately 20 m^2 of 84.899 m^2) will be impacted by widening the road at the far northern end. This small area of the site appears to be a non-contributing element to the site's eligibility to the NRHP, as there is no subsurface deposit, the artifacts have washed down from the top of the dune, the area has been heavily impacted by construction, and no diagnostic artifacts were observed. The area will be carefully searched for diagnostic artifacts, which will be recovered for educational use prior to grading. All construction activities within the APE will be monitored by a qualified archaeologist. If any cultural resources are encountered during the earth-disturbing activities, all work must halt at that location until such resources can be properly evaluated. Further, if human remains are unearthed during construction, work will cease in that area until the origin of such remains has been determined.

VI. CERTIFICATION

Prepared by: Catherine Girod, Cultural Resources Program Manager, Naval Base Ventura County

Signature Date: June 14, 2014; updated September 15, 2014

GIROD.CATHERINE.ANN.1367680454

Digitally signed by GIROD.CATHERINE.ANN.1367680454
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=GIROD.CATHERINE.ANN.1367680454
Date: 2014.09.23 17:12:39 -07'00'

VII. MAPS

Location: U.S.G.S. 7.5' San Nicolas Island 1950 (1967) Project Map Attached:

Quadrangle Name Date

VIII. PHOTOGRAPHS

Yes: X No: Attached: X (Optional)

IX. REFERENCES

Byrd, B. F. and L.M. Raab
2007 Prehistory of the Southern Bight: Models for a New Millenium. In California

Prehistory: Colonization, Culture, and Complexity, edited by T. L. Jones and K. A.Klar, pp. 215-228. Altamira Press, Lanham.

Chartkoff, J. L., and K. K. Chartkoff
1984 *The Archaeology of California*. Stanford: Stanford University Press.

Erlandson, J.M., D.J. Kennett, B.L. Ingram, D.A Guthrie, D.P. Morris, M.A. Tveskov, G.J. West, and P.L. Walker
1996 An Archaeological and Paleontological Chronology for Daisy Cave (CA-SMI-261), San Miguel Island, California. In *Radiocarbon* 38:355-373.

Erlandson, J.M., T.C. Rick, T.L. Jones, and J.F. Porcasi
2007 One If by Land, Two If by Sea: Who Were the First Californians? In *California Prehistory: Colonization, Culture, and Complexity*, edited by T.L. Jones and K.A. Klar, pp. 53-62. Altamira Press, Lanham.

Glassow, Michael A.
1980 Recent Developments in the Archaeology of the Channel Islands. In *The California Islands*, edited by D. Power, pp. 79-99. Santa Barbara Museum of Natural History, Santa Barbara.

Glassow, M. A., L. H. Gamble, J. E. Perry, and G. S. Russell
2007 Prehistory of the Northern California Bight and the Adjacent Transverse Ranges. In *California Prehistory: Colonization, Culture, and Complexity*, edited by T. L. Jones and K. A. Klar, pp. 191-214. Altamira Press, Lanham.

Grant, Campbell
1978a Chumash: Introduction. In *California*, edited by Robert F. Heizer, pp. 505-508. Handbook of North American Indians, vol. 8, William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Grant, Campbell
1978b Eastern Coastal Chumash. In *California*, edited by Robert F. Heizer, pp 509-519. Handbook of North American Indians, vol. 8, William G. Sturtevant, general editor, Smithsonian Institute, Washington D. C.

Johnson, J. R., T.W. Stafford, Jr., H.O. Ajie, and D.P. Morris
2002 Arlington Springs Revisited. In *Proceedings of the Fifth California Islands Symposium*, 2 vols., edited by D.R. Browne, K.L. Mitchell, and H.W. Chaney, pp 541-545. Santa Barbara Museum of Natural History, Santa Barbara.

Jones, T. and K. Klar
2007 *California Prehistory: Colonization, Culture, and Complexity*. Altamira Press, Lanham.

King, C. D.

1990 The Evolution of Chumash Society: A Comparative Study of Artifacts Used for Social System Maintenance in the Santa Barbara Channel Region Before A.D. 1804. Garland Publishing, Inc., New York.

McCawley, W.
1996 *The First Angelinos: The Gabrielinos of Los Angeles*. Malki Museum Press/ Ballena Press.

Moratto, M. J.
1984 *California Archaeology*. Academic Press.

Oakley, K.P.
1963 Relative Dating of Arlington Springs Man. In Science, New Series, Vol. 141, No. 3586, p. 1172.

Raab, L. M. and A. Yatsko
2006 Appendix D: San Clemente Island research design. In *San Clemente Island Cultural Resources Summary Report*. R. M. Apple, author. On file, Naval Air Station, Point Mugu.

Romani, J. F.
1981 Astronomy and Social Integration: An Examination of Astronomy in a Hunter and Gatherer Society. Unpublished master's thesis, Department of Anthropology. California State University Northridge.

Schwartz, S. J.
1994 Ecological Ramifications of Historical Occupation of San Nicolas Island. In The Fourth California Islands Symposium: Updates on the Status of Resources, edited by W. L. Halvorson and G. J. Maender, pp. 171-180. Santa Barbara Museum of Natural History, Santa Barbara.

Reinman, Fred M. and Gloria A. Lauter
1984 San Nicolas Island Cultural Resource Survey Report. F.M. Reinman and Associates for Pacific Missile Test Center.

Vellanoweth, R. L., M. R. Lambright, J. M. Erlandson, and T. C. Rick
2003 Early New World Maritime Technologies: Sea-grass Cordage, Shell Beads, and a Bone Tool from Cave of the Chimneys, San Miguel Island, California. In *Journal of Archaeological Science*, Vol. 30, pp. 1161-1173.

CA-SNI-12, northwest end of site, facing east

STATE OF CALIFORNIA – THE NATURAL RESOURCES AGENCY
EDMUND G. BROWN, JR., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov

August 4, 2014

Reply in Reference To: USN_2013_0814_001

Captain L.R. Vasquez
Department of the Navy
Naval Base Ventura County
311 Main Road, Suite 1
Point Mugu, CA 93042-5033

RE: Directed Energy Test Site Environmental Assessment, Naval Base Ventura County, San Nicolas Island, Ventura County, CA

Dear Captain Vasquez:

Thank you for consulting with me. Pursuant to 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act (NHPA), the Navy is seeking my concurrence with a finding of No Adverse Effect to Historic Properties.

In our previous round of consultation I could not concur with your Finding of Effect. I recommend the Navy determine the depth and extent of ground disturbance required to complete the project, pointing out that such efforts would provide a better basis for determining the likelihood of encountering subsurface cultural deposits. I also expressed concerns about your proposal to conduct data recovery at CA-SNI-12 and CA-SNI-157 as a mitigation measure in the event the sites could not be avoided.

Since this time, the project has been redesigned to avoid adverse effects known archaeological resources. The proposed Vizcaino Point location for the target site has been eliminated from the project. The target site will now be located at Bomber Cove. The access road to the cove runs through the National Register site CA-SNI-157 and segments of the road are within the vicinity of three other archaeological sites (CA-SNI-18, CA-SNI-161, and CA-SNI-393). The grading plan has been redesigned to avoid all known sites. Additionally, an archaeologist will monitor the sections of the road to be graded.

The construction of a two-story building at the shooter site, located at Tender Point, has been removed from the project. A concrete turnaround pad will be installed at the end of the dirt road. The area the pad will be installed consists of solid bedrock. The road to the pad will require minor modification. One curve in the road will be widened by filling the side of the road with clean fill dirt. The area has been subject to past grading and the soil has been disturbed and re-deposited several times in the process. An established staging area will be used. The staging area will not be graded or expanded.

A section of the road approaching the turn-around pad will be widened. A National Register-eligible archaeological site, identified as CA-SNI-12, is sited at the far northwest end of the proposed widening area. This section of CA-SNI-12 is downslope from a stabilized dune, on top of which is an extensive midden consisting of bone, shell, debitage, beads, and other artifacts. Some of the artifacts have washed downhill and are now in the area to be disturbed. Shovel testing was conducted in this area on June 11, 2014. Four shovel test pits were excavated in

this area and the small area on the opposite side of the road to be graded. Soil taken from the pits was screened through 1/8" mesh screen. Shell fragments, animal bone fragments, and lithic debitage were identified on the surface, with no artifacts located below the surface. A layer of 10YR 5/8 yellowish brown semi-cemented paleosol was encountered at a depth of 15-to-20 centimeters below surface level. This small area of the site appears to be a non-contributing element to site. All diagnostic artifacts will be recovered from this area for educational use prior to grading.

Though human remains have been recorded at CA-SNI-12, none are present in the area to be disturbed. A physical barrier will be installed to prevent sea mammals from accessing the pad for haul out; this barrier will also prevent persons from driving vehicles onto the archaeological site. Consistent with Naval Base Ventura County operating procedures, signage will be installed to direct people to walk only on paved and graded areas.

Having reviewed your submittal, I have the following comments:

1. Did the USN consult with Native Americans as part of their efforts to identify historic properties within the APE for this undertaking? Specifically, did they consult with Native Americans during their evaluation efforts of site SNI-12 or to see if they were interested in participating in the monitoring of the construction for the Bomber Cover Road?
2. Can the USN provide documentation (site records, previous test excavations, evaluations, etc.) about the sites, both within and adjacent to the APE?
3. Was an archaeological excavation and evaluation report produced for the evaluation of SNI-12? Specifically, a report that provides an archaeological context for SNI-12 and a research design, research questions, required data sets and excavation methods and methodologies used to evaluate the portion of SNI-12 that was tested.
4. Our office requests this documentation to complete our review of this undertaking and therefore we cannot concur on the USA's finding of no adverse effect at this time.

Thank you for seeking my comments and considering historic properties as part of your project planning process. I look forward to further consultation with you. If you have any questions or concerns, please contact Tristan Tozer of my staff at (916) 445-7027 or at email at Tristan.Tozer@parks.ca.gov.

Sincerely,

Carol Roland-Nawi, Ph.D.

Carol Roland-Nawi, Ph.D.
State Historic Preservation Officer

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

IN REPLY REFER TO
5090
Ser N0000CV/0666
July 2, 2014

Dr. Carol Roland-Nawi
State Historic Preservation Officer
Department of Parks and Recreation
1725 23rd Street, Suite 100
Sacramento, CA 95816-7100

Dear Dr. Roland-Nawi:

SUBJECT: CONTINUATION OF SECTION 106 CONSULTATION, DIRECTED ENERGY TEST SITE ENVIRONMENTAL ASSESSMENT, NAVAL BASE VENTURA COUNTY, SAN NICOLAS ISLAND

The Navy proposes to construct a directed energy test site at Naval Base Ventura County (NBVC) San Nicolas Island (SNI). This letter is in reply to your comments in the enclosed letter dated September 9, 2013, and continues Section 106 consultation in accordance with 36 CFR 800.3(a), regulations implementing the National Historic Preservation Act of 1966, as amended (NHPA). In your letter, you expressed concern regarding road grading and construction of a building in an area that has mapped archeological resources.

The project has been redesigned to avoid adverse effects to known archaeological resources. The proposed Vizcaino Point location for the target site has been eliminated from the project. The target site will be located at Bomber Cove. Though there is already an existing dirt road to Bomber Cove, it was originally graded through an archaeological site previously determined eligible for the National Register of Historic Places (NRHP) (CA-SNI-157). The road would have required improvement, causing further damage to the site. The road alignment has been specifically redesigned to avoid not only CA-SNI-157, but also three other archaeological sites in the vicinity (CA-SNI-18, CA-SNI-161, and CA-SNI-393). All grading will be monitored by a qualified archaeologist. In the event unknown buried deposits are discovered during grading activities, all work will cease in that area until such deposits are evaluated by a qualified archaeologist.

The shooter site, located at Tender Point, was originally designed with a two-story building as part of the project. The building has been removed from the project. The concrete turn-around pad is located on bare bedrock. The road to the turn-around pad will require minor modifications. One curve in the road will be widened by filling the side of the road with clean fill dirt.

This location has been subjected to grading and the soil has been disturbed and re-deposited several times as the road has been re-graded for maintenance.

As the road approaches the turn-around pad, it will be widened. The area to be widened is at the far northwest end of archaeological site CA-SNI-12, also eligible for the NRHP. This area of the site is downslope from a stabilized dune, on top of which is an extensive midden consisting of bone, shell, debitage, beads, and other artifacts. Some of the artifacts have washed downhill and are now in the area to be disturbed. Shovel testing was conducted in this area on June 11, 2014. Four shovel test pits were excavated in this area and the small area on the opposite side of the road to be graded. Shovel test pits were 40 centimeters in diameter. All soil was screened through a 1/8" mesh screen. There are shell fragments, animal bone fragments, and lithic debitage located on the surface, with no artifacts located below the surface. Soil consisted of loose beach sand, 10YR 7/4 very pale brown. The shovel test pits were excavated to a depth of 15 to 20 centimeters below the surface, at which point a layer of 10YR 5/8 yellowish brown semi-cemented paleosol was encountered. This small area of the site appears to be a non-contributing element to the site's eligibility to the NRHP. All diagnostic artifacts will be recovered from this area for educational use prior to grading.

Staging for the project will be at an existing staging area in the vicinity of the airfield, as well as on previously graded areas near the project locations. No grading will be necessary for staging areas for this undertaking and no materials will be staged within the boundaries of archaeological resources.

Though human remains have been recorded at CA-SNI-12, none are present in or near the area to be disturbed. A physical barrier such as K-rail will be installed to prevent sea mammals from accessing the pad for haul out; this barrier will also prevent people from driving vehicles onto the archaeological site. Consistent with NBVC standard operating procedures, signage will be installed to direct people to walk only on graded and paved areas.

Consistent with the above considerations and 36 CFR 800.4(d)(1), the Navy finds that the proposed undertaking will cause no adverse effects to historic properties.

The Navy respectfully requests your concurrence on its determination of No Adverse Effect to Historic Properties by the

5090
Ser N0000CV/0666
July 2, 2014

proposed undertaking at Tender Point and Bomber Cove within 30 days of receipt of this letter.

Should you have any questions or need further information, please contact Catherine Girod at (805) 989-9249.

Sincerely,

L. R. VASQUEZ
Captain, U.S. Navy
Commanding Officer

Enclosures:
1. Response from SHPO, September 9, 2013 (reference USN_2013_0814_001)
2. Bomber Cove Road
3. Photo, Part of Road to Tender Point to be Widened
4. Tender Point Turn-around
5. Photo, Northwest End of CA-SNI-12

Copy to:
Commander Navy Region Southwest, Environmental Department
Cultural Resources Management Program
San Diego, CA 92147

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

San Buenaventura Conservancy
P.O. Box 23263
Ventura, CA 93002

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov

September 09, 2013

Reply in Reference To: USN_2013_0814_001

Captain L.R. Vasquez
Department of the Navy
Naval Base Ventura County
311 Main Road, Suite 1
Point Mugu, CA 93042-5033

RE: Directed Energy Test Site Environmental Assessment, Naval Base Ventura County, San Nicolas Island, Ventura County, CA

Dear Captain Vasquez:

Thank you for consulting with me. Pursuant to 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act (NHPA), the Navy is seeking my concurrence with a finding of No Adverse Effect to Historic Properties.

The Navy plans to build a shooter site, target site, and four calibration sites. The shooter site will be located at Tender Point and will consist of a concrete pad and a permanent 3,000 square foot, two story building. An existing roadway will be widened and utilities for the building will be installed in the roadway.

Two possible sites, Bomber Cove and Vizcaino Point, are being considered for the target site. The site will require the construction of a 40 foot by 40 foot concrete pad. If Bomber Cove is chosen, approximately 2,215 feet of an 8 foot wide gravel road will be widened to 12 feet. An additional 2,885 feet of road will also be constructed. If Vizcaino Point is used, approximately 5,017 feet of an 8 foot wide gravel road will be widened to 12 feet and approximately 2,340 feet of new road will be built.

The four calibration sites will require the construction of 15 foot by 15 foot concrete pads.

You define the Area of Potential Effects (APE) for this undertaking as the shooter site, the possible target sites, the calibration sites, and the areas where the roads will be widened and expanded. The APE is depicted on maps included in the accompanying documentation.

In addition to your letter, you have provided the following documentation in support of this undertaking:

- *Environmental Assessment: Directed Energy Test Facilities at San Nicolas Island* (Naval Air Warfare Center Weapons Division: June 2013)

- *4000 Years on Ghalas-At: Part One of the San Nicolas Island Index Unit Analysis Program* (Patricia Martz: May 2008)

- *Index Units: Indirect Effect Area Investigations, San Nicolas Island, SLAM Targets, U.S. Naval Air Weapons Station, PT. Mugu, Ventura County, California* (Jane Rosenthal and Patricia Jertberg, Petra Resources, Inc.: January 1998)

As I understand it, the entirety of San Nicolas Island has been surveyed for archeological resources. Approximately 600 prehistoric and historic archaeological sites have been located on the island. Two National Register-eligible sites, CA-SNI-12 and CA-SNI-157 are sited within the APE and will be affected during road grading. It would appear that the road grading may constitute an adverse effect to one or more of the two National Register eligible sites. In keeping with the regulations, the Navy should first try to avoid all affects to the two sites either through project redesign, or some other means. Data recovery as a proposed mitigation measure is still an adverse effect. In order to resolve any possible adverse effects to National Register eligible or listed sites, the Navy should draft a Memorandum of Agreement for the purposes of taking those effects into account and submit to my office for review and consultation. Additionally, the Navy needs to notify the Advisory Council on Historic Preservation of an Adverse Effect unless through consultation with my office we are able to reach agreement on your proposed No Adverse Effect to Historic Properties.

Having reviewed this information, I have the following comments:

1) In order to better gauge the APE, I recommend the Navy determine the depth and extent of ground disturbance required to complete this project. The Navy will have a better basis for determining the likelihood of encountering subsurface cultural deposits once this aspect has been established. I would also suggest the Navy account for staging areas.

2) I cannot at present concur with your Finding of Effect. Until such a time the Navy, my office, and any other interested parties can agree that data recovery (which is considered an adverse effect to historic properties) is the appropriate mitigation measure for this undertaking and that the resulting agreement is realized in a Memorandum of Agreement, a finding of No Adverse Effect to Historic Properties is premature. I am unable to concur with your proposed No Adverse Effect to Historic Properties.

Thank you for seeking my comments and considering historic properties as part of your project planning process. I look forward to further consultation with you. If you have any questions or concerns, please contact Tristan Tozer of my staff at (916) 445-7027 or at email at Tristan.Tozer@parks.ca.gov.

Sincerely,

Carol Roland-Nawi, Ph.D.

Carol Roland-Nawi, Ph.D.
State Historic Preservation Officer

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

IN REPLY REFER TO
5090
Ser N0000CV/0902
8 Aug 13

Dr. Carol Roland-Nawi
State Historic Preservation Officer
Department of Parks and Recreation
1725 23rd Street, Suite 100
Sacramento CA 95816-7100

Dear Dr. Roland-Nawi:

SUBJECT: DIRECTED ENERGY TEST SITE ENVIRONMENTAL ASSESSMENT, NAVAL BASE VENTURA COUNTY, SAN NICOLAS ISLAND

The Navy proposes to construct a directed energy test site at Naval Base Ventura County (NBVC) San Nicolas Island (SNI). 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 (NHPA). In order to comply with NHPA and its implementing regulations (36 CFR 800) for this undertaking, the Navy is 1) describing the proposed undertaking, 2) defining the Area of Potential Effects (APE), 3) providing data regarding the identification of historic properties, and 4) providing the Navy's finding of No Adverse Effect to Historic Properties.

The remainder of this letter is organized to present an overview of the undertaking and associated Area of Potential Effects (APE); review of identification efforts completed to date, as basis for determining whether historic properties might be affected; and discussion of the proposed project's potential to affect historic architectural and archaeological properties.

a. Description of Undertaking and APE

(1) The proposed undertaking involves construction of a shooter site, a target site, and four calibration sites. The shooter site will be located at Tender Point, and consist of a concrete pad and a permanent two story 3000 square foot building, widening of the existing 8 foot wide road to 18 feet wide, and installation of underground utility conduit in the widened road. There are two possible locations for the target site, one at Bomber Cove and one at Vizcaino Point. The target site will require construction of a 40 foot by 40 foot concrete pad. If Bomber Cove is utilized as the target site, approximately 2,215 feet of 8 foot wide gravel road will be

widened to 12 feet, with an additional 2,885 feet of 12 foot wide gravel road constructed. If Vizcaino Point is used as the target site, approximately 5,017 feet of existing 8 foot wide gravel road will be widened to 12 feet, and approximately 2,340 additional feet of 12 foot wide gravel road will be constructed. The four calibration sites will each consist of a 15 foot by 15 foot concrete pad. Target sites A and B will not require any further construction, other than the pad. Target sites C and D will require short access roads (approximately 500 square feet each) to be graded.

(2) The APE is defined as the shooter site, the target site, the four calibration sites, and the areas where the roads will be widened or constructed.

(3) Building N-277 is within the APE for this project. Two prehistoric archaeological sites are within the APE and will be impacted by road widening and construction activities.

b. Identification of Historic Properties

(1) Pursuant to 36 CFR 800.4(b)(1), NBVC has made a reasonable and good faith effort to carry out appropriate identification efforts for historic properties in the vicinity of the proposed undertaking. Most of the buildings at NBVC SNI were inventoried and evaluated in 1998 by JRP Historical Consulting Services (*Draft: Inventory and Evaluation of National Register of Historic Places (NRHP) Eligibility for Buildings and Structures at Naval Air Weapons Station (NAWS) Point Mugu, Ventura County, California*). As a result of that study, one building on SNI was determined eligible for the National Register of Historic Places, Building N-138. Building N-138 is not located within the APE for the proposed undertaking.

(2) The entirety of NBVC SNI has been surveyed for archaeological resources. Approximately 600 prehistoric and historic archaeological sites have been located at NBVC SNI, two of which are within the APE for this undertaking.

c. Potential for Effects to Historic Architectural Resources:

(1) As documented in the enclosed, the Navy finds that building N-277 is located within the APE for this undertaking. Building N-277 is pump house for non-potable water, constructed in 1971. While utilities are an important part of daily operations on NBVC SNI, building N-277 has no direct or significant association with the missile RDAT&E programs on San Nicolas Island, nor does the building have a direct or significant association with persons important in history, nor does it embody distinctive characteristics of a type, period, or method of construction, or represent the works of masters, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction. The building has not yielded and is not likely to yield information important to history. The building does not meet any of the criteria for eligibility to the National Register of Historic Places, and is therefore not eligible. Further, the building does not meet the demanding threshold for exceptional significance for buildings constructed less than 50 years ago.

d. Potential for Effects to Archaeological Resources

(1) Grading activities for both the shooter and target sites will impact two prehistoric archaeological sites, CA-SNI-12 and CA-SNI-157, both of which are eligible for the National Register of Historic Places. Impacts to both sites are potentially significant. Procedures to resolve adverse effects to historic properties are provided in 36 CFR 800.6, which requires Federal agencies to consult with the California State Historic Preservation Officer (CASHPO) and other interested parties to seek methods to avoid, minimize, or mitigate adverse effects to historic properties. Consultation includes a description of the APE and of the potential effects. A Memorandum of Agreement (MOA) between NBVC and the SHPO would be prepared, detailing the required mitigation measures to avoid, minimize, or mitigate adverse effects to historic properties. A treatment plan will be included with the MOA. The project has been designed to impact the fewest possible archaeological resources, and mitigation measures will likely consist of data recovery efforts. Data recovery efforts will be conducted prior to commencing the undertaking. Impacts associated with this undertaking are potentially adverse, per 36 CFR 800.5, but would

be reduced to less than significant through mitigation efforts, per 36 CFR 800.6.

e. Finding of Effect

The proposed undertaking will result in impacts to two NRHP-eligible archaeological sites, CA-SNI-12 and CA-SNI-157. Adverse effects will be mitigated via a Memorandum of Agreement (MOA) negotiated between the CONBVC and CASHPO, reducing the effects to less than significant.

Consistent with the above considerations and 36 CFR 800.4(d)(1), the Navy finds that the proposed undertaking will cause no adverse effects to historic and prehistoric properties.

The Navy respectfully requests your concurrence on the proposed delineation of the APE and its determination of No Adverse Effect to Historic and Prehistoric Properties by the proposed undertaking at CA-SNI-12 and CA-SNI-157 within 60 days of receipt of this letter.

Should you have any questions or need further information, please contact Catherine Girod at (805) 989-9249.

Sincerely,

L. R. Vasquez
Captain, U.S. Navy
Commanding Officer

Enclosures:
1. Environmental Assessment: Directed Energy Test Facilities at San Nicolas Island
2. California Department of Parks and Recreation Form 523, CA-SNI-12 and CA-SNI-157
3. Martz 2008. *4000 Years at Ghalas-At: Part One of the San Nicolas Island Index Unit Analysis Program*
4. Donaldson 2010. Letter of concurrence, CA-SNI-12

5. Rosenthal and Jertberg 1998. *Index Units Indirect Effect Area Investigations, San Nicolas Island, SLAM Targets, U.S. Naval Air Weapons Station, Pt. Mugu, Ventura County, California*

Copy to:
Commander Navy Region Southwest, Environmental Department
Cultural Resources Management Program
San Diego, CA 92147

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

San Buenaventura Conservancy
P.O. Box 23263
Ventura CA 93002

Appendix C

Public Comment

Overview

The Navy filed a formal Notice of Availability (NOA) for the Draft Environmental Assessment (EA) for Directed Energy Test Facilities at San Nicolas Island in the Ventura County Star on July 5, 6 and 7, 2013, initiating a 21-day Draft EA comment period. The comment period closed on July 26, 2013. The Navy Region Southwest website included the NOA, a copy of the Draft EA, and instructions on how to comment on the Draft EA.

No written, verbal or website comments were received. Minor clarifying modifications to the Draft EA were made. In response to consultation with SHPO, the Proposed Action was reduced in scope to remove the proposed construction of a two-story control facility building.