Final

ENVIRONMENTAL ASSESSMENT

Point Mugu Sea Range
Countermeasures Testing and Training

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

July 2014

Acronyms and Abbreviations

ac	acre(s)
ACHP	Advisory Council on Historic Preservation
AICUZ	Air Installation Compatible Use Zone
a/m	amperes per meter
ANSI	American National Standards Institute
APE	Area of Potential Effect
ASBS	Area of Special Biological Significance
BMP	best management practice
°C	Celsius
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CEQ	Council on Environmental Quality
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CIWS	close-in weapon system
cm	centimeter(s)
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide-equivalent
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
dB L_{dnmr}	Rate Adjusted Day-Night Average-weighted Sound Level
DoD	Department of Defense
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPCRA	Emergency Planning and Community Right to Know Act
ESA	Endangered Species Act
°F	Fahrenheit
FAA	Federal Aviation Administration
FMP	Fishery Management Plan
ft	feet/foot
ft^2	square feet/foot
GHz	gigahertz
GHG	greenhouse gas
GW	gigawatts
ha	hectare
HAPC	Habitat Areas of Particular Concern
HE	High Explosive
HEL	High-Energy Laser
HERF	Hazards of Electromagnetic Radiation to Fuel
HERO	Hazards of Electromagnetic Radiation to Ordnance
HERP	Hazards of Electromagnetic Radiation to Personnel
HMX	High Melting Explosive
HPM	High-Power Microwave
HWMP	Hazardous Waste Management Plan
INRMP	Integrated Natural Resources Management Plan
kg	kilogram
kHz	kilohertz
km	kilometer
km^2	square kilometer
km/hr	kilometers per hour
kV/m	kilovolt per meter
kW	kilowatt
laser	light amplification by stimulated emission of radiation
lb	pound
LNTL	lead Navy technical laboratory
m	meter
MBTA	Migratory Bird Treaty Act
ManPADS	Manned Portable Air Defense System
mg/L	milligrams per liter
mg/m	milligrams per cubic meter
MHz	megahertz
ml/L	milliliters per liter
mi^2	square mile
mm	millimeter
MMPA	Marine Mammal Protection Act
mph	miles per hour
MRA	Marine Resource Assessment
msl	mean sea level
mV	millivolt
MW	megawatt
mW/cm^2	milliwatt 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 Preservation 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
NRHP	National Register of Historic Places
O_3	ozone
OEA	Overseas Environmental Assessment
OEIS	Overseas Environmental Impact Statement
OPNAVINST	Chief of Naval Operations Instruction
OSHA	Occupational Safety and Health Administration
PBX	Plastic-Bonded Explosives
PD	power density
PEL	permissible exposure limits
PFMC	Pacific Fishery Management Council
PH	hydrogen ion
PM_X	particulate matter less than X (2.5 or 10) microns in diameter
ppm	parts per million
R-2519	Restricted Area 2519
R-2535	Restricted Area 2535
RAM	Rolling Airframe Missile
RCRA	Resource Conservation and Recovery Act
RDAT&E	research, development, acquisition, test, and evaluation
RDX	Royal Demolition Explosive
RF	radio frequency
RLSSO	Range Laser System Safety Officer
RMS	root-mean square
RONA	Record of Non-Applicability
RPG	rocket propelled grenade
SAR	specific absorption rate
SARA	Superfund Amendments and Reauthorization Act
SCB	Southern California Bight
SCCAB	South Central Coast Air Basin
SEL	sound exposure level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SNI	San Nicolas Island
SO_2	sulfur dioxide
SOP	Standard Operating Procedure
SO_x	sulfur oxides
SWRCB	State Water Resources Control Board
UAS	unmanned aerial system(s)
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VCAPCD	Ventura County Air Pollution Control District
V/m	volt per meter
VOCs	volatile organic compounds
W/cm	watts per centimeter
W/kg	watts per kilogram
W/m^2	watts per square meter
µg/m	micrograms per cubic meter
$µW/cm^2$	microwatts per square centimeter
µPa	micropascal
WRCC	Western Regional Climate Center

FINAL ENVIRONMENTAL ASSESSMENT

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

Title of Proposed Action: Point Mugu Sea Range Countermeasures

Designation: Environmental Assessment

Abstract

The Naval Air Warfare Center Weapons Division Point Mugu is located in Ventura County along the Pacific Coast of Southern California and includes the 36,000 square mile (93,000 square kilometer) Point Mugu Sea Range (Sea Range). 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 Instruction 5090.1C Change Transmittal 1, *Environmental and Natural Resources 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; noise; biological resources; cultural resources; airspace, land, and water use; public safety; and hazardous materials. The increase in loud noise events associated with the proposed action would potentially affect wildlife species, including threatened and endangered species at Point Mugu and San Nicolas Island. However, with implementation of proposed conservation measures, there would be no significant impacts to wildlife species at Point Mugu or San Nicolas Island. No impacts are associated with other environmental resources or issues. No significant environmental impacts would occur to other resources from any of the three action alternatives 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

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EXECUTIVE SUMMARY

The Naval Air Warfare Center Weapons Division (NAWCWD) Point Mugu is located in Ventura County along the Pacific Coast of Southern California and includes the 36,000 square mile (93,000 square kilometer) Point Mugu Sea Range (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. 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. The Navy subsequently prepared an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) (January 2010) to extend its test and evaluation and training capability to include laser operations on the Sea Range, including San Nicolas Island (SNI). Lasers and other systems designed to function in a defensive or pre-emptive manner, to intercept, deflect, deceive, deactivate, or destroy approaching threats, are 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.

This EA addresses the potential environmental impacts of the aforementioned countermeasure activities on the Sea Range, at Point Mugu, and at SNI. 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 Instruction 5090.1C Change Transmittal 1, *Environmental and Natural Resources Program Manual* (Navy 2011c).

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to provide an overall capability for countermeasures testing and training on the Sea Range, at Point Mugu, and at SNI. Both Point Mugu and SNI have restricted airspace separate from the Sea Range that is also included in the proposed action, respectively known as Restricted Area 2519 (R-2519) and Restricted Area (R-2535). This would support DoD directives on the development of countermeasures systems vital to the National Defense through Research, Development, Acquisition, Testing, and Evaluation (RDAT&E) applications. These requirements are for operationally realistic engagements in both maritime and land environments. The proposed countermeasures testing and training would support these requirements. 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 countermeasures that can be deployed in realistic threat environments.

The Sea Range, R-2519, and R-2535 provide 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 accommodate readily the necessary countermeasures testing and training.

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 countermeasures testing and training is needed to support this mission.

PROPOSED ACTION

Proposed countermeasures testing and training in this EA consists of five components: lethal and non-lethal directed energy (i.e., high-energy lasers [HEL] and high-power microwave systems), small arms, missiles, flares, and electronic support systems. The intended use of the lethal HEL systems is to negate other unmanned systems; they are not intended to engage personnel. For the purposes of this EA, small arms include bullets fired from close-

in weapon systems as well as projectiles up to 5 inches (13 centimeters) in diameter; projectiles would only be fired from ships at sea. Missiles consist of a range of smaller missile types from shoulder fired weapons including those in the scale of rocket-propelled grenades and Manned Portable Air Defense Systems (ManPADS), to tripod launched man-portable missiles such as the Spike missile and not exceeding the scale of the Rolling Airframe Missile. Electronic support systems consist of radars, recording systems (electrical, optical, and infrared) mounted on vehicles or tripods, acoustic systems (land, sea surface, and airborne), and passive detection systems. No construction, excavation, grading, or filling would occur for any of these project components.

Shooter locations addressed in this EA include land, ocean surface, and airborne platforms at Point Mugu (including R-2519), at SNI (including R-2535). Locations at Point Mugu include the Alpha, Bravo, Charlie, and Nike-Zeus Pads; Buildings 738 and 761; Surfer's Point, and The Point. Locations on SNI include Rock Crusher, Tender Point, Thousand Springs West, and Balloon Launch.

ALTERNATIVES

The consideration of viable action alternatives focused on means to achieve the purpose and need. Three action alternatives were identified: use of all proposed locations at Point Mugu and SNI (Alternative 1, or the preferred alternative), use of only the Point Mugu location (Alternative 2), and use of only the SNI location (Alternative 3). All three action alternatives include RDAT&E activities for directed energy, small arms, missiles, flares, and electronic support systems either on shore or in nearshore waters. All action alternatives would use existing infrastructure and access roads and none of the action alternatives would involve construction activities.

ENVIRONMENTAL CONSEQUENCES

Resources analyzed in this EA include: geology and soils; air quality; marine sediments and water quality; noise; biological resources; cultural resources; airspace, land, and water use; public safety; and hazardous materials. The environmental consequences associated with implementation of the proposed action and no-action alternative are presented in Table ES-1. As shown in Table ES-1, implementation of the proposed action (Alternative 1, Alternative 2, or Alternative 3) or the no-action alternative would not result in significant impacts to any resource area. The increase in loud noise events associated with the proposed action would potentially affect wildlife species, including threatened and endangered species at Point Mugu and SNI. However, with implementation of proposed conservation measures, there would be no significant impacts to wildlife species at Point Mugu or SNI. The no-action alternative would not meet the purpose and need for the proposed action.

Table ES-1 Environmental Consequences of Alternatives

Resource Area	Alternative 1	Alternative 2	Alternative 3	No-Action Alternative
Geology and Soils	**o**	**o**	**o**	**o**
Air Quality	**o**	**o**	**o**	**o**
Marine Sediments and Water Quality	**o**	**o**	**o**	**o**
Noise	**o**	**o**	**o**	**o**
Biological Resources	**o**	**o**	**o**	**o**
Cultural Resources	**o**	**o**	**o**	**o**
Airspace, Land, and Water Use	**o**	**o**	**o**	**o**
Public Safety	**o**	**o**	**o**	**o**
Hazardous Materials	**o**	**o**	**o**	**o**

Notes: **o** = No significant impact

FINAL ENVIRONMENTAL ASSESSMENT

POINT MUGU SEA RANGE COUNTERMEASURES

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CHAPTER 1
PURPOSE AND NEED

1.1 INTRODUCTION

The Naval Air Warfare Center Weapons Division (NAWCWD) Point Mugu is located at Naval Base Ventura County (NBVC) along the Pacific coast of southern California and includes the 36,000 square mile (mi^2) (93,000 square kilometer [km^2]) Point Mugu Sea Range (Sea Range) (Figure 1-1). The Sea Range currently supports test and evaluation of sea, land, and air weapons systems as well as various categories of training activities. This testing and training is addressed in the March 2002 Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for the Point Mugu Sea Range (Department of the Navy [Navy] 2002). The EIS/OEIS addressed various forms of countermeasures testing and training. The Navy subsequently prepared an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) (January 2010) to extend its test, evaluation, and training capability to include light amplification by stimulated emission of radiation (laser) operations on the Sea Range, including San Nicolas Island (SNI) (Navy 2010). Lasers and other systems designed to function in a defensive or pre-emptive manner, to intercept, deflect, deceive, deactivate, or destroy approaching threats, are 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. Countermeasures testing and training in this EA includes directed energy (i.e., high-energy lasers [HEL] and high-power microwave [HPM] systems), small arms, small missiles, flares, and electronic support systems in nearshore areas at Point Mugu – including Restricted Area 2519 (R-2519) – and at SNI – including Restricted Area (R-2535). For the purposes of this EA, small arms include bullets fired from close-in weapon systems (CIWS) and similar artillery as well as projectiles up to 5 inches (13 centimeters [cm]) in diameter. Restricted Areas are airspace over United States (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. R-2535 includes all of SNI and the coastal waters within approximately 2 to 3 nautical miles (nm) (3.7 to 5.6 kilometers [km]) of the island's shoreline. Effective countermeasures systems testing and training requires realistic conditions such as that which exists on the Sea Range over land, in littoral (i.e., nearshore) environments, and in the open ocean.

This EA addresses the potential environmental impacts of the aforementioned countermeasure activities on the Sea Range, at Point Mugu, and at SNI. 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 Instruction 5090.1C Change Transmittal 1, *Environmental and Natural Resources Program Manual* (Navy 2011c).

Figure 1-1
Regional Location
Point Mugu Sea Range

1.2 PURPOSE AND NEED

1.2.1 Purpose

The purpose of the proposed action is to provide an overall capability for countermeasures testing and training on the Sea Range, at Point Mugu, and at SNI. Both Point Mugu and SNI have restricted airspace separate from the Sea Range that is also included in the proposed action, respectively known as R-2519 and R-2535. This would support Department of Defense (DoD) directives on the development of countermeasures systems vital to the National Defense through Research, Development, Acquisition, Testing, and Evaluation (RDAT&E) applications. These requirements are for operationally realistic engagements in both maritime and land environments. The proposed countermeasures testing and training would support these requirements.

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 countermeasures 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 countermeasures testing and training is needed to support this mission.

Five major types of test scenarios currently occur on the Sea Range: 1) air-to-air operations, 2) air-to-surface operations, 3) surface-to-air operations, 4) surface-to-surface operations, and 5) subsurface-to-surface operations (referring to subsurface missile launches). The term "surface" can refer to ocean surface or to land. Each type of test scenario was originally analyzed in the Point Mugu Sea Range EIS/OEIS (Navy 2002), including a variety of countermeasures components. Newer types of laser operations were analyzed separately in an EA/OEA (Navy 2010). Subsequently, additional types of countermeasures activities have been proposed for the Sea Range. The proposed countermeasures elements fall into each of the test scenario categories except for subsurface-to-surface.

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) 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 (Chief of Naval Operations Instructions [OPNAVINST] 5100.27B, 2 May 2008) and any revisions adopted in the future. 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 no new construction and only temporary increases of personnel during test events. Considering the nature of the proposed action, there would be negligible and insignificant impacts to the following resource/issue areas:

- **Onshore Water Quality**. No non-marine surface waters are present at the proposed target or shooter locations. No construction activities would occur. All NAWCWD activities would conform to the installation storm water pollution prevention plan and associated best management practices (BMPs) which include eliminating discharges of sediment and other pollutants that could affect water quality.
- **Aesthetics and Visual Resources**. Activities at the proposed shooter and target sites would be consistent with the aesthetics and visual resources of testing and training activities that occur at these locations.
- **Socioeconomics**. The proposed action would temporarily bring new personnel to Ventura County to support the proposed countermeasures testing and training activities. 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 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**. No new infrastructure is needed to support the proposed action. Proposed activities would require relatively small increases of water usage and have negligible effects on other users of base infrastructure and utilities. 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.

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

- Noise
- Biological Resources
- Cultural Resources
- Airspace, Land, and Water Use
- Public Safety
- Hazardous Materials

1.5 DOCUMENT ORGANIZATION

The organization of this EA is as follows:

- Chapter 1 defines the purpose of and need for the proposed action.
- Chapter 2 describes the proposed action 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 contains a detailed list of proposed countermeasures elements analyzed in this EA.
- Appendix B provides the Record of Non-Applicability (RONA) and additional air quality data.
- Appendix C contains agency correspondence related to the EA.
- Appendix D contains a public comment summary for 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 (MMPA) (16 USC 1361 et seq., as amended)
- Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq.)
- Migratory Bird Treaty Act (MBTA) (16 USC 703 et seq.)
- Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*
- National Historic Preservation Act (NHPA) (16 USC 470 et seq.)
- Coastal Zone Management Act (16 USC 1451 et seq.)

Each of the above regulatory requirements is addressed within the context of the relevant section of the EA. As defined, the proposed action does not require permits or authorizations from other agencies or consultation with the National Marine Fisheries Service (NMFS). The Navy has consulted with the U.S. Fish and Wildlife Service (USFWS) in accordance with Section 7 of the ESA. Compliance with the federal Coastal Zone Management Act has been accomplished through consultation with the California Coastal Commission and the subsequent review thereof (see Appendix C).

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CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

The proposed action is to implement testing and training use 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 components addressed in this EA are either newer types of countermeasure systems not addressed in previous NEPA documents or are countermeasure systems that would be used at locations not addressed in previous NEPA documents. Components of the proposed action include:

- *Directed Energy.* This consists of HEL and HPM systems as described in the EA/OEA for Laser Testing/Training, Point Mugu Sea Range (Navy 2010). The directed energy system typically has a shooter location and a target location. Shooter locations addressed in this EA include land, ocean surface, and airborne platforms. Lasers include certain lethal and non-lethal laser systems. The intended use of the lethal HEL systems is to negate other unmanned systems; they are not intended to engage personnel.
- *Small Arms*. For the purposes of this EA, this consists of bullets and small projectiles. Up to 35-millimeter (mm) caliber bullets would be fired from land at aerial targets operating at normal flight altitudes. Projectiles up to 5 inches (13 cm) in diameter would be fired from ships at sea at aerial and sea surface targets. Small arms used in this project are not intended to engage personnel.
- *Missiles.* For the purposes of this EA, this consists of small missiles such as rocket-propelled grenades (RPGs), Manned Portable Air Defense System (ManPADS), and other small missile or rocket systems as described in Section 2.2.1.
- *Flares.* This consists of flares dispensed from aircraft.
- *Electronic Support Systems.* These consist of radars, recording systems (electrical, optical, and infrared) mounted on vehicles or tripods, acoustic systems (land, sea surface, and airborne), and passive detection systems.

No construction, excavation, grading, or filling would occur for any of these project components. Test events would be conducted at a variety of proposed test sites. Appendix A provides a complete listing of all proposed activities addressed in this EA.

2.2 PROPOSED ACTION

2.2.1 Preferred Alternative

The preferred alternative involves multiple categories of testing and training activities. In all cases, these activities will involve using the systems as countermeasures against approaching aerial or surface targets. The systems would either destroy the target or prevent the target from continuing on its approach path. In many cases, the testing and training would only determine the system's ability to actively track an approaching target and actual firing of the system would not occur. In most cases, these systems and testing and training activities will not increase the overall level of activity but rather represent a shift in purpose towards countermeasures and/or a change in location from those previously analyzed. Figures 2-1 and 2-2 show the locations of the preferred alternative at Point Mugu and SNI, respectively. Details on the types of activities within each category are summarized and compared to existing levels of activity in

Table 2-1. Table 2-2 summarizes the specific activities proposed to occur at each project location. Tables 2-3 and 2-4 respectively summarize the electric fields associated with proposed narrowband HPM and wideband HPM systems.

The CIWS 20-mm small arms rounds and similar artillery would be aimed at aerial targets and travel up to 7 nm (13 km) offshore. Small arms rounds from CIWS are encased in plastic "sabots" and are attached to aluminum "pushers", both of which fall off from the rounds after being fired. CIWS sabots would fall 100-300 feet (ft) (30-90 meters [m]) from the firing point, and pushers would fall 300-890 ft (30-270 m) from the firing point. It is estimated that 60-150 rounds would be fired in a typical 1 to 2-second burst. CIWS firing could occur at any of the proposed small arms locations at Point Mugu and SNI; potential sabot/pusher debris patterns are shown in Figures 2-3 and 2-4, respectively.

A range of small missiles and rockets are proposed for use in this project. Examples vary from shoulder fired weapons including those in the scale of RPGs and ManPADS, to tripod-launched man-portable missiles such as the Spike missile and not exceeding the scale of the Rolling Airframe Missile (RAM). RPGs are shoulder-fired rockets equipped with an explosive warhead. RPGs vary from around 40 mm to 100 mm in size with ranges on the order of 330-1,640 ft (100-500 m). ManPADS are shoulder-launched surface to air missiles designed to target low-flying aircraft. ManPADS are 70 mm in diameter and 3-5 ft (1-1.5 m) long with a maximum range of approximately 14,800 ft (4,500 m). Spike missiles are tripod launchable guided missiles. Spike missiles are 170 mm in diameter and are approximately 5 ft (1.5 m) long with a range from 2,600 ft (800 m) for the Spike-SR to a maximum of 16 miles (25 km) for the Spike-NLOS (non-line-of-site) model. RAM is a small, lightweight, infrared homing surface-to-air missile usually mounted in a multi-barrel launcher capable of firing up to 21 missiles in sequence. RAM missiles are 127 mm in diameter and approximately 9 ft (2.8 m) long with a maximum range of 5.6 miles (9 km). The above examples provide the range of missile and rocket sizes proposed for use in this project.

2.2.2 Personnel

Personnel requirements for each event would vary by the type of test. Similar to the previous EA/OEA for laser testing (Navy 2010), project personnel could include approximately 40 persons currently working at NAWCWD Point Mugu and residing locally, plus an additional 10-30 temporary personnel during testing and training activities who would reside in military housing or local rental accommodations. One two-week event each year would involve up to 600 personnel, including personnel currently working at NBVC.

2.2.3 Safety Procedures

The Sea Range has established safety procedures as described in the Sea Range EIS/OEIS (Navy 2002), and these procedures would be followed for countermeasures testing and training. Additional safety procedures were identified for directed energy (laser) systems in the laser EA/OEA (Navy 2010). These procedures would also be implemented as appropriate. Since potential hazards would vary with each scenario, each test event would be managed on a case-by-case basis to eliminate or reduce any potential risks. Safety procedures are described in Section 3.0.2.1-F of the EIS/OEIS and in Section 2.1.7 of the laser EA/OEA. All test events 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).

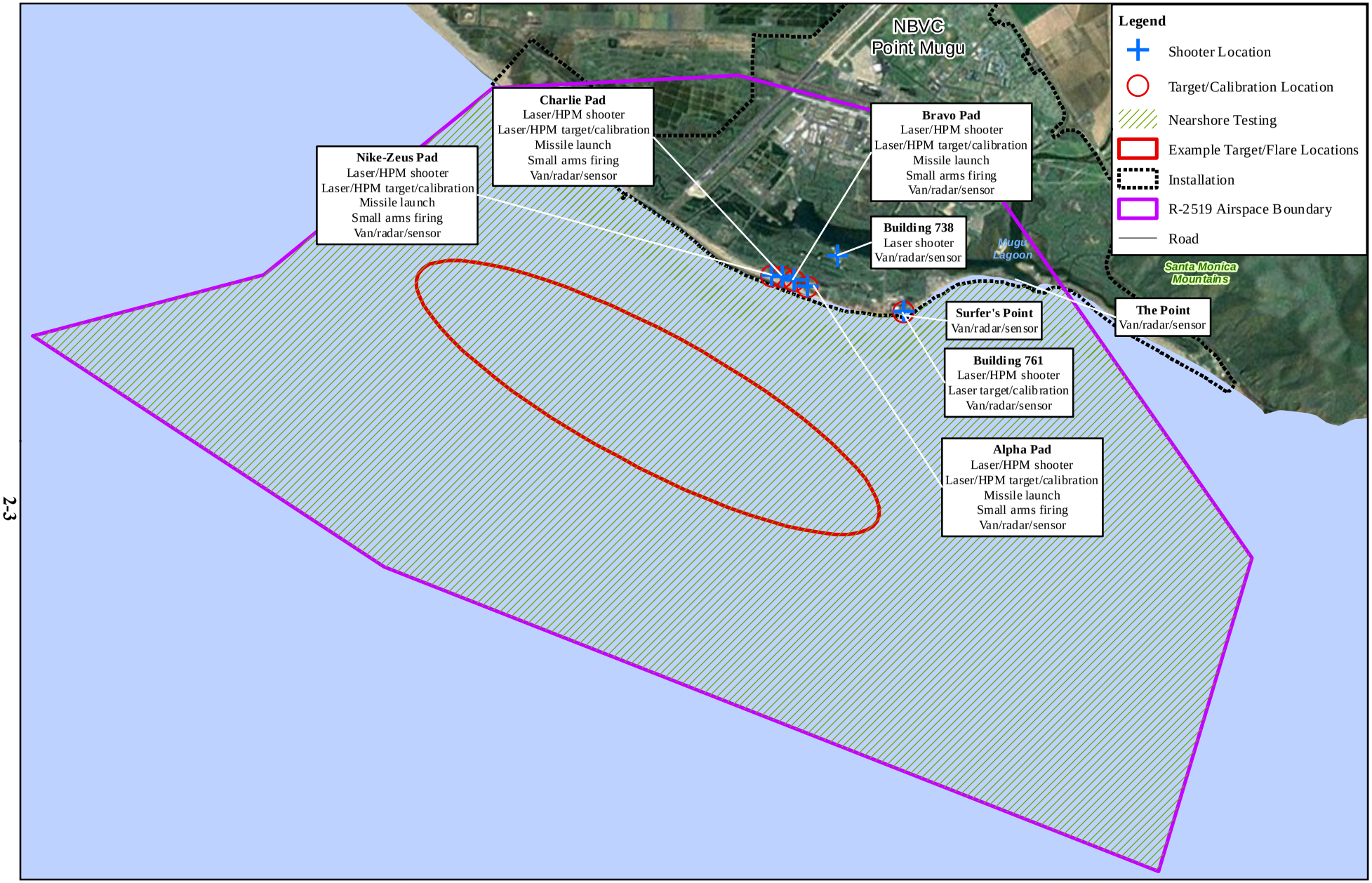
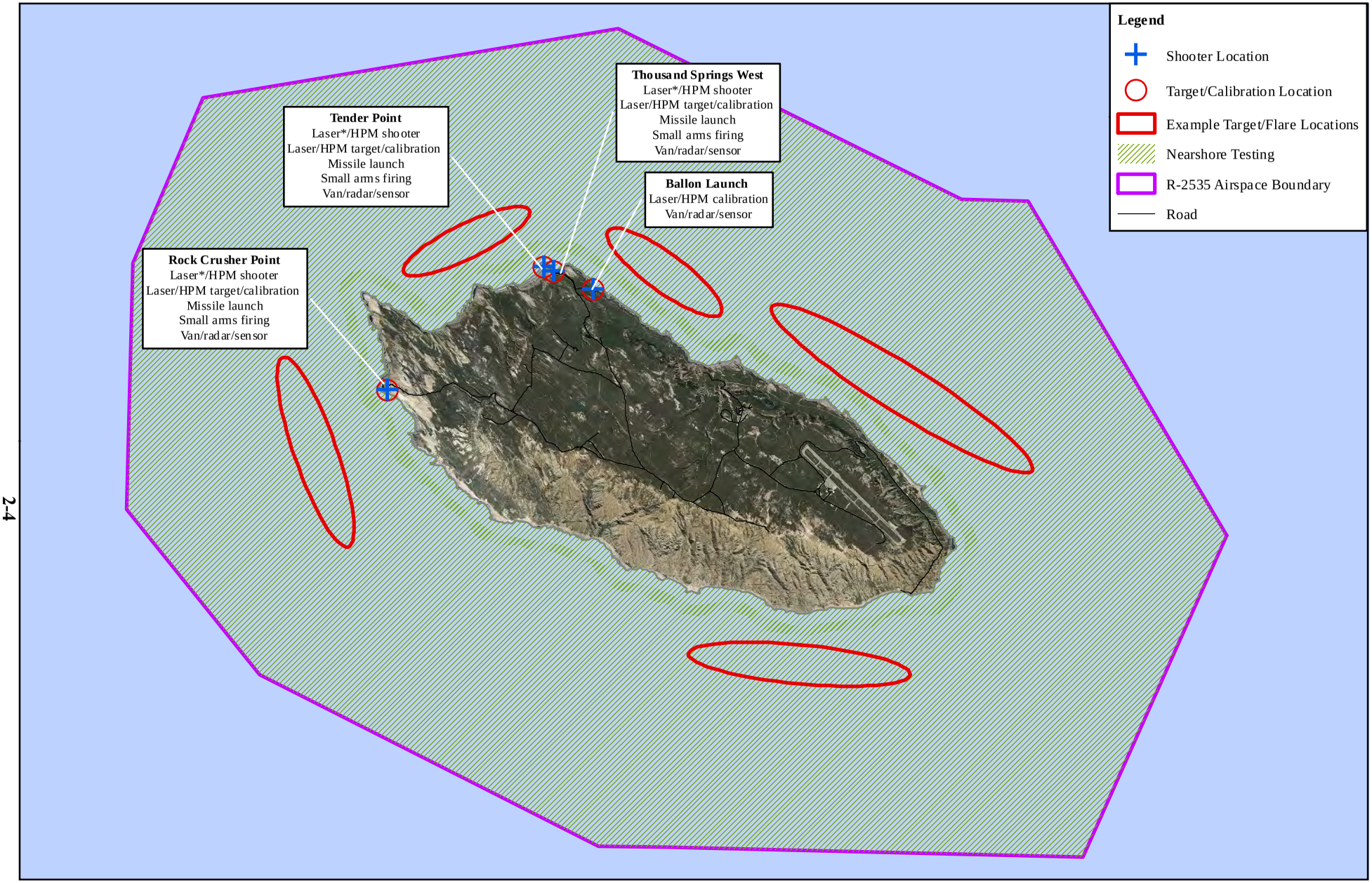


Figure 2-1
Proposed Countermeasures Locations: Point Mugu

Note: Details on proposed action components are presented in Tables 2-1 and 2-2.



0 1 2 Kilometers

0 1 2 Miles

*Analyzed in previous NEPA document.

Note: Details on proposed action components are presented in Tables 2-1 and 2-2.

Figure 2-2
Proposed Countermeasures Locations: San Nicolas Island

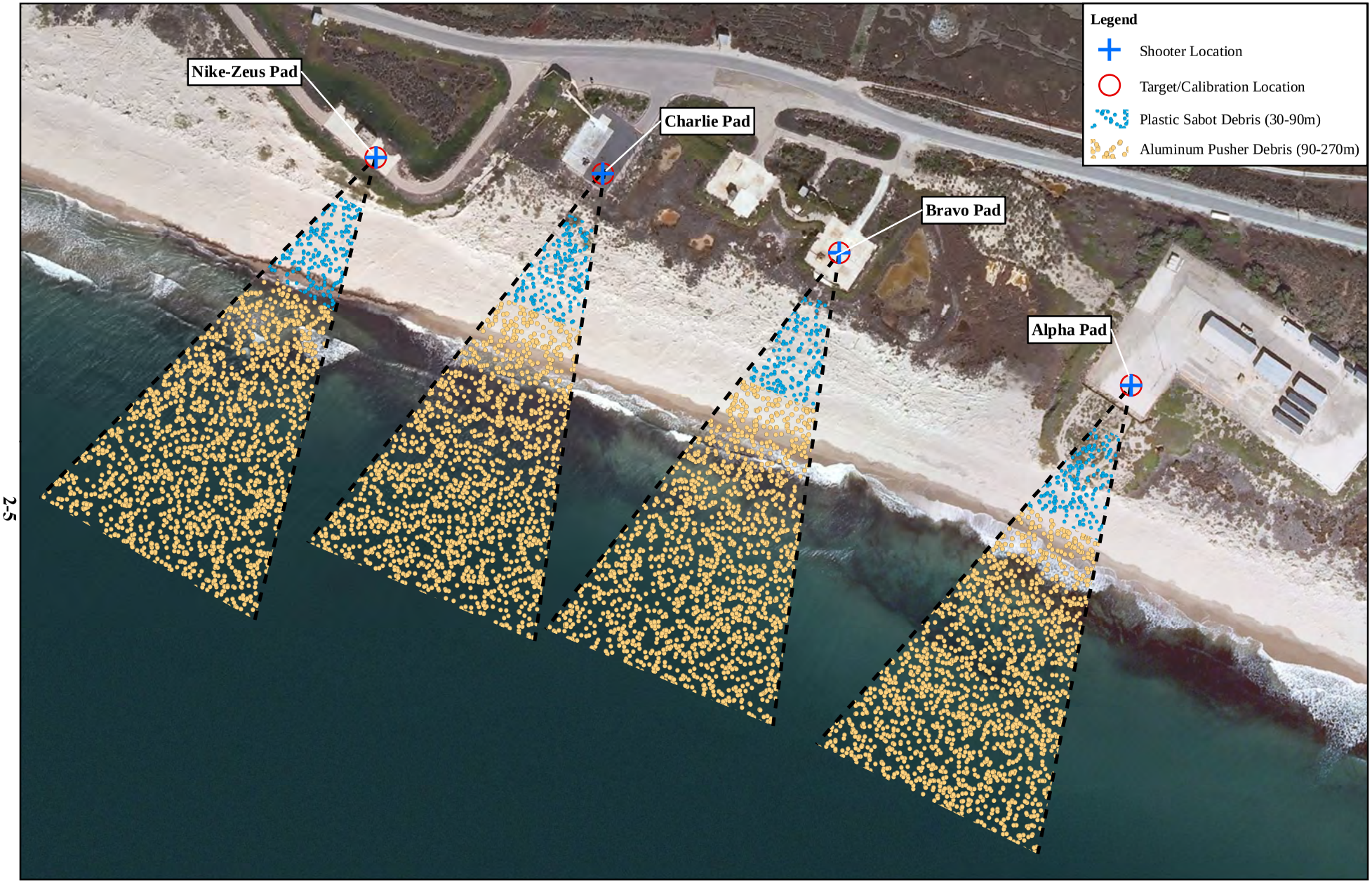


Figure 2-3
Proposed CIWS Locations at Point Mugu

Note: Details on proposed action components are presented in Tables 2-1 and 2-2.

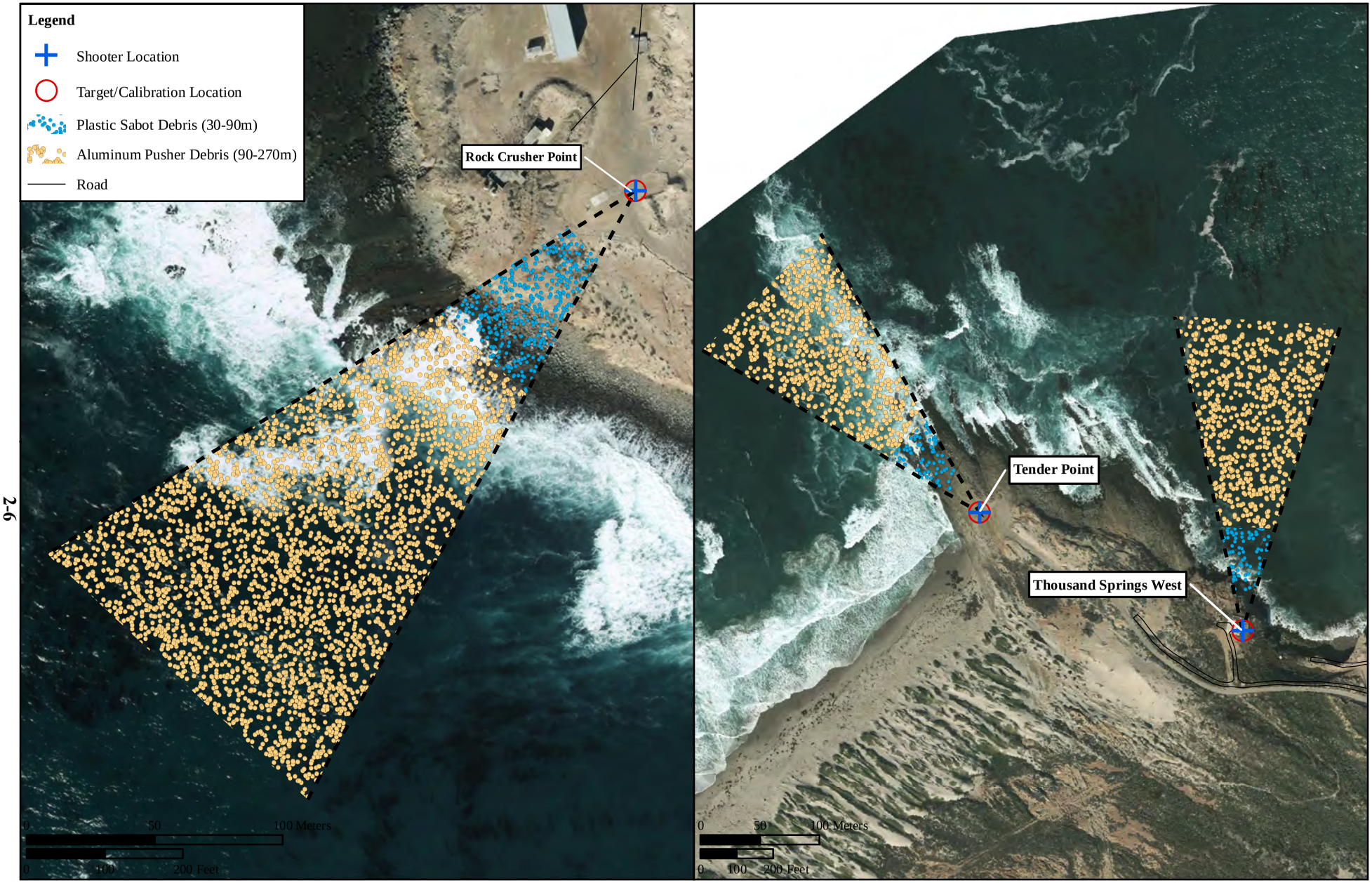


Figure 2-4
Proposed CIWS Locations at San Nicolas Island

*Analyzed in previous NEPA document.
Note: Details on proposed action components are presented in Tables 2-1 and 2-2.

Table 2-1. Activities Descriptions for the Preferred Alternative and Action Alternatives (also see Appendix A for Preferred Alternative Description).

Category	Preferred Alternative		Alternative 2 and 3 Differences from Preferred Alternative		No-Action
	Components	Activities/Tempo	Alternative 2 (Point Mugu Only)	Alternative 3 (SNI Only)	Existing Tempo (sources listed)
Main Actions					
Directed Energy – Laser	• Power: up through a maximum of 1 megawatt (MW) (average) for lethal lasers; 1 kilowatt (kW) (average) for non-lethal lasers. • Wavelength: 180 to 14,000 nanometers • Lethal: Class 1, 2, 3, and 4 lasers. Laser types operated would include: solid-state, fiber, carbon dioxide, free electron, and closed-cycle chemical, including continuous wave, pulsed, and ultra-short pulse. • Non-lethal: directional infrared countermeasures, optical dazzlers, ultraviolet systems, infrared systems, pulsed lasers, continuous wave lasers, alignment/calibration lasers, laser range finders, tracking and designating lasers. • Surface targets: Standard Container Express boxes (i.e., metal bulk shipping containers) and ocean targets (mobile ship target, high speed maneuvering surface target, zodiac-type boat target). • Airborne targets: Unmanned Aerial Vehicles in Warning Areas of the Sea Range, R-2519 R-2535, or other areas of the Sea Range. • Target constituents from any unrecoverable surface or air target are assumed to disperse evenly across the ocean underlying R-2519 and/or R-2535 (shown in Figures 2-1 and 2-2), as appropriate by alternative.	• Calibration: Each event would involve the directed energy system at the shooter site being aimed and shot at one or more of the calibration sites. Shooter/Target Sites: Various locations on land, on the ocean surface in the Sea Range, or on aircraft. • Test/Training: Once the system is calibrated, it would be aimed at one or more targets to conduct system tests and training. • Annual Tempo: Up to 10 events and 70 days/year within existing tempo and in combination with HPM. • Duration: 4 hours per day • Usage per day: 40 times. • Up to 5 surface and 10 airborne targets per event.	• All activities would still occur; SNI activities would shift to Point Mugu.	• All activities would still occur; Point Mugu activities would shift to SNI.	• Annual Tempo: Up to 125 days/year • Duration: 4 hours per day • Usage Per Day: 40 times • Up to 49 surface and 41 airborne targets per year (Navy, 2010)
Directed Energy – HPM	• Transmitter Operating Mode: continuous wave or pulsed • Antenna types: various types. These include both narrow band and impulse radiating designs. • Targets and target constituents: same as laser	• Calibration, shooter/target sites, and types of activities are similar to laser activities described above. • Annual Tempo: Up to 10 events and 70 days/year in combination with Laser events. • Duration: 4 hours • Usage per day: 30 times.	• All activities would still occur; SNI activities would shift to Point Mugu.	• All activities would still occur; Point Mugu activities would shift to SNI.	• No existing HPM tempo. Proposed HPM use in this EA would occur within existing Directed Energy - Laser tempo.

Category	Preferred Alternative		Alternative 2 and 3 Differences from Preferred Alternative		No-Action
	Components	**Activities/Tempo**	**Alternative 2 (Point Mugu Only)**	**Alternative 3 (SNI Only)**	**Existing Tempo (sources listed)**
Small Arms	• Up to 35-mm caliber bullets fired from Point Mugu and from SNI • Projectiles up to 5 inches in diameter fired from ships at sea • Surface targets: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type • Airborne targets: Fixed/rotary wing, unmanned aerial system (UAS), Vertical Lift • Constituents from 5-inch rounds are assumed to disperse evenly across the entire Point Mugu Sea Range. Constituents from all targets and all other rounds are conservatively assumed to disperse evenly across the ocean within 1 nm of shore under R-2519 and/or R-2535 (shown in Figures 2-1 and 2-2), as appropriate by alternative.	• Small caliber to 0.50 caliber: 5 events/year; up to 1,000 rounds/event. Weight/projectile: 0.1 pounds (lbs). • 20-mm rounds: 5 events/year; up to 1,500 rounds/event. Weight/projectile: 0.22 lbs. (Tungsten). • 35-mm rounds: 3 events/year; up to 800 rounds/event. Weight/projectile: 1.1 lbs. • 5-inch shells: 2 events/year; up to 100 rounds/event. Weight/projectile: 55 lbs. • Targets: Up to 3 surface and 10 airborne targets per event.	• All activities would still occur; SNI activities would shift to Point Mugu.	• All activities would still occur; Point Mugu activities would shift to SNI.	• Small caliber to 0.50 caliber: Up to 50 events per day, seasonal. • CIWS 20-mm: 3,000 rounds per year (Navy, 2002) • 7.62 mm to 5-inch: 10,000 rounds per year (Navy, 2002) • Targets summarized below
Missiles	• RPGs • ManPADS • Missiles not exceeding the scale of Rolling Airframe Missiles (RAM) • Surface targets: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type • Airborne targets: Fixed/rotary wing, UAS, Vertical Lift • Area of Use: the beach area underlying R-2519 and SNI • Constituents from any unrecoverable missiles and targets are assumed to disperse evenly across the entire Point Mugu Sea Range.	• RPGs: 5 events/year; up to 50 RPGs/event. • ManPADS: 5 events/year; up to 10 ManPADS/event. • Surface-to-air missiles: 15 events/year; up to 8 missiles/event. • Air-to-surface missiles: 15 events/year; up to 8 missiles/event. • Rockets: 5 events/year; up to 50 rockets/event. • Targets: Up to 3 surface and 10 airborne targets per event.	• All activities would still occur; SNI activities would shift to Point Mugu.	• All activities would still occur; Point Mugu activities would shift to SNI.	• 405 missiles per year (Navy 2002) • Targets summarized below
Flares	• Composition: aluminum, boron, iron, potassium, magnesium, nickel, nitrogen trioxide • Nearshore, divided evenly between Point Mugu and SNI. • Constituents from flares are conservatively assumed to disperse evenly across all ocean waters within 1,000 ft of shore, under R-2519 and/or R-2535 (shown in Figures 2-1 and 2-2), as appropriate by alternative.	• Annual tempo: 40 days (160 hours). Based on 8 weeks/year, 5 days/week, 4 hours/day. Maximum tempo approximately 300 hours • Usage per event: 1-12 flares per pack, 30-300 flares per flight • Burn completely before hitting surface • Not dropped over land • Aircraft conducts racetrack patterns offshore (no closer than 1,000 ft) • Vans positioned onshore 3,000-6,000 feet (slant distance) from where flares are dispensed to analyze flare characteristics	• All activities would still occur; SNI activities would shift to Point Mugu.	• All activities would still occur; Point Mugu activities would shift to SNI.	• Annual tempo: 26 days (Navy, 2002) • Usage per event: 376 flares and bundles of chaff combined (Navy, 2002)

Category	Preferred Alternative		Alternative 2 and 3 Differences from Preferred Alternative		No-Action
	Components	**Activities/Tempo**	**Alternative 2 (Point Mugu Only)**	**Alternative 3 (SNI Only)**	**Existing Tempo (sources listed)**
Electronic Support Systems	• Radars, including jammer radars (part of L-STAR radar group), Patriot radars, Sentinel radars. • Recording systems (electrical, optical and infrared) mounted on vehicles of tripods • Acoustic systems (airborne) • Passive detection systems	• Proposed countermeasures activities would partially use existing electronic support systems at Point Mugu and SNI • Additional mobile electronic support systems would be placed at various locations for each event and would be removed following event completion • Locations are listed in Table 2-2	• All activities would still occur; SNI activities would shift to Point Mugu.	• All activities would still occur; Point Mugu activities would shift to SNI.	
Supportive Actions Summary					
Aircraft Sorties	• All test aircraft, including but not limited to the V-22, C-130, F-18, AH-1, and the H-58, may be used for all main action components.	• 150 manned and 250 unmanned aircraft sorties/year (total, including uses noted above). Of these, 120 manned and 200 unmanned aircraft sorties/year would be located at Point Mugu. The remaining 30 manned and 50 unmanned sorties/year would be located at SNI.	• All activities would still occur; SNI activities would shift to Point Mugu.	• All activities would still occur; Point Mugu activities would shift to SNI.	• 4,084 aircraft sorties/year (Navy, 2002) • 36,000 Mugu aircraft operations per year (NBVC 2012 Data) • 2,688 approximate SNI aircraft operations per year (NBVC 2012 Data)
Ship Activity	• Support vessels (e.g.: the Diane G, a 105-ft tug with a 19x45 ft loadable aft deck used for target salvage and recovery) as well as Naval vessels (from the Destroyer to the Aircraft Carrier), may be used for all main action components.	• 15 events/year; 3 ships/event (total, including uses noted above).	• All activities would still occur; SNI activities would shift to Point Mugu.	• All activities would still occur; Point Mugu activities would shift to SNI.	• 960 ships per year, including support vessels (Navy, 2002)
Targets	• Sea Surface targets include: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type • Airborne targets include: Fixed/Rotary wing, UAS, Vertical Lift	• 280 sea surface targets (total, including all potential uses noted above). • 800 airborne targets (total, including all potential uses noted above).	• All activities would still occur; SNI activities would shift to Point Mugu.	• All activities would still occur; Point Mugu activities would shift to SNI.	• 93 surface targets (Navy, 2002) • No data for small airborne targets.
Personnel	• Large (600-person, 2-week duration) events and small (30- to 40-person, 1-week duration) events.	• One large event (at Point Mugu) per year. • Five small events split between Point Mugu and SNI per year.	• All activities would still occur; SNI activities would shift to Point Mugu.	• The large event would not occur due to lack of infrastructure at SNI. All small events would occur at SNI.	• 17,307 personnel are presently employed at NBVC (NBVC, 2013)

Note 1: Tables 2-3 and 2-4 respectively summarize the electric fields associated with proposed narrowband HPM and wideband HPM systems.
Note 2: Point Mugu locations include beach areas and all water regions under the R-2519 airspace up to 0.5km from shore.
Note 3: SNI locations include Tender point, Thousand Springs, West Thousand Springs, Rock Crusher, all launch pads, and nearshore waters within the confines of the R-2535 airspace.

Table 2-2. Existing and Proposed Activities by Location

Activity	Shooter Site		Target Site		Calibration Site		Missile Launch		Small Arms Firing		Flares		Electronic Support Systems		Notes
Location	Exist	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	
POINT MUGU															
 *Alpha Pad*		L HPM		L		√		√		√			√	√	• Directed energy shooter site, small arms firing, missile launches • Non-lethal laser target site (including calibration) • Placement of vans with radar/sensors during offshore flare testing and training
 *Bravo Pad*		L HPM		L		√	√	√		√			√	√	• Same as Alpha Pad
 *Charlie Pad*		L HPM		L		√	√	√		√			√	√	• Same as Alpha Pad

Notes: Locations are shown in Figures 2-1 and 2-2; details on each activity are in Table 2-1. All land-based laser/HPM target sites are also calibration sites.
Abbreviations: CIWS = close-in weapon system, ESS = electronic support systems, HPM = high-powered microwave, L = laser, NA = not applicable.

Activity	Shooter Site		Target Site		Calibration Site		Missile Launch		Small Arms Firing		Flares		Electronic Support Systems		Notes
Location	Exist	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	
 *Nike-Zeus Pad*		L HPM		L		√		√		√			√	√	• Same as Alpha Pad
 *Building 738*		L											√	√	• Non-lethal directed energy shooter site
 *Building 761*		L HPM		L		√							√	√	• Directed energy shooter site • Non-lethal (1 kW) and lethal and non-lethal (1 MW) target site (including calibration) lasers
 *Surfer's Point*													√	√	• Placement of vans with radar/sensors during offshore flare testing and training

Notes: Locations are shown in Figures 2-1 and 2-2; details on each activity are in Table 2-1. All land-based laser/HPM target sites are also calibration sites.
Abbreviations: CIWS = close-in weapon system, ESS = electronic support systems, HPM = high-powered microwave, L = laser, NA = not applicable.

Activity	Shooter Site		Target Site		Calibration Site		Missile Launch		Small Arms Firing		Flares		Electronic Support Systems		Notes
Location	Exist	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	
 *The Point*													√	√	• Placement of vans with radar/sensors during offshore flare testing and training
SAN NICOLAS ISLAND															
 *Rock Crusher*	L	L HPM CIWS	L	L HPM	√	√	√	√		√			√	√	• HPM shooter site, small arms firing • HPM target site (from ocean surface and airborne platforms in Sea Range) • Placement of vans with radar/sensors during offshore flare testing and training • CIWS firing, rounds encased in sabots
 *Tender Point*	L	L HPM	L	L HPM	√	√		√		√			√	√	• HPM shooter site, small arms firing, missile launches • HPM target site (from ocean surface and airborne platforms in Sea Range) • Placement of vans with radar/sensors during offshore flare testing and training

Notes: Locations are shown in Figures 2-1 and 2-2; details on each activity are in Table 2-1. All land-based laser/HPM target sites are also calibration sites.
Abbreviations: CIWS = close-in weapon system, ESS = electronic support systems, HPM = high-powered microwave, L = laser, NA = not applicable.

Activity	Shooter Site		Target Site		Calibration Site		Missile Launch		Small Arms Firing		Flares		Electronic Support Systems		Notes
Location	Exist	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	
 *Thousand Springs West*	L	L HPM	L	L HPM	√	√		√		√			√	√	• Same as Tender Point
 *Balloon Launch*					√	√							√	√	• Placement of vans with radar/sensors during offshore flare testing and training
OCEAN SURFACE															
Sea Range (> 3 nm from shore)	L	L HPM	NA*	NA*							NA*				• Surface targets covered by EIS, not analyzed in this EA • HPM directed energy shooting from ships and airborne platforms to aerial targets and surface targets > 3 nm from shore • HPM directed energy (HPM and non-lethal lasers) shooting from ships (> 3 nm from shore) to shore locations at Point Mugu and SNI

** Covered in EIS*

Notes: Locations are shown in Figures 2-1 and 2-2; details on each activity are in Table 2-1. All land-based laser/HPM target sites are also calibration sites.
Abbreviations: CIWS = close-in weapon system, ESS = electronic support systems, HPM = high-powered microwave, L = laser, NA = not applicable.

Activity	Shooter Site		Target Site		Calibration Site		Missile Launch		Small Arms Firing		Flares		Electronic Support Systems		Notes
Location	Exist	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	
 *Nearshore Testing and Training (R-2519 off Point Mugu)*		L		L HPM Missile Small Arms								√			• Lethal and non-lethal directed energy, small arms, and missiles firing at aerial targets flying >820 ft (250 m) from shore • Small arms firing at surface targets <1 nautical mile from shore Flares (>1,000 ft (305 m) off shore)
 *Nearshore Testing and Training (R-2535 off SNI)*	L	L HPM	Missile	L HPM Missile Small Arms								√			• HPM directed energy, small arms, and missile firing at aerial targets flying >820 ft (250 m) from shore; Small arms firing at surface targets <1 nautical mile from shore • Flares (> 1,000 ft (305 m) off shore) [*Note: assume off western and southwestern areas of SNI for firing from shore]

** Covered in EIS*

Notes: Locations are shown in Figures 2-1 and 2-2; details on each activity are in Table 2-1. All land-based laser/HPM target sites are also calibration sites.

Abbreviations: CIWS = close-in weapon system, ESS = electronic support systems, HPM = high-powered microwave, L = laser, NA = not applicable.

Table 2-3. 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 (TW)
400 – 1000	100	50	40	333
1000 – 4000	400	200	45	5333
4000 – 5999	1000	1200	55	33333
6000 – 13999	2500	1200	55	208328
14000 – 27999	2500	1200	55	208328
28000 – 40000	500	200	60	8333

Table 2-4. 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		

2.2.4 Wildlife Protection

Countermeasure activities will be implemented near concentrations of sensitive wildlife species. Western snowy plovers, California least terns, light-footed clapper rails, and Belding's savannah sparrows are present at Point Mugu on the beaches and marsh adjacent to the pads Alpha, Bravo, Charlie and Nike-Zeus, as well as the beach adjacent to Building 761 and 738. Snowy plovers also occur adjacent to Tender Point and Rock Crusher. Marine mammals (northern elephant seals, California sea lions, and southern sea otters) are present on the beaches and/or in the nearshore waters adjacent to Rock Crusher and Tender Point. A harbor seal haulout location is within the estuary at Point Mugu, west of the mouth of Mugu Lagoon. Harbor seals are also present in areas on SNI within R-2535 and can haul out near any of the proposed sites. Wildlife protection measures will be required during testing and training operations depending on the type of activity, location of the activity, and the time of year. Personnel will be required to stay off sites when testing and training or associated activities are not being conducted during periods of environmental closure (e.g., snowy plover nesting season).

Conservation measures to protect listed birds for the CIWS and other similar small arms are as follows:

1) CIWS testing and training will not occur when snowy plover, least tern, or light-footed clapper rail nests are within 500 ft (152 m) of the operational area.

2) Pre- and post- operation surveys for all listed species nesting within 1,000 ft (305 m) of testing or training sites will be conducted to confirm no abandonment occurred due to testing or training.

3) The CIWS will only be fired at aerial targets flying at normal operating altitudes well above the horizon to reduce potential of striking typically low-flying birds such as snowy plovers.

4) Before the CIWS is fired, the Navy will require as standard procedure that no listed species or other wildlife are present between the shooter site and the target or immediately behind the target. A qualified biologist will monitor the hazard area to ensure that the CIWS system is not fired if and when wildlife is present in the line of fire or expected debris pattern.

5) To maintain integrity of listed species habitat, following each CIWS test event a search will be conducted to pick up and properly dispose of debris that has fallen between the firing point and the water's edge.

6) If wintering snowy plovers are roosting adjacent to a selected pad at Point Mugu or Tender Point when utilizing CIWS, the location would change to an alternative pad/location if operationally feasible.

Conservation measures to protect marine mammals are as follows:

1) 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 and training activities at these sites, a qualified biologist familiar with the behavior of marine mammals and their use of shoreline habitats in the testing and training area will search for marine mammals within and adjacent to the testing and training area. Test activities will be postponed, relocated, and/or monitored by the qualified biologist as necessary to ensure that the activities do not result in any "take" (as defined under the MMPA) of marine mammals.

2) Testing and training activities will be scheduled to avoid the marine mammal breeding and pupping seasons whenever operationally feasible. When breeding/pupping marine mammals are within 100 yards (91 m) of proposed activities, access to the test facilities will be restricted to necessary operational activities only.

3) Missiles and targets will not be launched at low elevation on low azimuths that pass close to beach haulout sites.

4) Multiple missile or target launches in quick succession over haulout sites will be minimized, especially when young are present.

5) Testing and training activities will be scheduled to occur during daylight hours whenever operationally feasible.

6) 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.

Conservation measures to protect terrestrial listed species and other wildlife for all Countermeasures Operations are as follows:

1) A biologist will conduct regular nesting surveys of the affected area to determine location of nests prior to operations and to determine potential for disturbance due to operational activity and ensure if nests are found that all required protective measures are adhered to.

2) Countermeasures testing and training with a potential to impact snowy plover, least tern, or light-footed clapper rail nests will not be conducted within 500 ft (152 m) of active nests.

3) Pre- and post- operation surveys for all listed species nesting within 1,000 ft (305 m) of testing or training sites will be conducted to confirm no abandonment occurred due to testing or training. Observations will be made as close to the activity as operational and safety constraints allow.

4) If deemed safe by operational personnel, occupied nests visible within 1,000 feet (305 m) of countermeasure training or within 1,000-2,000 feet (305 - 610 m) of CIWS deployment would be monitored during operations to monitor behavior of incubating birds.

5) A Navy biologist will educate operational personnel about sensitive habitats and how to implement avoidance and minimization measures, delineate any areas adjacent to the site that should be avoided, and attend operationally related meetings as needed.

6) Before directed energy systems, missiles, and/or other projectiles are fired, the Navy will require as standard procedure that no listed species (or other wildlife) are present within the hazard area (which is specific to the type of system being used) between the shooter site and the target or immediately behind the target. A qualified biologist will monitor the hazard area to ensure that the countermeasures system is not fired if and when wildlife is present in the line of fire or expected debris pattern.

7) If operationally feasible, biologists will monitor adjacent light-footed clapper rail habitat when countermeasures with a potential to produce high decibel noise are utilized, to document any disturbance to clapper rails.

8) Within 24 hours of countermeasures testing or training that is planned to occur at Point Mugu when least terns are present (generally April 1 to September 15), a qualified biologist would identify locations where least terns are known or likely to forage in the nearshore area, and the Navy would ensure that targets are not deployed in or over those areas.

9) Surface targets will not be located within intertidal zones of SNI or Point Mugu.

10) Project vehicles and equipment will be restricted to existing concrete pads, leveled surfaces, and paved or dirt access roads.

11) At all nearshore testing and training sites, van placement for air-to-air flare activities will be restricted to existing concrete pads, leveled surfaces, and paved or dirt access roads that lead to nearby beaches; vehicles will not be allowed to drive onto any beach.

12) If night-time operations are necessary, permanent outdoor lighting will include shielding designs to ensure light entering adjacent nesting habitat is minimized.

13) At all times, trash collection containers will not be placed on site and the area will be maintained trash free to reduce attracting predators.

14) A Spill Prevention, Control, and Countermeasure 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 impacting listed species habitat, and to ensure that the cause of any spill is corrected.

15) Unless operationally necessary, personnel will not occupy the testing and training areas between dusk and dawn and the area will remain dark (no artificial lighting) to reduce the potential for adverse impacts to listed species in adjacent natural habitat.

16) All portable equipment brought to a test site will be removed upon test completion.

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.

Proposed countermeasures testing and training activities require a variety of air, marine, and land-based environments with adequate distance from non-participants to assure public safety. The Point Mugu Sea Range currently conducts similar types of activities with an established safety program in place. Point Mugu and SNI provide land-based support for these types of activities. The criteria below were used for developing the locations listed in Table 2-2:

- For directed energy, an over-the-ocean shot from a land-based shooter site to a land-based or airborne target is needed. Certain directed energy systems need to be tested in a realistic maritime environment, i.e., across water to a land-based, seaborne, or airborne target at a realistic engagement distance. A venue is needed where directed energy systems not yet ready for integration aboard a ship can be tested. Therefore, a coastal land-based shooter site is required that can attack an over-ocean airborne or seaborne target with HEL and HPM.
- Flare testing and training needs to be conducted in a nearshore environment. Vans with measurement equipment and other electronic support systems must be able to be placed on readily accessible locations on shore that are approximately 3,000-6,000 ft (914-1,829 m) (slant distance) from where flares are dispensed.
- Small arms firing and missile launches must occur at locations that can be cleared of personnel for safety purposes, and where offshore areas can be kept clear of non-participating ocean vessels and aircraft.
- Previously disturbed and/or used locations were given high priority to minimize potential disturbance to vegetation and wildlife.

These criteria were used to identify locations onshore for directed energy shooter/target sites, van placement for flare testing and training, small arms firing, missile launches, and ocean/airborne shooter/target configurations.

Since the purpose and need is to develop additional countermeasures testing and training capabilities on the Point Mugu Sea Range, locations other than the Sea Range, Point Mugu, and SNI were not considered. Other DoD locations are suitable and were considered for portions of countermeasures testing and training requirements. These locations include Eglin Air Force Base (Florida), Wallops Island (Virginia), Patuxent River (Maryland), and the Virginia Capes Operating Area. However, the Sea Range, in combination with Point Mugu (and R-2519) and SNI (and R-2535), provides the best 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 countermeasures testing and training. Therefore, the purpose of the proposed action is to accommodate countermeasures testing and training at the Sea Range, at Point Mugu (and R-2519), and at SNI (and R-2535).

2.4 ALTERNATIVES

The consideration of viable action alternatives focused on means to achieve the purpose and need. Three action alternatives were identified: use of all proposed locations at Point Mugu and SNI (preferred alternative), use of only the Point Mugu location, and use of only the SNI location. Each alternative is discussed further below.

2.4.1 Alternative 1: Point Mugu and San Nicolas Island Locations (Preferred Alternative)

Alternative 1 (the preferred alternative) involves use of all proposed locations at Point Mugu and at SNI. These locations are fully described in Table 2-2 and shown in Figures 2-1 and 2-2. This alternative would

allow the greatest diversity of test events, and would allow the Navy greater flexibility due to seasonality, weather, and other logistics associated with the countermeasures testing and training programs.

2.4.2 Alternative 2: Point Mugu Location

Alternative 2 involves use of proposed locations at Point Mugu but not those identified at SNI. These locations are fully described in the Point Mugu portion of Table 2-2 and shown in Figure 2-1. This alternative would allow a lesser diversity and flexibility of test events than Alternative 1. However, this alternative is carried forward for analysis in this EA.

2.4.3 Alternative 3: San Nicolas Island Location

Alternative 3 involves use of proposed locations at SNI but not those identified at Point Mugu. These locations are fully described in the SNI portion of Table 2-2 and shown in Figure 2-2. This alternative would allow a lesser diversity and flexibility of test events than Alternative 1. However, this alternative meets the basic purpose and need and is carried forward for analysis in this EA.

2.5 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the proposed countermeasures testing and training activities would not occur though existing activities would continue. However, this is not a viable option because the purpose and need for the proposed action would not be met. The consequences of the No-Action Alternative would be to lessen the capabilities for countermeasures testing and training on the Sea Range. This would slow the development of countermeasures technology, which is needed to counter increasingly sophisticated threats to military and non-military assets in coastal environments. Since other nations are rapidly developing laser technology for military applications, the No-Action Alternative would 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.

CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter includes a description of the existing environmental conditions within the Point Mugu Sea Range, Point Mugu and R-2519, and SNI and R-2535. 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. Unless otherwise stated, each resource description in this chapter is subdivided into three distinct areas to facilitate consistency with the proposed project components. These three areas are:

- *Point Mugu Sea Range*
- *Point Mugu and R-2519*
- *San Nicolas Island and R-2535*

Resource descriptions generally apply to all project sites within the specified project area. 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

Sea Range

The Point Mugu Sea Range includes several of the Channel Islands (see Figure 1-1). However, except for SNI (see Section 3.1.2), no land within the Sea Range will be affected as part of the proposed action.

Point Mugu and R-2519

Point Mugu is situated on the southern portion of the Oxnard Plain, a low-lying, near-level area with a very slight overall upward trend toward the north. The Oxnard Plain is composed largely of floodplain and marine sedimentary deposits. Unconsolidated sediments underlie Point Mugu to a depth of 1,500 ft (460 m). Sedimentary deposition in the form of fluvial (river), tidal, and beach processes continue to dominate the geologic setting of Point Mugu. Surface elevations at Point Mugu have an average upward slope of approximately 1 foot of elevation per 500 ft (1 m per 500 m) of distance from the tidal flats surrounding Mugu Lagoon. Most of the land within Point Mugu is less than 10 ft (3 m) above mean sea level (msl). The nearshore environment is dominated by sandy beaches, the topography of which is strongly influenced by ocean wave and wind action. (Navy 2002)

The soils at Point Mugu generally fall into four categories: fill material, coastal beach sands, tidal flats, and the loamy sands and silty clay loams typical of the Oxnard Plain. Fill material constitutes a large portion of the base soils, but its properties are not well documented. Most of the fill was dredged out of Mugu Lagoon and is presumed to have properties similar to the other soils at Point Mugu. Generally, soils at Point Mugu exhibit poor drainage and slow runoff characteristics, which contributes to ponding and occasional flooding. The erosion hazard is slight, except for the coastal beaches. Building 738 is located in tidal flat soils. All the other Point Mugu project sites are located in coastal beach sands. (Navy 2002)

San Nicolas Island and R-2535

SNI is a mesa with a gentle downward slope on the north side, and a steep downward slope on the south side. The long axis of the island is oriented northwest-southeast. The average surface elevation is 500 ft (152 m) above msl, with a maximum elevation of 908 ft (277 m) above msl. The most notable geographic feature of SNI is a series of well-defined marine terraces that are visible on the north side of the island. Elevations of the terraces range from below sea level to approximately 900 ft (274 m) (above msl. Topography on the island is further shaped by surface water runoff to the ocean. The ridgeline between the north and south sides of the island creates a north-south drainage divide for most of the length of the island. The steep southern slopes are deeply incised by the V-shaped canyons of ephemeral drainages. On the broader northern slopes, runoff creates steep walled gullies on the hillsides before spreading out on the marine terraces into indistinct channels among the dunes. The northwestern portion of the island also contains areas of dune topography with elevations in the range of 100 to 200 ft (30 to 60 m) above msl. (Navy 2002)

Soils are predominantly sedimentary in origin with sandstone as their major constituent; the soils also tend to contain a large concentration of ocean salts. The Balloon Launch (National Oceanic and Atmospheric Administration [NOAA]) site is located in dune sand soils, which occur on unvegetated upland areas and are characterized by an undulating or wavelike appearance with moderately steep slopes. The other SNI sites are located in coastal beach sands. These soils are composed of wind-deposited, quartzitic sands that are highly prone to both water (from coastal waves and alluvial processes) and wind erosion.

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 (Preferred Alternative)

Activities with the potential to affect geology and soils include target placement, van placement, and the activities of personnel before and after test events. No construction or grading activities are part of the proposed action. Under Alternative 1, there would be no excavation, grading, filling, or construction at Point Mugu or SNI. No new roads (paved or dirt) would be constructed to access the project sites. The site topography would not be altered in any way, nor would the placement of equipment affect site drainage or cause erosion. Portable equipment would be brought to the sites for the duration of the test period and then removed. At Point Mugu, all of the project sites have either an existing concrete pad or a filled and leveled surface to support project equipment and vehicle placement. Project vehicles and equipment would be restricted to the concrete pads, leveled surfaces, and access roads. At nearshore

testing and training sites at Point Mugu and SNI, van placement to monitor flare activities would be restricted to existing concrete pads, leveled surfaces, and paved or dirt access roads that lead to nearby beaches; vehicles would not be allowed to drive onto any beach. At all sites, activity would take place on existing concrete pads or packed soil in previously disturbed areas, and no activity would take place on beaches at either Point Mugu or SNI. Flares would be dispensed over water and would not come into contact with soils. With the exception of plastic sabots from the CIWS munitions, debris from small arms firing, missile launches, flares, and targets would fall into the nearshore waters of Point Mugu or the Sea Range and would not affect terrestrial resources. Long-term effects on soil properties are not expected because aluminum is an abundant component of rock and soil, and the plastic sabots are inert.

At SNI, established paved and dirt roads allow access to all project sites. All sites have an existing graded surface to support project vehicles and equipment. Project vehicles and equipment would be restricted to the leveled surfaces and access roads. At both Point Mugu and SNI, operational activities would not result in discharge of any ordnance onto the land surface. For laser and HPM directed at ground surface targets, the targets would be above-ground and would have no direct or indirect effects upon the land surface. With the exception of plastic sabots from the CIWS munitions, debris from small arms firing, missile launches, flares, and targets would fall into the nearshore waters of Point Mugu or the Sea Range and would not affect terrestrial resources. Long-term effects on soil properties are not expected because aluminum is an abundant component of rock and soil, and the plastic sabots are inert.

In summary, project vehicles and equipment would be limited to established developed surfaces and roads. Therefore, Alternative 1 would not have significant impacts to geology and soils.

3.1.2.3 Alternative 2

Alternative 2 involves use of proposed locations at Point Mugu but not those identified at SNI. The increased tempo of activities under this alternative at Point Mugu sites does not change the types or magnitudes of effects to this resource. Consequently, impacts of Alternative 2 are identical to those discussed for Point Mugu for Alternative 1. Therefore, Alternative 2 would not have significant impacts to geology and soils.

3.1.2.4 Alternative 3

Alternative 3 involves use of proposed locations at SNI but not those identified at Point Mugu. The increased tempo of activities under this alternative at SNI sites does not change the types or magnitudes of effects to this resource. Consequently, impacts of Alternative 3 are identical to those discussed for SNI for Alternative 1. Therefore, Alternative 3 would not have significant impacts to geology and soils.

3.1.2.5 Mitigation Measures

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

3.1.2.6 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 and still protect 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. (CARB 2011a; USEPA 2011a)

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. (CARB 2011a; USEPA 2011a)

The air pollutants that are considered in this analysis include volatile organic compounds (VOCs), O_3, CO, nitrogen oxides (NO_x), particulate matter less than or equal to 10 microns in diameter (PM_{10}), and particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$). Emissions are often characterized as being "primary" or "secondary" pollutants. Primary pollutants are those emitted directly into the atmosphere such as CO, sulfur dioxide (SO_2), PM_{10} and $PM_{2.5}$. Secondary pollutants are those formed through chemical reactions in the atmosphere such as O_3 and nitrogen dioxide (NO_2). SO_2 and NO_2 are commonly referred to and reported as generic oxides of sulfur (SO_x) and NO_x, respectively, as SO_2 and NO_2 constitute the majority of their respective oxides. Although VOCs (also referred to as hydrocarbons or reactive organic gases) and NO_x (other than nitrogen dioxide) have no established ambient standards, they are important as precursors to O_3 formation. (CARB 2011a; USEPA 2011a)

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 2011a; USEPA 2011a.

3.2.1.2 Regulatory Setting

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 CAA 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 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 SIP.

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. (NAVY 2002)

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.

The average annual temperature in the coastal and inland valleys of southern Ventura County ranges from 57ºF (14ºC) at the coast near Point Mugu to 65ºF (18ºC) in Simi Valley. The average minimum and maximum temperatures are 49°F (9.4ºC) and 70°F (21ºC), respectively. The highest average temperature, 74.3°F (23.5ºC), occurs in August and September; the lowest average temperature, 43.2°F (6.2ºC), occurs in February. Point Mugu receives 14.7 inches (37.3 cm) of precipitation per year, with the greatest rainfall occurring in January and February. The dry season occurs between June and August (Western Regional Climate Center [WRCC] 2011a). Prevailing winds are westerly, with an average speed of 7.7 knots (8.8 miles per hour [mph] or 14.2 km per hour[km/hr]). (Windfinder 2011a)

SNI is arid; total precipitation at SNI averages 5.23 inches (13.3 cm) 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 °F (15°C), with a seasonal variation (January to July) of

approximately 9°F (5°C). Temperatures during the coolest month average 54.7°F (13°C) and during the warmest month average 65.4°F (19°C) (WRCC 2011b). Prevailing winds are northwesterly, with an average speed from that direction of 11.3 knots (13 mph or 20.9 km/hr) (Windfinder 2011b).

Attainment Status and *de minimis* thresholds

Test activities associated with the proposed action would be conducted at NBVC Point Mugu and SNI, both in Ventura County. Effective 19 June 2008, Ventura County has been reclassified as a "serious" nonattainment area for the federal 8-hour O_3 standard (*de minimis* thresholds are 50 tons/year for VOCs and NO_x) and is in attainment of all other criteria pollutants (USEPA 2011b, USEPA 2008). Ventura County is classified as a nonattainment area for the state O_3, $PM_{2.5}$, and PM_{10} standards (CARB 2011b).

Although SNI is part of Ventura County, the USEPA has determined that SNI is separate and distinct from the South Central Coast Air Basin (SCCAB), which includes the Ventura County Air Pollution Control District (VCAPCD). SNI is in attainment/unclassified of the NAAQS for all criteria pollutants (USEPA 2011b); therefore, the provisions of the General Conformity Rule and *de minimis* thresholds do not apply to proposed activities conducted on SNI (VCAPCD 2008). 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.

Emissions from Stationary Sources

NBVC Point Mugu has a variety of stationary emissions sources including aircraft engine test cells, stationary electric generators, an incinerator, compressors, fuel storage and handling facilities, and gasoline fueling stations.

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 at NBVC Point Mugu and SNI consist of aircraft operations as well as combustion emissions from vehicles. In addition, test and training operations involve launching missiles and/or targets from both NBVC Point Mugu and 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, 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), the USEPA issued the *Final Mandatory Reporting of Greenhouse Gases Rule* (GHG Reporting Rule), which became effective on 29 December 2009. The GHG Reporting Rule requires annual reporting of GHG emissions to USEPA from large sources and suppliers in the United States, 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}, CEQ encourages federal agencies to consider whether the action's long-term emissions should receive similar analysis. Furthermore, 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 2010).

Federal agencies are, on a national scale, addressing emissions of GHGs by reductions mandated in federal laws and EOs, most recently, EO 13514. 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 address GHG pollutants jointly.

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

The evaluation of air quality includes the Conformity and NEPA Air Quality Analysis described below:

> *Conformity and NEPA Air Quality Analysis* – assessment of the air pollutant emissions from activities within U.S. territory and territorial waters. This includes emissions on the mainland and SNI, emissions within the 3 nm (5.6 km) limit of U.S. territorial waters (subject to the General

Conformity Rule), and emissions within the 12 nm (22 km) limit of U.S. territorial waters (subject to NEPA).

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

Sources of project emissions include aircraft activities (e.g., flare delivery, unmanned aerial vehicle flights), vehicle activities (e.g., personnel transport, mobile instrumentation vans), ordnance use, and mobile generators needed to provide electricity to the test operations.

3.2.2.2 Alternative 1 (Preferred Alternative)

Impacts

Since SNI and the offshore region proposed for the countermeasures testing and training program are classified as attainment/unclassified by the USEPA, the provisions of the General Conformity Rule do not apply. However, emissions within U.S. Territory (3-12 nm [6-22 km] offshore of SNI) and outside U.S Territory (greater than 12 nm [22 km] offshore of SNI) have been estimated for planning purposes and as subject to NEPA. Table 3-2 provides estimated air emissions occurring at SNI due to implementation of Alternative 1.

Table 3-2. Total Alternative 1 Emissions – SNI

Component	Pollutant (tons/year)						
	VOCs	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Ordnance Use	--	0.024	1.44	0.09	0.75	0.39	2.90
Equipment Operations	0.0073	0.042	0.0091	5.98×10^{-5}	0.0023	--	5.09
Ground Vehicle Operations	0.000746	0.000712	0.0071	1.07×10^{-5}	9.07×10^{-5}	--	1.80
Airborne Targets	0.105	0.0488	0.0832	0.120	0.00864	--	11.3
Marine Surface Targets	0.358	0.960	8.94	--	0.00638	--	94.9
Subtotal	**0.471**	**1.08**	**10.5**	**0.210**	**0.767**	**0.39**	**116.0**
de minimis threshold	NA	NA	NA	NA	NA	NA	
Exceeds *de minimis* threshold?	No	No	No	No	No	No	

Note: NA – not applicable since SNI is in attainment/unclassified of the NAAQS for all criteria pollutants. Emissions are presented for planning purposes only.

Estimated emissions that would occur within the SCCAB at Point Mugu within 3 nm (5.6 km) (subject to the General Conformity Rule), and within 12 nm (22 km) (subject to NEPA), as a result of implementation of Alternative 1 are shown in Tables 3-3 and 3-4, respectively. There would be no air quality impacts from flares themselves, but the activities associated with dispensing flares (e.g., aircraft flights) are included in Tables 3-3 and 3-4.

Conformity Applicability Analysis

The estimated emissions associated with the proposed action would be below *de minimis* threshold levels for conformity for the SCCAB (Ventura County, excluding SNI). Therefore, Alternative 1 would conform to the VCAPCD SIP and would not trigger a conformity determination under Section 176(c) of the CAA. In addition, since SNI has been categorized as an attainment/unclassified area by the USEPA, it is not subject to the General Conformity Rule. However, estimated emissions would be below *de minimis* levels; therefore, even if SNI was considered a nonattainment or maintenance area, a formal conformity

determination would not be necessary. Accordingly, a RONA has been prepared by the U.S. Navy (Appendix B). Alternative 1 would have no significant impact on air quality at or near SNI or Point Mugu.

Table 3-3. Alternative 1 Emissions – SCCAB <3 nm

Component	Pollutant (tons/year)						
	VOCs	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Aircraft Operations	0.24	0.15	0.61	0.0094	0.096	--	59.06
Vessel Operations	1.10	7.94	6.13	17.1	3.49	--	728.90
Ordnance Use	--	0.024	1.44	0.09	0.75	0.39	2.90
Airborne Targets	0.297	0.133	0.241	0.593	0.0251	--	32.5
Marine Surface Targets	0.435	1.17	10.8	--	0.00728	--	115.0
Equipment Operations	0.0073	0.042	0.0091	0.0000598	0.0023	--	5.09
Ground Vehicle Operations	0.0201	0.0192	0.19	0.0000289	0.00245	--	1.80
Subtotal	**2.0994**	**9.4782**	**19.4201**	**17.7924887**	**4.37313**	**0.39**	**945.25**
de minimis threshold	50	50	NA	NA	NA	NA	
Exceeds *de minimis* threshold?	No	No	No	No	No	No	

Note: Effective 19 June 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.

Table 3-4. Alternative 1 Emissions – SCCAB (3-12 nm)

Component	Pollutant (tons/year)					
	VOCs	NO_x	CO	SO_x	PM_{10}	CO_2
Aircraft Operations	0.030	0.32	0.20	0.017	0.10	99.69
Vessel Operations	2.07	12.8	26.1	4.55	1.19	2,416.49
Airborne Targets	0.0911	0.0351	0.133	0.517	0.0152	11.9
Marine Surface Targets	0.726	1.95	18.1	--	0.0130	192.0
Subtotal	**2.9171**	**15.1051**	**44.533**	**5.084**	**1.3182**	**2,720.08**

Greenhouse Gases

Implementation of Alternative 1 would lead to emissions of approximately 6,515 metric tons of CO_{2e}. Appendix B presents estimates of GHG emissions generated by the actions associated with Alternative 1. These data show that the CO_{2e} emissions associated with the proposed action would amount to approximately 0.000098% of the total CO_{2e} emissions generated by the U.S (6,633.2 million metric tons) (USEPA 2011c). Emissions under Alternative 1 are also below the 25,000 metric tons of CO_{2e} level proposed in the draft NEPA guidance provided by the CEQ.

3.2.2.3 Alternative 2

Alternative 2 involves use of proposed locations at Point Mugu but not those identified at SNI. Estimated emissions that would occur within the SCCAB at Point Mugu within 3 nm (5.6 km) (subject to the General Conformity Rule), and within 12 nm (22 km) (subject to NEPA), as a result of implementation of Alternative 2 are shown in Tables 3-5 and 3-6, respectively.

Table 3-5. Alternative 2 Emissions – SCCAB <3 nm

Component	Pollutant (tons/year)						
	VOCs	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Aircraft Operations	0.24	0.15	0.61	0.0094	0.096	--	59.06
Vessel Operations	1.10	7.94	6.13	17.1	3.49	--	728.90
Ordnance Use	--	0.048	2.88	9.48×10^{-5}	1.50	0.77	5.80
Airborne Targets	0.848	0.259	0.650	0.721	0.0521	--	106.0
Marine Surface Targets	0.380	1.02	9.46	--	0.00681	--	101.0
Equipment Operations	0.015	0.084	0.056	5.98×10^{-5}	0.0047	--	10.17
Ground Vehicle Operations	0.0402	0.0383	0.38	1.75×10^{-5}	0.00488	--	3.60
Subtotal	**2.6232**	**9.5393**	**20.166**	**17.8305721**	**5.15449**	**0.77**	**1,014.53**
de minimis threshold	50	50	NA	NA	NA	NA	
Exceeds *de minimis* threshold?	No	No	No	No	No	No	

Note: Effective 19 June 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3. NA = not applicable.

Table 3-6. Alternative 2 Emissions – SCCAB (3-12 nm)

Component	Pollutant (tons/year)					
	VOCs	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**CO_2**
Aircraft Operations	0.030	0.32	0.20	0.017	0.10	99.69
Vessel Operations	2.07	12.8	26.1	4.55	1.19	2,416.49
Airborne Targets	0.848	0.259	0.650	0.721	0.0521	106.0
Marine Surface Targets	0.760	2.04	18.9	--	0.0136	201.0
Subtotal	**3.708**	**15.419**	**45.85**	**5.288**	**1.3557**	**2,823.18**

Conformity Applicability Analysis

The estimated emissions associated with Alternative 2 would be below *de minimis* threshold levels for conformity for the SCCAB (Ventura County, excluding SNI). Therefore, Alternative 2 would conform to the VCAPCD SIP and would not trigger a conformity determination under Section 176(c) of the CAA. Alternative 2 would have no significant impact on air quality at or near Point Mugu.

Greenhouse Gases

Implementation of Alternative 2 would lead to emissions of approximately 6,662 metric tons of CO_{2e}. Appendix B presents estimates of GHG emissions generated by the actions associated with this alternative. These data show that the CO_{2e} emissions associated with Alternative 2 would amount to approximately 0.000102% of the total CO_{2e} emissions generated by the U.S (6,633.2 million metric tons) (USEPA 2011c). Emissions under Alternative 2 are also below the 25,000 metric tons of CO_{2e} level proposed in the draft NEPA guidance provided by the CEQ.

3.2.2.4 Alternative 3

Alternative 3 involves use of proposed locations at SNI but not those identified at Point Mugu. Table 3-7 provides estimated air emissions occurring at SNI due to implementation of the Alternative 3. Under this alternative, it is assumed that all aircraft and surface vessels will launch from SNI only. Estimated emissions that would occur within the SCCAB at Point Mugu within 3 nm (5.6 km) (subject to the General Conformity Rule), and within 12 nm (22 km) (subject to NEPA), as a result of implementation of Alternative 3 are shown in Tables 3-8 and 3-9, respectively.

Table 3-7. Alternative 3 Emissions – SNI

Component	Pollutant (tons/year)						
	VOCs	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Ordnance Use	--	0.048	2.88	9.48×10^{-5}	1.50	0.77	5.80
Equipment Operations	0.015	0.084	0.056	5.98×10^{-5}	0.0047	--	10.17
Ground Vehicle Operations	0.00149	0.00143	0.0141	2.15×10^{-5}	0.00018	--	3.60
Airborne Targets	0.0531	0.0243	0.0393	0.0677	0.00390	--	5.69
Marine Surface Targets	0.215	0.571	5.44	--	0.00373	--	56.9
Subtotal	**0.28459**	**0.72873**	**8.4294**	**0.0678761**	**1.51251**	**0.77**	**82.16**
de minimis threshold	NA	NA	NA	NA	NA	NA	
Exceeds *de minimis* threshold?	No	No	No	No	No	No	

Note: NA – not applicable since SNI is in attainment/unclassified of the NAAQS for all criteria pollutants. Emissions are presented for planning purposes only. NA = not applicable.

Table 3-8. Alternative 3 Emissions – SCCAB <3 nm

Component	Pollutant (tons/year)					
	VOCs	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**CO_2**
Aircraft Operations	0.24	0.15	0.61	0.0094	0.096	59.06
Vessel Operations	1.10	7.94	6.13	17.1	3.49	728.90
Aerial Targets	0.0123	0.00695	0.0117	0.0278	0.00127	1.24
Marine Surface Targets	0.0718	0.190	1.81	--	0.00124	19.0
Subtotal	**1.4241**	**8.28695**	**8.5617**	**17.1372**	**3.58851**	**808.2**
de minimis threshold	50	50	NA	NA	NA	
Exceeds *de minimis* threshold?	No	No	No	No	No	

Note: Effective June 19, 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.

Table 3-9. Alternative 3 Emissions – SCCAB (3-12 nm)

Component	Pollutant (tons/year)					
	VOCs	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**CO_2**
Aircraft Operations	0.030	0.32	0.20	0.017	0.10	99.69
Vessel Operations	2.07	12.8	26.1	4.55	1.19	2416.49
Aerial Targets	0.0245	0.0139	0.0234	0.0557	0.00254	2.47
Marine Surface Targets	0.287	0.761	7.25	--	0.00497	75.9
Subtotal	**2.4115**	**13.8949**	**33.5734**	**4.6227**	**1.29751**	**2,594.55**

Conformity Applicability Analysis

The estimated emissions associated with Alternative 3 would be below *de minimis* threshold levels for conformity for the SCCAB (Ventura County, excluding SNI). Therefore, Alternative 3 would conform to the VCAPCD SIP and would not trigger a conformity determination under Section 176(c) of the CAA. In addition, since SNI has been categorized as an attainment/unclassified area by the USEPA, it is not subject to the General Conformity Rule. However, estimated emissions would be below *de minimis* levels; therefore, even if SNI was considered a nonattainment or maintenance area, a formal conformity determination would not be necessary. Accordingly, a RONA has been prepared by the U.S. Navy (Appendix B). Alternative 3 would have no significant impact on air quality at or near SNI.

Greenhouse Gases

Implementation of Alternative 3 would lead to emissions of approximately 6,242 metric tons of CO_{2e}. Appendix B presents estimates of GHG emissions generated by the actions associated with this

alternative. These data show that the CO_{2e} emissions associated with Alternative 3 would amount to approximately 0.000094% of the total CO_{2e} emissions generated by the U.S (6,633.2 million metric tons) (USEPA 2011c). Emissions under Alternative 3 are also below the 25,000 metric tons of CO_{2e} level proposed in the draft NEPA guidance provided by the CEQ.

3.2.2.5 Mitigation Measures

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

3.2.2.6 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 general conditions, marine or nearshore water quality, and bathymetry and sediment quality within the Point Mugu Sea Range, Point Mugu and R-2519, and SNI and R-2535. The general description includes the extent of the area as well as currents. 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. CAA provides protection of surface water quality and preservation of wetlands.

At the state level, the Porter-Cologne Water Quality Control Act (California Water Code 13000- 13953.4) gives the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards responsibility for protection of the waters within their regions. The regional boards are also responsible for implementing provisions of the CAA 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 will not compromise protection of ocean waters for beneficial uses, and that the public interest will be served (Navy 2002).

3.3.1.3 Existing Conditions

<u>Sea Range</u>

General Description

The Sea Range straddles Point Conception, which is considered a major geographic feature that affects marine water resources (see Figure 1-1). 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 Southern California Bight (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.

Marine Water Quality

Surface temperatures of waters along the coast of the SCB range from approximately 54° F (12° C) in the winter to 70° F (21° C) in the summer. Surface water temperatures can show seasonal variation in association with upwelling, climatic conditions, and latitude. The marine environment has a high hydrogen ion (pH) buffering capacity due to the presence of dissolved elements, particularly carbon and hydrogen, which maintain a pH between 7.5 and 8.5. Surface waters are usually saturated or supersaturated with dissolved oxygen as a result of photosynthetic activity and wave mixing. Dissolved oxygen levels at the surface fluctuate between 5.4 and 5.9 milliliters per liter (ml/L), while levels at depths below the surface remain more constant, between 0.4 and 0.6 ml/L. Major nutrients include dissolved nitrogen (dominated by nitrate), phosphates, and silicates (Navy 2002).

Areas of Special Biological Significance

The state of California designated 34 coastal regions under the 1972 California Ocean Plan as State Water Quality Protection Areas, formally known as Areas of Special Biological Significance (ASBSs), in an effort to preserve these unique and sensitive marine ecosystems for future generations. There are two ASBSs within or adjacent to the project area:

- Latigo Point to Mugu Lagoon: Ocean water within a line originating from Latigo Point (eastern boundary), following the mean high-tide line to a distance of 1,000 ft (305 m) offshore or to the 100-ft (30-m) isobaths, whichever is greater, to a point lying due south of Laguna Point (western boundary), which is near Surfer's Point (SWRCB 2012); and
- SNI and Begg Rock: Waters surrounding SNI and Begg Rock to a distance of 1 nm (1.9 km) offshore or to the 300-ft (91 m) isobaths, whichever is greater. At the SNI and Begg Rock ASBS, discharges incidental to military research, development, testing, and evaluation of, and training with, guided missile and other weapons systems, fleet training exercises, small-scale amphibious warfare training, and special warfare training are allowed (SWRCB 2012).

Most of the marine water pollution within the SCB area stems from municipal discharges. The distance from the mainland, the large diluting volume of the ocean, and the shelves and basins near the mainland where many pollutants settle ensure high water quality in the Sea Range (Navy 2002).

Marine Bathymetry and Sediments

Much of the ocean floor in the northern portion of the SCB consists of the Santa Barbara, Santa Cruz, and Santa Monica basins (Navy 2002). The Santa Barbara Basin has a gradual slope that reaches depths of 1,970 ft (600 m). The relatively wide and irregular Santa Monica Basin has two submarine canyons with depths exceeding 2,300 ft (700 m). The Santa Cruz Basin also has a submarine canyon with depths greater than 4,920 ft (1,500 m). A relatively shallow island shelf approximately 330 ft (100 m) deep surrounds the islands, usually extending from 3 to 6 nm (6 to 11 km) from the island coast. Ocean depths quickly increase to more than 12,000 ft (3,700 m) west of a ridgeline that runs parallel to the SCB, approximately 25 to 50 nm (31 to 93 km) southwest of the Channel Islands. Sediment types in these areas are generally composed of 35 to 85% fines (silts and clays) and 15 to 65% sand. There are no apparent trends in sediment distribution with respect to size, water depth, or distance offshore (Navy 2002).

Point Mugu and R-2519

General Description

Point Mugu is located on a broad coastal plain adjacent to the Pacific Ocean and the Mugu Lagoon, in Ventura County (see Figure 1-1). 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 (see Figure 2-1). Surface currents in this area generally flow southeast along the coastline after mixing further offshore.

A significant water resource at Point Mugu is Mugu Lagoon, which is the largest surface water feature of Point Mugu and is one of the largest salt marshes in Southern California, encompassing 350 acres (ac) (142 hectares [ha]) of water and tidal flats. The lagoon runs parallel to the coast for 3.5 miles (5.6 km) and is never greater than 0.6 mile (1.0 km) wide. Mugu Lagoon is a significant ecological resource, is protected by the CWA, and is adjacent to an ASBS. Unlike most lagoons along the California coast, it is relatively undisturbed and provides a habitat for a diverse assemblage of marine organisms (Section 3.5, *Biological Resources*). Mugu Lagoon is regionally significant as it is one of the largest lagoons left in southern California containing unique and sensitive resources.

Calleguas Creek, Oxnard Drainage Ditches No. 2 and No. 3, and storm events are important sources of freshwater in Mugu Lagoon, although the lagoon is primarily marine-dominated and tides are responsible for the majority of the day-to-day input and removal of materials. The volume of water moved in and out of the lagoon by tides, the tidal prism, is large compared to the volume retained at lowest water. Very little of the water departing the lagoon on the ebb tide is returned following the flood tide due to the persistent southeast longshore current. Currents are fast near the mouth of the lagoon due to the large tidal exchange and narrow sea opening. Away from the mouth, currents are slow and are likely not to cause much mixing.

Building 738 is adjacent to Mugu Lagoon to the north and is bordered by marshland to the west, south, and east. Nike-Zeus pad, Charlie pad, Bravo pad, and Alpha pad are located approximately 100 ft (30 m) south of Beach Road, the southern border of the marshland. Surfer's Point, Building 761, and The Point are adjacent to the ASBS stretching from Mugu Lagoon and Latigo Point.

Nearshore Water Quality

Water quality in the nearshore area of Point Mugu is dependent upon the presence of particulates and contaminants in the outflow from Mugu Lagoon. In general, dissolved oxygen levels are high and anaerobic conditions do not occur within the lagoon. Concentrations of other nutrients have not been studied. Water temperatures inside the lagoon are usually similar to those of the Sea Range, although they may be higher and much more variable in the lagoon's shallows and salt marsh ponds. The average water temperature for the June-September months is 66° F (19° C); the average water temperature for January is 55° F (13° C). Temperatures up to 85° F (29° C) have been recorded during low tide conditions on hot summer days. Salinities within the lagoon are also generally similar to those of the ocean, with an average daily salinity of about 34 parts per thousand. Due to the lack of freshwater surface flows, there is no reason to expect freshwater dilution except near the mouth of Calleguas Creek and during rainfall events.

Within the SCB, most of the marine water pollution stems from municipal discharges originating on the mainland. Another potential source of water pollution offshore comes from the oil and gas development industry. As activity increases from offshore oil and gas development, the potential for discharge into the Sea Range also increases. In recent years, the increased frequency and extent of regional beach and shellfish-bed closures, coupled with decreases in local fishing catches, are taken as signs of declining

water quality (NOAA 2009). However, due to the large diluting volume of the ocean and circulation within the SCB, as stated above, water quality in the nearshore area of Point Mugu is most dependent upon the presence of particulates and contaminants in the outflow from Mugu Lagoon.

Nearshore Bathymetry and Sediments

Bathymetry near Point Mugu drops off steeply into subsurface canyons, reaching depths greater than 2,200 ft (670 m) within 6 nm (11 km). The area that borders Point Mugu adjacent to the ocean is dominated by sandy beach habitat. The topography of the sand beaches is strongly influenced by wave conditions. The beaches, composed of fairly coarse sand, are relatively steep. The foreshore extends out to a depth of about 10 to 12 ft (3 to 4 m), where the slope of the bottom decreases substantially. This marks the point of transition from beach into shallow shelf. Sand dunes are also present along most of the beaches (Navy 2002).

Freshwater

Rainfall in the region averages approximately 10.5 inches (27 cm) per year. Calleguas Creek is the principal stream draining Point Mugu. It originates in the Santa Susana Mountains and flows for approximately 37 miles (60 km) to the Pacific Ocean at Mugu Lagoon. Runoff to the creek from upstream areas includes treated sewage effluent and agricultural return flows potentially contaminated by pesticides and fertilizers. Conejo Creek drains an area of approximately 66 mi^2 (171 km^2) and is the largest tributary to Calleguas Creek, joining approximately 5 miles (8 km) upstream from the Pacific Ocean. Revolon Slough is the second largest tributary, draining 52 mi^2 (135 km^2) and joining Calleguas Creek about 1 mile (1.6 km) upstream from the Pacific Ocean. Oxnard Drainage Ditch No. 2 drains to Calleguas Creek and Oxnard Drainage Ditch No. 3 discharges into Mugu lagoon (Navy 2002).

The steep topography of the mountains promote rapid run-off and extensive flooding along Calleguas Creek and Conejo Creek is common. Large amounts of sediment are also transported and deposited in the lagoon during these times (Navy 2002).

Within the past 30 to 40 years, water quality has deteriorated due to agricultural development, urbanization and paving, and stream channelization. As a result, state and local agencies have coordinated and implemented regulatory programs to identify the source of water quality degradation. In general, water quality in Calleguas Creek does not meet drinking water standards (Navy 2002).

San Nicolas Island and R-2535

General Description

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 (Navy 2002). 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.

The coldest sea surface temperatures occur in March (monthly average 57° F [14° C]), while the warmest temperatures occur in September (66 °F [19° C]). 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 (Navy 2002). 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. Ocean waters surrounding SNI and Begg Rock to a distance of 1 nm (1.9 km) offshore or to the 300-ft (91-m) isobath, whichever is greater, have been designated as an 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 training areas overlap the SNI and Begg Rock ASBS.

Nearshore Water Quality

The proposed project locations are on the western end of the island and include Rock Crusher, Tender Point, Thousand Springs West, Balloon Launch, and the nearshore areas surrounding SNI (see Figure 2-2). The quality of ocean water in the immediate area of SNI is relatively pristine. Receiving waters at Blue Whale Cove represent an area impacted by launch-pad runoff and exceeded the reporting limit for hexavalent chromium (0.01 milligrams per liter [mg/L]) for both the 6-month median (0.002 mg/L) and daily maximum (0.008 mg/L) objectives of the Ocean Plan but was below the instantaneous maximum objective (0.02 mg/L). No other significant concerns were detected within Blue Whale Cove's receiving waters or sediment. Residual chlorine was the only constituent that did not meet Ocean Plan objectives at Coral Beach, located in close proximity to the Balloon Launch site (SWDIV NAVFACENGCOM 2007). 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.

Nearshore Bathymetry and Sediments

The bathymetry surrounding SNI is irregular in shape. The island is a pinnacle that is surrounded by water depths that quickly slope to greater than 5,200 ft (1,600 m) within 10 nm (18.5 km) of the southeastern portion of the island, whereas a shelf exists to the northwest of the island that gradually slopes to 400 ft (120 m) over 18 nm (33.5 km). The subtidal area nearest the island is characterized by sand, bedrock, or boulder (Navy 2002).

Freshwater

SNI contains only one perennial stream, Tule Creek and no other perennial bodies of water. Tule Creek is located in the vicinity of the proposed Thousand Springs West test site. The Thousand Springs West and Balloon Launch sites are also located in a groundwater recharge area for Thousand Springs.

3.3.2 Environmental Consequences

3.3.2.1 Approach to Analysis

The March 2002 Point Mugu Sea Range EIS/OEIS thoroughly analyzed water quality and sediment impacts to the Sea Range that would result from implementation of the action proposed in the EIS/OEIS (Navy 2002). This analysis characterizes the magnitude of the potential impacts to water quality and that may result from the implementation of the proposed action. This result is then compared to the increase in activity and impacts associated with the March 2002 EIS/OEIS.

3.3.2.2 Alternative 1 (Preferred Alternative)

Proposed project activities would not result in changes to water chemistry (e.g., the pH, temperature, and dissolved oxygen levels), turbidity, or the amount of light in the water column within the project area, including the Latigo Point to Point Mugu ASBS and the SNI and Begg Rock ASBS. Section 3.5, *Biological Resources*, discusses the potential biological impacts to the marine environment in detail. Similarly, implementation of the proposed action would not result in any changes to freshwater resources or to marine bathymetry.

All proposed project sites have been previously constructed at Point Mugu and at SNI, and the implementation of the proposed action would not result in any construction. The use of a site as a directed energy target or shooter site, or as an electronic support system site, would not result in any discarded material or direct impacts to marine sediments or water quality, and spent materials such as shell casings from small arms fire that fall onto or near the test site would be recovered as part of standard procedure; other spent materials, such as small arms rounds that land in the water, are discussed below. Therefore, the use of these sites would neither increase sedimentation within nearby groundwater recharge areas or nearshore waters.

The primary water quality and marine sediment impacts associated with the proposed action would result from the release of hazardous constituents contained within the small arms rounds (including aluminum pushers), missiles (including RPGs, ManPADS, and rockets), flares, and surface and air targets. These impacts are discussed in detail in Section 3.9, *Hazardous Materials*, and are summarized below.

Toxic materials produced by laser and high power microwave would be self-contained and not released into the environment.

Solid, hazardous constituents would be distributed over the sea range and R-2519 as a result of small arms rounds, missiles, flares, and surface and air targets use. Most of the solid material would be dense and would settle to the bottom, where it would be covered with sediment, coated by chemical processes (e.g., corrosion), or encrusted by marine organisms (e.g., barnacles). The large volume of water in the SCB, combined with the constant circulation, would quickly dilute any leached hazardous substances.

The use of missiles, airborne and sea surface targets, and flares was previously analyzed in the March 2002 Point Mugu Sea Range EIS/OEIS and impacts were found to be far from a significant threshold (Navy 2002). Airborne and sea surface targets are generally reusable and are recovered unless they explode, in which case hazardous liquids within the missile or targets (such as fuel and hydraulic liquids) are typically vaporized. Should a target be irrecoverable, the large volume of water and constant ocean currents in the SCB would dilute any remaining hazardous liquids to well below a level of significance.

Flares typically burn out prior to ground or water impact. The major component of flares is magnesium, which is not listed in the National Ambient Water Quality Criteria as it is a naturally occurring component in the ocean and is one of the most abundant dissolved ions in seawater. Flare components would be dispersed over a large area, would dissipate rapidly in ocean currents, and would likely be well below background concentration levels. Therefore, flare constituents would have a less than significant impact on water quality.

Therefore, for reasons described above, implementation of Alternative 1 would not have a significant impact to marine sediments and water quality.

3.3.2.3 Alternative 2

Alternative 2 involves use of proposed locations at Point Mugu but not those identified at SNI. Impacts of Alternative 2 would be similar to those for Alternative 1, except that the dispersal area for hazardous constituents would be reduced for some of the proposed activities (see Section 3.9.2 for details). However, the increased tempo of activities under this alternative at Point Mugu sites does not change the types or magnitudes of effects to this resource. Consequently, impacts of Alternative 2 are similar to those discussed for Point Mugu for Alternative 1. Therefore, Alternative 2 would not have significant impacts to marine sediments and water quality.

3.3.2.4 Alternative 3

Alternative 3 involves use of proposed locations at SNI but not those identified at Point Mugu. Impacts of Alternative 3 would be similar to those for Alternative 1, except that the dispersal area for hazardous constituents would be reduced for some of the proposed activities (see Section 3.9.2 for details). However, the increased tempo of activities under this alternative at SNI sites does not change the types or magnitudes of effects to this resource. Consequently, impacts of Alternative 3 are similar to those discussed for SNI for Alternative 1. Therefore, Alternative 3 would not have significant impacts to marine sediments and water quality.

3.3.2.5 Mitigation Measures

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

3.3.2.6 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 NOISE

3.4.1 Affected Environment

3.4.1.1 Definition of Resource

Noise is generally defined as sound that is unwanted or disturbing (USEPA 2011d). Noise can be intermittent or continuous, steady or impulsive, as well as stationary or transient. Stationary noise sources are typically associated with specific land uses (e.g., schools or industrial facilities). Transient noise sources move through the environment, either along relatively established paths (e.g., highways, railroads, and aircraft flight tracks around airports) or randomly. There are a wide range of responses to noise depending on the type of noise and the characteristics of the sound source, as well as the sensitivity and expectations of the receptor (e.g., a person or animal), the time of day, and the distance between the noise source and the receptor. Noise impacts to wildlife are discussed in Biological Resources (see Section 3.5.2).

3.4.1.2 Regulatory Setting

Noise standards and guidelines have been established at the federal, state, and local government levels to protect people from potential hearing damage as well as other impacts (i.e., annoyance) that can disrupt activities or alter quality of life. DoD lands are required to comply with federal noise standards and guidelines such as those set by the Noise Control Act of 1972, as amended (42 USC §§ 4901 *et seq.*). The Noise Control Act of 1972, as amended, provides a framework for the coordination of federal noise control research, establishes noise emission standards, and provides information to the public. Although the DoD is not subject to state and local noise ordinances, these ordinances are considered when determining the significance of a noise impact in order to avoid or minimize impacts to surrounding land uses, including sensitive receptors.

3.4.1.3 Existing Conditions

Sea Range

Noise sources at the Sea Range are transitory and widely dispersed. Airborne noise introduced by surface vessels is negligible compared to noise introduced by low-flying aircraft, missiles, and targets; as such, airborne noise levels are addressed with respect to aircraft, aerial targets, and missiles only.

Airborne noise sources include civilian and military aircraft, both of which fly at altitudes ranging from hundreds of feet to tens of thousands of feet above the surface. Civilian aircraft fly at subsonic speeds and military aircraft, aerial targets, and missiles fly at subsonic or supersonic speeds. Although the Sea Range hosts nearly every type of aircraft in the DoD aircraft inventory, more than 90% of annual aircraft activity is accounted for by aircraft affiliated with the test squadrons.

The Sea Range covers very little land area. The few structures that occur within areas encompassed by the Sea Range are primarily located on SNI. There are no public communities beneath the Sea Range airspace subject to routine aircraft overflight.

The March 2002 Point Mugu Sea Range EIS/OEIS thoroughly analyzed existing conditions within the Sea Range and modeled nearly 4,000 baseline aircraft sorties throughout the Sea Range (Navy 2002). Generally, the ranges with the highest distributed sound level, between 60 and 65 dB L_{dnmr} (Rate Adjusted Day-Night Average-weighted Sound Level), were those adjacent to SNI or to its west. The action proposed in the EIS involved increasing the baseline number of sorties by 130, which was expected to

result in a negligible increase in the baseline distributed sound level (less than 0.1 dB) for all Range Areas within the Sea Range.

Point Mugu and R-2519

Point Mugu and R-2519 are surrounded by lands designated generally as residential, commercial, industrial, community services, open space, agriculture, and undeveloped. These surrounding areas are subject to noise from civilian and military aircraft operations, automobile traffic, and construction activities. The Point Mugu airfield supports an annual total of about 36,000 aircraft operations (Navy 2012a). Aircraft noise tends to be the dominant noise source in areas immediately adjacent to airfields and beneath primary flight corridors, although aircraft noise is typically also limited to these areas since it becomes indistinguishable as aircraft gain altitude. The offbase acreage exposed to community noise equivalent level (CNEL) values above 65 is about 1,800 ac (730 ha); most of this area is located under the approach and departure routes to the north (onshore) and south (offshore) of the base, although a portion also occurs along the western base boundary. Noise levels and land use compatibility in these areas are addressed in the Air Installation Compatible Use Zone (AICUZ) program. Due to the frequent loop patterns around the airfield, all project sites at Point Mugu (see Figure 2-1) are located within the 65-70 decibels (dB) Community Noise Equivalent Level (CNEL) noise contour, and the area just offshore and south of the project sites is within the 70-75 dB CNEL noise contour.

Missile and target launches at Point Mugu are conducted at the Building 55 Launch Complex, Bravo Pad, and Charlie Pad. Measured missile launch noise durations at Building 55 range from 0.56 seconds to 2.11 seconds. Peak noise levels range from 161 dB re 20 µPa at 50 ft (15 m) to 115 dB re 20 µPa at 3,000 ft (900 m). Missile and target launches at Bravo Pad and Charlie Pad generate similar noise levels. Small arms firing does not currently occur at any of these locations.

San Nicolas Island and R-2535

Commuter-type aircraft use the airfield several times each day, transporting personnel to and from Point Mugu. Since no year-round human residents occupy areas near the airfield, AICUZ studies have not been performed and baseline noise conditions are assumed to be dominated by aircraft activity. The highest noise levels (80-85 dB CNEL, on an average busy day) are found on or immediately adjacent to the runway. Noise contours would be similar to those of Point Mugu, although they would also be reduced due to the limited number of flights occurring at the island.

Aircraft overflights in support of test operations also occur at various locations away from the airfield at SNI. An F/A-18 overflight for a captive-carry sortie, flown 500 knots (930 km/hr) produced an A-weighted sound pressure level at 500 ft (150 m) of 107 dB re 20 µPa. The A-weighted sound exposure level (SEL) was 109 dB re 20 $\mu Pa^2 s$.

Missile and targets are also launched from SNI. The A-weighted sound pressure level observed for Vandal missiles (MQM-8) ranged from 87 dB re 20 µPa at the closest point of approach of 5,500 ft (1,700 m) to 133 dB re 20 µPa at the closest point of approach of 230 ft (70 m). Measured missile launch noise durations range from 0.17 seconds to 4.58 seconds.

Other aerial targets are also launched from SNI. The sound levels of these launches are similar to those at Point Mugu (see previous subsection). Small arms firing in support of testing and training activities has historically occurred at Rock Crusher. Minimal noise data for small arms firing are available. The Point Mugu Sea Range EIS/OEIS described noise associated with CIWS, so that information is used as a worst-case scenario for proposed small arms firing in this analysis. A worst-case scenario for use of this system, that assumes firing from a vessel moving forward through the water, would expose an area of 4,994

square feet (ft^2) (494 square meters [m^2]) to noise of 145 dB SEL re 20 μPa^2s. This activity does not presently occur at Point Mugu. However, it has historically occurred at Rock Crusher on SNI.

The March 2002 EIS/OEIS used a similar approach to noise impacts at SNI as was used for the Point Mugu airfield. Specifically, the EIS/OEIS concluded that the occasional use of the SNI airfield by aircraft supporting additional operations would result in no notable changes in noise contours, and that only a fraction of the 130 sorties proposed would use the SNI airfield.

3.4.2 Environmental Consequences

3.4.2.1 Approach to Analysis

The March 2002 Point Mugu Sea Range EIS/OEIS thoroughly analyzed noise impacts to the Sea Range, discussed above, that would result from implementation of the action proposed in the EIS/OEIS (Navy 2002). This analysis characterizes the magnitude of impact associated with the proposed action by comparing the increase in activity proposed in the EIS/OEIS, and its associated noise impact, with the increase in activity proposed in Chapter 2 of this EA. Impacts of noise to wildlife are discussed in Section 3.5.2, *Biological Resources*.

3.4.2.2 Alternative 1 (Preferred Alternative)

Increased aircraft, missile, and small arms activity would result in intermittent loud noises but relatively small increases in overall noise levels at locations where the proposed activities would occur. All proposed activity would follow standard operating procedures. Furthermore, the proposed increase of small arms fire would not impact sensitive noise receptors because of the localized nature of sound generated by small arms fire, the incremental nature of the increase above current activity levels, and because all Navy personnel exposed to potentially harmful sound would wear ear protection while engaged in mission-related activities. There would be no noise impacts from flares themselves, but the activities associated with dispensing flares (e.g., aircraft flights) are included in this analysis.

The majority of the increased airfield activity would occur at Point Mugu. By type, the majority of aircraft would be either rotary-wing or fixed-wing propeller, although some fixed-wing aircraft with jet-engines would also be used. Aircraft types and use would be consistent with the Mugu Airfield environment, although a greater proportion would occur over the nearshore environment. F/A-18 overflights can produce sound levels of up to 108.8 A–weighted decibels (dBA) re 20 µPa at an altitude of 500 ft (150 m) (Navy 2002). Baseline Point Mugu annual aircraft operations number are about 36,000 (Navy 2012a). The 130 additional aircraft sorties associated with the March 2002 EIS/OEIS, each of which involved one or more aircraft operations such as a take-off, landing, or touch-and-go maneuver, represented an increase in baseline activity of just over 3% and was deemed a negligible change (Navy 2002). The EIS/OEIS further stated that a "notable increase" in noise levels would require aircraft operations to increase by 10% to 20%. Assuming the proposed increase of 320 aircraft sorties involves an increase in air operations proportional to that of the 2002 EIS/OEIS, aircraft activity at Point Mugu is expected to increase by an additional 7.4%. Therefore, the proposed Point Mugu airfield activity increase would not be noticeable.

Similar to Point Mugu, the proposed increase in air activity at SNI would be consistent with the existing airfield environment. By curving to the northeast, the 65 to 85 dB CNEL noise contours within the vicinity of the SNI airfield avoid "Nicktown," located approximately 0.8 mile (1.3 km) (northwest of the airfield (Navy 2002). The nearest land-based project area, Balloon Launch (see Figure 2-2), is located approximately 3.6 miles (5.8 km) northwest of the SNI airfield and is well removed. Aircraft activity at SNI is minimal compared to that at Point Mugu and involves only 14 airfield operations during an

average busy day. If the 80 sorties proposed for SNI each involved one take-off and one landing, annual SNI airfield activity would increase by 160 operations. This is equivalent to less than one additional take-off and landing every four days. Therefore, the proposed SNI airfield activity increase would not be noticeable.

Minimal noise data for small arms firing are available. The Point Mugu Sea Range EIS/OEIS described noise associated with CIWS, so that information is used as a worst-case scenario for proposed small arms firing in this analysis. A worst-case scenario for use of this system, that assumes firing from a vessel moving forward through the water, would expose an area of 4,994 ft^2 (494 m^2) to noise of 145 dB SEL re 20 μPa^2s. This is an overestimate of the impacts from a stationary system firing from shore. This is a new activity at the pads at Point Mugu though it has historically occurred at Rock Crusher on SNI. These activities would occur in areas that currently experience loud noise events from aircraft overflights and from missile and target launches. In addition, ambient noise from wind and wave action may exceed 100 dB (Navy 2002). On SNI, ambient noise prior to recorded missile launches averaged 66 dB re 20 µPa flat-weighted with a peak of 91 dB (Holst and Greene 2008). This ambient noise can significantly mask noises from firing.

At Point Mugu, missile launching, and small arms firing would occur at Alpha Pad, Bravo Pad, Nike Zeus, and Charlie Pad. Missile launches currently occur at Bravo Pad and Charlie Pad. Missile and rocket launching is likely to produce the greatest amount of sound when compared to other countermeasures activities. RAM is the loudest missile system proposed in this project. Sound from RAM is brief in duration (seconds) and used here as a worst case scenario for comparison. RAM launches have been measured with a peak sound pressure of 147 dB at the launch site, with pressures averaging 112 dB less than 2,300 ft (700 m) from the launcher and decreasing to an average of 109 dB less than 6,500 ft (2,000 m) away (Holst and Greene 2008). Targets and missiles depart the launch site rapidly and head away from sensitive noise receptors. The proposed target launches are consistent at both Point Mugu and at SNI and would not create a significant impact to noise.

For reasons described above, noise impacts of Alternative 1 to human receptors would not be significant. Impacts of noise to wildlife are discussed in Section 3.5.2, *Environmental Consequences*.

3.4.2.3 Alternative 2

Compared to the implementation of Alternative 1, aircraft activity at Point Mugu under Alternative 2 would increase by an additional 80 sorties per year, and all missile launching, target launching, and small arms firing activities proposed for SNI would instead occur at Point Mugu. Despite this increase and due to the current activity levels at Point Mugu, single-event noise impacts from implementation of Alternative 2 are expected to be similar to those of Alternative 1. Therefore, Alternative 2 would not have significant noise impacts to human receptors. Impacts of noise to wildlife are discussed in Section 3.5.2, *Environmental Consequences*.

3.4.2.4 Alternative 3

Compared to the implementation of Alternative 1, aircraft activity at SNI under Alternative 3 would increase by an additional 320 sorties per year, and all missile launching, target launching, and small arms firing activities proposed for Point Mugu would instead occur at SNI. Despite this increase and due to the current activity levels at Point Mugu, single-event noise impacts from implementation of Alternative 3 are expected to be similar to those of Alternative 1. Therefore, Alternative 3 would not have significant noise impacts to human receptors. Impacts of noise to wildlife are discussed in Section 3.5.2, *Environmental Consequences*.

3.4.2.5 Mitigation Measures

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

3.4.2.6 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 noise would occur.

3.5 BIOLOGICAL RESOURCES

3.5.1 Affected Environment

3.5.1.1 Definition of Resource

Biological resources include terrestrial and marine flora and fauna and the habitats in which they occur within the areas that may be affected by the proposed action: Sea Range, Point Mugu and R-2519, and SNI and R-2535. Terrestrial resources discussed include vegetation communities, wildlife, and special status species. Marine biological resources discussed include sea birds, aquatic vegetation, invertebrates and fishes, and special-status species such as sea turtles and marine mammals. Where appropriate, marine biological resources are further categorized by the habitat type in which they occur (rock versus sand). Special topics such as essential fish habitat (EFH), special aquatic sites, and fisheries are also discussed for the proposed action area.

3.5.1.2 Terrestrial Biological Resources

Vegetation Communities

Point Mugu

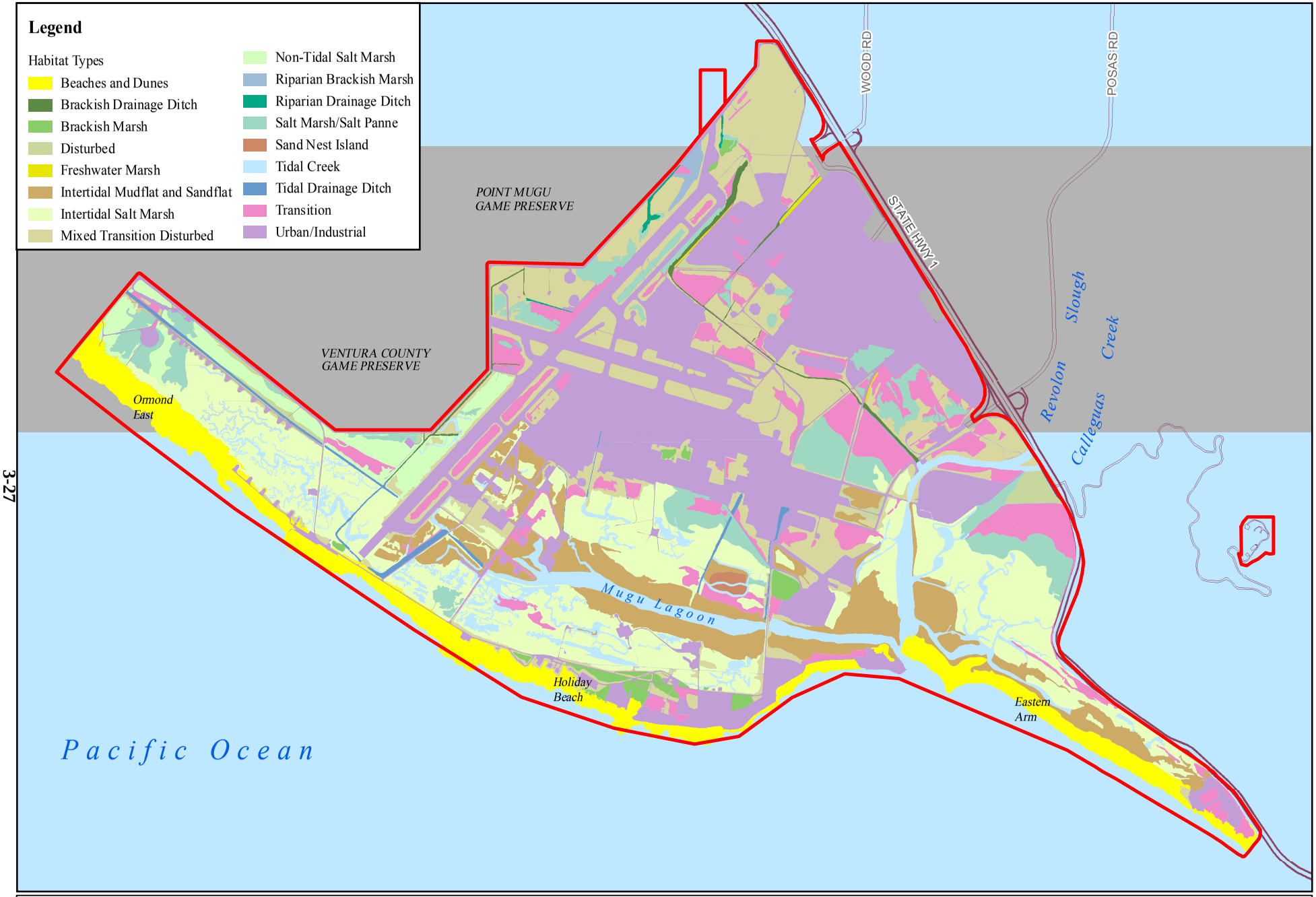
Using a modified habitat classification from Zedler et al. (1992), the 2002 Point Mugu Integrated Natural Resources Management Plan (INRMP) (NBVC 2002) mapped habitat types based on dominant plant species and physiognomy (Figure 3-1). The areas of major habitat types and jurisdictional wetlands within the installation as a whole are provided in Table 3-10.

Table 3-10. Major Habitat Types at Point Mugu

Habitat Type	Acres
Jurisdictional Wetlands	2,162.1
Transition Disturbed	995.4
Intertidal Salt Marsh	742.3
Non-tidal Salt Marsh and Salt Pannes	355.6
Intertidal Mud and Sandflats	334.8
Beach and Dunes	297.9
Tidal Creeks, Estuarine Channels and Open Water	281.7
Brackish and Freshwater Marshes	78.4

Source: NBVC 2004

Mugu Lagoon is the largest functioning salt marsh along the coast of southern California today (USFWS 2009a) consisting of 2,500 ac (1,012 ha) of marsh lands that provides habitat for numerous invertebrate, fish, bird, and plant species (Navy 2002). Coastal salt marsh at Mugu Lagoon is defined by the presence of hydrophytic halophytes (plants that grow partly or wholly in water and are salt tolerant) and water levels that fluctuate due to tidal action. Coastal salt marsh at Point Mugu, for mapping purposes, is divided into intertidal salt marsh and salt panne, intertidal mud flat and sand flat, open water and tidal creeks, and non-tidal salt marsh (Navy 2002). Proceeding upward from the high tide line are unvegetated sand beach and vegetated dune communities, within which can be recognized foredune (unstable habitats characterized by pioneering plant species), backdune (stabilized by perennial plants), and dune swale (wetland) communities which are important vestiges of the sand dune habitats that have been largely eliminated from southern California. Other prevalent communities at Point Mugu include developed and/or disturbed habitats. The endangered salt marsh bird's beak (*Chloropyron maritimum* subsp. m*aritimum*, originally listed as *Cordylanthus maritimus* ssp. *maritimus*) is the only federally listed plant species that occurs at Point Mugu (Navy 2002). Apart from Mugu Lagoon, NBVC Point Mugu provides beach habitats and some upland habitats.



Source: Navy 2009

Figure 3-1
Habitat Types at Point Mugu

San Nicolas Island

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. Two hundred and seventy-eight vascular plant taxa (species, subspecies, and varieties) have been documented on SNI (Junak 2008). 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 (Junak 2008).

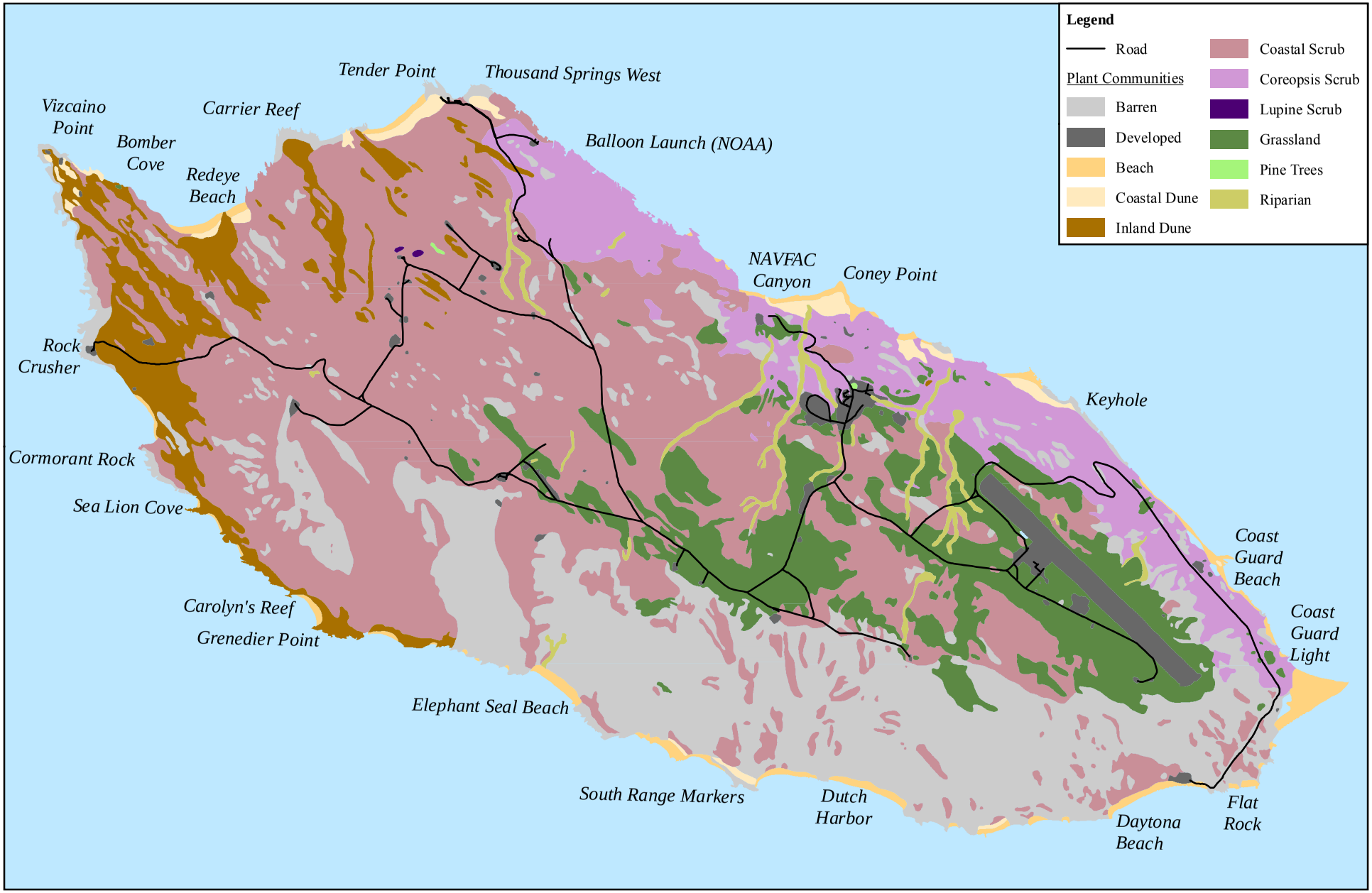
Approximately 11% of the island's native vascular plant taxa are endemic to the Channel Islands, ranking it in the middle amongst other Channel Islands. Two vascular plant taxa found only on SNI are the SNI buckwheat (*Eriogonum grande* var. *timorum*) and the SNI malacothrix (*Malacothrix foliosa* ssp. *polycephala*). SNI has no federally listed endangered or threatened plant species (Junak 2008).

Figure 3-2 shows the vegetation in the vicinity of the proposed countermeasures locations on SNI based on classification and mapping by Halvorson et al. (1996). Unvegetated (barren) and developed areas are included. Vegetation communities include scrub communities covering 7,355 ac (2,976 ha). Freshwater aquatic vegetation communities include vernal pools and riparian habitats. Coastal and inland dunes are found along the coastline of SNI and coastal marsh is found in three small areas. Annual iceplant, native and non-native grasslands, and disturbed and developed communities also occur. Barren areas which support no vegetation cover 3,470 ac (1,404 ha) (Junak 2008). Table 3-11 lists the extent and percent cover of these plant communities; additional details on the distribution and floristic composition of vegetation communities are provided by Junak (2008) and in the INRMP for SNI (NBVC 2010).

Table 3-11. Vegetation of San Nicolas Island

Vegetation Community	Area (ac)	Area (ha)	% of SNI
Coastal scrub*	6,006	2,430	42
Barren	3,470	1,404	24
Grassland	1,739	704	12
Coreopsis scrub	1,349	546	9.5
Inland dunes	783	317	5.5
Developed	325	131	2.3
Beach	234	95	1.6
Riparian	201	85	1.4
Coastal dunes	139	56	0.9
Coastal marsh	9.1	3.7	<0.1
Pine trees (planted)	2.7	1.1	<0.1
Vernal pools	0.8	0.3	<0.1
Total	14,259	5,770	

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



0 0.5 1 Kilometers

0 0.5 1 Miles

Source: Halverson, et al 1996

Figure 3-2
Vegetation Communities at SNI

Terrestrial Wildlife

Point Mugu

Numerous wildlife species inhabit the tidal flats, beaches, salt marsh, and adjacent dunes and other upland habitats at Point Mugu. Mugu Lagoon (including the lagoon and adjacent wetland and upland areas) is one of the largest and least disturbed coastal wetland ecosystems in southern California. A total of 351 species of birds have been identified at Mugu Lagoon, including 151 species of water birds (shorebirds, waterfowl, and wading birds) (Navy 2002). Avian species diversity and abundance varies seasonally with migration; Point Mugu experiences the highest bird densities during the spring migration. With the exception of rock doves (*Columba livia*), European starlings (*Sturnus vulgaris*), and house sparrows (*Passer domesticus*), all bird species at Point Mugu are protected under the MBTA (16 USC § 703 *et seq.*), 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 bird habitats is mandated by EO 13186.

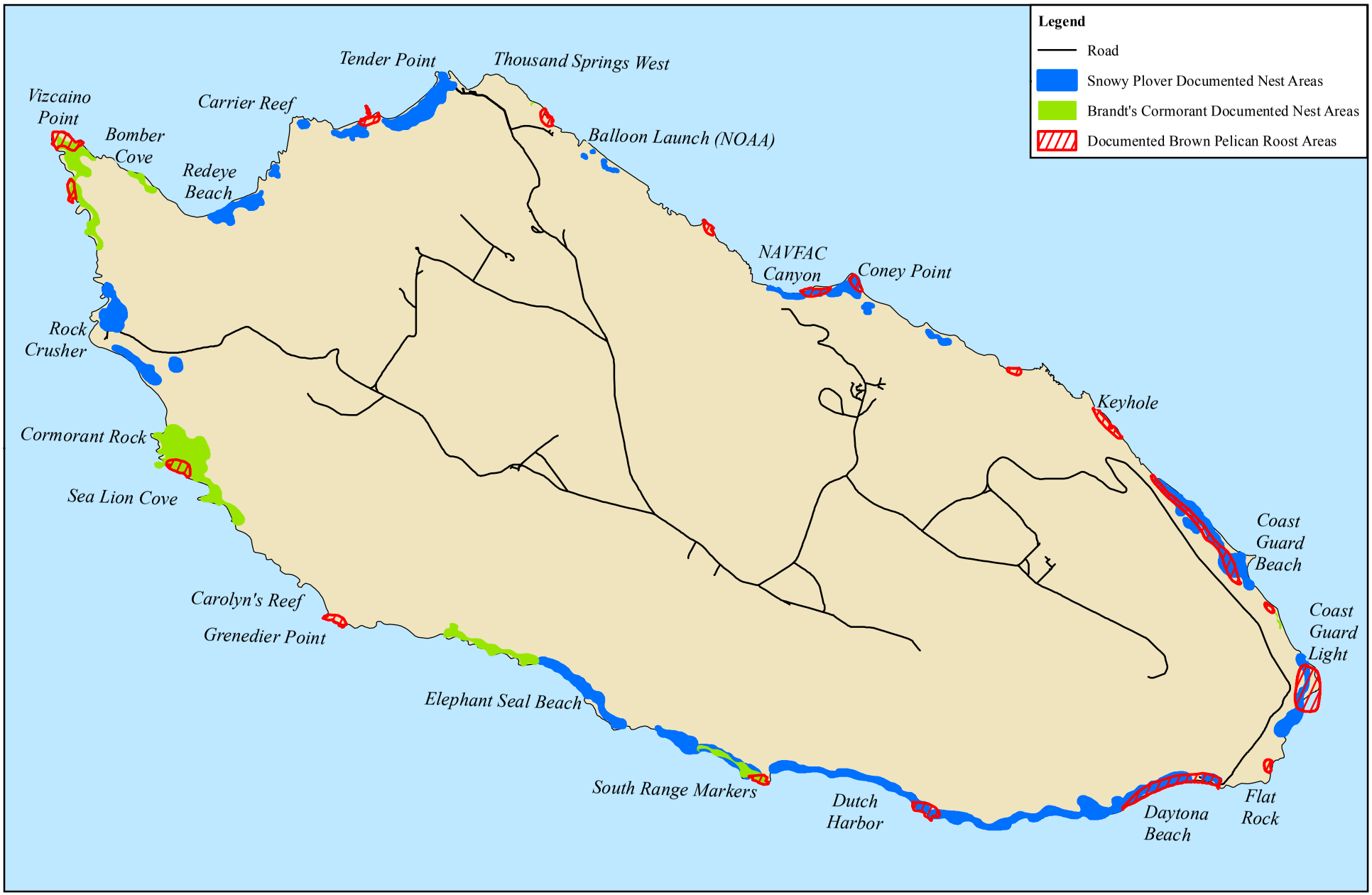
Amphibians are uncommon in the salt marsh, but can occur in adjacent freshwater areas. Reptiles are common in the salt marsh. The southern Pacific rattlesnake (*Crotalus oreganus helleri*) inhabits the upper fringe of intertidal salt marsh habitat. The southwestern pond turtle (*Clemmys marmorata pallida*), a California Department of Fish and Wildlife (CDFW) Species of Special Concern (California Department of Fish and Game [CDFG] 2011a), occurs in freshwater habitat on-base (NBVC 2002).

California ground squirrels (*Spermophilus beecheyi*), black-tailed jackrabbits (*Lepus californicus*) and desert cottontails (*Sylvilagus audubonii*) occur in the upper marsh. Other mammals known to inhabit the upland areas of Point Mugu and Mugu Lagoon include coyote (*Canis latrans*), raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*). Mugu Lagoon also supports numerous terrestrial invertebrates including spiders, wasps, and moths (Navy 2002).

San Nicolas Island

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).

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 and other selected bird species are shown on Figure 3-3.



0 0.5 1 Kilometers

0 0.5 1 Miles

Sources: Navy 1994, 2006, 2012

Figure 3-3
Brown Pelican Roosts, Snowy Plover Nesting Areas, and Brandt's Cormorant Nesting Areas at SNI

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 the western tip of SNI and at several other areas around the island (NBVC 2010) (see Figure 3-3). They are expected to be present foraging in the shallow water and offshore of the project areas.

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 on SNI are protected by the MBTA of 1918, which prohibits the taking, killing, or possessing of migratory birds or the parts, nests, or eggs of such birds, unless permitted by regulation. Conservation of migratory birds is also mandated by EO 13186, and is addressed by the Navy for all activities occurring on SNI (NBVC 2010).

Terrestrial Special-Status Species

Special-status species include those species that are listed, proposed for listing, or are active candidates for listing as threatened or endangered under the federal ESA by the USFWS; or as rare, threatened, or endangered under the California ESA by the CDFW. Pursuant to Section 7 of the ESA, the Navy consulted with the USFWS who issued a Biological Opinion and Incidental Take Statement regarding potential impacts to federally listed species (Appendix C).

Point Mugu

Least Bell's Vireo. The least Bell's vireo was listed as an endangered bird species by the USFWS in June 1986 due to habitat loss restricting their breeding range and nest parasitism by the brown-headed cowbird (*Molothrus ater*). The least Bell's vireo prefers habitat in dense riparian vegetation dominated by willows with a lush understory. Most foraging occurs within riparian vegetation. Occasionally foraging occurs within oak woodlands and adjacent chaparral; however, these foraging areas are generally within 100 feet (30 meters) of riparian vegetation (USFWS 1989). There has been only one least Bell's vireo confirmed at NBVC Point Mugu before 2009; however, least Bell's vireo have been documented at several different locations at the installation since 2009 (Navy 2009b). None of the project areas associated with the Proposed Action have suitable habitat or foraging areas for least Bell's vireo.

Salt Marsh Bird's Beak. The federally and state-listed endangered salt marsh bird's beak is an annual plant, blooming from May to October. It is found in the upper portions of tidal and salt marshes, especially where there is seasonal freshwater inflow or inundation; low salinities enhance seed germination. This species is hemiparasitic, meaning it augments its nutrient supply by rooting into a host plant. The species is currently known to persist in seven coastal salt marshes in California from San Diego County to San Luis Obispo County (USFWS 2009b). Salt marsh bird's-beak is considered sensitive at Mugu Lagoon, where a fluctuating population has been observed annually in the upper portions of the western marsh (Navy 2002).

Soil compaction and trampling that is a result from foot traffic can have a severe impact on salt marsh bird's beak. Evidence indicates that even moderate foot traffic damages seedlings and inhibits germination (USFWS 2009b). Application of herbicides along roadways is postulated to have deleterious effects on populations. Mugu Lagoon serves as a relatively secure germination and growth site for the plant, based on the current Navy practices and the restriction of public access (Navy 2002). Under the Navy's INRMP (NBVC 2002), SMBB areas are protected, as well as enhanced, by exotic plant removal and the establishment of new populations.

Salt marsh bird's beak habitat at Point Mugu is shown in Figure 3-4. Primary suitable habitat for salt marsh bird's beak on Point Mugu occurs in salt marsh habitats on the eastern and western arms of the Mugu Lagoon.

Tidewater Goby. The tidewater goby was designated as endangered fish species by the USFWS on 7 March 1994. Prior to 2011, the last recorded observation of tidewater goby in Calleguas Creek was on 6 June 1940. A total of 11 individual tidewater gobies were documented during a 2011 survey conducted along a 500-foot (152-meter) stretch of the Calleguas Creek channel. Potential habitat for tidewater gobies, include components that are essential to the fish's primary biological needs including; coastal lagoons and estuary systems supported by a natural hydrological regime, which results in sufficient streamflow; areas of shallow water; deep pockets of permanent water; sand and silt substrate; a variety of aquatic and emergent vegetation; a diversity of prey species; and an environment free from exotic fish species. None of the project areas associated with the Proposed Action have suitable habitat for tidewater gobies. Natural resources staff at NBVC Point Mugu continue to monitor known occupied and potential tidewater goby habitat for impacts from Navy operations or sources within the Calleguas Creek watershed.

0 0.5 1 Kilometers
0 0.5 1 Miles

Sources: Navy 2005, 2012b

Figure 3-4
Clapper Rail and Bird's-Beak Habitats and Harbor Seal Haulouts at Point Mugu

Light-footed Clapper Rail. The federally and state-listed endangered light-footed clapper rail (*Rallus longirostris levipes*) is found in salt marshes dominated by tall, dense vegetation, typically cordgrass (*Spartina foliosa*), which it uses for nesting and cover, and pickleweed (*Salicornia pacifica*), which it uses for foraging and high tide refuge. Due to its secretive nature, the light-footed clapper rail is a rarely observed, resident bird at Point Mugu.

Historical records indicate that the threats associated with the decline of this species include hunting for sport and food, contamination from organochlorides and heavy metals, low genetic variability, and, most significantly, habitat loss (USFWS 1985). Since 1980, the lowest number of pairs detected in California was 142 in 1985 when 14 marshes were surveyed. The highest number of pairs detected was 443 in 2007 when 19 marshes were censused (CDFG 2011b).

Light-footed clapper rails commence breeding activity around mid-February with the establishment of mating pairs. Nesting occurs from mid-March to July, with the majority of eggs laid between April and May. Both parents incubate and are responsible for parental care for the precocial chicks that hatch in approximately 23 days. Construction of separate incubation brood nests for chicks is typical for light-footed clapper rails, but may not be the standard for birds at Mugu Lagoon. Dispersal of the young occurs in mid to late-July. Pairs of light footed clapper rails are able to double clutch.

Mugu Lagoon is the northernmost marsh in California occupied by light-footed clapper rail and represents over 25% of the potential habitat for the species (USFWS 2009a). At Mugu Lagoon, nesting occurs in stands of southwestern spiny rush (*Juncus acutus* spp. *leopoldii*) that afford close proximity to foraging habitat in tidal flats and channels. Between 2000 and 2011, the highest number of pairs detected at Mugu Lagoon was 19 in 2004, while the lowest was 5 in 2008. In 2011, 16 pairs were detected (CDFG 2011b). Light-footed clapper rail habitat at Point Mugu is shown in Figure 3-4.

Mugu Lagoon represents a relatively secure breeding and foraging site because public access is restricted (light-footed clapper rails are generally tolerant of human activity if it does not result in habitat degradation [USFWS 2001]), and because of current NBVC Environmental Division management policies. Under the Navy's INRMP (NBVC 2002), clapper rail nesting and foraging areas are protected, and additional recovery programs, such as population and nesting monitoring and predator management, are conducted.

Building 738, a proposed non-lethal directed energy shooter site, is adjacent to clapper rail habitat and the Alpha Pad, Bravo Pad, Charlie Pad, and Nike-Zeus Pad are located across the road from and approximately 200 ft (61 m) south of clapper rail habitat (see Figure 3-4). Proposed activities at these locations include: use as directed energy shooter sites, small arms firing (including CIWS and other small arms testing and training), missile launches, non-lethal laser target sites from the ocean surface, and placement of vans during offshore flare testing and training.

California Least Tern. The federally and state-listed endangered California least tern (*Sterna antillarum* ssp. *browni*) nests in open beach habitat adjacent to Mugu Lagoon; birds forage in the shallow open waters of the lagoon and ocean waters just offshore. California least terns establish nesting colonies on sandy soils with little vegetation along the ocean, lagoons, and bays. Their nests are shallow depressions lined with shells or other debris. Least terns are generally present at nesting areas in California between April and mid-September, often with two waves of nesting during this time period (CDFG 2012a).

Least tern breeding and foraging areas at Point Mugu are shown on Figure 3-5. Mugu Lagoon, and adjacent beaches, represents a relatively secure breeding and foraging area for the species due to no public access and current NBVC Environmental Division management policies. In 2011, an estimated

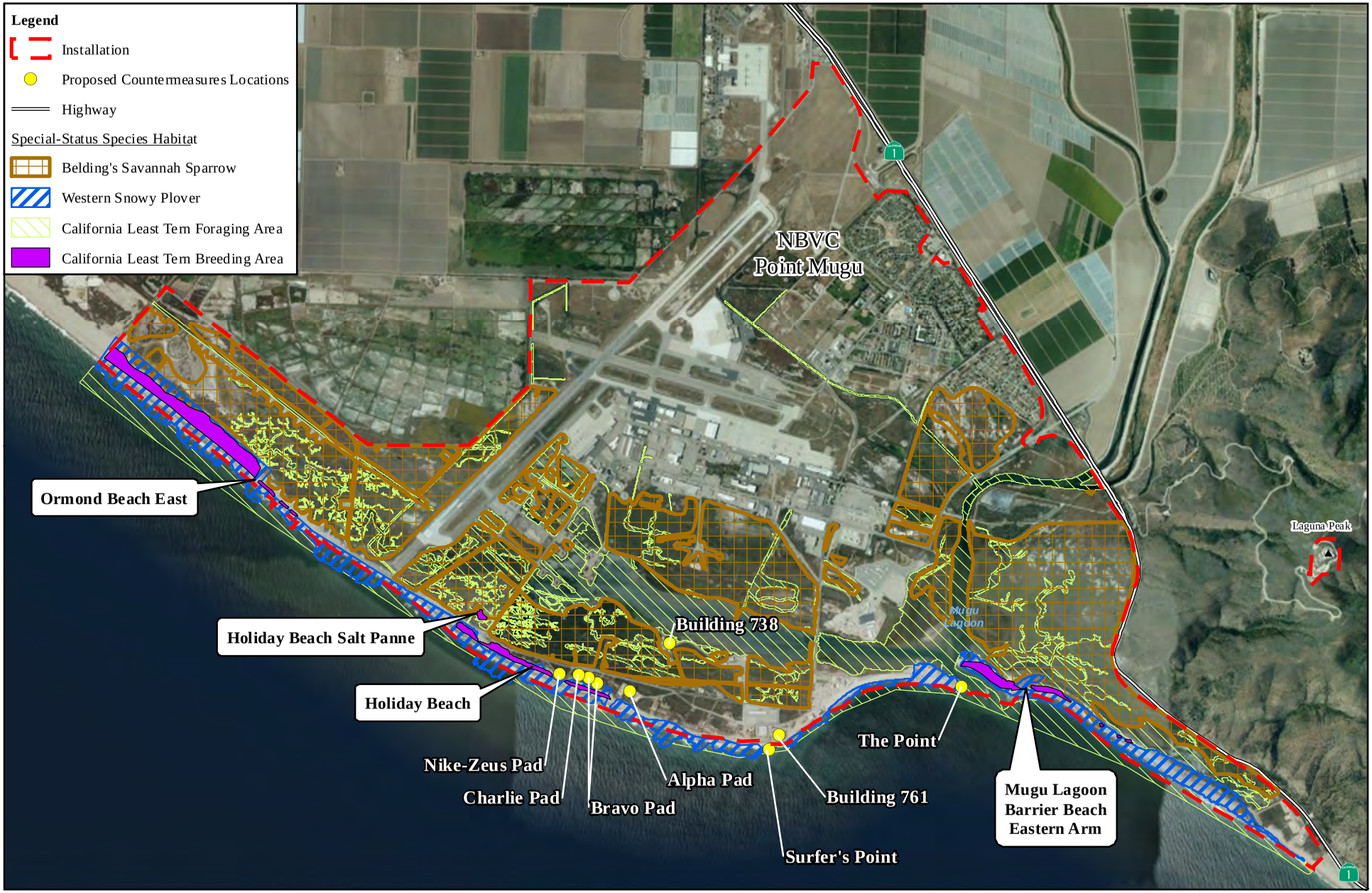


Figure 3-5
Snowy Plover, Least Tern, and Savannah Sparrow Habitats at Point Mugu

Sources: Navy 2005, 1993, 2012b

498-703 breeding pairs established 717 nests at Point Mugu for a total of 72 fledglings. The vast majority of breeding pairs and fledglings (467-672 pairs and 59 fledglings) were located at Ormond Beach East; 28 breeding pairs and 12 fledglings were located at Holiday Beach, 2 pairs and 1 fledgling were located at the Holiday Beach Salt Panne, and 1 pair without any fledglings was located at the Eastern Arm of the Mugu Lagoon's barrier beach (CDFG 2012a). The Ormond Beach colony is the largest least tern colony in Ventura County. Under the Navy's INRMP (NBVC 2002), least tern nesting and foraging areas are protected, and additional recovery programs, such as population and nesting monitoring and predator management, are conducted.

The Bravo Pad, Charlie Pad, and Nike-Zeus Pad are located on previously developed and disturbed habitats that are adjacent to California least tern breeding areas, and all project sites at Point Mugu are located near open water areas that are utilized for foraging by least terns (see Figure 3-5). Proposed activities at these locations include: use as directed energy shooter sites, small arms firing, missile launches, non-lethal laser target sites from the ocean surface, and placement of vans during offshore flare testing and training.

Western Snowy Plover. The federally listed threatened western snowy plover (*Charadrius alexandrinus* ssp. *nivosus*) nests on sandy beaches and above-tidal flats adjacent to Mugu Lagoon from the beginning of April to mid-September (see Figure 3-5) (Navy 2002). Snowy plovers forage on open flats and beaches above and below the mean high tide water line and in salt pannes, where they pick insects and marine invertebrates from sand surfaces, decomposing kelp, marine mammal carcasses, and foredune vegetation.

The majority of the sandy beaches and salt pannes at Point Mugu are utilized for foraging, nesting, and resting by snowy plovers, and these areas are considered essential habitat for the species (Navy 2002; USFWS 2012). The area provides both nesting (for birds of southern latitudes) and wintering areas (for birds of northern latitudes) for snowy plovers. Three primary nesting sites are utilized by snowy plovers on Point Mugu, on the western and eastern arms of the Mugu Lagoon barrier beach. Breeding season window surveys at Point Mugu between 1978 and 2011 found a low of 26 adults in 1997 and a high of 87 adults in 2010. In 2011, 55 adults were observed at Point Mugu during the breeding season (USFWS 2007, 2011). Wintering plovers regularly roost on the stretch of beach in front of the Bravo and Charlie pads (Ruane 2012).

In its current designation of critical habitat (USFWS 2012), the USFWS has determined that lands subject to the INRMP for Point Mugu are exempt from critical habitat designation under ESA Section 4(a)(3) owing to the effectiveness of Navy conservation measures implemented.

The Alpha Pad, Bravo Pad, Charlie Pad, and Nike-Zeus Pad are located on previously developed and disturbed land that is within or adjacent to western snowy plover habitat. Proposed activities at these locations include: use as directed energy shooter sites, small arms firing, missile launches, non-lethal laser target sites from the ocean surface, and placement of vans during offshore flare testing and training.

Belding's Savannah Sparrow. The state-listed endangered Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) resides year-round in the coastal salt marshes of southern California and is common throughout Mugu Lagoon, primarily in the pickleweed-dominated areas of the salt marsh. The Point Mugu subpopulation is the single largest subpopulation, comprising 31% of the state total in 2010 (Zembal and Hoffman 2010).

The Belding's savannah sparrow breeding cycle begins in late December with the establishment of male territories. These defended territories are occupied by males that sing (males only use the primary song for territorial displays), perch on prominent areas within the boundaries of the territory, survey the

territory, and chase other conspecific sparrows. Nest building starts in mid-to late March, with egg-laying in early April. Nests are predominately constructed on the ground or in the low branches of salt marsh vegetation, which make them vulnerable to predation and human disturbances. The initial brood hatches in mid-April, and fledging of the chicks occurs approximately in 10 days. Females are able to re-nest up to three times in a breeding season. The nesting season ceases in mid-August.

There have been numerous restoration projects at Point Mugu that have brought a considerable acreage of wetland under enhanced tidal influence. Consequently, Mugu Lagoon may represent 20-25% of the available coastal marsh habitat in southern California. Furthermore, Belding's savannah sparrows are widespread throughout the marsh, perhaps a product of dampened tidal amplitude (Zembal and Hoffman 2010). Belding's savannah sparrows occupy areas of higher elevation intertidal salt marsh dominated by pickleweed at Point Mugu (Figure 3-5). Mugu Lagoon represents a relatively secure foraging and nesting area for Belding's savannah sparrows because of restricted public access and current NBVC Environmental Division management policies. Other areas that Belding's savannah sparrows occupy are vulnerable to changes due to a lack of formal protections. Preservation of this species habitat is a high priority for the NBVC Environmental Division.

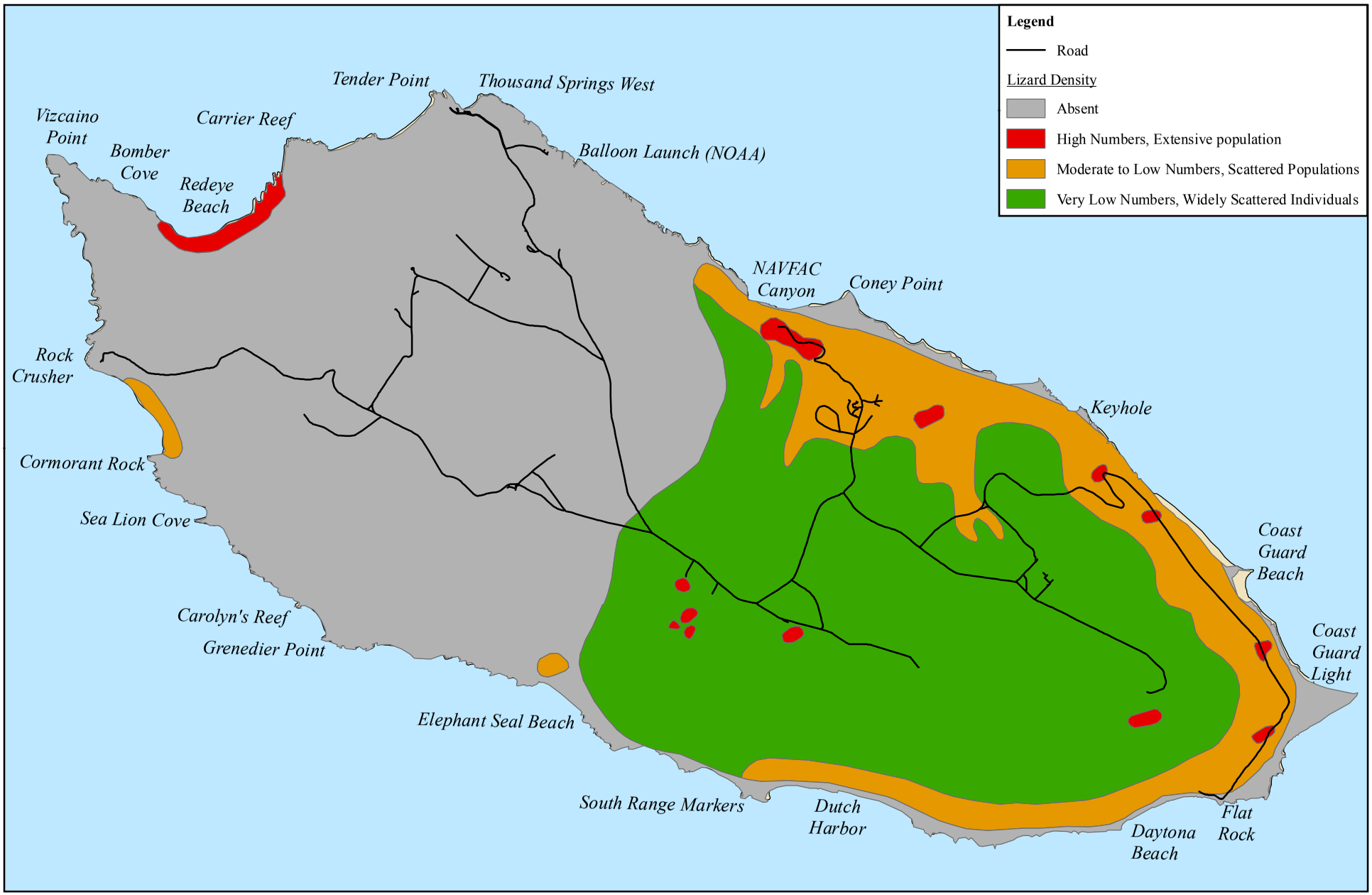
Building 738, a proposed non-lethal directed energy shooter site, is adjacent to occupied Belding's savannah sparrow habitat. The Alpha Pad, Bravo Pad, Charlie Pad, and Nike-Zeus Pad are located across the road from and approximately 200 ft (61 m) south of Belding's savannah sparrow habitat (Figure 3-5). Proposed activities at these locations include: use as directed energy shooter sites, small arms firing (including CIWS testing and training), missile launches, non-lethal laser target sites from the ocean surface, and placement of vans during offshore flare testing and training.

San Nicolas Island

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. 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.

Island Night Lizard. The island night lizard is a medium-sized, cryptically patterned lizard endemic to San Clemente Island, Santa Barbara Island, and SNI. The island night lizard is federally listed as a threatened species. However, the USFWS has proposed delisting 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).



0 0.5 1 Kilometers

0 0.5 1 Miles

Source: Fellers *et al.* 1998

Figure 3-6
Island Night Lizard Density at SNI

Predators of the island night lizard include the SNI fox. Feral cats previously preyed on the island night lizard, but were removed from the island in 2011. Introduced southern alligator lizards may compete for burrows and food. Critical Habitat for the island night lizard has not been designated (NBVC 2010). All proposed project sites have been previously constructed at SNI, and implementation of the proposed action would not result in any construction, excavation, grading, or filling. The likelihood of a lizard passing through the narrow HPM beam or the line of small arms fire, in the exact moment they are fired is extremely low and can be discounted. Therefore, no impacts to island night lizard are expected and the species will not be discussed further.

Western Snowy Plover. SNI beaches are exempt from western snowy plover critical habitat designation due to the protections afforded the species through the 2010 SNI INRMP (USFWS 2012). 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 nest and forage on beaches and in the intertidal zone at SNI (see Figure 3-3). 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 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 (Navy 2011a). Snowy plovers also use the beaches southeast and north of the proposed activities at Rock Crusher at lower concentrations for breeding and non-breeding activities. The nearest areas used are approximately 650 and 950 ft (290 m) to the southeast and north, respectively (NBVC 2010).

The results of surveys from 2005 through 2011 are shown in Table 3-12. 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 3-12. Adult Snowy Plovers Observed on SNI during Winter and Breeding Season Surveys, 2005 – 2011

	Winter Survey (total count)			Breeding Survey (total count)		
Year	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

Note: *2008 and 2011 breeding surveys and 2010 winter survey incomplete.
Source: Navy 2011a.

Monitoring efforts occur more regularly at the Tender Point area, with less frequent survey efforts on Tender Beach as no military operations presently 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 (Navy 2011a). Since 2009, nesting surveys of Tender Beach have shown relatively low nest success due to depredation, tides, winds, and abandonment (Ruane 2012).

On SNI, the Thousand Springs West and Tender Point proposed countermeasures locations are located within or adjacent to known western snowy plover habitat.

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, and seasonally available bird eggs. They occupy all island habitat types, with densities being highest in areas of native vegetation and lowest in barren areas or those comprised primarily of alien annual grasslands. The SNI fox population appears to be at a high 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).

3.5.1.3 Marine Biological Resources

Marine biological resources at NBVC Point Mugu and SNI, and of the Sea Range in general, are discussed below. Additional detail can be found within the *Final Environmental Impact Statement/Overseas Environmental Impact Statement, Point Mugu Sea Range* (Navy 2002) and the *Marine Resources Assessment for the Southern California and Point Mugu Operating Areas,* referred to hereafter as the Marine Resource Assessment (MRA) (Navy 2008).

Marine Habitats

The Sea Range overlaps a major area of climatic and biogeographic transition along the west coast of North America. The shape of California's coastline south of Point Conception creates a broad ocean embayment known as the SCB. The SCB encompasses the area from Point Conception south to Mexico and is influenced by two major oceanic currents: the southward flowing, cold-water California Current and the northward flowing, warm-water California Counter Current. These currents mix in the SCB and strongly influence patterns of ocean water circulation, temperatures and productivity, as well as the dispersal of marine organisms. The Sea Range includes the northern portion of the SCB as well as areas north of Point Conception (see Figure 1-1).

Coastal Wetlands

Coastal wetlands form the transition zone between terrestrial and marine systems; because of this, they help to prevent shoreline erosion, reduce flood damage, and improve water quality. These wetlands are also among the most productive and diverse natural systems on earth, capable of producing more food per acre than the richest farmland. They support essential habitat for 80% of the world's fish and shellfish species and provide feeding, nesting, shelter, high tide refuge, spawning grounds, nursery habitat, and other benefits for thousands of commercially and recreationally important fish (the Pacific lamprey, anadromous fish such as steelhead trout, and estuarine-dependent fish such as halibut), birds, mammals, and invertebrates. They provide vital food and habitat for many invertebrates including clams and crabs as well as offering shelter and nesting sites for many species of migratory waterfowl along the Pacific flyway (Navy 2008).

Mugu Lagoon, a 2,200-ac (890-ha) coastal wetland ecosystem, supports the largest remaining coastal salt marsh in southern California and provides habitat for seven federally and/or state-listed endangered species. The lagoon's location within NBVC has allowed the lagoon to remain free from many of the human activities that impact other coastal salt marshes in southern California (Navy 2008).

Tidal Flats

Tidal flats are located in coastal areas sheltered from wave action where sediments accumulate. Within or near the project area, tidal flats are typically dissected by meandering tidal creeks and channels. Tidal flats can be classified into sand flat and mud flat habitats according to sediment composition. They can also be categorized into coastal tidal flat and estuarine tidal flat based on their location. The physical characteristics of an area determine sediment composition; this, in turn, influences the biological diversity and the productivity of the habitat. Abundant fauna use the nutrient-rich detritus found in tidal flats. The flora and fauna supported by tidal flats are typical of that found in the bays and estuaries along the California coastline and serve as the food base for regional fishes and birds. Seasonally, many tidal flats serve as essential stopovers for migrating birds to rest, feed and breed (Navy 2008). The most extensive tidal flats near the project area are found at Mugu Lagoon.

Beach

A beach environment can be defined as the intertidal zone of unconsolidated material that extends landward from the low water line. Wind and waves continually influence the deposition and erosion of sediments; therefore, beach environments are constantly changing. Sandy beaches have a steep gradient, topographically, because they are exposed to significant wave action; therefore, the sediments are coarse in size, aerobic, experience rapid and differential drying, and are more strongly zoned than mudflats. The upper intertidal beach is submerged for a short time and exposed to the widest range of temperatures; the animals inhabiting this zone rely on unpredictable and patchy food sources. This zone is used as a breeding habitat by a variety of birds and pinnipeds. The mid-littoral beach is alternately submerged and exposed for moderate periods of time; the characteristic fauna is dominated by species with high mobility (e.g., isopods, sand crabs, and polychaetes). The swash zone is submerged for approximately 12 hours per day. The low intertidal zone is exposed for brief periods of time during the lowest tides; the characteristic fauna is dominated by species that burrow into the sediments for protection. The surf zone is constantly submerged and subjected to the motion of breaking waves. The animals in the surf zone are subjected to nearly constant and intense physical agitation (Navy 2008).

Beaches are an important habitat at Point Mugu and within the Sea Range. Exposed sandy beaches make up approximately 23% of the Channel Islands coastlines. The Channel Islands National Marine Sanctuary contains approximately 47 miles (76 km) of sandy beaches (Navy 2008).

Beaches support extensive invertebrate communities that are an important food resource for shorebirds. A number of plants and animals have become adapted to this stressful habitat; the most common invertebrates found are the common sand crab (*Emerita analoga*), isopods (e.g., *Excirolana chiltoni*), talitrid amphipods (e.g., *Megalorchestia* spp.), polychaetes (e.g., *Euzonus mucronata*), the Pismo clam (*Tivela stultorum*), the bean clam (*Donax gouldii*), and the purple olive snail (*Olivella biplicata*). Typical plants along coastal shoreline areas include dune buckwheat (*Eriogonum parviflorum*), beach ragweed (*Ambrosia chamissonis*), red sand verbena (*Abronia maritima*), and beach evening primrose (*Camissonia cheiranthifolia*). Native plant cover is especially important because it serves as important habitat for nesting, roosting, and foraging bird species including the endangered California least tern, the threatened western snowy plover, and the Belding's savannah sparrow. Additionally, these beaches provide resting areas for some marine mammals; many species of pinnipeds have large rookeries on the isolated and

undisturbed beaches of the Channel Islands. Harbor seals and California sea lions are known to haulout onto much of the project area's coastline at Point Mugu and at SNI; northern elephant seals are also known to haulout around SNI's entire coastline (Navy 2008).

Rocky Intertidal

Rocky intertidal habitat forms along the shoreline between high and low tide where the shoreline is steep and sand is absent due to constant wave action, currents, and a lack of offshore sand reservoirs. Biological assemblages common to rocky intertidal habitats are defined by extreme physical factors including exposure to air and potential desiccation, tidal inundation, strong wave and surf exposure, rocky substrate, competition for living space, and the need to find food and shelter while avoiding predators. Cracks, crevices, and overhangs create microhabitats for organisms to elude predators, minimize wave shock, and avoid desiccation. These characteristics create strong vertical zonation in which the distribution of an organism is determined by its physiological tolerance to desiccation and competitive and predatory interactions with other species (Navy 2008).

Four zones of biological assemblages are traditionally associated with different tidal heights. These four zones are the splash zone, the upper intertidal, the mid intertidal, and the lower intertidal. The splash zone is the uppermost intertidal band; it is only occasionally wetted by waves. The high intertidal zone is located below the splash zone and is exposed to air regularly; therefore, the organisms common in this zone have adapted to temperature fluctuations and desiccation. The middle intertidal zone is covered with water at higher low tides; thus, the organisms in this zone are offered some protection from desiccation. The low intertidal zone is located at the lowest low tide level and is almost always submerged. In general, diversity of the benthos (e.g., algae and invertebrates) increases with depth in rocky intertidal habitats. The Channel Island rocky intertidal habitats tend to have higher biodiversity, biomass, and percent cover than the mainland sites because the mainland's nearshore environment is dominated by sandy areas that are infrequently separated by rocky substrates whereas the Channel Islands nearshore environment is composed primarily of rocky substrate with relatively small expanses of sand (Navy 2008). 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 2008b, 2009).

Continental Shelf Habitats and Assemblages

The bottom environment of the SCB is complex due to the variety of bottom substrates and the complicated system of water circulation and bathymetry. Both flora and fauna marine benthic assemblages are extremely diverse and include representatives of nearly all phyla. The distribution of the benthos is determined by a vertical zonation pattern that is mainly a function of depth (i.e., light penetration, temperature, and wave action) and substrate (i.e., availability and type of substrate and movement and accumulation of sediments). With increasing depth, light intensity declines and eventually algae and plants are unable to survive; therefore, benthic flora decrease in abundance and size. Within the project area, rocky, sandy, and muddy substrates occur within the continental shelf subtidal environment and support habitats such as seagrass, kelp, and live/hardbottom communities (Navy 2008). Additional details on continental shelf habitats and assemblages, including information on kelp, drift kelp, seagrass, unvegetated shallows, live/hardbottom, benthic macrophytes, benthic macrofauna, corals, and islets, can be found in the 2008 MRA.

Kelp forests are highly productive, structurally complex habitats that support a great abundance and diversity of fish and invertebrates, providing refuge, forage, and nursery areas to support commercial and sport fish, invertebrates, marine mammals, and marine birds. Kelp forests in the SCB provide support for

nearly 800 animal and plant species including sea urchins, squid, abalone, spiny lobster, California halibut, Pacific mackerel, rockfish, and crab. Sea otters often use kelp forests along the central and southern coasts of California as a refuge from predation by white sharks and as nursery areas (Navy 2008). According to surveys conducted by the CDFW, the shapes of kelp beds have varied over the years but overall abundance has remained relatively stable (CDFG 2008). The abundance of kelp around SNI is generally highest off the northern shores of the island, but kelp can be found around most shores of the island in varying abundance. Additional information on kelp forests, including the locations of kelp beds and kelp harvest locations, can be found in the 2008 MRA.

Rocky subtidal areas, especially those that support kelp beds, provide the greatest potential to support the endangered white abalone (*Haliotis sorenseni*), although this species is not known to presently occur at SNI. White abalone is discussed further later in this section. Historically, SNI was an important area for commercial kelp harvesting, and large kelp beds were harvested at sites along the northern and southern shores. At present, however, there is no demand for commercial kelp harvesting along the California coast due to economic conditions, and the beds at SNI are not being harvested. Commercial kelp beds are managed by the CDFW, and the beds at SNI could be available to commercial harvesters in the future. Kelp beds extend out as far as 3 nm (5.6 km) from shore on the western shores of SNI and are found just outside the intertidal to 1.5 nm (2.8 km) from shore in all other parts of the island.

Deep Water (Open Ocean)

The Sea Range includes regions of complex bathymetry that provide diverse habitats for a variety of marine life. Open water areas offshore are part of a pelagic habitat that hosts various fish, invertebrates, drift algae, and plankton communities. Sea lions and seabirds may rest on buoys or other floating structures on the open ocean. Beyond the depths of kelp beds (greater than 100 ft [30 m]), approximately 3% of the sea floor consists of rubble and rocky outcrops inhabited by marine invertebrate assemblages. On the continental shelf regions, sand and gravel substrate is typically interspersed between these rocky areas. Offshore shelves, ridges, and banks exhibit the most diverse macrobenthic assemblages of the deep water regions in the Sea Range. The high species diversity is attributed mainly to the persistent upwelling and the wide range of sediment types. Nearshore and offshore lower slope regions are lower in species abundance and diversity (Navy 2002).

The deep sea can be divided into two primary areas: pelagic (associated with the open water) and benthic. The open ocean pelagic habitat can be described as having a light zone and a dark zone. Each zone is distinct in its characteristics of water movement, quantity of sunlight, temperature, pressure, availability of food, oxygen, and salinity. In the light zone, sunlight reaches approximately 328 to 656 ft (100 to 200 m) below the water's surface; this zone is where primary production (photosynthesis) occurs. In the dark zone, life is sparse due to little or no nutrients, sunlight, or food. Stability, cold temperatures, and extreme water pressure also characterize the dark zone. In the mesopelagic zone (the transition area between the light and dark zone), deep-living zooplankton and nekton undergo diurnal vertical migration, moving upwards into the light zone at night to feed on the abundant phytoplankton and downwards during the day to avoid predation. These pelagic biological oceanographic communities (i.e., phytoplankton and zooplankton) are discussed in Section 2.6 of the MRA (Navy 2008).

In the benthos, biomass diminishes and diversity increases with increasing distance offshore. Benthic animals rely on the input of food or falling detritus from the surface waters. In general, animals living on or in the benthos in the open ocean grow slower, live longer, and have smaller broods than animals living in shallow waters. However, there are very productive microhabitats associated with the deep benthic environment, including deep rocky substrates (i.e., seamounts), deep-water corals, and chemosynthetic

communities. Macrobenthic species diversity and biomass decrease over slope depth, and on lower slopes, these parameters approach their lowest values. Deep sea basins exhibit the lowest macrofaunal species abundance and diversity of any other benthic habitat in the offshore region. This impoverishment is likely due to the anaerobic conditions and high sedimentation rates typical of these areas (Navy 2002, 2008). These benthic habitats are also discussed in further detail in the MRA (Navy 2008).

Fish and Essential Fish Habitat

The project area is situated within the SCB, a region of diverse ichthyofauna and highly productive fisheries. Of the 554 species and 144 families of California marine fishes, approximately 481 species (87%) and 129 families (90%) occur in the SCB. Predominant ecosystems found in the SCB include nearshore coastal (i.e., rocky habitats, soft bottom, and estuaries), continental shelf (i.e., upwelling zones, inner portion of California Current, and rocky reefs), and oceanic (i.e., epipelagic, mesopelagic, and bathypelagic) systems. The majority of the fishery resources are found in the epipelagic and benthic areas of the continental shelf ecosystem (Navy 2008).

Important marine species include coastal pelagics (mackerels, anchovies, herrings, and jacks), nearshore, shelf, and slope groundfish (flatfish, rockfish, roundfish, skates and sharks), salmonids (Chinook salmon, coho salmon, and pink salmon and steelhead), highly migratory (tunas, sharks, billfish, swordfish, and dolphinfish), other relatively large pelagic fishes (louvar, *Luvarus imperialis*; oarfish, *Regalecus glesne*; opah, *Lampris guttatus*; Pacific saury, *Cololabis saira*; common mola, *Mola mola;* black skipjack, *Euthynnus affinis*; and others), invertebrates (California spiny lobster, *Panulirus interruptus*; red sea urchin, *Strongylocentrotus franciscanus*; Dungeness crab, *Cancer magister*; ocean shrimp, *Panadalus jordani*; warty sea cucumber, *Parastichopus parvimensis*; and others), and kelp beds (Navy 2008).

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

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

EFH near SNI has been identified in the FMPs for three groups of managed species: coastal pelagic species, highly migratory species, and west coast groundfish (PFMC 1998, 2005, 2007). Coastal pelagic species include anchovy, sardine, mackerel, and market squid (NBVC 2010) and corresponding EFH includes the coastal and offshore waters throughout the U.S. Exclusive Economic Zone (EEZ) to 200 nm (370 km) offshore where sea surface temperatures range from 50°F to 79°F (10°C to 26°C). No HAPCs have been designated for coastal pelagic species. Highly migratory species include, but are not limited to, albacore, swordfish, and several species of shark and tuna. EFH for highly migratory species includes all of the waters within the EEZ, but no HAPCs have been designated within EFH. The west coast groundfish species complex includes 83 species of bottom-dwelling fishes that occur in diverse habitats. Approximately 30 of these species are known to occur in the waters around SNI (Pinkard-Meier and

Butler 2008). EFH for west coast groundfish includes the entire west coast of the U.S. out to depths of 11,483 ft (3,500 m). The FMP for west coast groundfish identifies five HAPCs (PFMC 2005):

- **Estuaries** – inland extent of the estuary HAPC is defined as mean higher high water, or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 parts per thousand during the period of average annual low flow. The seaward extent is an imaginary line closing the mouth of a river, bay, or sound; and to the seaward limit of wetland emergents, shrubs, or trees occurring beyond the lines closing rivers, bays, or sounds. This HAPC also includes those estuary influenced offshore areas of continuously diluted seawater. The Mugu Lagoon is the primary estuary area near the Point Mugu Sea Range but is not within areas proposed for countermeasures testing and training activities.
- **Seagrass** – includes those waters, substrate, and other biogenic features associated with eelgrass species (*Zostera* spp.), widgeongrass (*Ruppia maritima*), or surfgrass (*Phyllospadix* spp.). Eelgrass grows in shallow, subtidal, or intertidal unconsolidated sediments and surfgrass grows on wave-beaten rocky shores. Areas where seagrasses may be expected to occur (i.e., in protected areas of suitable depth [<66 ft or 20 m]) within the Point Mugu Sea Range are designated as potential seagrass range. Eelgrass is found within the Mugu Lagoon and at Coast Guard Beach on the north side of the southeast end of SNI, and surfgrass surrounds parts of SNI (particularly the northwestern coast) (Engle and Miller 2003; Navy 2008). Additional potential seagrass range exists around SNI and the Mugu Lagoon (Navy 2008).
- **Canopy Kelp –** includes those waters, substrate, and other biogenic habitat associated with canopy-forming kelp species (e.g., Macrocystis spp. and Nereocystis sp.). Canopy kelp beds and associated rocky reef areas are located throughout the nearshore area of Point Mugu and within the nearshore area on all sides of SNI; the northwestern area of SNI is particularly thick (Navy 2008, NBVC 2010).
- **Rocky Reefs** – includes those waters, substrates and other biogenic features associated with hard substrate (bedrock, boulders, cobble, gravel, etc.) to the mean higher high water level. A first approximation of its extent is provided by the substrate data in the groundfish EFH assessment geographic information system. However, at finer scales through direct observation, it may be possible to further distinguish between hard and soft substrate in order to define the extent of this HAPC. Rocky reefs are located within the project area.
- **Areas of Interest** – discrete areas that are of special interest due to their unique geological and ecological characteristics. In southern California, areas of interest include all seamounts, canyons, specific areas in the federal waters of the Channel Islands National Marine Sanctuary and specific areas of the Cowcod Conservation Area. The project area, however, is not located within any Areas of Interest.

As described above, three of the five HAPCs designated for west coast groundfish occur in the proposed project area: canopy kelp beds, rocky reef areas, and seagrass.

SNI is also located within a Cowcod Conservation Area (CDFG 2012b). Cowcod (*Sebastes levis*) is an overfished stock that is being rebuilt under the Federal West Coast Groundfish Fishery Management Plan. Cowcod Conservation Areas, where most bottom fishing is prohibited in waters deeper than 20 fathoms (37 m), were created to help recover cowcod populations, which are found from about 230-1,150 ft (70-350 m) in depth, primarily in the SCB.

Marine Birds

SNI provides important breeding habitat for several bird species, including the western gull (*Larus occidentalis*), Brandt's cormorant (*Phalacrocorax penicillatus*), and black oystercatcher (*Haematopus bachmani*). 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). California brown pelican roosting areas, western snowy plover habitat, and nesting areas for Brandt's cormorants are shown on Figure 3-3.

The nearshore, offshore, and shallow water areas surrounding SNI and Point Mugu provide foraging opportunities for a variety of shorebirds and pelagic seabirds. Within the Sea Range, seabird densities are estimated to range from less than 0.01 to 0.46 bird per ac (0.02 to 1.14 birds per ha). In the area immediately surrounding SNI the density has been estimated at 0.1 bird per ac (0.25 birds per ha) (Navy 2002). Seabirds include various species of gulls, terns, murres, auklets and cormorants, shearwaters, petrels, and the California brown pelican (State of the California Current 2007). All seabirds in the project area are protected by the MBTA, which prohibits the taking, killing, or possessing of migratory birds or the parts, nests, or eggs of such birds, unless permitted by regulation. Conservation of migratory birds is also mandated by EO 13186, and is addressed by the Navy for all activities occurring on SNI (NBVC 2010).

Marine Mammals

Forty-six marine mammal species have confirmed or possible occurrence at Point Mugu, SNI, or the Sea Range. Table 3-1 of the 2008 MRA provides information on all of these species, including species descriptions, status, habitat associations, distribution (including location and seasonal occurrence), behavior and life history, and acoustics, and hearing abilities (Navy 2008). All marine mammal species are protected by either the ESA, MMPA, or both. Consequently, individual marine mammal species that are likely to occur in areas affected by the proposed action are discussed as special-status species in the next section.

Marine Special-Status Species

Special-status marine species known or likely to occur in the region of the proposed action include federally listed threatened or endangered fish and marine invertebrates, birds, sea turtles, and marine mammals. All marine mammals are also protected by the MMPA. Pursuant to Section 7 of the ESA, the Navy consulted with the USFWS who issued a Biological Opinion and Incidental Take Statement regarding potential impacts to federally listed species (Appendix C).

Marine Fish and Invertebrates

The project area is known to support the ESA-listed white abalone (*Haliotis sorensensi*) and black abalone (*Haliotis cracherodii).*

White Abalone. The white abalone (*Haliotis sorenseni*) was listed as an endangered species under the ESA in May 2001. A recovery plan for the species has been completed (NMFS 2008a). In its final rule to list the species, NMFS determined that it would not be prudent to designate critical habitat because the identification of such habitat would increase the risk of poaching (NMFS 2001). White abalone are marine gastropods that grow slowly and have a lifespan of 30 years or more. Juvenile white abalone seek cover in rocky crevices and under rocks, while adults reside in low to mid relief rocky areas at the sand/rock interface. White abalone were historically found in waters ranging from 66 to 200 ft (20 to 61

m) but are now found in relatively deep waters ranging from 98 to 200 ft (30 to 61 m) (Butler et al. 2006). White abalone are herbivores that feed on drift macroalgae and, therefore, are commonly found in association with the brown algae *Laminaria farlowii* and *Agarum fimbriatum* (Hobday and Tegner 2000; Lafferty 2001).

Quantitative analyses have produced different estimates of suitable white abalone habitat in the SCB (Davis et al. 1998; Hobday and Tegner 2000; Butler et al. 2006). Recent (2002-2004) habitat mapping and surveys for white abalone at San Clemente Island and Tanner and Cortes Banks resulted in a much greater estimate of suitable habitat and population sizes (Butler et al. 2006). A habitat model for white abalone around SNI was made by NOAA using depth ranges and general substrate types as input parameters. According to this effort, white abalone habitat is most prevalent along the northern shores of SNI, with patches of suitable habitat along the southern shores. White abalone habitat seems to correspond closely to locations of kelp beds. Construction of this habitat model considered environmental parameters but did not actually survey for presence/absence of abalone.

During remotely operated vehicle surveys conducted at SNI, no white abalone were identified in a 2.5-ac (1-ha) search area. Surveys were limited in coverage due to poor weather conditions and restraints on access to waters near SNI that are used for military exercises (Pinkard-Meier and Butler 2008). Fisheries landing data collected during the peak of the abalone fishing period indicated that less than 0.5% of all landings came from SNI, and this species has not been sighted at SNI for many years (Hobday and Tegner 2000).

Black Abalone. The black abalone (*Haliotis cracherodii*) was listed in 2009 as an endangered species (NMFS 2008b, 2009). In the final rule designating critical habitat for the species, SNI was excluded from critical habitat under ESA Section 4(a)(3) based on conservation benefits provided by the revised INRMP (NMFS 2011b).

Like white abalone, they are relatively slow-growing, long-lived snails with a flattened shell, reaching a diameter of about 4 inches (10 cm) at 4-8 years, and growing more slowly thereafter (NMFS 2008b). The range of black abalone is from Mendocino County to northern Baja California. Historically, the largest numbers of animals occurred on the Channel Islands. Black abalone occur on rocky shores where exposed bedrock provides a complex surface with ample crevices in which the animals find refuge from predators and exposure at low tides (NMFS 2008b). They occur primarily in the intertidal zone, but are found to a depth of 20 ft (6 m). Following a relatively short period (3 to 10 days) of larval dispersal, they settle onto rocky substrates and feed on algal films. As they become larger, black abalone commonly feed by trapping pieces of drift kelp under the edge of their shell (NMFS 2008b).

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

The most extensive and rigorous long-term data on the abundance of black abalone come from SNI and have been collected by G. VanBlaricom of the U.S. Geological Survey and University of Washington. Surveys in the intertidal and shallow subtidal habitats on all sides of SNI have been conducted for more than 30 years (VanBlaricom 1993, 2007; G. VanBlaricom, U.S. Geological Survey and University of

Washington, unpublished data). The sites with highest densities, on the order of one per square meter, are located on the southern shores of SNI.

Marine Birds

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

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 300 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).

Marine Mammals

All marine mammals are protected under the MMPA of 1972 as amended (16 USC 1361 et seq.), and some species are additionally protected by the ESA of 1973 (16 USC 1531). Marine mammals listed as threatened or endangered under the ESA are also automatically considered "depleted" under the MMPA. For detailed status and distribution information for each species, refer to the current Marine Mammal Stock Assessment Reports prepared by the NOAA, available online at http://www.nmfs.noaa.gov/pr/sars/species.htm. Table 3-1 of the 2008 MRA also provides additional details for all marine mammal species with known or potential occurrence within the project area, including species descriptions, status, habitat associations, distribution (including location and seasonal occurrence), behavior and life history, and acoustics.

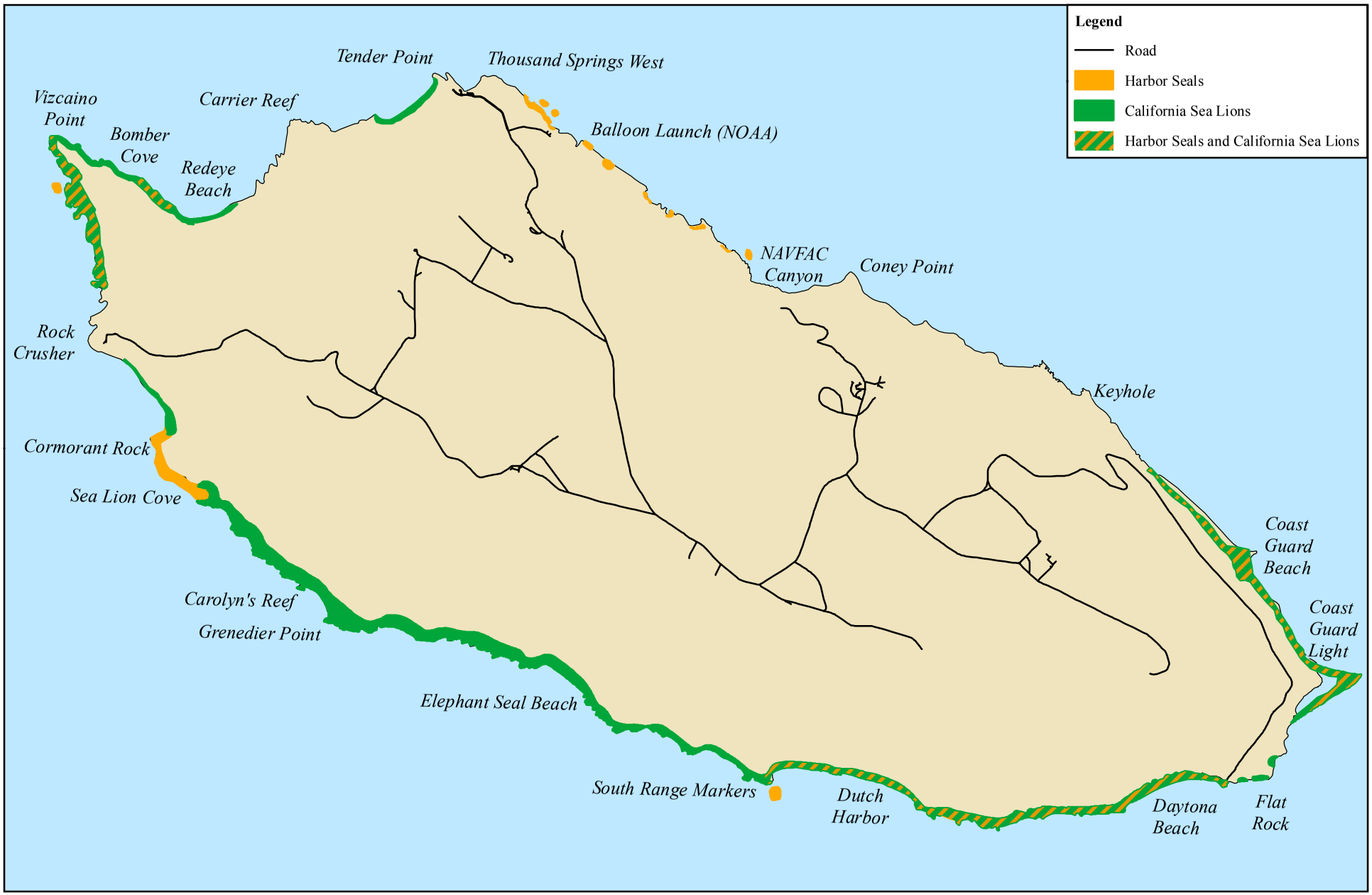
Two marine mammal species occur at Point Mugu: the Pacific harbor seal (*Phoca vitulina richardsi*) and the California sea lion (*Zalophus californianus californianus*). Harbor seals haulout within Mugu Lagoon (see Figure 3-4). In the early-to-mid 1980s, less than 100 harbor seals were counted during their molting period. From 1988 to 1995, from 120 to 243 seals were counted in June during the index counts conducted by CDFW personnel (Navy 2002).

Since April 1992, Navy biologists have conducted year-round counts of harbor seals hauled-out at Point Mugu. The highest number of harbor seal individuals counted was 497 on 21 May 2003. Pupping season is from mid-February to the middle of July at Mugu Lagoon. Point Mugu is a significant pupping area. Harbor seal pups are precocious and are able to crawl and swim within an hour of birth. The population seems to have stabilized over the last decade, with an average 250 harbor seals commonly found hauled-out (Ruane 2013).

California sea lions have been sighted in large numbers in the nearshore waters at Point Mugu during all seasons except summer. Often a few individual California sea lions can be observed during the summer. California sea lions that irregularly haulout at NBVC Point Mugu are speculated to be juveniles and sub-adults, because adults tend to be found at or near their breeding grounds when the majority of these observations have been made (June and July).

Three species of pinnipeds are seen regularly on SNI and within the Sea Range: California sea lion, northern elephant seal (*Mirounga angustirostris*), and Pacific harbor seal (Figures 3-7 and 3-8). SNI and surrounding waters provide important foraging, breeding, and haulout areas for these pinnipeds. Harbor seal haulout sites are patchily distributed on all shores of SNI with the exception of the northeast stretch. Elephant seal haulouts exist along most of the southern, eastern, and western shores. California sea lions are known to haulout along the entire stretch of the southern shore of SNI. Table 3-13 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) and are expected to be found regularly within the Sea Range. There are no known rookeries or haulout sites in California for the Guadalupe fur seal, and the few observations of non-breeding 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.

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). 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).

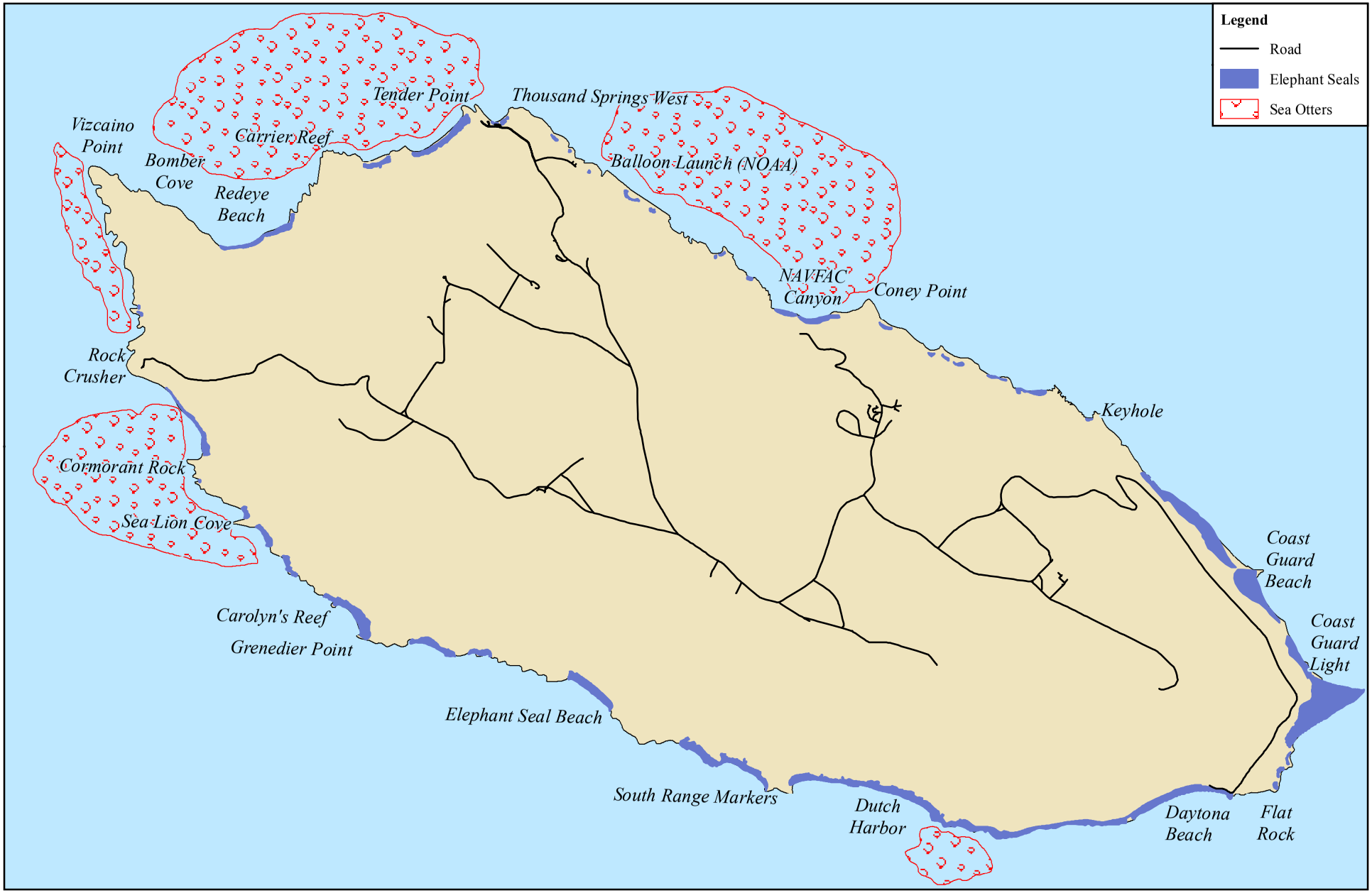


0 0.5 1 Kilometers

0 0.5 1 Miles

Source: Navy 2002

Figure 3-7
Harbor Seal and California Sea Lion Haulouts at SNI



0 0.5 1 Kilometers

0 0.5 1 Miles

Sources: Hatfield 1997; Navy 2012

Figure 3-8
Elephant Seal Haulouts and Sea Otters at SNI

Table 3-13. 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.

Several cetacean species, both odontocetes (toothed whales) and mysticetes (baleen whales), have been sighted near SNI, although in small numbers. Other cetacean species are known to occur in the Sea Range and in the vicinity of SNI. Odontocetes sighted near SNI include Dall's porpoise (*Phocoenoides dalli*) and northern right whale dolphins (*Lissodelphis borealis*), and mysticetes include gray whales (*Eschrichtius robustus*) and humpback whales (*Megaptera novaeangliae*). A limited number of gray whales have been observed within or adjacent to the nearshore project areas at both Point Mugu and at SNI during annual migrations. However, gray whales do not stop at or congregate within the proposed project areas, and migration routes are widely dispersed throughout the SCB (NOAA National Centers for Coastal Ocean Science 2005; Navy 2008). Blue whales (*Balaenoptera musculus*) may occur within 3 nm (5.6 km) of SNI, but the occurrence of this species nearshore would be considered rare (Navy 2002; U.S. Pacific Fleet 2005). The humpback, sei (*Balaenoptera borealis*), fin (*Balaenoptera physalus*), sperm (*Physeter macrocephalus*), and blue whales are federally listed endangered species that are known to occur within the Sea Range (NOAA 2008, Navy 2008); the California population of gray whales was delisted in 1994 due to rising numbers (NMFS 1994). The endangered North Pacific right whale (*Eubalaena japonica*) is considered a rare visitor to the Sea Range (Navy 2008).

Sea Turtles

Four threatened or endangered species of sea turtles potentially occur within the waters surrounding SNI: loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), eastern Pacific green (*Chelonia mydas*), and olive ridley (*Lepidochelys olivacea*). There are no sea turtle nesting beaches on the Pacific coast north of Mexico. Occurrences of the four species on the Sea Range can be anticipated as follows (Navy 2002):

- Juvenile loggerheads may be encountered year-round, with greatest numbers during July-September, but also in winter during warm years. Adult loggerheads are rare at any time of year.
- Leatherbacks are common during July-September, and otherwise in years when water temperatures are above normal.
- Green sea turtles may be encountered year-round, with highest concentrations during July-September.
- Olive ridleys are rare in southern California waters and unlikely to be encountered on the Sea Range.

3.5.2 Environmental Consequences

3.5.2.1 Approach to Analysis

This section addresses potential impacts from projectiles, noise, debris, and activities related to the proposed countermeasures testing and training. 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 consequences of both direct and indirect impacts are considered.

Special consideration is given to the potential for noise impacts, particularly for nesting birds and marine mammals. Noise can be defined as any sound that interferes with communication, is intense enough to damage hearing, or is otherwise disrupting or annoying. Noise is commonly measured using a logarithmic scale expressed in dB. Sound measurements are further refined by using a dBA scale that emphasizes those frequencies that are most audible to humans. As a result, dBA measurements, which de-emphasize the high and low frequencies and emphasize the middle frequencies, are used to characterize sound levels. The SEL is a measure of the physical energy associated with a noise event that incorporates both the intensity and duration of the event.

In the following sections, the potential impacts of the proposed action are analyzed for each category of biological resources.

3.5.2.2 Alternative 1 (Preferred Alternative)

The increased directed energy usage, electronic support systems activity, air operations, aerial and surface targets, missiles, small arms rounds, and flares would represent only marginal increases to current activity levels. In many cases, there will be no overall increase in activities, but rather a shift in type of activities from those previously presented. Appendix A and Table 2-1 describe the proposed action and compare the proposed action with the no-action alternative in terms of activity. Section 2.2.4, *Wildlife Protection*, provides the various wildlife protection measures included as part of the proposed action. These measures include locating all countermeasures testing and training activities at least 500 ft (152 m) from any active protected species nest; additionally, before directed energy systems, missiles, and/or other projectiles are fired, the Navy will require as standard procedure that no persons, wildlife, reflective surfaces, or non-target obstructions of any sort are present within the hazard area (which is specific to the type of system being used) between the shooter site and the target or immediately behind the target. Furthermore, a search will be conducted to pick up and properly dispose of debris that has fallen between the firing point and the water's edge subsequent to each CIWS test event.

All proposed project sites are in previously disturbed areas at Point Mugu and SNI. Implementation of the proposed action would not result in any construction, excavation, grading, or filling. Portable equipment would be brought to the sites for the duration of the test period and then removed upon completion. All project sites at Point Mugu, except the nearshore testing and training site, have either an existing concrete pad or a filled and leveled surface to support project equipment and vehicle placement. Project vehicles and equipment would be restricted to the concrete pads, leveled surfaces, and access roads. At all nearshore testing and training sites, van placement for air-to-air flare activities would be restricted to existing concrete pads, leveled surfaces, and paved or dirt access roads that lead to nearby beaches; vehicles would not be allowed to drive onto any beach. At SNI, established paved and dirt roads allow access to the project sites. All sites have an existing graded surface to support project vehicles and equipment. Project vehicles and equipment would be restricted to the leveled surfaces and access roads.

Increased aircraft, missile, and small arms activity would result in intermittent loud noises but relatively small increases in overall noise levels at locations where the proposed activities would occur. Missile launches are consistent with current activities at both Point Mugu and at SNI and the noise generated from such activities is not expected to significantly impact wildlife.

Minimal data exists regarding effects of small arms fire on wildlife. Research conducted at Fort Stewart, Georgia on red-cockaded woodpeckers showed that small-caliber live fire noise at distances less than 1,312 ft (400 m) did not appear to induce flush responses in individual birds (Delaney et al. 2002). In their review of existing data, Delaney et al. (2002) found that it was rare for bird species to flush when the noise disturbance stimulus distance was greater than 60 m.

The Point Mugu Sea Range EIS/OEIS (see Appendix C in Navy 2002) estimated maximum airborne noise levels from the CIWS as 149 dB A-weighted SEL re 20 μPa^2s at 8 ft (2.4 m) from the muzzle, declining with distance at a rate of 28 dB per 10-fold increase. This would equate to 93 dB re 20 μPa^2s at 330 ft (100 m) and, given that the review by Southall et al. (2007) suggests that behavioral reactions by pinnipeds are likely when received airborne SELs exceed 100 dB re 20 μPa^2s, the 330-ft (100-m) distance can be used to determine potential disturbance to pinnipeds. Since there are no specific thresholds for birds, and avian hearing is generally considered similar to that of mammals, the same distance is used here to define potential noise disturbance to birds. Burger (1981) demonstrated disturbance to shorebirds at a sound level of 108 dB.

The Point Mugu Sea Range EIS/OEIS (Section 4.7) also calculated the probability of a marine mammal sustaining injury due to the impulse generated by a CIWS round striking the nearby water surface. Using a conservative approach, the Navy determined that the predicted sound impulse is "well below the minimum impulse necessary to cause physical injury to a marine mammal" and is also "well below the temporary threshold shift threshold for a single transient event." Additionally, all activities proposed in this project produce launch sounds lower than that predicted for temporary threshold shift in marine mammals (see Section 3.4.2.2 for sound level estimates).

Small arms firing represents a new type of noise activity at the pads at Point Mugu. However, this activity would occur in areas that currently experience loud noise events from aircraft overflights and from missile and target launches. Furthermore, small arms activity does occur in the area, as there is a small arms range adjacent to the beach. The difference between the current and proposed activities is that proposed activities include the rapid-fire of arms and the existing range is surrounded by berms that reduce sound levels to adjacent habitat. Birds and mammals are potentially affected by increased noise levels through temporary displacement, increased stress, loss of energy and time available for foraging and/or reproduction, and by increased exposure to predation. Ambient noise (e.g., wind or waves) may mask anthropogenic sounds and reduce impacts as species in the area are accustomed to loud noises. Therefore, depending on the source and location, the increase in loud noise events associated with Alternative 1 could potentially affect wildlife species.

Use of the CIWS and other small arms may result in downrange impacts due to the fallout of bullets as well as the aluminum pushers and plastic sabots that are part of the munitions. Coastal and marine habitats and wildlife could be affected directly (e.g., by the actual impact of rounds or aluminum pushers) or indirectly (by ingestion of plastic debris or changes in water or sediment quality). As described below, however, these impacts are unlikely and not expected to result in negative impacts to habitats or wildlife.

Potential impacts to biological resources are described in detail below.

Vegetation Communities

All proposed project sites are in previously disturbed areas at Point Mugu and at SNI. Implementation of the proposed action would not result in any construction, excavation, grading, or filling. All project vehicles and equipment would be restricted to previously constructed or graded surfaces. With the exception of plastic sabots from the CIWS munitions, debris from small arms firing, missile launches, flares, and targets would fall into the nearshore waters of Point Mugu or the Sea Range and would not affect terrestrial resources. Therefore, no impacts to vegetation communities are expected to occur. Aluminum pushers and plastic sabots are estimated to fall out a maximum of 900 ft (270 m) and 300 ft (90 m), respectively from the firing location (see Figures 2-3 and 2-4), and hence could land on the beach or in the nearshore waters. The direct impact of debris fallout on plants would be negligible because of the small areas of impact. Long-term effects on soil properties are not expected because aluminum is an abundant component of rock and soil and the plastic sabots are inert. Effects on terrestrial wildlife are considered below.

Terrestrial Wildlife

The use of missiles, airborne and sea surface targets, and flares was previously analyzed in the Point Mugu Sea Range EIS/OEIS and impacts to terrestrial wildlife were found to be less than significant (Navy 2002). Terrestrial special-status species at Point Mugu and at SNI are considered below.

Use of the CIWS would result in aluminum and plastic debris on the shore at Point Mugu or SNI that could fall on or be ingested by wildlife. Given the proposed conservation measures, wildlife would not be present in the line of fire and the odds of a bird being hit by a falling aluminum pusher or plastic sabot (which is unlikely to cause harm) are negligible. Ingestion of the aluminum pushers is unlikely because they do not resemble prey.

Plastic debris in the ocean can be mistaken for prey and as a result, it can be ingested with harmful effects to marine fish, turtles, birds, and mammals (Hammer et al. 2012). From the proposed firing positions, all of the plastic sabot debris resulting from use of the CIWS is expected to fall onto the beach, shore, or very close to the water's edge and be washed upward. Post-event debris cleanup would minimize the chances of plastic ingestion on land as well as the amount of plastic debris that could be transported by wind or the tide into the ocean. Any plastic sabot debris not collected would result in a small but less than significant impact to marine and terrestrial wildlife. As a result, the potential impact of proposed countermeasures testing and training is not considered significant.

Before a laser or HPM can be fired, the Navy will implement standard procedures to ensure no persons, reflective surfaces, or non-target obstructions of any sort are present within the hazard area between the laser/HPM and the target or behind the target. The likelihood of a bird, or other wildlife, passing through the narrow laser or HPM beam during testing and training activities 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 (Navy 2010). 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.

Terrestrial wildlife, particularly mammals and birds, may be temporarily displaced to nearby areas by noise or visual stimuli associated with project activities, particularly missile launching and small arms firing (including use of the CIWS). However, Point Mugu and SNI are 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. Furthermore, any disturbance would be highly localized and temporary. Moreover, mammals and birds are highly mobile organisms and are not

dependent solely upon the project area. For these reasons, project activities are not expected to lead to substantial disruption of important nesting, resting, or foraging activities and no significant impact to the abundance or distribution of mammals or birds is anticipated. Therefore, there would be no significant impact to wildlife from implementation of Alternative 1.

Terrestrial Special-Status Species

Point Mugu

Least Bell's Vireo, Salt Marsh Bird's Beak, and Tidewater Goby. Least Bell's vireo, salt marsh bird's beak, and tidewater goby do not occur in habitats that would be affected by Alternative 1. All proposed project sites are far from potential occupied habitat and have been previously constructed at Point Mugu and implementation of the proposed action would not result in any construction, excavation, grading, or filling. Therefore, no impact or effect to the species would occur under implementation of Alternative 1 and Section 7 of the ESA, consultation is not required.

Light-footed Clapper Rail and Belding's Savannah Sparrow. The use of missiles, airborne and sea surface targets, and flares was previously analyzed in the Point Mugu Sea Range EIS/OEIS and impacts to terrestrial wildlife were found to be less than significant (Navy 2002).

By implementing the Wildlife Protection Measures included as part of the proposed action (see Section 2.2.4), the likelihood of a clapper rail or Belding's savannah sparrow passing through the narrow laser or HPM beam during testing and training activities is extremely low and can be discounted. In addition, the bird would have to remain in the fixed beam for many seconds before it would potentially experience any impact (Navy 2010). 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.

Since CIWS and other small arms testing and training would not occur when light-footed clapper rails are nesting within 500 ft (152 m) of the operational area, the potential for CIWS testing and training events to interrupt clapper rail nesting is minimal. Any clapper rail or savannah sparrow movement from nearby areas would be brief and unlikely to affect the energetics or survival of individual clapper rails or savannah sparrows or to cause nest abandonment. Given the background of prevailing activities, the distance to the nearest edge of clapper rail and savannah sparrow habitat (a minimum of 150 ft [46 m]), and the limited duration and extent of the proposed activities, the proposed activities are expected to have brief and negligible effects on foraging or resting by clapper rails and savannah sparrows. However, given the difficulty in locating clapper rails and their nests through regular survey methods, there is a potential that a nest and/or a clapper rail could be nearby and undetected and individual birds may vocalize in response to launch noises. Such vocalization, if it continued after the launch sounds ceased, could put individual birds at risk of predation.

Other countermeasures activities, including missile launching and small arms firing, would not increase the current overall noise levels at proposed countermeasure locations at Point Mugu to an extent that would impact light-footed clapper rails or Belding's savannah sparrows as the implementation of Alternative 1 would not significantly increase the overall intensity of military activities presently conducted in the area. Furthermore, the nearest edge of their habitat is separated from the direct noise source by a minimum of 150 ft (46 m) and is on the other side of a paved road; any disturbance would be highly localized and temporary; both species are highly mobile organisms. Increased personnel at countermeasure locations would potentially cause temporary displacement of birds during countermeasure activities, but such activities are not directed towards areas of suitable habitat for either species.

With the implementation of conservation measures the potential for temporary disturbance of nesting birds and behavioral reactions from the proposed action may affect light-footed clapper rails. As such, the Navy has consulted with the USFWS under Section 7 of the ESA regarding impacts to clapper rails. Through implementation of conservation measures and terms and conditions included as part of the resulting USFWS biological opinion there would be no significant impact to light-footed clapper rails under Alternative 1 (Appendix C).

California Least Tern. Least terns are generally present at nesting areas on the western and eastern arms of the Mugu Lagoon barrier beach between mid-April and late August. Nesting and foraging behavior of least terns can be affected by human activity (USFWS 2006). Incubating birds often leave nests in response to human presence. Increased vehicle and human activity can result in nests being abandoned or chicks becoming separated from adults (USFWS 2006). However, it should be noted that a number of thriving least tern nesting colonies are in close proximity to busy, noisy locations such as highways and airfields.

During directed energy countermeasure activities, the likelihood of a least tern passing through the laser or HPM beam in the exact moment it is fired is extremely low but would not be discountable if the birds were foraging in the nearshore waters during a test event. Given the level of continuing Navy activity around Mugu Lagoon, it is expected that other countermeasures activities (including missile launching and small arms firing) would not significantly increase the tempo of activities or the associated noise and personnel at the pads to a level that would significantly disrupt foraging and nesting behavior (affecting the well-being of adults or nestlings) or lead to nest abandonment.

To minimize potential impacts to least terns and other birds, the Navy has incorporated within the proposed action a number of conservation measures that would be implemented during operations (refer to Section 2.2.4, *Wildlife Protection*). Appropriate conservation measures include the temporary cessation or relocation of countermeasures activities within 500 ft (152 m) of an active least tern nest. Furthermore, pre- and post- operation surveys for all listed species nesting within 1,000 ft (305 m) of testing or training sites will be conducted to determine nesting status Observations will be made as close to the activity as operational and safety constraints allow.

With implementation of the proposed conservation measures the potential for temporary disturbance of nesting birds and their behavioral reactions from the proposed action may affect California least terns. As such, the Navy has consulted with the USFWS under Section 7 of the ESA regarding impacts to the species. Through implementation of conservation measures and terms and conditions included as part of the resulting USFWS biological opinion there would be no significant impact to California least terns under Alternative 1 (Appendix C).

Western Snowy Plover. The western snowy plover is a year-round resident on the coast of California. Plovers 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). 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) (CINP 2014). 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).

To minimize potential impacts to snowy plovers and other birds, the Navy has incorporated within the proposed action a number of conservation measures that will be implemented during operations (refer to Section 2.2.4, *Wildlife Protection*). Appropriate conservation measures include the temporary cessation or relocation of countermeasures activities within 500 ft (152 m) of an active protected species nest. Furthermore, pre- and post- operation surveys for all listed species nesting within 1,000 ft (305 m) of testing or training sites will be conducted to determine nesting status. Observations will be made as close to the activity as operational and safety constraints allow.

During directed energy countermeasure activities, the likelihood of a snowy plover passing through the laser or HPM beam in the exact moment it is fired is so low as to be discountable, since plovers spend almost all their time on the ground. Missile launching would not increase the current overall noise levels at proposed countermeasure locations at Point Mugu to an extent that would impact snowy plovers. Other proposed countermeasures activities would not significantly increase the overall intensity of military activities presently conducted in the area. Increased personnel at countermeasure locations could potentially cause temporary displacement of plovers during countermeasure activities, although this is expected to be minimal as plovers at Point Mugu are acclimated to human presence and activity at the proposed countermeasure locations.

During the winter and migration seasons, snowy plovers are widely dispersed on area beaches. Any movement from the stretch of beach in front of the launch pads would be brief and unlikely to affect the energetics or survival of individual plovers, and testing or training will cease if plovers are located between a shooter site and the associated target site. If wintering snowy plovers are roosting adjacent to selected pad at Point Mugu or Tender Point when utilizing CIWS or other small arms systems, the location will be changed to an alternative pad/location if operationally feasible. Given the background of prevailing activities, the availability of equally useable habitat adjacent to the area, and the limited duration and extent of the proposed activities, the proposed activities are expected to have brief and negligible effects on foraging or resting by wintering snowy plovers.

The potential for impacts to snowy plovers is greatest during the nesting season when adult birds are more sensitive to nearby noise and human activity, increasing the potential for nest abandonment. With implementation of the proposed conservation measures the potential for temporary disturbance of nesting birds and their behavioral reactions from the proposed action may affect snowy plovers. As such, the Navy has consulted with the USFWS under Section 7 of the ESA regarding impacts to the species. USFWS concluded the Navy's proposed conservation measures were adequate and appropriate to minimize takes of listed species. No additional measures were required. Considering the context and intensity of the proposed action and USFWS conclusions that: 1) no suitable habitat would be lost, 2) few listed species would be killed or injured, 3) nest failure is expected to be rare, and 4) that reproduction, numbers and distribution of listed species is not expected to be reduced, the Navy concluded there would be no significant impact to western snowy plovers under Alternative 1 (Appendix C).

San Nicolas Island

Western Snowy Plover. Compared to the impacts at Point Mugu, impacts to snowy plovers at Rock Crusher would be reduced due to the increased distance between testing and training activities and snowy plover habitat and because no weapons systems would be fired or launched directly over nesting habitat. Nesting or roosting snowy plovers at Tender Point and Thousand Springs West could potentially be impacted as a result of proposed activities for the same reasons described above for the Point Mugu countermeasures locations. In contrast to Point Mugu, however, the proposed test sites at SNI are in relatively prominent, unscreened locations, are seldom used for similar activities, and the overall level of

human activity and anthropogenic noise is much less. As a result, the potential for disturbance is higher, although no long-term effect on the population is expected. Conservation measures that will be implemented during operations (refer to Section 2.2.4, *Wildlife Protection*) to minimize potential impacts to western snowy plovers include surveys for and monitoring of plover nests as well as the cessation or relocation of all countermeasures testing and training activities within 500 ft (152 m) of an active protected species nest. Furthermore, pre- and post- operation surveys for all listed species nesting within 1,000 ft (305 m) of testing or training sites will be conducted to determine nesting status. Observations will be made as close to the activity as operational and safety constraints allow. Additionally, testing or training will cease if plovers were located between a shooter site and the associated target site.

With implementation of the proposed conservation measures the potential for temporary disturbance of nesting birds and their behavioral reactions from the proposed action may affect snowy plovers. As such, the Navy has consulted with the USFWS under Section 7 of the ESA regarding impacts to the species. Through implementation of conservation measures and terms and conditions included as part of the resulting USFWS biological opinion there would be no significant impact to western snowy plovers under Alternative 1 (Appendix C).

San Nicolas Island Fox. All proposed project sites have been previously constructed at SNI, and implementation of the proposed action would not result in any construction, excavation, grading, or filling that would degrade potential fox habitat. The likelihood of a fox passing through the narrow HPM beam or the line of small arms fire, in the exact moment they are fired is extremely low and can be discounted. It is likely that visual disturbance from increased personnel and increased noise associated with small arms fire, including use of the CIWS, would temporarily displace individuals, but such an impact would be localized and negligible. Therefore, the proposed action may temporarily affect individual SNI foxes but there would be no significant impact to SNI fox populations under Alternative 1.

Marine Invertebrates and Plants

Surface targets would not be located within intertidal zones of SNI and Point Mugu and, therefore, the proposed action would not impact the intertidal zone where invertebrate and marine plant and algae densities are typically high. Areas of dense kelp are avoided by Navy vessels as a matter of standard practice whenever possible. Otherwise, project-related vessel movement would be the same as routinely occurs on the Sea Range and unlikely to cause appreciable damage to kelp plants, especially considering the strong surge to which SNI kelp beds are normally exposed. Owing to the density of seawater, the terminal velocity reached by sinking objects is relatively slow compared to falling objects in air. As a result, debris is unlikely to land with sufficient force to damage any object on the bottom, and in any case would affect only a minute portion of the seabed. Therefore, activities associated with the proposed action would have no significant impact on marine invertebrates or plants. Threatened and endangered marine invertebrates are discussed in the Marine Special-Status Species section, below.

Marine Birds

Before directed energy systems, missiles, and/or other projectiles can be fired, the Navy will require as standard procedure that no persons, wildlife, reflective surfaces, or non-target obstructions of any sort are present within the hazard area (which is specific to the type of system being used) between the shooter site and the target. A bird in flight or at long distance might not be detectable, but the likelihood of a bird crossing the direct line of fire is remote.

With the implementation of conservation measures listed in Section 2.2.4, the likelihood of direct mortality or significant disturbance to marine birds is very low and is not considered significant.

Birds may be temporarily displaced to nearby areas by noise and visual stimuli associated with project activities, such as missile launching and small arms firing, including use of the CIWS. The proposed project area is currently utilized for various military training activities and activities associated with the proposed action would not significantly increase the overall intensity of military activities presently conducted in the area. As birds are highly mobile organisms, any disturbance would be very localized and temporary; no significant impact on the abundance or distribution of marine birds would be anticipated.

As described in Chapter 3 of the Sea Range EIS/OEIS, marine bird densities range from less than 0.01 to 0.46 bird per ac (0.02 to 1.14 birds per ha) within the Sea Range (Navy 2002). Although average densities are low, large numbers of birds can congregate in feeding frenzies on the water surface. In addition, sea lions or seabirds may haul out or land on floating targets, particularly if they are unattended. The measures described in Section 2.2.4 will ensure that marine mammals or seabirds are not present within the hazard zone during countermeasure systems testing and training. These passive methods of protection will not adversely affect seabirds. Endangered or threatened marine birds are discussed in the Marine Special-Status Species section, below.

Fish and Essential Fish Habitat

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

Under the provisions of the Magnuson-Stevens Fishery Conservation and Management Act, as reauthorized by the Sustainable Fisheries Act Amendments, federal agencies must consult with NMFS prior to undertaking any actions that may adversely affect EFH. Federal agencies retain the discretion to determine what actions fall within the definition of "adverse effect." Temporary or minimal impacts, as defined below, are not considered to "adversely affect" EFH. "Temporary impacts" are those that are limited in duration and that allow the particular environment to recover without measurable impact. "Minimal impacts" are those that may result in relatively small changes in the affected environment and insignificant changes in ecological functions.

The proposed action area includes EFH for coastal pelagic species, highly migratory species, and west coast groundfish. No alterations to EFH for coastal pelagic species or highly migratory species would occur, as these organisms and the associated EFH areas are pelagic, and no permanent alteration of the pelagic environment would take place from the proposed action. Routine vessel movement on the Sea Range, as would occur in conjunction with the proposed action, would have no effect on EFH. Small quantities of unrecovered debris may float or sink through the water column, but this is unlikely to have any effect on EFH. EFH for west coast groundfish also occurs throughout the marine portion of the proposed project area. HAPCs for groundfish include kelp canopy and rocky reefs, which occur around SNI. Areas of dense kelp are avoided by Navy vessels as a matter of standard practice whenever possible. Otherwise, project-related vessel movement would be the same as routinely occurs on the Sea Range and unlikely to cause appreciable damage to kelp plants, especially considering the strong surge to which SNI kelp beds are normally exposed. Owing to the density of seawater, the terminal velocity reached by sinking objects is relatively slow (compared to falling objects in air). As a result, debris is unlikely to land with sufficient force to damage any object on the bottom, and in any case would affect only a minute portion of the seabed. Therefore, activities associated with Alternative 1 would have no effect on groundfish EFH.

Marine Special-Status Species

Abalone

The federally endangered black abalone resides in the intertidal and shallow subtidal zones surrounding SNI, and none of the targets would be located in these depths. Since the CIWS would be aimed offshore at aerial targets flying at normal operating altitudes and at an angle well above the horizon, there is no possibility that a black abalone in the intertidal or shallow subtidal zones could be hit by a round. The proposed countermeasures testing and training activities occur almost entirely outside black abalone habitat. Small amounts of debris may fall in areas potentially inhabited by black abalone during small arms firing, but given the abalone's preference for sheltered habitat within cracks and under rocks, the potential for debris to injure an abalone is highly unlikely.

The endangered white abalone is known to reside in depths that would be underneath potential shooter site hazard zones. White abalone have specific habitat requirements (rock reef surrounded by sand in 98 to 213 ft (30 to 65 m) depth). Within the project area, these habitat requirements are only met within a small portion of the seafloor surrounding SNI, and the presence of white abalone at SNI has not been documented recently. Owing to the density of seawater, the terminal velocity reached by sinking objects is relatively slow (compared to falling objects in air). As a result, debris is unlikely to land with sufficient force to damage any object on the bottom, and in any case would affect only a minute portion of the seabed.

Therefore, Alternative 1 would have no effect on or impact to endangered black abalone or white abalone and consultation with NMFS under Section 7 of the ESA is not required.

Marine Mammals

The southern sea otter, pinnipeds, and cetaceans known to occur in the proposed action area are highly mobile organisms which are unlikely to be affected by the passage of vessels, which is routine on the Sea Range. There are no onshore project areas in which marine mammals are expected to be found in abundance. With the exception of the proposed electronic support systems at The Point, none of the proposed countermeasures locations at Point Mugu are adjacent to known harbor seal haulouts. Alpha Pad is the nearest site proposed for CIWS testing and training and is more than 1.4 miles (2.3 km) from known harbor seal haulout areas (see Figure 3-4). Furthermore, activities would not be directed towards these areas. While sea otters are found offshore SNI, they primarily inhabit areas farther offshore than expected debris patterns and much nearer to shore than target locations. Additionally, proposed protective measures will prohibit potentially hazardous operations if marine mammals are in the line of fire.

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 and 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 MMPA) of marine mammals.

Of the munitions used on the Sea Range, only small or medium caliber projectiles, or small fragments of larger munitions, would be small enough for marine mammals to ingest. These solid metal materials would be dense and would quickly settle to the bottom where they would be covered with sediment, coated by chemical processes (e.g., corrosion), or encrusted by marine organisms (e.g., barnacles).

Target-related material, flares, their subcomponents (including Styrofoam and plastic endcaps), and plastic sabots from use of the CIWS may float for some time before sinking. Non-munition military expended materials that would remain floating on the surface are too small to pose a risk of intestinal blockage to any marine mammal that happened to encounter it.

Based on the limited quantities of materials to be expended, as well as the limited temporal availability of munitions and debris on the seafloor or in the water column, the amount of expended material that an individual could encounter is extremely low. Furthermore, marine mammals would not be preferentially attracted to these military expended materials, and since they do not resemble prey, marine mammals are generally expected to reject them as such. Therefore, the relatively small increase of expended material within the Sea Range would not be likely to result in any harm to marine mammals.

Countermeasures testing and training activities will be scheduled to avoid the marine mammal breeding and pupping seasons when operationally feasible. When breeding/pupping marine mammals are within 100 yards (90 m) of proposed activities, access to the test facilities will be restricted to necessary operational activities only.

Since the CIWS and similar systems would be aimed offshore at aerial targets operating at normal flying altitudes and an angle well above the horizon, there is no possibility that a marine mammal on or near the shoreline could be hit by a round. Similarly, the possibility of CIWS rounds or debris injuring a marine mammal offshore is extremely limited. The possibility of marine mammals being hit by falling debris on the Sea Range, including rounds from the CIWS, was analyzed in the Point Mugu Sea Range EIS/OEIS and is generally remote: based on the tempo provided in the EIS, only one serious marine mammal injury or death is expected in approximately 285,060 years (Navy 2002). Both the tempo and total area covered by proposed CIWS use in this EA are far less than that analyzed in the EIS/OEIS. The predicted debris fields for aluminum pushers and plastic sabots fall outside areas inhabited by marine mammals. In addition, the low velocity of the aluminum pushers and plastic sabots would not result in any marine mammal injuries if an animal was hit, and the CIWS will not be fired if marine mammals are in the potential fallout area. Additionally, proposed protective measures will prohibit potentially hazardous operations if marine mammals are in the line of fire.

Noise impacts, either through disturbance or hearing impacts are not expected from this project. As discussed above, given the distances to the nearest pinnipeds on the beach and to sea otters offshore, missile launches, small arms fire, or other activities would not result in any disturbance and peak sound levels will be below those that could potentially cause a temporary threshold shift to hearing.

Accordingly, implementation of the proposed action would not be likely to result in any harm or harassment of marine mammals and no “takes” of marine mammals as defined by the MMPA or ESA are anticipated. Therefore, consultation with the NMFS and USFWS is not required for marine mammals and no significant impacts and no effect on the species would occur with implementation of Alternative 1.

Sea Turtles

The probability of occurrence of sea turtles in the project area is very low as sea turtles are rarely sighted in the Sea Range. Furthermore, if a sea turtle were present in the action area, the likelihood of it being struck by a vessel or debris associated with the project would be remote (Navy 2002). Due to the rare occurrence of these species in the proposed action area and the low likelihood of activities impacting these organisms, there would be no effect or impact of the proposed action on loggerhead, leatherback, eastern Pacific green, or olive ridley sea turtles and consultation with the USFWS is not required. Therefore, implementation of Alternative 1 would not significantly impact marine special-status species.

3.5.2.3 Alternative 2

Alternative 2 involves use of proposed locations at Point Mugu but not those identified at SNI. The increase in loud noise events associated with the proposed action would potentially affect wildlife species, including threatened and endangered species at Point Mugu. USFWS concluded the Navy's proposed conservation measures were adequate and appropriate to minimize takes of listed species. No additional measures were required. Considering the context and intensity of the proposed action and USFWS conclusions that: 1) no suitable habitat would be lost, 2) few listed species would be killed or injured, 3) nest failure is expected to be rare, and 4) that reproduction, numbers and distribution of listed species is not expected to be reduced, the Navy concluded there would be no significant impact to wildlife species at Point Mugu. Therefore, Alternative 2 would not have significant impacts to biological resources.

3.5.2.4 Alternative 3

Alternative 3 involves use of proposed locations at SNI but not those identified at Point Mugu. The increase in loud noise events associated with the proposed action would potentially affect wildlife species, including threatened and endangered species at SNI. USFWS concluded the Navy's proposed conservation measures were adequate and appropriate to minimize takes of listed species. No additional measures were required, Considering the context and intensity of the proposed action and USFWS conclusions that: 1) no suitable habitat would be lost, 2) few listed species would be killed or injured, 3) nest failure is expected to be rare, and 4) that reproduction, numbers and distribution of listed species is not expected to be reduced, the Navy concluded there would be no significant impact to wildlife species at SNI. Therefore, Alternative 3 would not have significant impacts to biological resources.

3.5.2.5 Mitigation Measures

The increase in loud noise events associated with the proposed action would potentially affect wildlife species, including threatened and endangered species at Point Mugu and SNI. Through implementation of conservation measures and terms and conditions included as part of the resulting USFWS biological opinion there would be no significant impact to wildlife species at Point Mugu or SNI. Therefore, no mitigation measures are proposed or required.

3.5.2.6 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, and 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 are structures including, but not limited to, standing buildings, dams, bridges, and canals. Under the NHPA of 1966 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, plants, animals, 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 1966 NHPA (PL 89-665, as amended by PL 96-515; 16 USC 470 et seq.) provides for establishment of the National Register of Historic Places (NRHP) to include districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture. Section 106 of the NHPA 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 NRHP, and affords the State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP) an opportunity to comment with regard to the undertaking. The NRHP eligibility criteria have been defined by the Secretary of the Interior's Standards for Evaluation (36 CFR 60). Cultural resources are considered to be NRHP 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; or

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 (PL 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); and
- DoD Directive 4710.1 (outlines the policy to incorporate historic preservation requirements into all DoD activities).

Section 101(d)(6)(B) of the 1966 NHPA 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 1966 NHPA, 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 Point Mugu has been inventoried for historic-era buildings and structures, and most of the non-developed and non-wetland acreage has been surveyed for prehistoric sites. Several investigations conducted within the last 13 years have resulted in the identification of 11 structures, one prehistoric archaeological site, and one historic-era archaeological site determined eligible for the National Register (Mikesell 1998; Schaefer and McCawley 1999; Statistical Research 2004).

Of the seven proposed action locations at Point Mugu, one (Bravo Pad) is a historic property. None of the other six proposed action locations are in proximity to a historic property. The Baker Launch Complex (renamed Bravo Pad) was determined eligible for the National Register with the California SHPO (Schwartz 2011). The Baker Launch Complex is located in the southern extent of Point Mugu and consists of three elements, two concrete slab launching pads (buildings 728 and 729) and one concrete control building (727) (Mikesell 1998). All three components of the complex are contributing elements to the property. The structure was determined eligible for the National Register with the California SHPO (Schwartz 2011).

Much of SNI has also 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 (Martz 2002, Reinman and Lauter 1984, Schwartz and Martz 1993).

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). Other prehistoric site types commonly encountered on SNI include 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 are generally encountered on the terraces above Naval Facilities Engineering Command (NAVFAC) Beach (NAWCWD 1997).

The SNI area of proposed action contains two National Register eligible prehistoric sites (CA-SNI-12 and CA-SNI-147) adjacent to Tender Point, Balloon Launch, and Thousand Springs West locations. Schwartz (2011) notes that none of these locations are on the respective site, but within 50 ft (15 m). Site CA-SNI-12, located on the northwest corner of SNI, is within 50 ft (15 m) of the Tender Point and Thousand Springs West locations of proposed action. The site consists of a possible habitation area with multiple middens (processing, shellfish, and fish), a lithic component, shell beads, fishing equipment, milling equipment, and human burials. Depth of deposits at CA-SNI-12 ranges from no depth to 12 inches (30 cm) below surface depending on the presence of middens, burials, or caches (Kritzman 1977). CA-SNI-12 has been determined by consensus to be eligible for listing to the National Register of Historic Places.

Site CA-SNI-147 is located on a coastal terrace within the northwestern portion of SNI, within 50 ft (15 m) of the Balloon Launch location of proposed action. The site is a buried midden on a stabilized dune, with an associated sparse lithic scatter in a deflated area to the north and northeast of the dune (Martz 2002). Depth of deposits at CA-SNI-147 extends to at least 36 inches (90 cm) below surface. CA-SNI-147 appears to be eligible for the National Register, but no formal determination has been made (Schwartz 2013).

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 APE for the proposed action at Point Mugu consists of seven locations, inclusive of Nike-Zeus Pad, Charlie Pad, Bravo Pad (formerly known as Baker Pad), Alpha Pad, Building 738, Building 761, and Nearshore Testing and training. The APE locations of proposed action at SNI include Rock Crusher, Tender Point, Thousand Springs West, and Balloon Launch.

3.6.2.2 Alternative 1 (Preferred Alternative)

The proposed action requires no new construction to support any of the test components. No new infrastructure is needed to support the proposed action. Use of Bravo Pad, Tender Point, and Thousand Springs West by the proposed action would be consistent with the aesthetics and visual resources of testing and training activities that occur at these locations. Furthermore, no new infrastructure or utilities are needed to support the proposed action. Debris from small arms rounds, missile launches, flares, and targets would fall into the nearshore waters of Point Mugu or the Sea Range and would not affect terrestrial resources. Plastic sabots from the CIWS would fall on beach areas (see Figures 2-3 and 2-4). However, this would not affect cultural resources as archaeological and historic resources do not occur in these locations. Therefore, implementation of Alternative 1 would not affect any determined or recommended National Register eligible historic properties. Impacts to cultural resources would not be significant.

3.6.2.3 Alternative 2

Alternative 2 involves use of proposed locations at Point Mugu but not those identified at SNI. The increased tempo of activities under this alternative at Point Mugu sites does not change the types or magnitudes of effects to this resource. This action would cause no effect to the Baker Launch Complex or other NBVC locations provided in Section 3.6.1.3. Consequently, impacts of Alternative 2 are identical to those discussed for Point Mugu for Alternative 1. Therefore, Alternative 2 would not have significant impacts to cultural resources.

3.6.2.4 Alternative 3

Alternative 3 involves use of proposed locations at SNI but not those identified at Point Mugu. The increased tempo of activities under this alternative at SNI sites does not change the types or magnitudes of effects to this resource. This action would cause no effect to sites CA-SNI-12, CA-SNI-147, or other locations provided in Section 3.6.1.3. Consequently, impacts of Alternative 3 are identical to those discussed for SNI for Alternative 1. Therefore, Alternative 3 would not have significant impacts to cultural resources.

3.6.2.5 Mitigation Measures

None of the aforementioned historic properties would be impacted during the proposed action, provided that all components of the proposed action remain within the existing test site locations. No significant effects to cultural resources would occur; therefore, no mitigation measures are required.

3.6.2.6 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 AIRSPACE, LAND, AND WATER USE

3.7.1 Affected Environment

3.7.1.1 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 is established for military flight activities and may be used for commercial or general aviation when not reserved for military activities. Restricted Areas are airspace over U.S. land or territorial waters that are used by the military to exclude non-authorized aircraft and to contain hazardous military activities. Warning Areas are designated airspace for military activities that are in international airspace but are open to all aircraft. Flights in Warning Areas by non-participating aircraft are not prohibited since these areas are over international waters.

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

3.7.1.2 Regulatory Setting

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

3.7.1.3 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 en route 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 Notice to Airmen (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. These ranges 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 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 will take off from and land on an aircraft carrier. About 36,000 aircraft operations occurred at the Point Mugu Airfield in a one-year period between 2011 and 2012 (Navy 2012a).

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 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.

Land Use

Point Mugu and R-2519

Point Mugu comprises approximately 4,490 ac (1,820 ha). Of this, approximately 1,990 ac (805 ha) have been developed and the rest remain in their natural state. Land use at Point Mugu is dominated by natural and operational constraints that require preservation of this open space. Included in the undeveloped area are 2,153 ac (871 ha) of designated wetlands, 200 ac (81 ha) of beach dunes, and 270 ac (109 ha) of grasslands. Much of the open land at Point Mugu is environmentally constrained due to the presence of sensitive environmental resources. Development is also limited by the existence of airfield safety clearance zones.

Land use at Point Mugu is grouped into ten categories: 1) Aircraft Operations; 2) Aircraft Maintenance; 3) Base Support; 4) Test and Evaluation; 5) Administration; 6) Community Support; 7) Housing; 8) Training; 9) Ordnance; and 10) Open Space. Approximately 890 ac (360 ha) are used for administration, operations, and training; 240 ac (97 ha) are used for military housing and recreation.

Aircraft operations and test, evaluation, and training constitute a major land use of Point Mugu. Recommendations regarding land use compatibility in the immediate vicinity of Point Mugu are established by the Point Mugu AICUZ Program to prevent incompatible development in high noise exposure areas, to minimize public exposure to potential health and safety hazards associated with aircraft operations, and to protect the operational capability of the air installation.

Portions of Point Mugu are within the jurisdiction of government agencies other than the U.S. Navy that can affect military land use. Although excluded from the Coastal Zone because it is federally-owned property, Point Mugu is subject to provisions of the Coastal Zone Management Act and California Coastal Commission review of actions that may affect land, water, or natural resources of the Coastal Zone. The County of Ventura may review and comment in an advisory capacity to the Coastal Commission on federal activities that may affect the Coastal Zone (from the mean high-tide line to 3,000 ft [915 m] inland, and up to 3 nm [5.6 km] offshore) including changes in use of Mugu Lagoon. The U.S.

Army Corps of Engineers (USACE) has jurisdiction over the two major drainages to Point Mugu – Calleguas Creek and Revolon Slough – as well as Mugu Lagoon and adjacent wetlands.

San Nicolas Island and R-2535

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 Point Mugu Sea Range operations. SNI facilities support all aspects of range operations, including 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 (3,050-m) concrete runway and facilities to support testing and training operations. Adjoining the airfield are a control tower, hangars, ground control approach capabilities, and a 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 and training is currently conducted at various locations on the island, including project sites Tender Point, Thousand Springs, and Rock Crusher (Navy 2010).

Water Use

Point Mugu Sea Range

A large amount of ocean traffic occurs through the Point Mugu Sea Range; more than 7,000 vessel movements through the Sea Range have been estimated for a 1-year period (Navy 2002). Of these, approximately 800 are a result of Navy activity. Shipping routes cross the Sea Range through the Santa Barbara Channel and through an area south of the Channel Islands.

Point Mugu utilizes the Sea Range for a variety of uses, although maritime transport and missile launches are two primary uses. Common types of vessels used in the Sea Range include range support boats, larger ships (i.e., cruisers, destroyers, and aircraft carriers), and surface targets.

Non-military activities can occur in all areas within the Sea Range. When U.S. Navy activities require exclusive use of an area, NAWCWD notifies mariners by issuing a Notice to Mariners (NOTMAR) and secures the area.

Maritime Shipping. A major shipping channel established by the U.S. Coast Guard is aligned just north of, and roughly parallel with, the northern Channel Islands. This channel is used by commercial cargo vessels traveling between northern Pacific and southern California ports, as well as by traffic destined for remote ports such as the Panama Canal or Asia.

Fishing. Commercial fishing, diving, and trapping occur at various locations off the coast of southern California, including portions of the Sea Range and the Channel Islands, which constitutes an extremely productive commercial fishing area. The nearshore waters along the coast from Ventura to Santa Barbara and the waters just off the Channel Islands contain giant kelp beds that provide habitats for numerous species; the majority of fish are caught within these areas. The top five fisheries based on commercial landings at Ventura Harbor are: squid, lobster, halibut, tuna, and sea cucumber (CDFG 2010).

Oil and Gas Production. Numerous oil platforms and exploratory drilling rigs are located in the Santa Barbara Channel between Oxnard and Gaviota, both in state waters (out to 3 nm) and federal waters (beyond 3 nm).

Point Mugu and R-2519

Point Mugu does not have a port and does not directly support ship activity. As described above, a large portion of Point Mugu is designated as wetland. Nearshore activity in the vicinity of Point Mugu includes surfing and swimming at a beach near Mugu Lagoon (Navy 2002). However, Point Mugu is designated a classified or secure base. Public admittance is generally not allowed. Two beach areas (Family Beach and Surfers Point) are open to DoD employees, base contractors, and active duty, retired or reserve personnel (Navy 2002).

San Nicolas Island and R-2535

Due to the distance from the mainland, the area around SNI is primarily used by naval vessels, commercial fishing boats, and sport fishing boats. Most types of inshore fisheries common in southern California can occur in the nearshore waters of SNI. 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. (Navy 2002)

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 CDFW 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. Furthermore, restrictions are enacted to clear the appropriate range areas of non-participants before military operations are conducted. (Navy 2005)

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.” Point Mugu and SNI are wholly owned and operated by the Navy and, therefore, are 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 Point Mugu and 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. Consultation has been conducted with the California Coastal Commission (Appendix C).

3.7.2 Environmental Consequences

3.7.2.1 Approach to Analysis

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

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

3.7.2.2 Alternative 1 (Preferred Alternative)

Airspace

The increased laser and electronic support systems activity, the addition of air operations, targets, missiles, small arms rounds, and flares (see Table 2-1) would represent only marginal increases to current activity levels. Dispensing of flares would occur over water and would be consistent with military testing and training activities currently conducted in airspace over the Sea Range. The types of safety issues and procedures that could affect airspace use are discussed in Section 3.8, *Public Safety*, and would not result in a significant impact. Furthermore, the proposed action does not include proposed airspace modifications and would not change the existing relationship of the Navy's special use airspace 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. All offshore activities would be located within established warning areas, which are designated airspace for military activities. A NOTAM would be published 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 operations that have the potential of creating hazards to aircraft would be coordinated with the FAA to ensure that non-participating aircraft are not in the hazard area. For laser testing and training activities, similar coordination with the Laser Clearinghouse would also occur whenever laser or HPM testing and training creates potential hazards to satellites. Therefore, Alternative 1 would not have significant impacts to airspace over the Sea Range, over Point Mugu and R-2519, or over SNI and R-2535.

Land and Water Use

Land use associated with the proposed action would be consistent with current land uses and designations at Point Mugu and at SNI. Project activities would take place at locations previously designated for such activities. The temporary increase in personnel at testing and training events, the increased laser and electronic support systems activity, and the increased air operations, missile launches, and small arms firing would represent only marginal increases to current activity levels. In accordance with existing safety procedures, access to portions of Point Mugu and SNI would be temporarily restricted during testing and training operations. Sites proposed for use at Point Mugu are designated for these testing and

training activities, and SNI lies in an area of the Point Mugu Sea Range that is similarly designated for these testing and training activities.

As stated above in Section 3.7.1.3, laser testing and training currently takes place at SNI at most of the locations where testing and training would occur under the proposed action, i.e., Tender Point, Thousand Springs, and Rock Crusher, so there would be no change to land use. Activities associated with Alternative 1 would be coordinated so that they do not interfere with existing uses at SNI. Four of the proposed Point Mugu project sites (Alpha Pad, Bravo Pad, Charlie Pad, and Nike-Zeus Pad) are used for occasional target launches. Buildings 738 and 761 at Point Mugu are used for RDAT&E (Navy 2002). The Point Mugu sites at Surfer's Point and The Point are designated as RDAT&E and open space, respectively (Navy 2002). Activities associated with Alternative 1 would involve temporary closure of The Point, and temporary placement of vans at the project site. The vans would be removed after each event, so there would be no permanent change to land use. Closures of portions of Point Mugu, SNI, and their nearshore waters are common. Regular activities at other parts of Point Mugu (e.g., Administration), SNI (e.g., Nicktown) and on areas of the Sea Range not associated with testing and training activities would be allowed to continue during testing and training operations.

Public access of the waters within approximately 300 to 400 yards (274 to 366 m) of Point Mugu is denied (33 CFR 334.1126), as are the waters within 300 yards (274 m) of SNI (33 CFR 334.980). Waters within 3 nm (5.6 km) of SNI are divided into three zones: Alpha, Bravo, and Charlie (Figure 3-9). These areas may be closed to all access on an as-needed basis.

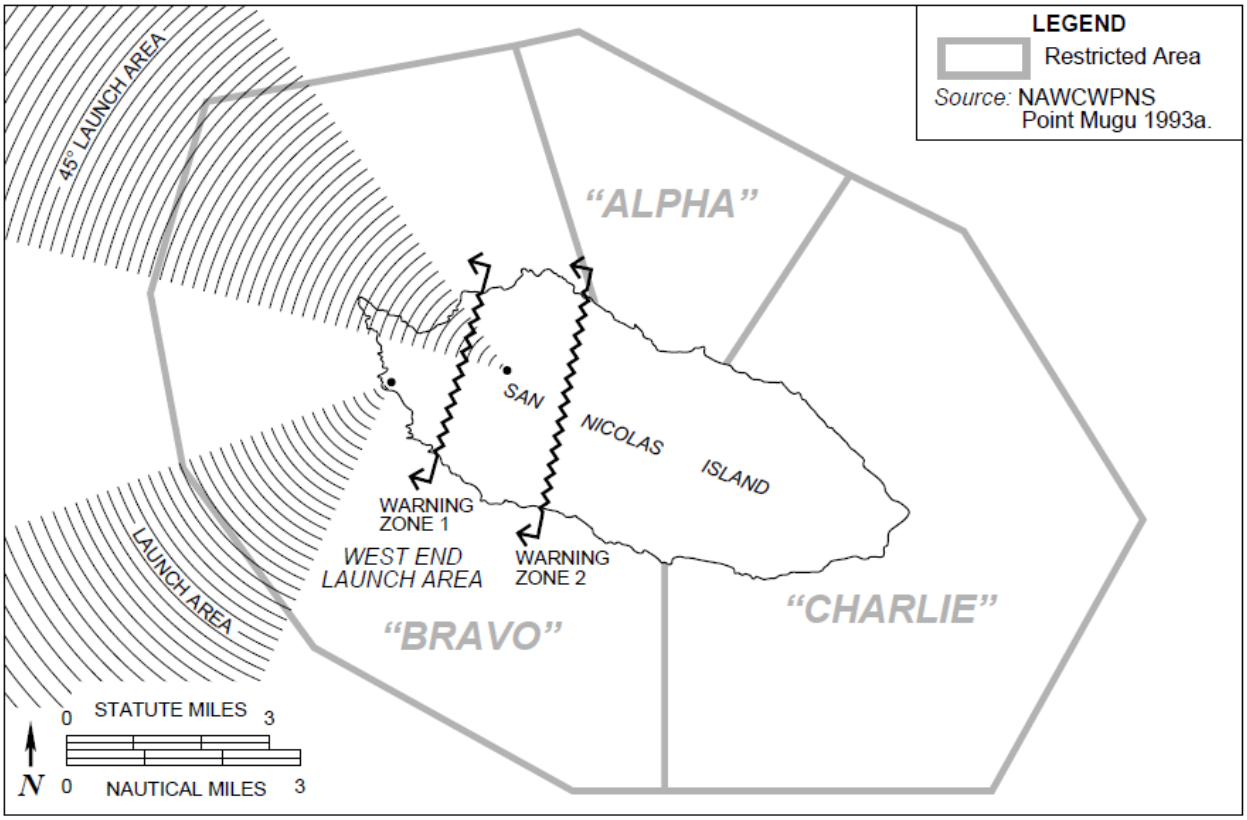


Figure 3-9. Restricted Areas around San Nicolas Island

For safety, military training, fishing, and recreational uses offshore from the vicinity of a test site at Point Mugu or SNI would be limited during testing and training activities, and areas beneath or near flight paths of missiles and targets would be cleared of non-participating vessels for each event. 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, the proposed action would not affect any fish populations or fish habitat and all offshore uses associated with the proposed testing and training are consistent with military testing and 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 planned 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 training activities are underway (Section 3.8, *Public Safety*).

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, Alternative 1 would not have significant impacts to land and water use.

3.7.2.3 Alternative 2

Alternative 2 involves use of proposed locations at Point Mugu but not those identified at SNI. The increased tempo of activities under this alternative at Point Mugu sites does not change the types or magnitudes of effects to this resource. Consequently, impacts of Alternative 2 are identical to those discussed for Point Mugu for Alternative 1. Therefore, Alternative 2 would not have significant impacts to airspace, land, and water use.

3.7.2.4 Alternative 3

Alternative 3 involves use of proposed locations at SNI but not those identified at Point Mugu. The increased tempo of activities under this alternative at SNI sites does not change the types or magnitudes of effects to this resource. Consequently, impacts of Alternative 3 are identical to those discussed for SNI for Alternative 1. Therefore, Alternative 3 would not have significant impacts to airspace, land, and water use.

3.7.2.5 Mitigation Measures

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

3.7.2.6 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.

3.8 PUBLIC SAFETY

3.8.1 Affected Environment

3.8.1.1 Definition of Resource

Safety is defined as the protection of workers and 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, a much larger area must be considered. This area varies depending on the nature of the operation and may extend for miles beyond the source of the hazard.

The primary safety issues associated with the proposed action include those inherent with laser and HPM operations, flight operations, small arms use, missile firings, and use of flares. The safety policy of NAWCWD is to take every reasonable precaution in the planning and execution of all operations which occur on the Sea Range to prevent injury to people and damage to property. This involves implementing extensive measures for risk mitigation and increased range control in the areas determined to have the highest risk to public safety.

3.8.1.2 Regulatory Setting

The Occupational Safety and Health Administration (OSHA) is responsible for protecting worker health and safety in non-military workplaces. Relevant OSHA regulations are found in 20 CFR 1910. Protection of public health and safety is an USEPA responsibility mandated through a variety of laws such as the Resource Conservation and Recovery Act (RCRA) (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 (SARA) of 1986, (PL 99-499); the CWA; and the CAA. Additional safety responsibilities are mandated by the Department of Transportation, whose regulations can be found in 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 regulation and standards that apply to the testing and training activities associated with the proposed action. Key among these directives, regulations, and standards are the following:

- OPNAVINST 5100.23G, *The Navy Safety and Occupational Health Program Manual* (30 Dec 2005);
- NAVSEA OP-5, *Ammunition and Explosives Safety Ashore* (1 July 2008);
- OPNAVINST 5100.27B, *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/IEEE C95.1-1992, *Safety Levels with Respect to Human Exposure to Radio Frequency (RF). Electromagnetic Fields, 3 kHz to 300 GHz*;
- IEEE C95.3-1991, *Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave*.

3.8.1.3 Existing Conditions

Laser Safety

Before any lasers are used at the Sea Range, operations must comply with OPNAVINST 5100.27B/ Marine Corps Order 5104.1C Navy Laser Hazards Control Program and approved by NAWCWD Range Laser System Safety Officer (RLSSO). This OPNAVINST incorporated the industry standard, ANSI Z136.1, *Safe Use of Lasers*, into its requirements. In addition to OPNAVINST 5100.27B, NAWCWD would implement a detailed range hazard assessment and SOP process prior to the use of a laser system on the Sea Range, SNI, and Point Mugu. 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 RLSSO review every step of planned laser tests, and if there are any unknowns that had not been addressed or mitigated, the test does not proceed. If all information is provided and the analysis indicated that the Sea Range could safely accommodate the proposed event, the RLSSO generates an RSA for the program.

Additionally, the Navy's Laser Safety Review Board 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* and ANSI Z136.6 (2007), *Safe Use of Lasers Outdoors*, also contains guidance and recommended practices.

The Laser Safety Review Board 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 NSWCDL, based on expertise in lasers and laser safety. NSWCDL's head of the LNTL also is a sitting member of multiple ANSI Z136 subcommittees focused on the safe use of lasers.

General Laser Control Measures

General laser control measures have been established for the protection of scientists, Navy personnel, and the public. These include laser safety analysis, SOPs, safety buffer zones, remote viewing and operation,

range control measures (barriers and warning systems), interlock controls, target backstops, and administrative controls. These measures would apply to the proposed action and are described below.

- *Laser Safety Analysis*. A prerequisite prior to each test is a laser safety analysis that quantifies potential ocular and skin hazards and provides recommendations for their mitigation.
- *Laser System SOPs*. As required by ANSI Z136.1 and ANSI Z136.6 standards, as well as the Navy's own laser protection standard, each laser system and designated firing must have an SOP developed and approved. This SOP designates the individual(s) responsible for the safe operation of the laser system, the specific control measures employed to minimize unintended exposures, conditions under which the laser system may be operated and appropriate personal protective equipment for operators, and the specific nominal ocular hazard distance and nominal hazard zone. Each laser system SOP must be submitted to the Navy's Laser Safety Review Board and the NAWCWD RLSSO for approval; only after approval may the laser test be conducted. SOPs require laser safety training as well as medical surveillance for the operators to ensure their health and safety.
- *Safety Buffer Zone (Laser Hazard Cone)*. Range control measures include use of safety zones, from which personnel are excluded during testing and 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 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. The nominal ocular hazard distance and nominal hazard zone are determined for each laser system to ensure that the operators, as well as other personnel and the general public, are located beyond the distances where skin or ocular hazards are present, including specular (highly reflective, such as from a mirror) or diffuse reflection of laser energy.
- *Laser Safety Interlock Controls*. Safety interlocks work through an instantaneous feedback loop to cut off the power to an emitting laser if a single mechanical or electrical component fails or if the laser beam strays from the anticipated beam path. For example, lower-power beams are

initially used to validate that the center of the intended target is being illuminated when fired upon. Validation is accomplished by calorimeter sensors placed around the intended aim point of the target. The sensors detect the position of the narrow laser beam by fractions of an inch relative to the center of the aim point. The laser beam is then intentionally made to drift off target to check the sensors. If the laser beam veers off the intended path, the beam will heat up the calorimeter sensors, which will in turn send a signal that the laser is off-target and instantaneously turn off the power to the laser. Another safety interlock example is a system that must be engaged to allow power to flow to the laser system, such as a magnetic connection between a closed door and the door frame leading into the area where the laser system is operated. If this door is opened, 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 will be looked at to ensure laser energy goes out to sea for the laser-on-target time. To minimize reflected laser energy, all materials and objects associated with the target – for example, a stand holding it in place – are painted with or composed of light-absorbing materials.
- *Air-space Clearance*. Any laser operations that have the potential of creating hazards to aircraft shall be coordinated with the FAA to ensure that when the laser is fired no non-participating aircraft are in the hazard area. Similar coordination with the Laser Clearinghouse will occur whenever laser testing or 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 will be cleared of debris prior to testing and training, and NAWCWD will ensure that appropriate industrial hygiene characterizations of exposure to laser-generated air 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 will be within close proximity to the target impact area. Once lasing activities stop, all collateral radiation (if any) would cease, and no residual collateral radiation would remain.

High-Power Microwave 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); and
- 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 3-10 although all values have been converted to average power density.

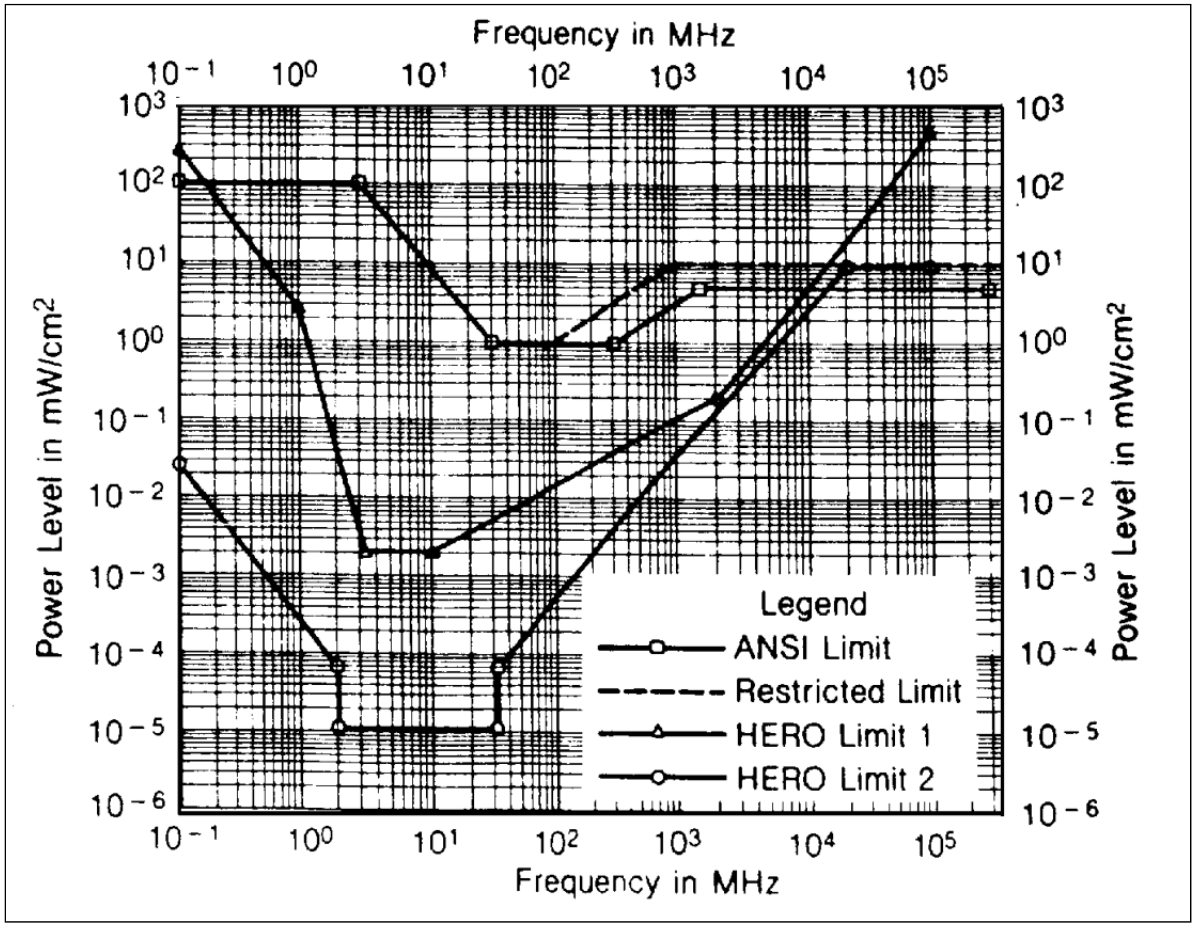


Figure 3-10. Radiation Hazards to Ordnance and Personnel

These limits are shown as average power density. 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. 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 radio frequency (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 which may occur incidental to passage through an area; and
- *Uncontrolled Environments* – A lower maximum level where there is no expectation that higher levels should be encountered, such as living quarters.

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 3-14.

Table 3-14 Specific Absorption Rates

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

Source: Federal Communication Commission 1999.

The term PEL is equivalent to the term maximum permissible exposure and RF protection guidelines found in other publications. There are several exceptions to the maximum limits in Figures 3-11 and 3-12 (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 also 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 3-11.

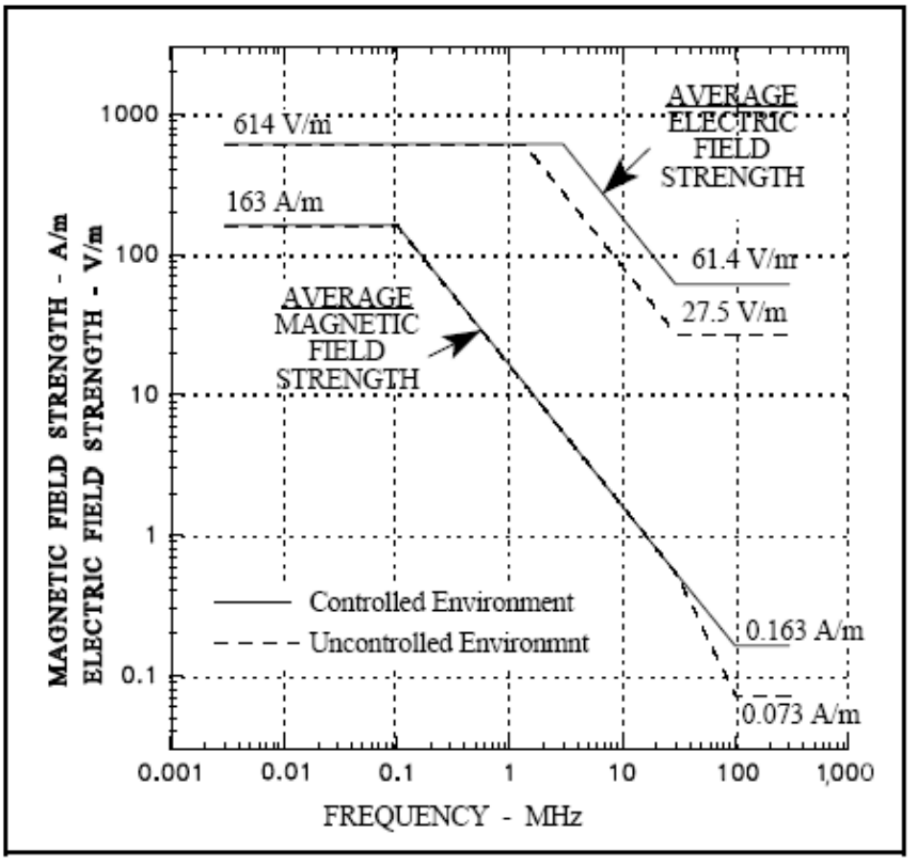


Figure 3-11. Lower Frequency HERP (from DoD INST 6055.11)

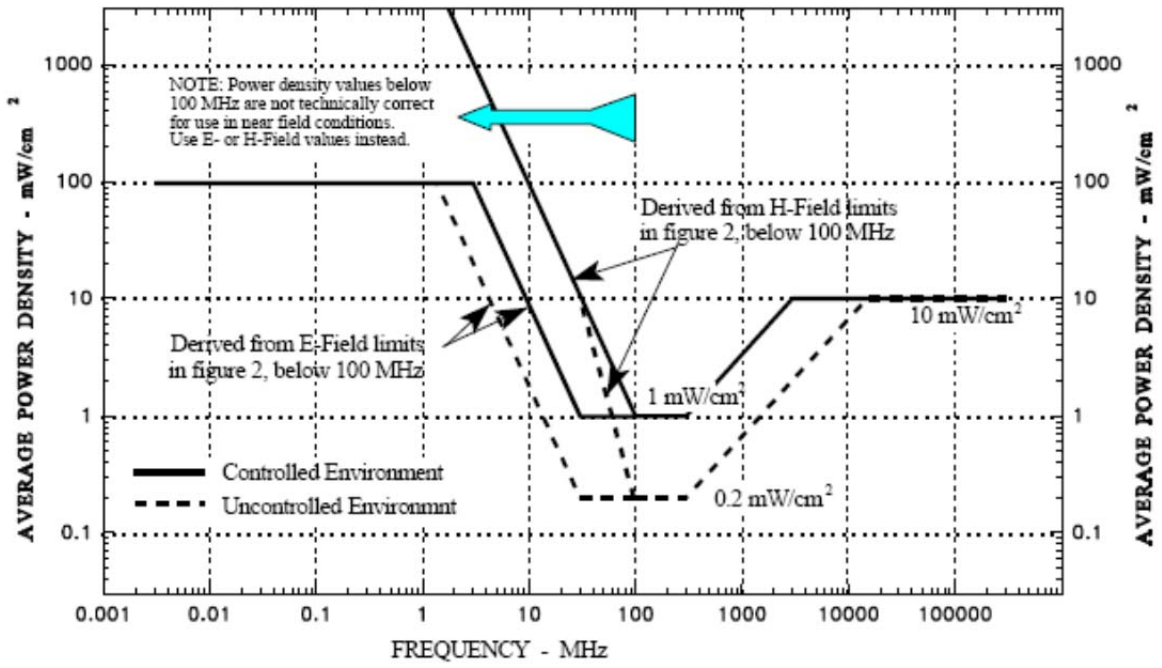


Figure 3-12. DoD INST 6055.11 HERP Limits

- 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 (PD) may be approximated with:

  PD = PD (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.

The PELs listed in Figures 3-11 and 3-12 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 (A/m). 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 3-15 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 adjacent aircraft or vehicle.
- 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 (W/cm) should be shut off.
- Antennas radiating 250 watts or less should be installed at least 50 ft from fueling areas.
- For antennas which 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 3-15 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: A = amperes, cm = centimeters, m = meters, µW = microwatts, W = watts.

Range Safety

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

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

Access to NBVC Point Mugu and SNI is strictly controlled. Access is granted for military-related activities and for pre-approved, non-military users, primarily for scientific purposes. Three surface restricted water areas are located around SNI: Alpha, Bravo, and Charlie. In addition, NAWCWD has established two airspace Restricted Areas over SNI that extend 3 nm (5.6 km) around the island. The two areas are divided by a line that extends from the north side to the south side of SNI where the Bravo boundaries intersect the shorelines; they extend from the surface to 100,000 ft (30.5 km).

NAWCWD's Point Mugu Sea Range has an extensive surveillance system to implement real-time safety clearance procedures prior to initiation of an operation on the range. This system includes the use of land-, sea-, and air-based radar in addition to aircraft surveillance of the range which is necessary to

ensure that the public remains clear of designated operational areas where they could be subjected to hazardous conditions. The range uses specially modified P-3 aircraft to provide extended Sea Range surveillance. Past Range Safety Office records show that accidents involving the public on the Sea Range have never occurred (Navy 2002).

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

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

3.8.2 Environmental Consequences

3.8.2.1 Approach to Analysis

This section evaluates potential human health and safety effects associated with the proposed action. 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.

Countermeasures testing and training would not involve weapons or directed energy systems being intentionally directed at military or civilian personnel at the Sea Range or within surrounding restricted areas. Therefore, the safety and occupational health concerns discussed will focus on the potential impacts outside the target area, impacts created by the kinetic weapons, lasers, and HPM systems.

3.8.2.2 Alternative 1 (Preferred Alternative)

Kinetic Weapons and Flares

Kinetic weapons to be used in the countermeasures testing and training include small arms (projectiles up to 5 in [13 cm] in diameter) and missiles (e.g., rocket-propelled grenades, surface-to-air missiles, air-to-surface missiles). Detailed descriptions of safety procedures and public safety communications conducted by the Navy are provided in the *Final Environmental Impact Statement/Overseas Environmental Impact Statement for the Point Mugu Sea Range* (Navy 2002).

As described in the FEIS/OEIS, the size of a clearance area for a particular kinetic weapons test is determined based on characteristics of the weapon systems and targets involved. Based on technical studies, 11 ft-pounds(lbs) (15 Newton-m) is considered the threshold force for safety considerations of personnel on the ground (Cole and Wolfe 1996). Analysis of each proposed test and training operation on the Sea Range involves estimating the area on the ground where particles with forces of 11 foot-pounds (15 Newton-meters) are likely to occur. For aircraft, the same Cole and Wolfe study indicates that serious damage to aircraft can occur by impact or engine ingestion of debris particles greater than 0.4 inch (10 mm) in diameter. Considering this, aircraft are excluded from test areas involving such debris.

During testing and training operations, onshore and offshore areas within and just outside the launch azimuth boundaries are cleared for safety purposes during each target or missile launch. Onshore clearance involves military personnel, while offshore clearance could involve vessels or aircraft (recreational and commercial). NAWCWD issues NOTAMs and NOTMARs 24 hours in advance of any Navy activity requiring exclusive use of an area. A special phone number was established by NBVC Point Mugu to inform commercial fishermen in advance of military activities at SNI (Navy 2002).

The storage and handling of munitions and explosives would be conducted in accordance with NAVSEA OP 5, *Ammunition and Explosives Safety Ashore*, as well as NAWCWD and NBVC procedures. Safety interlocks, administrative controls, and hazard safety zones would be incorporated with all weapons delivery activities, minimizing the potential for release of explosives devices. Hearing protection would be required for all personnel in areas where the noise level would be above 85 dBA.

Through implementation of clearance procedures and hazards communications, there would be no significant impacts to public safety due to the use of kinetic weapons and flares. Occupational safety and health impacts would also be insignificant, given the adherence to stringent procedures and the implementation of administrative and engineered controls.

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) (WHO 1989a; 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 25°C [50 to 77°F]) for short periods of time, typically less than a minute (WHO 1989a). A photochemical injury results from potential impact of light particles (photon) on skin molecules; the molecule's chemical composition gets altered, resulting in minor or severe sun burn, and prolonged exposure may promote the formation of skin cancer. Acoustical transient effects are related to pulse duration and may occur in short-duration pulses (up to 1 millisecond), depending on the specific wavelength of the laser. The acoustical transient effect is poorly understood, but it can cause retinal damage that 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 will be effectively increased to 100 W/cm^2 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 megawatt [MW]).

Pulsed lasers are also proposed to be tested on the Sea Range, including SNI. The averaged power of a pulsed laser will usually be less than that of a continuous-wave laser, but the peak power in the pulse may be very large if the pulse duration is very short. Pulses lasting less than 1 microsecond focused on the retina can cause an acoustical transient, resulting in substantial damage and bleeding in addition to thermal injury (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 lasing operations. The non-beam control measures in place and strict adherence to the health and safety program minimizes the health and safety risks associated with non-beam effects of lasing activities on the Sea Range and at SNI.

Laser operations would include systems at wavelengths from 180 to 14,000 nanometers (0.18 to 14.0 micrometers) and at average powers up to a maximum of 1 MW, including Building 761 as a target site at Point Mugu. 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 to be negligible.

By implementing strict health and safety procedures, NAWCWD scientists and engineers conducting high energy laser testing and training would be located well beyond distances that could result in injury from either continuous-wave or pulsed lasers, and the distance to the general public would be even farther away from testing and training. In addition, the laser control measures that would be in place during testing and 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 or training. Therefore, the impacts of increased testing and training on safety and occupational health are considered negligible.

Electromagnetic Radiation Effects Due to Electronic Support and HPM Systems

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 1 inch (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 is prevented by biological or environmental factors, the exposed tissue will 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. RF induced sounds are similar to other common sounds such as a click, buzz, hiss, knock, or chirp (USAF 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 RFs 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 cm per pulse, or energy absorption per pulse of 16 microjoules per gram. Audible sounds are produced by rapid thermal expansion, resulting from only a $5 \times 10^{-6\circ}$ C 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 degrees Celsius. 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 (USAF 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 V/m (USAF 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 (WHO 1989b). 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 the hazards involved in laser and HEL tests. Implementation of SOPs and adherence to standards and regulations provided in Section 3.8.1.3 would reduce the risks associated with these hazards significantly.

By implementing strict health and safety procedures, NAWCWD scientists and engineers conducting HPM testing and 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 training. In addition, the HPM system control measures that would be in place during testing and 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 or training. Therefore, implementation of Alternative 1 would not have significant impacts to public safety.

3.8.2.3 Alternative 2

Alternative 2 involves use of proposed locations at Point Mugu but not those identified at SNI. The increased tempo of activities under this alternative at Point Mugu sites does not change the types or

magnitudes of effects to this resource. The scenarios proposed under Alternative 2 would include the same actions to reduce or eliminate impacts to safety and health as described under the proposed action. Consequently, impacts of Alternative 2 are identical to those discussed for Point Mugu for Alternative 1. Therefore, Alternative 2 would not have significant impacts to public safety.

3.8.2.4 Alternative 3

Alternative 3 involves use of proposed locations at SNI but not those identified at Point Mugu. The increased tempo of activities under this alternative at SNI sites does not change the types or magnitudes of effects to this resource. The scenarios proposed under Alternative 3 would include the same actions to reduce or eliminate impacts to safety and health as described under the proposed action. Consequently, impacts of Alternative 3 are identical to those discussed for SNI for Alternative 1. Therefore, Alternative 3 would not have significant impacts to public safety.

3.8.2.5 Mitigation Measures

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

3.8.2.6 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 public safety would occur.

3.9 HAZARDOUS MATERIALS

3.9.1 Affected Environment

3.9.1.1 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 lasers produce hazardous or toxic materials during the process of lasing, but these systems would be self-contained so that all hazardous materials are captured and safely stored. Hazardous materials are often used in targets because they are strong, lightweight, reliable, long-lasting, or low cost. When targets are used for their intended purpose, component hazardous materials are considered hazardous constituents.

A hazardous waste may be a solid, liquid, semi-solid, or contained gaseous material that alone or in combination may: 1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or 2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Hazardous wastes are controlled by the RCRA (42 USC § 6901 et seq.).

3.9.1.2 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 (SARA) of 1986, (PL 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 SARA, 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 13423 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.

3.9.1.3 Existing Conditions

<u>NBVC Point Mugu</u>

NBVC Point Mugu operates under a Hazardous Waste Management Plan (HWMP) (Navy 2005) that provides guidance and direction for the use, storage, and compliance activities for hazardous materials and wastes at the base. The HWMP provides a comprehensive compilation of procedures and

requirements that are mandated by law, directive, or regulation. The plan has a compliance orientation to ensure safe and efficient control, use, transport, and disposal of hazardous materials and waste.

The majority of hazardous materials used at NBVC Point Mugu are managed by the NBVC Point Mugu Environmental Planning and Conservation Branch of the Environmental Division and stored at the Hazardous Material Minimization Center. Individual shops are authorized to store hazardous materials in small quantities. Generally, these shops are limited to storing one week's worth of hazardous materials needed for routine tasks. There are approximately 40 storage lockers at NBVC Point Mugu.

Fuel products comprise the greatest amount of hazardous materials present on the base. Table 3-16 provides a summary of the types and amounts of fuels stored on base.

Table 3-16. Fuel Type and Quantity Stored at NBVC Point Mugu

Fuel Type	Supply (gallons)
JP-8 (jet fuel)	800,000 to 1,100,000
Unleaded gasoline	Up to 50,000
Aviation gasoline	Up to 52,000
Diesel	Up to 24,000

Source: Navy 2002.

As indicated in Navy 2002, NBVC Point Mugu generated approximately 826,000 lbs (375,000 kilogram [kg]) of hazardous waste in 1996. These wastes consisted primarily of contaminated jet fuel, waste rags, paint, solvents, spill residues and absorbent materials, corrosion prevention compound in aerosol cans, ethylene glycol, batteries, antifreeze, hydraulic fluid, photo processing waste materials, waste cleaning compounds, and debris materials

Hazardous wastes are generated at most of the industrial shops at NBVC Point Mugu. There are approximately 40 satellite accumulation areas and three less-than-90-day accumulation areas on the base. Hazardous waste is collected at the accumulation sites by the NBVC hazardous waste management contractor and transported to the less-than-90-day accumulation areas. The NBVC waste transport vehicles are equipped with spill containment systems and emergency spill kits. All hazardous waste is removed from the waste treatment yard and transported to an approved treatment, storage, and disposal facility (Navy 2002).

San Nicolas Island

To the extent possible, maintenance of weapons systems is performed at NBVC Point Mugu. However, some hazardous materials are shipped to and stored on SNI. Hazardous materials used on SNI are ordered through the NBVC Point Mugu Hazardous Materials Minimization Center and shipped to the island via barge or aircraft. Seven storage lockers are located on the island. The largest quantity of hazardous materials stored is in the form of fuel. Jet fuel and unleaded gasoline are shipped to the island by tanker barge.

There are 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).

3.9.2 Environmental Consequences

3.9.2.1 Approach to Analysis

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

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

The components that contain hazardous constituents include propellants, batteries, flares, telemetry igniters, jet and diesel fuel, hydraulic fluid, coolants, and explosive warheads. NBVC Point Mugu accumulates and manages hazardous wastes (e.g., paints, adhesives, solvents, aerosols, batteries, and cleaning compounds) for maintenance activities. Each of these constituents has the potential to effect human health and the environment through direct contact with individuals, groundwater, surface water, soil, and air.

Military munitions are not considered hazardous wastes under two conditions stated in the USEPA Military Munitions Rule and the DoD Interim Policy on Military Munitions. Specifically, munitions are not wastes:

a. when they are used for their intended purpose, including training of military personnel and explosive emergency response specialists; research and development activities; and when they are recovered, collected, and destroyed during range clearance events.
b. when they are unused and being repaired, reused, recycled, reclaimed, disassembled, reconfigured, or subjected to other material recovery activities.

These two conditions cover virtually all of the use of guided missiles, rockets, and targets associated with the proposed actions of this EA. Military munitions, under the conditions described above, are not considered "hazardous wastes" and are exempt for the requirements of RCRA. Aerial targets are not technically munitions, but are "used for their intended purposes" just like munitions on the Sea Range. Similarly, used targets do not fall within the USEPA or the California Environmental Protection Agency definition of "solid waste."

Hazardous constituents originate in four classes of systems used for RDAT&E activities:

- Missiles and rockets,
- Small arms,
- Aerial targets, and
- Surface targets.

In addition to these categories, there are quantities of non-hazardous constituents, consisting mostly of steel, concrete, and other routine constituents used in inert munitions and gunfire rounds. Flares dispensed over the Sea Range also contain hazardous constituents.

To address potential impacts, the approach to this analysis includes characterizing the estimated yearly RDAT&E operations associated with this EA that may contribute hazardous constituents to the Sea Range environment. These include approximately 15,000 gunfire and cannon rounds, 250 rocket

propelled grenades (RPGs), 200 missile and rocket firings, 50 aerial targets, 15 surface targets, and 12,000 flares. The estimated ordnance numbers represent maximum values evaluated for this EA and tend to overestimate the hazardous constituent volumes associated with the proposed action. For missiles or rockets with live warheads, three cases of fate and transport were considered:

- warheads exploded when hitting or passing close to a target;
- warheads did not explode near a target but fuzed on impact with the water (delayed explosion); or
- dud warheads entering the water intact.

The analysis for this EA estimated the mass of hazardous constituents entering the waters of the Sea Range. This estimated mass was then compared to the values calculated in the Point Mugu Sea Range EIS/OEIS (Navy 2002).

3.9.2.2 Alternative 1 (Preferred Alternative)

As described above, four classes of materials were investigated for this EA. Table 3-17 provides a summary of these.

Table 3-17. Hazardous Constituents Involved with the Proposed Action

Category	Description of Hazardous Constituents	Annual Operations Estimate
Missiles/rockets	Solid fuel propellant within the range of 5 lb (2.3 kg) to 150 lb (68 kg). Many contain inert warheads (no High Explosives [HE]), but some can contain up to 137 lb (62 kg) of HE.	250 RPG 50 ManPADS 120 SAM 250 rockets
Small arms	Small arms gunfire rounds will be used over the Sea Range. These vary in size from 0.50 caliber to 5-inch shells. CIWS 20-mm rounds are encased in plastic "sabots" and are attached to aluminum "pushers" plants, both of which fall off from the rounds after being fired.	7,500 20-mm rounds <7,500 sabots <7,500 pushers 2,400 35-mm rounds 200 5-inch shells 5,000 0.50 caliber rounds
Aerial targets	Remote-controlled, subsonic, jet-powered aerial targets that can be launched from air or surface. Can be recovered on land or at sea. Hazardous constituents include oils, hydraulic fluid, batteries, and explosives.	150 ScanEagle 150 Aerolight 150 Small Tactical UAS 150 Shadow 100 Fire Scout 100 Predator
Flares	Solid flare and pyrotechnic residues may contain, depending on their purpose and color, an average weight of up to 0.85 lb (0.4 kg) of aluminum, magnesium, zinc, strontium, barium, cadmium, nickel, and perchlorates.	12,000 flares
Surface targets	Surface vessels that have been stripped of excess hazardous constituents. All operate under their own power, utilizing diesel or gasoline engines with battery-powered starters. Vessels can be 5, 15, or 18 m in length. These targets are augmented to prevent sinking upon being hit by a weapon.	40 Spartan 30 Unmanned Sea Surface Vehicle – High Speed 30 Protector 40 Odyssey 100 Sea Doo 40 Zodiac

The potential environmental effects of expended RDAT&E materials are primarily associated with the toxicity of hazardous constituents to marine biota. Hazardous materials may be contained in several components of expended materials, including outer casings, propellants, batteries, explosives, and pyrotechnics.

Heavy metals commonly of concern associated with munitions include lead, cadmium, mercury, and chromium. Zinc, copper, and manganese also may be of concern when exposure levels are high. In the area of potential effect, heavy metals are present in manned and unmanned aircraft and vessels, shells, missiles, bullets, batteries, electronic components, and anticorrosion compounds coating exterior surfaces of ordnance, including missiles, and small-caliber rounds. Most of these materials are inert and dense, and will settle to the bottom. There they will eventually be covered by sediment, coated by chemical processes (e.g., corrosion), or encrusted by marine organisms (e.g., barnacles).

Hazardous chemicals include fuels and other propellants, and combustion byproducts of those fuels and propellants. These materials are present or may be generated by the use of aircraft, vessels, ordnance, and unmanned aircraft. Toxic components of fuel oils include aromatic hydrocarbons, such as benzene, toluene, and xylene, and polycyclic aromatic hydrocarbons such as naphthalene, acenaphthene, and fluoranthene. Like commercial and recreational watercraft, Navy boat engines discharge petroleum products in their wet exhaust (Navy 2011b).

In general, the single largest hazardous constituent of missiles is solid propellant, such as solid double-base propellant, aluminum and ammonia propellant grain, and arcite propellant grain. The solid propellant is primarily composed of rubber (polybutadiene) mixed with ammonium perchlorate. In general, a surface-to-air missile typically consumes 99-100% of its propellant when it functions properly (Navy 2009). Hazardous constituents, such as plastic-bonded explosives (PBX) high-explosive components, PBX-106 explosive, and PBX (AF)-108 explosive, are also used in igniters, explosive bolts, batteries (potassium hydroxide and lithium chloride), and warheads.

Explosives are used in spotting charges for training rounds, live missiles, and rockets. Ordnance constituents of concern include nitroaromatics—principally trinitrotoluene (TNT), its degradation products, and related compounds and cyclonitramines, including Royal Demolition Explosive (RDX, cyclotrimethylene trinitramine), High Melting Explosive (HMX, cyclotetramethylene tetranitramine), and their degradation products. Most new military explosives are mixtures of plastic or other polymer binders, RDX, and HMX. Pentaerythritoltetranitrate is used in blasting caps, detonation cord, and similar initiators of explosions. When live ordnance functions properly, 99.997% of the explosives contained therein are converted to inorganic compounds (USACE 2003).

Explosives become a concern when ordnance does not function correctly and fails to detonate (failure) or detonates incompletely (low-order detonation). In these cases, all or a portion of the explosive remain unconsumed. Table 3-18 provides the failure and low-order detonation rates of various ordnance items.

Table 3-18. Failure and Low-Order Detonation Rates of Military Ordnance

Ordnance	Failure Rate (%)	Low-Order Detonation Rate (%)
Guns/artillery	4.68	0.16
Hand grenades	1.78	not applicable
High-explosive ordnance	3.37	0.09
Rockets	3.84	not applicable
Submunitions	8.23	not applicable
Flares	0.01	not applicable

Sources: Rand 2005, USACE 2007.

RDAT&E activities associated with the proposed action include 20-mm rounds (some containing plastic sabots and aluminum pushers, see Figures 2-3 and 2-4), 35-mm rounds, 5-inch shells, and 0.50 caliber rounds. Plastic sabots would fall onshore and are inert; aluminum pushers would mostly fall offshore. Hazardous materials from shells and small-arms rounds are unexploded shells and metals contained in

shell casing, ammunition jackets, and ammunition cores. Shells are composed of steel, brass, copper, tungsten, and other metals, all of which are relatively inert. Live 5-inch (12.7 cm) shells are typically fused to detonate within 3 ft (0.91 m) of the water surface. Shell fragments, unexploded shells, and non-explosive ordnance rapidly decelerate in the water and settle to the ocean floor. Less than 1% of these materials consist of toxic metals such as lead (Navy 2009).

The presence of shell casings in the sediments would not be expected to substantially affect water quality because brass would undergo slow corrosion, even in a salty environment, and leached substances would be quickly diluted by ocean currents. Most of the ammunition expended during activities involving small arms fire is comprised of steel, with small amounts of aluminum and copper. Steel practice bullets may release small amounts of iron, aluminum, and copper into the sediments and the overlying water column as the bullets corrode. All three elements are widespread in the natural environment, although elevated levels can cause toxic reactions in exposed plants and animals. Any elevation of metals in beach sand or ocean sediments would be restricted to a small zone around the bullet, and any release to the water column in the ocean would be quickly diluted (Navy 2011b).

Flares contain hazardous constituents including magnesium and white and red phosphorus. Flares do not explode, but burn at high temperatures once ignited. Metals such as barium, sodium, nickel, and titanium are often incorporated into pyrotechnic materials to produce specific visual characteristics, such as color, smoke, or both. Perchlorates may be used as oxidizers and to enhance the visual characteristics of the item. Residues from pyrotechnic items that function as designed include metallic compounds and residual perchlorate compounds. Pyrotechnic items also may include igniters and fuses.

Many studies investigating the potential environmental effects of flare use have been conducted. Based on studies considering quantities of flares used in military training, no acute or cumulative chemical effects were anticipated on terrestrial environments. No significant unresolved issues related to chemical effects of flare materials on soils or consequently on plants, animals or groundwater were expected.

Similarly, no adverse effects were found for flare usage in marine environments. This included analysis of incidental flare duds falling into marine environments. In the studies, the only chemicals detected in flare ash samples were magnesium, boron, and chromium. None of these chemicals were found to be at levels of concern (USAF 1994).

Infrequently, a recoverable target may be lost. In those cases, the hazardous materials of concern include propellant, petroleum products, metals, and batteries. Small concentrations of fuel and ionic metals released during battery operation could enter the water and contaminate limited areas; however, they are not considered a source of substantial environmental degradation.

Most target fragments will sink quickly in the ocean. Expended material that sinks to the ocean floor will gradually degrade, be overgrown by marine life, or be incorporated into bottom sediments. Floating non-hazardous expended material may be lost from target boats and will either degrade over time or wash ashore as flotsam. For the purposes of this EA, it is assumed that targets would yield no measurable impact on the environment within the study area because:

1. The majority of targets would be recovered after use,
2. The majority of expended materials are inert, and
3. Expended target materials would be buried in bottom sediments.

Table 3-19 provides the maximum annual numbers and weights of expended materials under the proposed RDAT&E activities.

Table 3-19 Summary of Expended Materials and Hazardous Constituents

Component		Hazardous Constituents	Dispersal Area[1]	Number of Items	Material Weight (lb)	
					Total Expended	Hazardous
RPG		Ammonium perchlorate, alumina, copper, organic lead	Entire Sea Range (33,300 mi^2)	250	3,850	32.0
ManPADS				50	1,080	8.95
SAM				120	34,600	287
Rockets				250	3,400	28.2
5-inch shells		Lead, aluminum, copper, tungsten		200	12,600	96.9
20-mm rounds			Within 1 nm of shore, under R-2519 and R-2535 (26.61 mi^2)	7,500	4,220	42.2
35-mm rounds				2,400	1,850	18.5
5-inch shells				200	12,600	96.9
0.50 caliber				5,000	1,240	12.4
Flares		Alumina, magnesium, zinc, strontium, barium, cadmium, nickel, perchlorates	Within 1,000 ft of shore, under R-2519 and R-2535 (4.14 mi^2)	12,000	52 [2]	0.20
Air & surface targets	Directed Energy (Laser)	Lithium batteries, gasoline, diesel	Under R-2519 and R-2535 (91.46 mi^2)	65[3]	78[4]	2.96
	Directed Energy (HPM)			65[3]	78[4]	2.96
	Small Arms		Within 1 nm of shore, under R-2519 and R-2535 (26.61 mi^2)	65[3]	78[4]	2.96
	Missiles		Entire Sea Range (33,300 mi^2)	65[3]	78[4]	2.96
Totals				**28,030**	**63,152**	**538.19**

Notes: HPM = High-Power Microwave; lb = pound; mi^2 = square miles

1. Dispersal Area provided is for Alternative 1.
2. Represents residual material following ignition.
3. Aerial and surface target use would total 65 targets. For the purposes of this analysis, however, it is conservatively assumed that each individual action category would use the full allotment of targets. As such, the projected amount of hazardous waste is over-estimated by 8.88 pounds.
4. Represents target material not recovered or material separated from main target body.

As described in Table 2-1, some of the actions proposed in this EA would occur within 1 nm of the Point Mugu or SNI shorelines, potentially concentrating dispersal of hazardous materials. Table 3-20 summarizes the dispersal rates of hazardous constituents by weapon type and distance from shore. These totals would be reduced or eliminated as described above by the measures to recover materials and facts that most materials would be inert or rapidly buried in bottom sediments.

In the 2002 Point Mugu Sea Range EIS/OEIS (Navy 2002), it was assumed that 16,225 lbs (7,375 kg) of hazardous materials would be distributed equally over an area of 33,300 mi^2 (86,249 km^2) yielding an annual dispersal rate of 0.48724 lb/mi^2 (0.08551 kg/km^2). The Sea Range EIS/OEIS concluded that this rate of distribution would have no significant impact on the environment. Using this same assumption, the

proposed action deposit 538 lbs (244 kg) with an annual hazardous material deposition rate of 0.0162 lb/mi^2 (0.00283 kg/km^2), or only 3.32% of the total analyzed in the Sea Range EIS/OEIS. Therefore, hazardous wastes or materials managed and generated under Alternative 1 would pose no significant impacts.

Table 3-20. Hazardous Constituent Dispersal Rate – Preferred Alternative

Component		Dispersal Rate (lbs/mile^2·year)			
		Inside of R-2519 and R-2535			Outside of R-2519 and R-2535
		< 1,000 ft from shore	1,000 ft < x < 1 nm	> 1 nm from shore	
RPG		0.000961	0.000961	0.000961	0.000961
ManPADS		0.000269	0.000269	0.000269	0.000269
SAM		0.00862	0.00862	0.00862	0.00862
Rockets		0.000847	0.000847	0.000847	0.000847
20-mm rounds		1.586	1.586	--	--
35-mm rounds		0.695	0.695	--	--
5-inch shells		0.00291	0.00291	0.00291	0.00291
0.50 caliber		0.466	0.466	--	--
Flares		0.0483	--	--	--
Air & surface targets	Directed Energy (Laser)	0.0324	0.0324	0.0324	--
	Directed Energy (HPM)	0.0324	0.0324	0.0324	--
	Small Arms	0.111	0.111	--	--
	Missiles	0.0000889	0.0000889	0.0000889	0.0000889
Totals		**2.9847959**	**2.9364959**	**0.0784959**	**0.0136959**

3.9.2.3 Alternative 2

Hazardous materials expended under Alternative 2 would be the same as those analyzed under the proposed action (538 lbs [244 kg]), although the dispersal area would be reduced for some components, increasing the localized dispersal rate. Table 3-21 provides the adjusted hazardous constituent dispersal rates. The scenarios proposed under Alternative 2 would include the same actions to reduce or eliminate impacts to the areas of potential effect as described under the proposed action. Therefore, hazardous wastes or materials managed and generated under Alternative 2 would pose no significant impacts.

3.9.2.4 Alternative 3

Hazardous materials expended under Alternative 3 would be the same as those analyzed under the proposed action (538 lbs [244 kg]), although the dispersal area would be reduced for some components, thus increasing the localized rate. Table 3-22 provides the adjusted hazardous constituent dispersal rates. The scenarios proposed under Alternative 3 would include the same actions to reduce or eliminate impacts to the areas of potential effect as described under the proposed action. Therefore, hazardous wastes or materials managed and generated under Alternative 3 would pose no significant impacts.

3.9.2.5 Mitigation Measures

Implementation of the proposed action would not result in significant impacts with respect to hazardous materials; therefore, no mitigation measures are proposed or required.

Table 3-21. Hazardous Constituent Dispersal Rate – Alternative 2

Component		Dispersal Rate (lbs/mile^2·year)			
		Inside of R-2519 and R-2535			Outside of R-2519 and R-2535
		< 1,000 ft from shore	1,000 ft < x < 1 nm	> 1 nm from shore	
RPG		0.000960961	0.000960961	0.000960961	0.000960961
ManPADS		0.000268769	0.000268769	0.000268769	0.000268769
SAM		0.008618619	0.008618619	0.008618619	0.008618619
Rockets		0.000846847	0.000846847	0.000846847	0.000846847
20-mm rounds		5.910364146	5.910364146	--	--
35-mm rounds		2.591036415	2.591036415	--	--
5-inch shells		0.00290991	0.00290991	0.00290991	0.00290991
0.50 caliber		1.736694678	1.736694678	--	--
Flares		0.206185567	--	--	--
Air & surface targets	Directed Energy (Laser)	0.123901214	0.123901214	0.123901214	--
	Directed Energy (HPM)	0.123901214	0.123901214	0.123901214	--
	Small Arms	0.414565826	0.414565826	--	--
	Missiles	0.000088889	0.000088889	0.000088889	0.000088889
Totals		**11.12034306**	**10.91415749**	**0.261496423**	**0.013693995**

Table 3-22. Hazardous Constituent Dispersal Rate – Alternative 3

Component		Dispersal Rate (lbs/mile^2·year)			
		Inside of R-2519 and R-2535			Outside of R-2519 and R-2535
		< 1,000 ft from shore	1,000 ft < x < 1 nm	> 1 nm from shore	
RPG		0.000960961	0.000960961	0.000960961	0.000960961
ManPADS		0.000268769	0.000268769	0.000268769	0.000268769
SAM		0.008618619	0.008618619	0.008618619	0.008618619
Rockets		0.000846847	0.000846847	0.000846847	0.000846847
20-mm rounds		2.167437083	2.167437083	--	--
35-mm rounds		0.950179764	0.950179764	--	--
5-inch shells		0.00290991	0.00290991	0.00290991	0.00290991
0.50 caliber		0.636877247	0.636877247	--	--
Flares		0.063091483	--	--	--
Air & surface targets	Directed Energy (Laser)	0.043806423	0.043806423	0.043806423	--
	Directed Energy (HPM)	0.043806423	0.043806423	0.043806423	--
	Small Arms	0.152028762	0.152028762	--	--
	Missiles	0.000088889	0.000088889	0.000088889	0.000088889
Totals		**4.07092118**	**4.007829697**	**0.101306841**	**0.013693995**

3.9.2.6 No-Action Alternative

Under the no-action alternative, the proposed action would not occur and existing conditions would remain unchanged. Therefore, no significant impacts with respect to hazardous materials would occur.

CHAPTER 4
CUMULATIVE IMPACTS

Federal law (42 USC 4321 et seq.) and Navy regulations for implementing NEPA (32 CFR 775), as described in OPNAVINST 5090.1C Change Transmittal 1 (Navy 2011c), require that the cumulative impacts of a proposed action be assessed. According to CEQ regulations, the analysis of cumulative impacts in an EA should consider the potential environmental impacts resulting from "*the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency… or person undertakes such other actions"* (40 CFR 1508.7).

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. 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 countermeasures testing and 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 entire 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 use of laser technology on the Sea Range (Navy 2010). This involves laser testing and 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 Naval Base Ventura County.

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

The proposed project consists of increasing brine and filter backwash discharge at the existing reverse osmosis facility. The current permit allows for discharge of 67,000 gallons (254,000 liters) per day. This would increase under the proposed project to 216,000 gallons (818,000 liters) per day. The Navy is currently reviewing options for disposal of brine and filter backwash, and is in communication with the SWRCB regarding this project.

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 SNI Roads and Airfield Repairs Project

An EA was prepared for the Navy proposal to perform a maintenance and mission-critical infrastructure project to repair the SNI roads and airfield (NBVC 2012). Since the pier at Daytona Beach that is used to transfer supplies to the island is not designed to handle the large volumes of heavy aggregate required to complete the repairs, barge beach landings will be used to offload these materials. The road repair project will be completed in two phases. In Phase I, four road segments totaling 5.65 miles (9 km) will be repaired. In Phase II, five road segments totaling 6.8 miles (11 km) will be repaired. In addition, all existing degraded culverts and drainage courses crossing the roads will be repaired, including eight culverts in Phase I, totaling 0.21 ac (0.1 ha), and up to ten in Phase II, totaling 0.28 ac (0.1 ha). Three construction projects totaling 33 ac (13 ha) will be completed in the existing airfield right-of-way. In addition, one culvert located outside the right-of-way at the runway perimeter will also be repaired. No significant impacts were identified for the proposed action, either of the action alternatives, or the no-action alternative.

4.2.6 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-kilowatt 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 acres (13 ha). No significant impacts were identified; adverse but less than significant impacts to island night lizards were identified.

4.2.7 SNI Directed Energy Test Facilities

Construction and operation of Directed Energy Test Facilities (also referred to as the “test facilities”) is proposed for Tender Point at SNI. Components of the proposed action include a shooter site (location where laser and HPM equipment would be placed for testing and training), a target site (location of laser and HPM targets), and four calibration target sites. 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 supporting infrastructure and facilities. 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 the target site in order to conduct system tests. Siting "shooter" systems at Tender Point would allow a system to attack targets at Bomber Cove as well as airborne or seaborne targets. An EA and Biological Assessment are being prepared.

4.2.8 Sea Range Expansion of Unmanned Systems Operations

An extension of the Navy's UAS 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 special use airspace over the Sea Range. The proposed action includes construction of new support facilities at NBVC Point Mugu and 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 is being prepared.

4.2.9 West Coast Home Basing Of the MQ-4C Triton Unmanned Aircraft System at Naval Base Ventura County Point Mugu

The Navy proposes to establish facilities and functions to support the west coast home basing and maintenance of four MQ-4C Triton Unmanned Aircraft Systems (Triton UAS), which were formerly known as the Broad Area Maritime Surveillance UAS (BAMS UAS), at NBVC Point Mugu. The Triton UAS is a multiple-sensor, unarmed, unmanned aircraft system that is approximately 48 ft (15 m) long and has a wingspan of approximately 131 ft (40 m). The Triton UAS provides a continuous (up to 24 hours per day) maritime intelligence, surveillance, and reconnaissance data collection and dissemination capability to the serviced Fleet Commander. The proposed action also includes supporting up to four additional Triton UAS undergoing maintenance actions at any one time; conducting an average of five Triton UAS flight operations (i.e., takeoffs or landings) per day (1,825 annually, representing a 5.2% increase in existing annual operations at NBVC Point Mugu); constructing, demolishing, and renovating facilities and infrastructure at NBVC Point Mugu; and stationing up to 700 personnel, plus their family members, while supporting rotational deployments to and from outside the continental United States. Of the 700 personnel, approximately 200 would be on rotational deployment at any given time and 500 would be on-installation to support the Triton UAS at any given time. The Triton UAS would cross the Sea Range during some operations. An EA is being prepared; no significant impacts were identified in the Draft EA (NBVC 2013).

4.3 CUMULATIVE IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

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

4.3.1 Geology and Soils

The proposed action would have only short-term, localized effects, if any, on geology and soils. Such effects are limited to ground disturbance during operation and occasional maintenance activities. As described in the Point Mugu Sea Range EIS, 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 the proposed action, the action would have only minor, temporary effects, if any, and would not measurably add to effects from other activities. Therefore, there would be no cumulative impact on geology and soils.

4.3.2 Air Quality

The proposed action would conform to the applicable State Implementation Plan and would not trigger a conformity determination under Section 176(c) of the Clean Air Act. The Navy has prepared a Record of Non-Applicability for Clean Air Act Conformity in the South Central Coast Air Basin (Appendix B). Moreover, these negligible impacts, when added to the impacts from the other listed projects, would account for a very small percentage increase of overall air emissions budgets for the air basin. Emissions of the proposed action on SNI, along with other pending Navy actions, have been largely accounted for in 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 would not have a cumulative impact on air quality.

4.3.3 Marine Sediments and Water Quality

The proposed action would have only short-term, localized effects, if any, on sediment and water quality. As described in the Point Mugu Sea Range EIS, 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, the action would have only minor, temporary effects, if any, and would not measurably add to quantities of pollutants in the marine environment. Therefore, there would be no cumulative impact on marine sediments and water quality.

4.3.4 Noise

The proposed action would have only short-term, localized noise effects. Moreover, these short-term impacts, when added to the impacts from the other listed projects, would account for a relatively small change to the overall noise environment. Noise from current testing and training activities, along with other pending Navy actions, has been largely accounted for in RDAT&E activities that were analyzed in the Point Mugu Sea Range EIS/OEIS. As a result, the proposed action would not have a significant cumulative impact on noise.

4.3.5 Biological Resources

Implementation of the proposed action would have no significant effects on sensitive plant species and no significant effect to threatened or endangered animals. Hence there is no potentially significant interaction with the effects of actions on the native plants and animals of Point Mugu, SNI, and the Sea Range. This is supported by the Biological Opinion that also considered cumulative effects to listed species. The programmatic biological opinion for SNI indicates that ongoing activities at SNI have minor to no effects on the species on SNI. The same conclusion was reached for NBVC. Therefore, when combined with the effects of other past, present, and foreseeable project activities, implementation of the proposed action of

either action alternative is unlikely to have any additional cumulative effect on plant and animal populations at Point Mugu and on SNI.

4.3.6 Cultural Resources

Implementation of the proposed action would not adversely impact cultural resources. The proposed action would not result in disturbance of known archaeological sites. There would be no adverse effect to Bravo Pad since the actions would be consistent with actions that already occur their regularly. The Navy's cultural resource management program on SNI assures that potentially significant cultural resources are protected and are not subject to incremental degradation. Therefore, the proposed action, in conjunction with other past, present, and foreseeable activities, would not result in cumulative impacts to cultural resources.

4.3.7 Airspace, Land and Water Use

Implementation of the proposed action would not result in significant airspace or land and water use impacts. Existing land use designations would not change as a result of the proposed action, and the existing land uses within the project area would continue to be used for the same purposes. The proposed action would not impose new restrictions on the public's right of access to the sea in the coastal zone. The near shore areas around SNI are U.S. Territorial Waters and access is restricted for reasons of public safety or military security. The proposed action would not affect coastal resources and their uses. Therefore, implementation of the proposed action, or either action alternative, in conjunction with other past, present, and foreseeable actions would not result in cumulative impacts to airspace, land, or water use.

4.3.8 Public Safety

Scheduling procedures associated with test events 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 countermeasures testing and training would not be scheduled to occur when another test or training event is scheduled in the same area. As a result, implementation of the proposed action would not have a cumulative effect on public safety.

4.3.9 Hazardous Materials

The proposed action would have no impacts with respect to hazardous materials. Because the proposed action 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.

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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 Executive Order 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, countermeasures testing and training would be conducted at the Sea Range, Point Mugu, and SNI. The test program would not result in a significant irreversible or irretrievable commitment of resources. Fuel for the necessary test platforms would be a commitment of resources; however, the use of fuel for the testing and training program would have a negligible impact on fossil fuel resources and human labor associated with Navy operations and training. Munitions and targets would fall into the ocean in the Sea Range and not be retrieved. This would constitute a commitment of resources but would have a negligible impact as these components are constructed elsewhere and are readily available.

5.2 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

Countermeasures testing and training would occur at Point Mugu and SNI. Point Mugu is part of NBVC, a military installation controlled by the Navy. SNI is a Navy-owned property that is isolated from the mainland and any sensitive populations or centers of children's activity. Human inhabitants of Point Mugu and SNI are DoD personnel and/or contractors for the purpose of managing and maintaining Navy land and facilities. Military personnel live on base at Point Mugu, while no permanent non-DoD population exists on SNI. Low-income populations, minorities, and children would not be disproportionately affected by the proposed action. Therefore, the provisions of EO 12898 and 13045 are satisfied.

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CHAPTER 6
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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

Christopher Noddings

Clint Scheuerman

Rick Spaulding

GIS & Graphic Design (Cardno TEC, Inc.)

Shannon Brown

Jason Harshman

Technical Editors (Cardno TEC, Inc.)

Claudia Tan

Jackie Brownlow

Appendix A

Proposed Action Summary

Scenario	Option	Countermeasure Location	Target Location	Notes
1. Land-to-Air Directed Energy Laser Types: Solid-State, Fiber, CO2, Free Electron, & Chemical Pulsed and CW lasers Classes 1,2,3,4 max power = 1MW (average max) Wavelengths from 180nm to 14,000nm Alignment and Calibration Lasers Laser Range Finders/Tracking Lasers Laser Designators/Illuminators High Power Microwave	A	B-738	Airborne	Targets: fixed/rotary wing, UAS, Vertical Lift
	B	Pt. Mugu: Alpha Site	Airborne	
	C	Pt. Mugu: Bravo Site	Airborne	
	D	Pt. Mugu: Charlie Site	Airborne	
	E	Pt. Mugu: Nike-Zeus Site	Airborne	
	F	Pt. Mugu: B-761	Airborne	
	G	SNI: Thousand Springs West	Airborne	
	H	SNI: Rock Crusher Point	Airborne	
2. Land-to-Air Small Arms Various bullet calibers 35mm Max Diameter No Depleted Uranium	A	Pt. Mugu: Alpha Site	Airborne	Targets: fixed/rotary wing, UAS, Vertical Lift Target no closer than 250 meters from shore
	B	Pt. Mugu: Bravo Site	Airborne	
	C	Pt. Mugu: Charlie Site	Airborne	
	D	Pt. Mugu: Nike-Zeus Site	Airborne	
	E	SNI: Tender Point	Airborne	
	F	SNI: Thousand Springs West	Airborne	
	G	SNI: Rock Crusher Point	Airborne	
3. Land-to-Air Missiles Rocket Propelled Grenades ManPADS Surface-to-Air Missiles	A	Pt. Mugu: Alpha Site	Airborne	Targets: fixed/rotary wing, UAS, Vertical Lift Target no closer than 250 meters from shore
	B	Pt. Mugu: Bravo Site	Airborne	
	C	Pt. Mugu: Charlie Site	Airborne	
	D	Pt. Mugu: Nike-Zeus Site	Airborne	
	E	SNI: Tender Point	Airborne	
	F	SNI: Thousand Springs West	Airborne	
	G	SNI: Rock Crusher Point	Airborne	

Scenario	Option	Countermeasure Location	Target Location	Notes
4. Land-to-Sea Directed Energy Laser Types: Solid-State, Fiber, CO2, Free Electron, & Chemical Pulsed and CW lasers Classes 1,2,3,4 max power = 1MW (average max) Wavelengths from 180nm to 14,000nm Alignment and Calibration Lasers Laser Range Finders/Tracking Lasers Laser Designators/Illuminators High Power Microwave	A	Pt. Mugu: Alpha Site	Ocean Surface	Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
	B	Pt. Mugu: Bravo Site	Ocean Surface	
	C	Pt. Mugu: Charlie Site	Ocean Surface	
	D	Pt. Mugu: Nike-Zeus Site	Ocean Surface	
	E	Pt. Mugu: B-761	Ocean Surface	
	F	SNI: Tender Point	Ocean Surface	
	G	SNI: Thousand Springs West	Ocean Surface	
	H	SNI: Rock Crusher Point	Ocean Surface	
5. Land-to-Sea Small Arms Various bullet calibers 35mm Max Diameter No Depleted Uranium	A	Pt. Mugu: Alpha Site	Ocean Surface	Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
	B	Pt. Mugu: Bravo Site	Ocean Surface	
	C	Pt. Mugu: Charlie Site	Ocean Surface	
	D	Pt. Mugu: Nike-Zeus Site	Ocean Surface	
	E	SNI: Tender Point	Ocean Surface	
	F	SNI: Thousand Springs West	Ocean Surface	
	G	SNI: Rock Crusher Point	Ocean Surface	
6. Land-to-Sea Missiles Rocket Propelled Grenades ManPADS Surface-to-Surface Missiles	A	Pt. Mugu: Alpha Site	Ocean Surface	Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
	B	Pt. Mugu: Bravo Site	Ocean Surface	
	C	Pt. Mugu: Charlie Site	Ocean Surface	
	D	Pt. Mugu: Nike-Zeus Site	Ocean Surface	
	E	SNI: Tender Point	Ocean Surface	
	F	SNI: Thousand Springs West	Ocean Surface	
	G	SNI: Rock Crusher Point	Ocean Surface	

Scenario	Option	Countermeasure Location	Target Location	Notes
7. Sea-to-Air Directed Energy Laser Types: Solid-State, Fiber, CO2, Free Electron, & Chemical Pulsed and CW lasers Classes 1,2,3,4 max power = 1MW (average max) Wavelengths from 180nm to 14,000nm Alignment and Calibration Lasers Laser Range Finders/Tracking Lasers Laser Designators/Illuminators High Power Microwave	A	Ocean Surface	Airborne Off Shore of Mugu	Targets: fixed/rotary wing, UAS, Vertical Lift Targets >3 miles from shore (Inner Sea Range)
	B	Ocean Surface	Airborne Off Shore of SNI	Targets: fixed/rotary wing, UAS, Vertical Lift Targets >3 miles from shore (Inner Sea Range)
8. Sea-to-Air Small Arms All calibers of bullets up to and including 5" projectiles	A	Ocean Surface	Airborne Off Shore of Mugu	Targets: fixed/rotary wing, UAS, Vertical Lift Targets >3 miles from shore (Inner Sea Range)
	B	Ocean Surface	Airborne Off Shore of SNI	Targets: fixed/rotary wing, UAS, Vertical Lift Targets >3 miles from shore (Inner Sea Range)
9. Sea-to-Air Missiles Rocket Propelled Grenades ManPADS Surface-to-Air Missiles	A	Ocean Surface	Airborne Off Shore of Mugu	Targets: fixed/rotary wing, UAS, Vertical Lift Targets >3 miles from shore (Inner Sea Range)
	B	Ocean Surface	Airborne Off Shore of SNI	Targets: fixed/rotary wing, UAS, Vertical Lift Targets >3 miles from shore (Inner Sea Range)

Scenario	Option	Countermeasure Location	Target Location	Notes
10. Sea-to-Sea Directed Energy Laser Types: Solid-State, Fiber, CO2, Free Electron, & Chemical Pulsed and CW lasers Classes 1,2,3,4 max power = 1MW (average max) Wavelengths from 180nm to 14,000nm Alignment and Calibration Lasers Laser Range Finders/Tracking Lasers Laser Designators/Illuminators High Power Microwave	A	Ocean Surface	Ocean Surface	Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
	B	Ocean Surface	Ocean Surface	Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
11. Sea-to-Sea Small Arms All calibers of bullets up to and including 5" projectiles	A	Ocean Surface	Ocean Surface	Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
	B	Ocean Surface	Ocean Surface	Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
12. Sea-to-Sea Missiles Rocket Propelled Grenades ManPADS Surface-to-Surface Missiles	A	Ocean Surface	Ocean Surface	Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
	B	Ocean Surface	Ocean Surface	Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type

Scenario	Option	Countermeasure Location	Target Location	Notes
13. Sea-to-Land Directed Energy Laser Types: Solid-State, Fiber, CO2, Free Electron, & Chemical Pulsed and CW lasers Classes 1,2,3,4 max power = 1MW (average max) Wavelengths from 180nm to 14,000nm High Power Microwave	A	Ocean Surface	SNI: Thousand Springs West	
	B	Ocean Surface	SNI: Rock Crusher Point	
	C	Ocean Surface	SNI: Tender Point	
14. Sea-to-Land Non-lethal Lasers Includes DIRCM and Optical Dazzlers UV and IR Ground Test Systems Pulsed and CW lasers Wavelengths from 180nm to 14,0000nm Max 100kw (avg) power Alignment and Calibration lasers Laser Range Finder/Tracking Lasers Laser Designators	A	Ocean Surface	Pt. Mugu: Alpha Site	
	B	Ocean Surface	Pt. Mugu: Bravo Site	
	C	Ocean Surface	Pt. Mugu: Charlie Site	
	D	Ocean Surface	Pt. Mugu: Nike-Zeus Site	
	E	Ocean Surface	SNI: Thousand Springs West	
	F	Ocean Surface	SNI: Rock Crusher Point	
	G	Ocean Surface	SNI: Tender Point	

Scenario	Option	Countermeasure Location	Target Location	Notes
15. Air-to-Air Flares Composition: Al,B,Co,Fe,K,Mg,Ni,NO3 Expendables/flight: 30-300	A	Airborne	Airborne	Pt. Mugu: Flares dispensed > 1000 ft from shore (off shore)
	B	Airborne	Airborne	SNI: Flares dispensed > 1000 ft from shore (off shore)
16. Air-to-Air Non-lethal Lasers Includes DIRCM and Optical Dazzlers UV and IR Ground Test Systems Pulsed and CW lasers Wavelengths from 180nm to 14,0000nm Max 100kw (avg) power Alignment and Calibration lasers Laser Range Finder/Tracking Lasers Laser Designators	A	Airborne	Airborne	Pt. Mugu: Targets: fixed/rotary wing, UAS, Vertical Lift
	B	Airborne	Airborne	SNI: Targets: fixed/rotary wing, UAS, Vertical Lift

Scenario	Option	Countermeasure Location	Target Location	Notes
17. Air-to-Sea Flares Composition: Al,B,Co,Fe,K,Mg,Ni,NO3 Expendables/flight: 30-300	A	Airborne	Ocean Surface	Pt. Mugu: Flares dispensed > 1000 ft from shore (off shore)
	B	Airborne	Ocean Surface	SNI: Flares dispensed > 1000 ft from shore (off shore)
18. Air-to-Sea Directed Energy Laser Types: Solid-State, Fiber, CO2, Free Electron, & Chemical Pulsed and CW lasers Classes 1,2,3,4 max power = 1MW (average max) Wavelengths from 180nm to 14,000nm	A	Airborne	Ocean Surface	Pt. Mugu: Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
	B	Airborne	Ocean Surface	SNI: Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
19. Air-to-Sea Non-lethal Lasers Includes DIRCM and Optical Dazzlers UV and IR Ground Test Systems Pulsed and CW lasers Wavelengths from 180nm to 14,0000nm Max 100kw (avg) power Alignment and Calibration lasers Laser Range Finder/Tracking Lasers Laser Designators	A	Airborne	Ocean Surface	Pt. Mugu: Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
	B	Airborne	Ocean Surface	SNI: Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
20. Air-to-Sea Small Arms Various bullet calibers 35mm Max Diameter No Depleted Uranium	A	Airborne	Ocean Surface	Pt. Mugu: Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
	B	Airborne	Ocean Surface	SNI: Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
21. Air-to-Sea Missiles **Air**-to Surface Missiles	A	Airborne	Ocean Surface	Pt. Mugu: Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type
	B	Airborne	Ocean Surface	SNI: Target types: Mobile Ship Target, High Speed Maneuvering Surface Target, Zodiac-type

Scenario	Option	Countermeasure Location	Target Location	Notes
22. Air-to-Land Directed Energy Laser Types: Solid-State, Fiber, CO2, Free Electron, & Chemical Pulsed and CW lasers Classes 1,2,3,4 max power = 1MW (average max) Wavelengths from 180nm to 14,000nm Alignment and Calibration Lasers Laser Range Finder/Tracking Lasers Laser Designators/Illuminators High Power Microwave	A	Airborne	SNI: Thousand Springs West	
	B	Airborne	SNI: Rock Crusher Point	
	C	Airborne	SNI: Tender Point	

Appendix B

Record of Non-Applicability and 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/022
12 Sep 13

MEMORANDUM

From: Head, NAVAIR Ranges Sustainability Office

Subj: COUNTERMEASURES TESTING AND TRAINING - POINT MUGU SEA RANGE - 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) Point Mugu Sea Range Countermeasures 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. Test activities associated with the proposed action would be conducted at Naval Base Ventura County (NBVC) Point Mugu and San Nicolas Island (SNI), both in Ventura County. Effective 19 June 2008, Ventura County has been reclassified as a "serious" nonattainment area for the federal 8-hour ozone (O_3) standard (*de minimis* thresholds are 50 tons/year for VOC and NO_X) and is in attainment of all other criteria pollutants. Ventura County is classified as a nonattainment area for the state O_3, $PM_{2.5}$, and PM_{10} standards.

(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 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.

3. An emissions analysis for the proposed countermeasures testing at the Point Mugu Sea Range, NBVC Point Mugu, and SNI is provided in the pages 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.

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

POINT MUGU SEA RANGE COUNTERMEASURES
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.

Test activities associated with the proposed action would be conducted at Naval Base Ventura County (NBVC) Point Mugu and SNI, both in Ventura County. Effective 19 June 2008, Ventura County has been reclassified as a "serious" nonattainment area for the federal 8-hour ozone (O_3) standard (*de minimis* thresholds are 50 tons/year for VOC and NO_X) and is in attainment of all other criteria pollutants. Ventura County is classified as a nonattainment area for the state O_3, $PM_{2.5}$, and PM_{10} standards.

Although part of Ventura County, SNI has been determined to be separate and distinct from the 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 pollutants remaining in the ambient air of the Island is very low.

An emissions analysis for the proposed countermeasures testing at the Point Mugu Sea Range, NBVC Point Mugu, and 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.

Location: The Point Mugu Sea Range, NBVC Point Mugu, and SNI, California.

Proposed Action Name: Point Mugu Sea Range Countermeasures

Proposed Action Summary: The purpose of the proposed action is to provide an overall capability for countermeasures testing at the Point Mugu Sea Range, at Point Mugu, and at SNI. Both Point Mugu and SNI have restricted airspace separate from the Sea Range that is also included in the proposed action, respectively known as R-2519 and R-2535. This would support DoD directives on the development of countermeasures systems vital to the National Defense through research, development, acquisition, testing, and evaluation (RDAT&E) and training applications. These requirements are for operationally realistic engagements in both maritime and land environments. The proposed countermeasures testing would support these requirements.

Air Emissions Summary:

Estimated emissions that would occur within the SCCAB at Point Mugu within 3 nm (5.6 km) (subject to the General Conformity Rule), as a result of implementation of the proposed action are shown in Table 1. Since SNI and the offshore region proposed for the Point Mugu Countermeasures Training Program are classified as attainment/unclassified by the USEPA, the provisions of the General Conformity Rule do not apply. However, emissions at SNI and within U.S. Territory (3-12 nm offshore of NBVC Point Mugu) have been estimated for planning purposes and as subject to NEPA and EO 12114. Tables 2 and 3 provide estimated proposed action air emissions occurring at SNI and within the 3-12 nm U.S. Territory waters, respectively.

Sources of project emissions include aircraft activities (e.g., flare delivery, unmanned aerial vehicle flights), vehicle activities (e.g., personnel transport, mobile instrumentation vans), ordnance use, and mobile generators needed to provide electricity to the test operations.

Affected Air Basin: South Central Coast Air Basin

Table 1 Proposed Emissions – SCCAB <3 nm

Component	Pollutant (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Aircraft Operations	0.24	0.15	0.61	0.0094	0.096	--
Vessel Operations	1.10	7.94	6.13	17.1	3.49	--
Ordnance Use	--	0.024	1.44	0.09	0.75	0.39
Airborne Targets	0.0009	0.0078	0.037	0.00068	0.011	--
Marine Surface Targets	0.00056	0.00072	0.017	2.33×10^{-5}	3.55×10^{-5}	--
Equipment Operations	0.0073	0.042	0.0091	5.98×10^{-5}	0.0023	--
Ground Vehicle Operations	0.0201	0.0192	0.19	2.89×10^{-4}	0.00245	--
Subtotal	**1.37**	**8.18**	**8.43**	**17.2**	**4.35**	**0.39**
de minimis threshold	50 *	50 *	NA	NA	NA	NA
Exceeds *de minimis* threshold?	No	No	No	No	No	No

Note: * Effective June 19, 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_X are precursors to the formation of O_3.

Table 2 Proposed Action Emissions – SNI

Component	Pollutant (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Ordnance Use	--	0.024	1.44	0.09	0.75	0.39
Equipment Operations	0.0073	0.042	0.0091	5.98×10^{-5}	0.0023	--
Ground Vehicle Operations	0.000746	0.000712	0.00709	1.07×10^{-5}	9.07×10^{-5}	--
Subtotal	**0.0080**	**0.067**	**1.46**	**0.090**	**0.75**	**0.39**
de minimis threshold	NA	NA	NA	NA	NA	NA
Exceeds *de minimis* threshold?	No	No	No	No	No	No

Note: NA – not applicable since SNI is in attainment/unclassified of the NAAQS for all criteria pollutants. Emissions are presented for planning purposes only.

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

Component	Pollutant (tons/year)				
	VOCs	**NO_X**	**CO**	**SO_x**	**PM_{10}**
Aircraft Operations	0.030	0.32	0.20	0.017	0.10
Vessel Operations	2.07	12.8	26.1	4.55	1.16
Airborne Targets	0.0023	0.019	0.092	0.017	0.028
Marine Surface Targets	0.0014	0.0018	0.042	5.98×10^{-5}	8.95×10^{-5}
Subtotal	**2.10**	**13.1**	**26.4**	**4.58**	**1.29**

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

Emission Calculations – Proposed Action

Aircraft Emissions

C-130 ops LTO from AESO 2000-09, mission ops AESO 2000-10

	fuel use	VOCs	NOX	CO	SOX	PM10	CO2
LTO	2367	7.65	17.35	14.79	0.95	9.03	7570
ops-hr	1125	0.52875	9.18	2.32875	0.45	4.46625	3614.6

V-22 LTO AESO 9946, Ops AESO 9965

	fuel use	VOCs	NOX	CO	SOX	PM10	CO2
LTO	668/601	0.09	9.25	5.33	0.52	1.73	4150.9
ops	314	0.003	4.4	0.17	0.13	0.5	1009

CH-53 - AESO 9822 LTO, AESO 9960 ops

	fuel use	VOCs	NOX	CO	SOX	PM10	CO2
LTO	1746	11.2	8.9	22.9	0.7	3.8	5575.7
ops-hr	4464	0.7	36.1	9.5	1.8	9.9	14380.1

CH-46 - AESO 9816 LTO, AESO 9959 ops

	fuel use	VOCs	NOX	CO	SOX	PM10	CO2
LTO	366	6.81	1.01	21.37	0.15	1.36	1130
ops-hr	1120	3.84	4.41	22.11	0.45	1.99	3557

F/A-18 - AESO 9815 LTO

	fuel use	VOCs	NOX	CO	SOX	PM10	CO2
LTO	2058	53.74	13.09	139.4	0.82	16.17	6100.69

Mugu airfield ops (LTO only) Assume 6 LTOs for each aircraft

	VOCs	NOX	CO	SOX	PM10	CO2
C-130	45.9	104.1	88.74	5.7	54.18	45420
V-22	0.54	55.5	31.98	3.12	10.38	24905.4
CH-53	67.2	53.4	137.4	4.2	22.8	33454.2
CH-46	40.86	6.06	128.22	0.9	8.16	6780
F/A-18	322.44	78.54	836.4	4.92	97.02	36604.14
lb/yr	476.94	297.6	1222.74	18.84	192.54	147163.74
tpy	0.23847	0.1488	0.61137	0.00942	0.09627	73.58187

Manned Vessels

Emission factors (lb/hr)

	VOCs	NOX	CO	SOX	PM10	CO2
DDG	8	48.9	103.99	11.6	3.3	23693
tug	2.8	22	3.73	66.1	13.3	18955
carrier	0	0	0	0	0	0

Emissions (<3 nm)

	ops hrs	VOCs	NOX	CO	SOX	PM10	CO2
DDG	100	800	4890	10399	1160	330	2369300
tug	500	1400	11000	1865	33050	6650	9477500
	lb/yr	2200	15890	12264	34210	6980	11846800
	tpy	1.1	7.945	6.132	17.105	3.49	5923.4

Emissions (3-12 nm)

	ops hrs	VOCs	NOX	CO	SOX	PM10	CO2
DDG	500	4000	24450	51995	5800	1650	11846500
tug	50	140	1100	186.5	3305	665	947750
	lb/yr	4140	25550	52181.5	9105	2315	12794250
	tpy	2.07	12.775	26.09075	4.5525	1.1575	6397.125

Ordnance

Per Round emission factors

ordnance	VOC	NOX	CO	SOX	PM10	PM2.5	CO2
20 mm	0.00E+00	4.00E-04	3.00E-02	4.50E-04	1.04E-02	5.50E-03	2.00E-03
35 mm	0.00E+00	2.00E-04	8.60E-02	0.00E+00	8.00E-02	4.72E-02	4.40E-02
5-in	0.00E+00	3.60E-04	1.40E-01	0.00E+00	2.55E-01	1.20E-01	1.60E-01
0.50 cal	0.00E+00	5.39E-03	1.10E-02	0.00E+00	1.24E-01	4.60E-02	5.10E-02
ManPADS	0.00E+00	2.40E-02	5.02E+00	1.14E-01	9.80E-01	6.60E-01	5.80E+00
RPG	0.00E+00	2.40E-02	2.50E+00	1.14E-01	9.80E-01	6.60E-01	4.16E+00
rocket	0.00E+00	2.40E-02	2.50E+00	1.14E-01	9.80E-01	6.60E-01	4.16E+00
SAM	0.00E+00	3.60E-02	7.20E+00	9.50E-01	1.85E-01	7.00E-02	2.52E+01

ordnance emissions @ Mugu and SNI

ordnance	#	NOX	CO	SOX	PM10	PM2.5	CO2
20 mm	7.50E+03	3.00E+00	2.25E+02	3.38E+00	7.80E+01	4.13E+01	1.50E+01
35 mm	2.40E+03	4.80E-01	2.06E+02	0.00E+00	1.92E+02	1.13E+02	1.06E+02
5-in	2.00E+02	7.20E-02	2.80E+01	0.00E+00	5.10E+01	2.40E+01	3.20E+01
0.50 cal	5.00E+03	2.69E+01	5.50E+01	0.00E+00	6.20E+02	2.30E+02	2.55E+02
ManPADS	5.00E+01	1.20E+00	2.51E+02	5.70E+00	4.90E+01	3.30E+01	2.90E+02
RPG	2.50E+02	6.00E+00	6.26E+02	2.85E+01	2.45E+02	1.65E+02	1.04E+03
rocket	2.50E+02	6.00E+00	6.26E+02	2.85E+01	2.45E+02	1.65E+02	1.04E+03
SAM	1.20E+02	4.32E+00	8.64E+02	1.14E+02	2.22E+01	8.40E+00	3.02E+03
lb/yr		48	2880	180	1502	780	5802
tpy		2.40E-02	1.44E+00	9.00E-02	7.51E-01	3.90E-01	2.90E+00

Air Targets

Emission Factors per target launch (lb/unit)

	VOCs	NOX	CO	SOX	PM10
BQM-74	0.048	0.415	1.975	0.0362	0.587
BQM-34	0.168	1.4525	6.9125	0.1267	2.0545

Launches at Mugu

	#	VOCs	NOX	CO	SOX	PM10
BQM-74	6	0.288	2.49	11.85	0.2172	3.522
BQM-34	9	1.512	13.0725	62.2125	1.1403	18.4905
lb/yr		1.8	15.5625	74.0625	1.3575	22.0125
tpy		0.0009	0.0077813	0.03703125	0.00067875	0.01100625

Launches at sea

	#	VOCs	NOX	CO	SOX	PM10
BQM-74	14	0.876	8.23	29.85	0.5068	10.073
BQM-34	21	3.728	28.8	153.97	2.6607	45.934
lb/yr		4.604	37.03	183.82	3.1675	56.007
tpy		0.002302	0.018515	0.09191	0.00158375	0.0280035

Marine Surface Targets

Emissions factor (lb/hr)

Vessel	VOC	NOX	CO	SOX	PM
MST	0.0428	0.0455	1.145	0.00329	0.00352
QST-33	0.01185	0.0183	0.405	0.00001	0.000493
QST-35	0.0237	0.0366	0.81	0.00002	0.000986

<3nm

Vessel	hrs	VOC	NOX	CO	SOX	PM
MST	14	5.99E-01	6.37E-01	1.60E+01	4.61E-02	4.93E-02
QST-33	16	1.90E-01	2.93E-01	6.48E+00	1.60E-04	7.89E-03
QST-35	14	3.32E-01	5.12E-01	1.13E+01	2.80E-04	1.38E-02
	#/yr	1.12E+00	1.44E+00	3.39E+01	4.65E-02	7.10E-02
	tpy	5.60E-04	7.21E-04	1.69E-02	2.33E-05	3.55E-05

3-12 nm

Vessel	hr	VOC	NOX	CO	SOX	PM
MST	36	1.54E+00	1.64E+00	4.12E+01	1.18E-01	1.27E-01
QST-33	34	4.03E-01	6.22E-01	1.38E+01	3.40E-04	1.68E-02
QST-35	36	8.53E-01	1.32E+00	2.92E+01	7.20E-04	3.55E-02
		2.80E+00	3.58E+00	8.42E+01	1.20E-01	1.79E-01
	tpy	1.40E-03	1.79E-03	4.21E-02	5.98E-05	8.95E-05

Support Equipment

Generator support (assume 400 hr/yr at Mugu and SNI)

Emission factors (lb/hr)

	VOCs	NOX	CO	SOX	PM10	CO2
Generator	3.65E-02	2.10E-01	4.55E-02	2.99E-04	1.15E-02	2.54E-02

Emissions

	VOCs	NOX	CO	SOX	PM10	CO2
Mugu	1.46E+01	8.40E+01	1.82E+01	1.20E-01	4.60E+00	1.02E+01
SNI	1.46E+01	8.40E+01	1.82E+01	1.20E-01	4.60E+00	1.02E+01
tpy	0.0073	0.0420	0.0091	5.9800E-05	0.0023	0.0051

Ground Vehicles

2013 vehicle fleet mix

Passenger Vehicles (pounds/mile)	
CO	0.00709228
NOx	0.00071158
ROG	0.00074567
SOx	0.00001072
PM10	0.00009067
PM2.5	0.00005834
CO2	1.10087435
CH4	0.00006707

Mugu assumptions: 1 large event (150 vehicles @ 30 miles/day x 10 days)
3 small events (20 vehicles @ 30 miles/day x 5 days)

SNI assumptions: 2 small events (20 vehicles @10 miles/day x 5 days)

Mugu vehicle emissions (lb/yr)

Event size	#/yr	vehicles	mi/day	day	VOCs	NOX	CO	SOX	PM10	CO2
Large	1	150	30	10	33.55	32.02	319.15	0.48	4.08	49539.35
Small	3	20	30	5	6.71	6.40	63.83	0.10	0.82	9907.87
				lb/yr	40.27	38.43	382.98	0.58	4.90	59447.21
				tpy	2.01E-02	1.92E-02	1.91E-01	2.89E-04	2.45E-03	2.97E+01

SNI vehicle emissions (lb/yr)

Event size	#/yr	vehicles	mi/day	day	VOCs	NOX	CO	SOX	PM10	CO2
Small	2	20	10	5	1.49	1.42	14.18	0.02	0.18	2201.75
				lb/yr	1.49	1.42	14.18	0.02	0.18	2201.75
				tpy	7.46E-04	7.12E-04	7.09E-03	1.07E-05	9.07E-05	1.10E+00

Appendix C

Agency Correspondence

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

March 22, 2013

Reply in Reference To: USN_2013_0215_001

Captain L.R. Vasquez
Naval Base Ventura County
311 Main Road, Suite 1
Point Mugu, CA 93042-50

RE: Countermeasures Environmental Assessment, Naval Base Ventura County (NBVC) Point Mugu and NBVC San Nicholas Island, Ventura County, CA

Dear Captain L.R. Vasquez:

Thank you for consulting with me on the above-referenced undertaking. Pursuant to 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act, the United States Navy (Navy) is requesting my concurrence with a finding of No Historic Properties Affected.

The Navy proposes to expand weapons testing and evaluation capabilities at NBVC Point Mugu and NBVC San Nicholas Island. Testing activities currently include sea, land, and air weapons systems, as well as a variety of training activities. New activities will include the testing of high energy laser systems, microwave systems, small arms, missiles, and flares within the Point Mugu Sea Range, over land, in littoral environments, and on the open ocean. This undertaking will require use of existing buildings and structures; no additional construction, excavation, grading, or filling will be required. All components of the testing programs will be conducted on existing buildings and roads.

You define the Area of Potential Effects (APE), as the southern portion of NBVC Point Mugu and the north and west portions of San Nicholas Island, as depicted in the accompanying documentation.

Pursuant to 36 CFR 800.4 (b)(1), the Navy 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 Point Mugu and San Nicholas Island were inventoried and evaluated in 1998 by JRP Historical Consulting Services. As a result of that study, eleven buildings and structures at NBVC Point Mugu and one building on San Nicholas Island were determined by consensus to be eligible for listing on the National Register of Historic Places (NRHP). One of these properties, Launch Pad Bravo (constructed in 1948 and eligible for listing on the NRHP under Criteria A and C) is sited within the APE. No other eligible or listed properties are sited within the APE.

The following seven buildings sited within the APE were evaluated in preparation of this undertaking:

- PM 7-17 (constructed in 1945)
- PM 738 (constructed in 1968)
- PM 749 (constructed in 1952)
- PM 751 (constructed in 1960)
- PM 761 (constructed in 1963)
- N 279 (constructed in 1983)
- N 807 (constructed in 1971)

The Navy is of the opinion that none of these properties are eligible for listing on the NRHP. PM 7-17, located at Pad Alpha (also known as the Able Launch Complex), is a launch pad. Pad Alpha is the oldest missile launch complex at NBVC Point Mugu; however, the complex has gone through extensive changes over the decades and no longer reflects its original design. Building PM 738 served as the telemetry building for the Pacific Missile Range and now operates as the telemetry laboratory. Though telemetry is important to missile testing and evaluation programs, the building does not have a direct association with any particular missile testing and evaluation at Point Mugu. PM 749 is a combination concrete launch pad and rocket launcher. PM 751 is launch pad originally designed for testing the Nike-Zeus Missile System. Both PM 749 and 751 have been modified and expanded and no longer retain a great degree of material integrity. PM 761 is a computer simulation laboratory, with associated office and repair shop space. Though computer simulation is an important aspect of missile testing and evaluation, this building does not have a direct association with any particular testing and evaluation program. N 279 is a launch facility for weather balloons and N 807 is a ship simulator used to approximate the roll and pitch of vessels at sea; the properties do not have direct or significant association with specific Cold War missile programs or with historically important persons, nor do they exhibit notable architectural elements.

Two archaeological sites have been located NBVC Point Mugu, neither of which is sited within the APE. Three prehistoric archaeological sites on San Nicholas Island are outside of the APE but in close proximity to the area. As part of the existing protective measures already in place at San Nicholas Island, personnel will receive an environmental indoctrination informing them of the necessity to remain on pavement and other developed areas to prevent damage to archaeological and natural resources.

Having reviewed your submittal, I concur with your Determinations of Eligibility and Finding of Effect. None of the buildings exhibit architectural merits or historical associations that might qualify them for inclusion on the NRHP. I further concur that this undertaking will not adversely affect Launch Pad Bravo. Be advised that under certain circumstances, such as an unanticipated discovery or a change in project description, you may have additional future responsibilities for this undertaking under 36 CFR Part 800.

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

Sincerely,

Susan K Stratton for

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

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

July 16, 2013

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

Re: **ND-0207-13**, U.S. Navy Negative Determination, Point Mugu Sea Range Countermeasures Testing and Training, Point Mugu Sea Range, Southern California offshore waters and San Nicolas Island

Dear Captain Vasquez:

The Coastal Commission staff has reviewed the above-referenced negative determination for the Navy's Point Mugu Sea Range Countermeasures Testing and Training Program at the Point Mugu Sea Range offshore southern California. "Countermeasures" involve weapons designed to function in a defensive or pre-emptive manner, to intercept, deflect, deceive, deactivate, or destroy approaching threats. In many cases, the testing and training would only determine the system's ability to actively track an approaching target, and actual firing of the system would not occur. While the Commission has reviewed past comprehensive proposals for Navy Mugu Sea Range testing and training activities (CD-002-01), these countermeasures represent new technology not specifically covered in past consistency documents.

The five components of the proposed action include directed energy (high-energy lasers [HEL] and high-power microwave [HPM] systems), small arms, small missiles, flares, and electronic support systems. No construction, excavation, grading, or filling would occur for any of the project components. Test events would be conducted at a variety of existing proposed test sites on the Sea Range, including nearshore Navy Restricted Areas R-2519 (at Point Mugu) and R-2535 (at San Nicolas Island). The activities would also include monitoring, reconnaissance, and range clearance procedures as needed to ensure there are no hazards to people, ships or planes within the hazard area, including notification to FAA when airspace could be affected, and publication of Notices to Mariners (NOTMARs) and Notices to Airmen (NOTAMs).

Wildlife protection and avoidance measures would also be included, depending on the type or location of the activity, and the time of year. Sensitive habitats would be avoided, and before any directed energy systems, missiles, and/or other projectiles are fired, standard procedures would assure that no persons, wildlife, reflective surfaces, or non-target obstructions are present within any hazard area. A qualified biologist would monitor hazard areas with binoculars or remote sensors as necessary to ensure that the countermeasures systems are not fired if and when wildlife is within the nominal hazard area. The proposed conservation measures are summarized in Section 2.2.4 of the Navy's Environmental Assessment (Attachment 1 to this letter). Noise effects would be minimal. With the measures included, the Navy expects no "take" of any marine mammals (as defined under the Marine Mammal Protection Act), and the Navy is coordinating with the U.S. Fish and Wildlife Service and will avoid effects on snowy plovers, light-footed clapper rails, and California least terns. Copies of all monitoring reports will be provided to the Commission staff.

To protect public safety, the Navy states that military training, fishing, and recreational uses offshore from the vicinity of a test site would all be limited during testing and training activities, and that areas beneath or near flight paths of missiles and targets would be cleared of non-participating vessels for each event. These are the same types of area closures that now occur during other Sea Range events. As noted above, Notices to Mariners and Airmen would further assure public safety. The Navy would also minimize marine resource and water quality effects by recovering and/or recycling the majority of targets after use, and the Navy notes the majority of expended materials are inert.

The Navy concludes:

> ***CONCLUSION***
>
> *The Navy has determined that the proposed countermeasures testing and training would temporary and insignificant or negligible effects on the coastal zone. The project is consistent with existing land and water use on the Point Mugu Sea Range, at Navy-owned Point Mugu, 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*[, including] *... Point Mugu Sea Range, CD-002-01 ... and Laser Testing and Training Program, ... ND-017-09.*

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 above-noted Navy consistency and negative determinations for overall testing on the Sea Range (CD-002-01), and the Laser Testing and Training Program (ND-017-09); summaries of these past reviews are attached (Attachment 2). With the measures incorporated into the activities to minimize effect on sensitive habitat, marine resources, water quality, public access and recreation, and commercial and recreational fishing, 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

1. Monitoring, Avoidance, and Minimization Measures
2. Previous Commission Authorizations on the Sea Range

cc: Ventura District Office

Table 2-3. 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 (TW)
400 – 1000	100	50	40	333
1000 – 4000	400	200	45	5333
4000 – 5999	1000	1200	55	33333
6000 – 13999	2500	1200	55	208328
14000 – 27999	2500	1200	55	208328
28000 – 40000	500	200	60	8333

Table 2-4. 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		

2.2.4 Wildlife Protection

Countermeasure activities are proposed to occur near concentrations of sensitive wildlife species. Western snowy plovers, California least terns, light-footed clapper rails, and Belding's savannah sparrows are present at Point Mugu on the beaches and marsh adjacent to the pads Alpha, Bravo, Charlie and Nike-Zeus, as well as the beach adjacent to Building 761 and 738. Snowy plovers also occur adjacent to Tender Point and Rock Crusher. Marine mammals (northern elephant seals, California sea lions, and southern sea otters) are present on the beaches and/or in the nearshore waters adjacent to Rock Crusher and Tender Point. A harbor seal haulout location is within the estuary at Point Mugu, west of the mouth of Mugu Lagoon. Harbor seals are also present in areas on SNI within R-2535 and can haul out near any of the proposed sites. Wildlife protection measures will be required during testing and training operations depending on the type of activity, location of the activity, and the time of year. Personnel will be required to stay off sites when testing and training or associated activities are not being conducted during periods of environmental closure (e.g., snowy plover nesting season).

Measures proposed specifically for use of the CIWS and other similar small arms are as follows:

1) CIWS testing and training will not occur when snowy plover, least tern, or light-footed clapper rail nests are within 500 ft (152 m) of the operational area.

2) Pre- and post- operation surveys for all listed species nesting within 1,000 ft (305 m) of testing or training sites will be conducted to determine any changes in nest status due to testing and training activities.

3) The CIWS will only be fired at aerial targets flying at normal operating altitudes well above the horizon to reduce potential of striking typically low-flying birds such as snowy plovers.

4) Before the CIWS is fired, the Navy will require as standard procedure that no listed species or other wildlife are present between the shooter site and the target or immediately behind the target. A qualified biologist will monitor the hazard area to ensure that the CIWS system is not fired if and when wildlife is present in the line of fire or expected debris pattern.

5) To maintain integrity of listed species habitat, following each CIWS test event a search will be conducted to pick up and properly dispose of debris that has fallen between the firing point and the water's edge.

Measures proposed to protect marine mammals are as follows:

1) 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 and training activities at these sites, a qualified biologist familiar with the behavior of marine mammals and their use of shoreline habitats in the testing and training area will search for marine mammals within and adjacent to the testing and training area. Test activities will be postponed, relocated, and/or monitored by the qualified biologist as necessary to ensure that the activities do not result in any "take" (as defined under the MMPA) of marine mammals.

2) Testing and training activities will be scheduled to avoid the marine mammal breeding and pupping seasons whenever operationally feasible. When breeding/pupping marine mammals are within 100 yards (91 m) of proposed activities, access to the test facilities will be restricted to necessary operational activities only.

3) Missiles and targets will not be launched at low elevation on low azimuths that pass close to beach haulout sites.

4) Multiple missile or target launches in quick succession over haulout sites will be minimized, especially when young are present.

5) Testing and training activities will be scheduled to occur during daylight hours whenever operationally feasible.

6) 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.

Measures proposed to protect terrestrial listed species and other wildlife for all Countermeasures Operations are as follows:

1) A biologist will conduct regular nesting surveys of the affected area to determine location of nests prior to operations and to determine potential for disturbance due to operational activity and ensure if nests are found that all required protective measures are adhered to.

2) Countermeasures testing and training with a potential to impact snowy plover, least tern, or light-footed clapper rail nests will not be conducted within 500 ft (152 m) of active nests.

3) Pre- and post- operation surveys for all listed species nesting within 1,000 ft (305 m) of testing or training sites will be conducted to determine any changes in nesting status due to operations. Observations will be made as close to the activity as operational and safety constraints allow.

Attachment 2
Previous Commission Actions

CD-002-01 - Navy, Point Mugu Sea Range Programmatic Plan

The Commission concurred with the Navy's consistency determination for testing and training activities conducted by the Naval Air Warfare Center Weapons Division on the Point Mugu Sea Range offshore of southern California. The activities include both continuing existing historic levels of testing and training, one new program (theater missile defense (TMD) testing and training), increases in current levels of several existing testing and training exercises, and modernization of various support facilities on San Nicolas Island and at Point Mugu.

The Point Mugu Sea Range is a 36,000 square mile area of ocean and controlled airspace, roughly 200 nautical miles (NM) long (north to south) and extending west into the Pacific Ocean from its nearest point at the mainland coast (3 nautical miles (NM) at Ventura County) out to approximately 180 NM offshore. The Sea Range includes San Nicolas Island and portions of the northern Channel Islands. The Navy has been conducting activities on the Sea Range for over 50 years "... to test and evaluate sea, land, and air weapon systems; to provide realistic training opportunities; and to maintain operational readiness of ... [Navy] forces." The Navy maintains the tests are critical to "... the successful assessment, safe operation, and improvement of the capabilities of current and future weapon systems."

The proposed activities are within the range and scope of historic Navy activities conducted on the Sea Range. The primary coastal recourse concerns are effects on marine mammals found throughout the Sea Range, and sensitive nearshore and land-based sensitive wildlife habitats at San Nicolas Island and Pt. Mugu. To address these concerns, the Navy has coordinated with the National Marine Fisheries Service (NMFS) and the U. S. Fish and Wildlife Service and proposes avoidance, minimization, mitigation and monitoring measures, including: (1) assuring that activities that could harass marine mammals on the Sea Range do not occur when significant concentrations of marine mammals are present; (2) monitoring launch activities on San Nicolas Island; (3) enhancing habitat for the western snowy plover, light-footed clapper rail, and island night lizard; (4) limiting effects on San Nicolas Island to previously disturbed areas; (5) population and density monitoring for a number of sensitive wildlife species; (6) training military personnel on wildlife issues; and (7) if monitoring efforts indicate species are not being protected, implementation of corrective measures to avoid and minimize "take" of listed species.

The Navy has also committed to provide all new or revised monitoring plans for Commission staff review, prior to their finalization, as well as provide regular monitoring results to the Commission staff on an ongoing basis as they become available. With the monitoring and mitigation commitments the Navy has incorporated into the project, including the commitment to enable continuing Commission staff review of finalized monitoring plans and ongoing monitoring results, the project is consistent with the marine resources, environmentally sensitive habitat, and water quality policies (Sections 30230, 30240 and 30231) of the Coastal Act.

Access, recreation, and fishing impacts would be limited to occasional Sea Range clearances of non-military boating activities, primarily in the vicinity of San Nicolas Island. The project would not affect existing public access opportunities on the northern Channel Islands or the

mainland. Clearances would generally be limited to eight-hour events, and the Navy will provide advance notice to commercial and recreational fishermen and recreational boaters and divers, to enable them to plan around proposed clearances. The clearances would be isolated and relatively short term, and are necessary to protect public safety and military security needs. The project is consistent with the public access and recreation (Sections 30210-30212), recreational boating and diving (Sections 30213 and 30220), and the commercial and recreational fishing (Sections 30230, 30234 and 30234.5) policies of the Coastal Act.

ND-017-09 – Navy, Laser Testing and Training Program, Point Mugu Sea Range

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

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:
08EVEN00-2013-F-0475

March 20, 2014

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

Subject: Biological Opinion for the Countermeasures Testing and Training Program at Naval Base Ventura County, California (8-8-13-F-47)

Dear Captain Vasquez:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the Department of the Navy's (Navy) proposed countermeasures testing and training program (Program) at Naval Base Ventura County (NBVC) and its effects on the federally-threatened western snowy plover (*Charadrius nivosus nivosus*), and the federally-endangered California least tern (*Sterna antillarum browni*) and light-footed clapper rail (*Rallus longirostris levipes*). Your request to initiate formal consultation, dated May 29, 2013, was received in our office on June 1, 2013. Your request and our response are made in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.).

As described in the biological assessment (BA) included with your consultation initiation request, and other written correspondence with our office, the Navy determined that the proposed actions would have no effect on the federally-threatened least Bell's vireo (*Vireo bellii pusillus*), tidewater goby (*Eucyclogobius newberryi*), island night lizard (*Xantusia riversiana*), and southern sea otter (*Enhydra lutris nereis*), and the federally-endangered salt marsh bird's beak (*Cordylanthus maritimus* ssp. *maritimus*).

We prepared this biological opinion using the BA (Navy 2013a) supporting your consultation request, telephone and electronic correspondence between our respective staffs, and information in our files. This biological opinion supersedes biological opinion number 8-8-12-F-28, which we issued to the Navy on March 13, 2014. A complete decision file for this biological opinion can be made available at the Ventura Fish and Wildlife Office.

CONSULTATION HISTORY

On September 12, 2013, we sent a letter to the Navy requesting a revised effects determination, as well as clarification of and additional information on project details and potential effects to listed species. We received the Navy's response on December 3, 2013, which provided the Navy's determination that the proposed activities would have no effect on the southern sea otter. The Navy also clarified the project description including survey, minimization, and avoidance measures for listed species. Most recently, between February 20, 2014, and March 11, 2014, David Simmons of my staff and Martin Ruane of your staff exchanged electronic correspondence to further clarify the proposed actions including survey methods, buffer distances, avoidance and minimization measures, current conditions in the proposed project area, and potential effect of the proposed actions on listed species. This consultation history is reflected in the Description of the Proposed Action section of this biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Navy is proposing to conduct a countermeasures testing and training program at Naval Base Ventura County, which is composed of three operating facilities: Naval Air Station Point Mugu (Pt. Mugu), Port Hueneme, and San Nicolas Island (SNI). Land-based operations of the proposed Program would occur at Pt. Mugu and SNI. Pt. Mugu is located along the Pacific Coast, approximately 5 miles southeast of the city of Oxnard in Ventura County, California. San Nicolas Island is located approximately 61 miles southwest of Pt. Mugu. Program activities would also occur in the greater Point Mugu Sea Range, a large area (thousands of square miles west of mainland Southern California south of Monterey County) of restricted sea and air space that accommodates aerial and marine testing and training activities by the Department of Defense.

The countermeasures Program is part of the Navy's larger effort to continually develop and maintain state-of-the-art countermeasures that can be deployed against adversarial attacks by land, sea, or air. Countermeasures are designed to function in a defensive or pre-emptive manner to intercept, deflect, deceive, deactivate, or destroy approaching aerial or surface targets. Countermeasures include a wide range of systems from conventional small-arms weapons to lasers and other directed energy systems. The proposed Program would provide operationally realistic maritime and land environments in which to test these countermeasures systems. However, in many cases, testing and training would be limited to determining a system's ability to actively track an approaching target, and actual firing of the system would not occur.

Details on the types of activities within each category of countermeasures are summarized in Table 2 of the BA. Proposed countermeasures testing and training components consist of:

- Directed energy. This component consists of high-energy laser (HEL) and high-power microwave (HPM) systems that emit a focused beam of energy. The directed energy systems would be fired from land, ocean surface, and airborne platforms. The Navy would operate up to 10 events over 70 days per year using directed energy.
- Small Arms. For the purposes of this project, small arms include bullets and projectiles up to 5 inches in diameter. Bullets up to 35 millimeter diameter would be fired from land, and projectiles up to 5 inches in diameter would be fired from ships at sea; they are not intended to engage personnel and rounds fired from land will be aimed at aerial targets operating at normal flight altitudes. The Navy would operate up to 5 events per year using directed energy. The small arms systems would produce noise up to 145 decibels.
- Missiles. Small missile categories such as rocket propelled grenades (RPG), rolling airframe missile (RAM), and manned portable air defense system (ManPADS) fired from a shoulder-mount, tripod, or vehicle. The RAM system would produce noise up to 147 decibels, the highest volume noise in the Program. The Navy would operate up to 15 events per year using missiles.
- Flares. This consists of flares dispensed from aircraft at least 1,000 feet from shore. The Navy would operate events using flares up to 8 weeks per year.
- Electronic Support Systems. These consist of radars, recording systems (electrical, optical and infrared) mounted on vehicles or tripods, acoustic systems (land, sea surface, and airborne), and passive detection systems.
- Aircraft sorties. The Program would include up to 400 sorties per year. Eighty percent of these would occur at Pt. Mugu, and 20 percent would occur at SNI.
- Ship activity. Includes support and/or combat vessels. The Navy would use ships in 15 events per year, with 3 ships per event.
- Targets. Includes mobile sea surface and airborne targets. The Program would use up to 280 sea surface targets and 800 airborne targets.
- Personnel events. Includes one large event per year including up to 600 personnel at Pt. Mugu, and five small events per year including 30 to 40 personnel at Pt. Mugu or SNI. The personnel would be operating or participating in the countermeasures components listed above.

The countermeasure systems typically have a shooter location and a target location. Larger diameter projectiles (i.e., 5-inch shells) would be fired from ships operating offshore. Directed energy, close-in weapon systems (CIWS), and missile systems would be fired from land, ocean surface, and airborne platforms. Shooter locations at Pt. Mugu include the Alpha, Bravo, Charlie, and Nike-Zeus Pads; Buildings 738 and 761; Surfer's Point; and The Point (see Figure 2 of the BA). Shooter locations on SNI include Rock Crusher, Tender Point, Thousand Springs West, and Balloon Launch (see Figure 3 of the BA).

The CIWS, which includes small arms rounds and similar artillery up to 35 millimeter diameter, would be aimed at aerial targets and travel up to 7 nautical miles (nm) offshore. Some small arms rounds from CIWS are encased in plastic "sabots" and are attached to aluminum "pushers", both of which fall off the rounds after being fired. CIWS sabots would fall 100 to 300 feet from the firing point, and pushers would fall 300 to 890 feet from the firing point. The Navy estimates that 60 to 150 rounds would be fired in a typical 1 to 2-second burst, and up to 1,500 rounds could be expended per event. Multiple firings may occur during a single training event, with the entire event usually lasting 1 hour or less from first firing to last. The sabot and pusher debris would fall in a conical pattern as illustrated in Figures 4 and 5 of the BA. CIWS firing could occur at any of the proposed small arms locations at Pt. Mugu and SNI.

The Navy is proposing to use a range of small missiles and rockets in the Program. Examples vary from shoulder fired weapons including those in the scale of a RPG and ManPADS, to tripod launched man-portable missiles such as the Spike missile and not exceeding the scale of the RAM. RPGs are shoulder-fired rockets that vary from around 40 mm to 100 mm in diameter with ranges of approximately 330 to 1,640 feet. ManPADS are shoulder-launched surface to air missiles designed to target low-flying aircraft. ManPADS are 70 mm in diameter and 3 to 5 feet long with a maximum range of approximately 14,800 feet. Spike missiles are 170 millimeter, tripod-launchable, guided missiles approximately 5 feet long with a range from 2,600 feet to 16 miles. The RAM is a small, lightweight, infrared homing surface-to-air missile usually mounted in a multi-barrel launcher capable of firing up to 21 missiles in sequence. RAMs are 127 mm in diameter and approximately 9 feet long with a maximum range of 5.6 miles. The use of missiles from Pad Bravo and Pad Charlie are covered by the programmatic biological opinion for Point Mugu (1-8-99-F-24), therefore this analysis will address impacts from additional proposed launch sites.

Conservation Measures

The Navy proposes to implement the following conservation measures during CIWS and similar small arms firing operations to avoid and minimize potential impacts on the western snowy plover, California least tern, and light-footed clapper rail:

- CIWS testing and training will not occur when snowy plover, least tern, or light-footed clapper rail nests are within 500 feet of the operational area.
- Pre- and post- operation surveys for all listed species nesting within 1,000 feet of testing site will confirm no abandonment occurred due to training.
- The CIWS would only be fired at aerial targets flying at normal operating altitudes well above the horizon to reduce potential of striking typically low-flying birds.
- Before the CIWS is fired, the Navy would require as standard procedure that no listed species or other wildlife are present between the shooter site and the target or immediately behind the target. A qualified biologist will monitor the hazard area with binoculars or remote cameras as necessary to ensure that the CIWS system is not fired if and when wildlife is within the expected debris pattern.

- To maintain integrity of listed species habitat, following each CIWS test event a search will be conducted to pick up and properly dispose of debris that has fallen between the firing point and the water's edge.
- If wintering snowy plovers are roosting adjacent to a selected pad at Point Mugu or Tender Point when utilizing CIWS, the location would change to an alternative pad/location if operationally feasible.

The Navy will implement the following additional conservation measures to protect listed species and other sensitive wildlife:

- A biologist will conduct regular nesting surveys of the affected area to determine location of nests prior to operations and to determine potential for disturbance due to operational activity and ensure if nests found all required protective measures are adhered to.
- Countermeasures testing and training with a potential to impact snowy plover, least tern, or light-footed clapper rail nests will not be conducted within 500 feet of active nests. Navy biological staff will review countermeasures activities prior to test and training events to determine potential impact.
- Pre- and post- operation surveys for all listed species nesting within 1,000 feet of a testing or training site will confirm no abandonment occurred due to training. Observations would be made as close to the activity as operational and safety constraints allow.
- If deemed safe by operational personnel, nests visible within 1,000 feet of countermeasure training or within 1,000-2,000 of CIWS deployment would be monitored during operations to monitor behavior of incubating birds.
- A Navy biologist will educate operational personnel about sensitive habitats and how to implement avoidance and minimization measures, delineate any areas adjacent to the site that should be avoided, and attend operationally related meetings as needed.
- Before directed energy systems, missiles, and/or other projectiles are fired, the Navy will require as standard procedure that no persons, listed species (or other wildlife), reflective surfaces, or non-target obstructions of any sort are present within the hazard area (which is specific to the type of system being used) between the shooter site and the target or immediately behind the target. A qualified biologist will monitor the hazard area with binoculars or remote cameras as necessary to ensure that the countermeasures system is not fired if and when wildlife is within the expected debris pattern.
- Biologists will monitor adjacent light-footed clapper rail habitat when countermeasures with a potential to produce high decibel noise are utilized, to document any disturbance to clapper rails.
- Project vehicles and equipment will be restricted to existing concrete pads, leveled surfaces, and access roads.

- At all nearshore testing and training sites, van placement for air-to-air testing of flares will be restricted to existing concrete pads, leveled surfaces, and paved or dirt access roads that lead to nearby beaches; vehicles would not be allowed to drive onto any beach.
- If night-time operations are necessary, permanent outdoor lighting will include shielding designs to ensure light entering adjacent nesting habitat is minimized.
- At all times, trash collection containers would not be placed on site and the area will be maintained trash free to reduce attracting predators.
- A Spill Prevention, Control, and Countermeasure Plan would 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 impacting listed species habitat, and to ensure that the cause of any spill is corrected.
- Unless operationally necessary, personnel would not occupy the testing and training areas between dusk and dawn and the area would remain dark (no artificial lighting) to reduce the potential for adverse impacts to listed species in adjacent natural habitat.
- All portable equipment brought to a test site would be removed upon test completion.
- Within 24 hours of countermeasures testing or training that is planned to occur at Pt. Mugu when least terns are present (generally April 1 to September 15), a qualified biologist would identify locations where least terns are known or likely to forage in the nearshore area, and the Navy would ensure that targets are not deployed in or over those areas.
- Surface targets would not be located within intertidal zones of SNI or Pt. Mugu.
- Implementation of the proposed Program will not result in any new construction, excavation, grading, or filling.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

The jeopardy analysis in this biological opinion relies on four components: (1) the *Status of the Species*, which evaluates the range-wide condition of the western snowy plover, California least tern, and light-footed clapper rail, the factors responsible for that condition, and the species' survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of these species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of these species; (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 these species; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on these species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of each of these species, 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 these species in the wild.

The jeopardy analysis in this biological opinion places an emphasis on consideration of the range-wide survival and recovery needs of the subject species and the role of the action area in the survival and recovery of these species as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

STATUS OF THE SPECIES

Western snowy plover

The Service listed the Pacific coast population of the western snowy plover as threatened on March 5, 1993 (58 Federal Register (FR) 12864) and issued a recovery plan for the species in September 2007 (Service 2007b). The Service designated critical habitat for the western snowy plover in a revised final rule in June 2012 (77 FR 36727).

The western snowy plover is a small shorebird in the family Charadriidae. Individuals weigh from 1.2 to 2 ounces and range in length from 5.9 to 6.6 inches (Page et al. 1995). Coloration 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. 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 an individual was documented as at least 15 years old (Page et al. 1995). Western snowy plovers forage for invertebrates in intertidal zones, the wrack line, dry sandy areas above the high tide line, salt pans, mud flats, and the edges of salt marshes.

The western snowy plover breeding season generally occurs between March 1 and September 30, although breeding can start/end earlier or later depending on latitude. Individuals nest near tidal waters along the mainland coast and offshore islands from southern Washington to southern Baja California, Mexico, with most nesting occurring on unvegetated to moderately vegetated, dune-backed beaches and sand spits. Other less common nesting habitats include salt panes, 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).

Both males and females incubate the eggs, which take about 27 days to hatch. Polyandrous double brooding is common in coastal California (Warriner et al. 1986). The chicks are precocial, feeding on their own within hours of hatching; however, they are unable to fly until approximately four weeks old. 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. The majority of western snowy plovers return to

the same breeding area in subsequent breeding seasons, although some disperse within and between years (Warriner et al. 1986, Stenzel et al. 1994).

Western snowy plovers may remain at breeding sites or migrate to other locations during the non-breeding season, with most wintering south of Bodega Bay, California. During the non-breeding season, western snowy plovers are found on many of the beaches used for nesting, as well as some beaches that are rarely, or never, used for nesting (Page et al. 1986).

The most important breeding areas for the listed population are San Francisco Bay, Monterey Bay, Morro Spit and Atascadero State Beach, Vandenberg Air Force Base, and NBVC. These areas are particularly important because they are able to support 80 to 100 or more breeding adults.

Historical records indicate that nesting western snowy plovers were once more widely distributed and abundant in coastal Washington, Oregon, and California; however, the western snowy plover 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, but the primary threat is habitat destruction and degradation. Habitat loss and degradation can be primarily attributed to human disturbance, urban development, introduced plant species, and expanding predator populations.

There are still relatively few western snowy plovers in Washington and Oregon. In 2006, Pearson et al. (2006) estimated 70 adults along the Washington coast, and Lauten et al. (2006) estimated 177 to 179 adults along the Oregon coast. California currently supports at least 90 percent of the listed population, and 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, the Oxnard lowland, Santa Rosa Island, and San Nicolas Island (Page et al. 1991).

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). By 1991, 78 percent of the remaining breeding population in coastal California nested at only eight sites: San Francisco Bay, Monterey Bay, Morro Bay, Callendar-Mussel Rock dunes area, Point Sal to Point Conception area (Vandenberg Air Force Base), Oxnard lowlands, Santa Rosa Island, and San Nicolas Island (Page et al. 1991). In 1991, the estimated breeding population of western snowy plovers in coastal California was 1,371, and by 2000, this number had dropped to 976 (Page 2000). Western snowy plovers had abandoned all historic breeding sites in Santa Barbara County south of Point Conception (Page and Stenzel 1981), presumably due to disturbance or habitat destruction (Lafferty 2000). However, following the protection of a wintering population of western snowy plovers, nesting resumed at Coal Oil Point (Lafferty et. al. 2003). In 2006, approximately 2,231 adults occurred in coastal California and San Francisco Bay (window survey including correction factor) (Service 2007b). In 2012, 1,621western snowy

plovers (not including correction factor) were observed during summer window surveys in California (Service 2014).

Western snowy plover habitat is subject to erosion and accretion and is highly susceptible to degradation by human activities including 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 support services that may cause direct and indirect losses of breeding and wintering habitat for the western snowy plover. Urban development has permanently eliminated 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).

In addition to causing direct loss of habitat, urban development usually facilitates increased human use of beaches and higher density of western snowy plover predators, resulting in additional adverse impacts to the species and its habitat. Human activities such as walking, jogging, fishing, fireworks, flying kites, unleashed pets, horseback riding, and off-road vehicles can cause, or contribute to, loss of western snowy plover nests and chicks. These activities can flush adults and chicks thereby exposing them to inclement weather and predation, or otherwise disrupting their ability to shelter, forage, and conduct normal activities. Chicks that become separated from their parents may die because of inadequate nutrition, exposure to wind and cold temperatures, and increased predation risk.

Predator density is an important factor affecting the quality of western snowy plover nesting habitat (Stenzel et al. 1994). Human development tends to provide supplemental food sources for predators and can artificially increase the abundance of native and non-native predators near western snowy plover habitat. Non-native predators include eastern red foxes (*Vulpes vulpes regalis*), domestic and feral dogs and cats, and Virginia opossums (*Didelphis virginiana*). Common native predators of the western snowy plover include coyotes, American crows (*Corvus brachyrhynchos*), common ravens (*Corvus corax*), American kestrels (*Falco sparverius*), loggerhead shrikes (*Lanius ludovicianus*), and several gull species (*Larus* spp.). Elevated predation frequency has resulted in the loss of adults, chicks, and eggs, and substantially decreased breeding success at many breeding beaches.

Another cause of substantial habitat loss for coastal breeding western snowy plovers is the encroachment of introduced plant species including beachgrasses (*Ammophila* spp.), Scotch broom (*Cytisus scoparius*), gorse (*Ulex europaeus*), South African iceplant (*Carpobrotus edulis*), pampas grass (*Cortaderia selloana*), jubata grass (*Cortaderia jubata*), iceplant (*Mesembryanthemum* spp.), and shore pine (*Pinus contorta*). These plants stabilize sand dunes, form vegetative structures that render habitat unsuitable for western snowy plovers, alter the diversity and abundance of arthropods, and provide cover/habitat for predators (Schwendiman 1975, Slobodchikoff and Doyen 1977, Stern et al. 1990, Seabloom and Wiedemann 1994, California Native Plant Society 1996, Powell 1996).

Between 2005 and 2012, surveyors in Ventura County reported between 164 and 221 western snowy plovers, with an average of 189. The actual number of western snowy plovers in the Ventura County is likely slightly higher after accounting for individuals not observed during surveys. NBVC, including Point Mugu and San Nicolas Island, supports the majority of the western snowy plovers in Ventura County; however, in recent years, larger flocks at McGrath State Beach and Ormond Beach have decreased the proportion of Ventura County western snowy plovers on NBVC (Service 2013).

Recovery plan for the western snowy plover

The 2007 final recovery plan for the western snowy plover (Service 2007b)states that the goal of recovery efforts is to remove 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 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 recovery plan contains detailed criteria by which the western snowy plover can be considered for delisting. The delisting criteria are summarized as follows:

1. An average of 3,000 breeding adults, distributed among 6 recovery units, has been maintained for 10 years;
2. A yearly average productivity of at least one fledged chick per male has been maintained in each recovery unit in the last 5 years prior to delisting; and
3. Mechanisms have been developed and implemented to assure long-term protection and management of breeding, wintering, and migration areas to maintain the subpopulation sizes and average productivity specified in Criteria 1 and 2.

Western snowy plover 5-year status review

The 5-year review for the western snowy plover (Service 2006a) states that the subspecies continues to be threatened by habitat loss and fragmentation; mortalities, injuries, and disturbance resulting from human activities; and lack of comprehensive State and local regulatory mechanisms throughout its range. Although overall increases in western snowy plover numbers, which can be attributed to management actions currently being implemented, have been observed, western snowy plover populations sizes are low or the species is absent throughout parts of its historical range in Washington, Oregon, and California. Based on these ongoing threats, the 5-year review concludes that the western snowy plover continues to qualify as a threatened species under the Act.

California least tern

The California least tern, which is one of three subspecies of least tern in the United States, was federally listed as endangered in 1970 (35 FR 16047). The Service issued a revised recovery plan for the species in 1985 (Service 1985a) and completed a 5-year status review in September

2006 (Service 2006b). The Service has not designated critical habitat for the California least tern. The State of California listed the California least tern as endangered in 1971. The California least tern is a fully protected species under California law (see California Fish and Game Code, Section 3511). The following description of the California least tern's basic ecology was compiled from the final recovery plan (Service 1980a).

The California least tern is the smallest of the North American terns and is found along the Pacific Coast of California, from San Francisco southward to Baja California. Least terns feed on small fish captured either in ponds, bays and estuaries, or immediately offshore. The species typically nests in colonies on relatively open beaches kept free of vegetation by natural scouring from tidal action. The typical colony consists of approximately 25 pairs and is relatively secluded from disturbance and predation. The breeding season usually begins in April, and nests are made in a simple scrape in the sand or shell fragments; however, if no sand is available, individuals will use a depression in the ground, such as a boot or tire track in dried mud. The typical clutch is 2 eggs, and both adults incubate and care for the young. Pairs can re-nest up to two times if eggs or chicks are lost early in the breeding season. Least terns are gregarious and forage, roost, nest and migrate in colonies. Fall migration usually begins in late July or early August and ends by mid-September. California least terns appear to have nesting site fidelity and many return to their natal breeding beach year after year (Collins et al. 1998).

Since 1970, nesting sites have been documented in California from the San Francisco Bay area to the Tijuana River at the Mexican border (Marschalek 2006), and in Mexico around the Gulf of California and on the west coast of Baja California from Ensenada to San José del Cabo at the tip of the peninsula (Lamb 1927, Grinnell 1928, Patten and Erikson 1996). In California, the species was historically concentrated in Los Angeles, Orange, and San Diego Counties; between Ventura County and the San Francisco Bay area, only Guadalupe Dunes-Mussel Rock Dunes, and Purisima Point have been used regularly by California least terns (Marschalek 2006). Large nesting colonies along the California coast have been discontinuous and are spread out on beaches at the mouths of larger estuaries. The Santa Margarita River mouth in San Diego County generally hosts the largest number of California least terns among all locations.

At the time of listing, a census revealed 600 pairs of California least terns breeding in California. Recovery efforts implemented since listing have helped raise numbers of breeding birds. Statewide surveys in 1995 counted 2,598 pairs (Caffrey 1995) and the population had increased to approximately 7,100 pairs by 2006. In addition, the number of California least tern sites has nearly doubled since the time of listing, with most of the California least tern colonies occurring in southern California. The results of the most recent survey efforts estimate between 4,300 and 6,300 pairs in 2012 (Frost 2013). Dramatic fluctuations in the number of breeding pairs after listing have been attributed to severe El Niño Southern Oscillations, which affect the least tern's food supply.

The decline of the California least tern is attributed primarily to the loss and fragmentation of breeding and foraging habitat due to the gradual urban development of the California coast. The

Pacific Coast Highway, constructed in the early 1900s, is thought to have contributed substantially to the decline of the species as construction of the highway eliminated many nesting locations and facilitated access for development and recreation along the coast.

Repeated disturbance of California least tern breeding sites by human activities can also have substantial effects on a colony's reproductive success resulting in nest failure, re-nesting, and site abandonment (Massey and Fancher 1989). For example, the California least tern colony at Ormond Beach in Ventura County, California, was repeatedly disturbed by paragliders and ultralight aircraft. In a period of 4 years, all nesting attempts at Ormond Beach had failed and the site was abandoned (C. Dellith, Service biologist, pers. obs. 2006). Once this source of disturbance was removed, the colony returned and nesting resumed to pre-disturbance numbers.

The rate of habitat loss has slowed in recent years, likely because most coastal habitats have already been developed, and the attention raised by the species' listed status has prompted protection and management of the species' remaining habitat. Many colonies are small patches of degraded nesting habitat adjacent to human activity. While the species' population has increased greatly since listing, generally there is a lack of undisturbed or moderately-disturbed, suitable breeding habitat available for further population expansion. Although most of the largest nesting sites are in public ownership, competing land uses continue to be a major threat resulting in disturbance to, or elimination of, nesting habitat. The conflict generated by continued human use of the California coast, limited habitat availability, and increasing California least tern populations is expected to continue and likely be compounded by climate change, rising sea level, and associated alteration of breeding habitat.

Recovery plan for the California least tern

The 1985 final recovery plan for the California least tern (Service 1985a) states that the goal of recovery efforts is reclassification of the species from endangered to threatened, and ultimately, delisting of the species. The recovery plan states that reclassification to threatened status may be considered when: (1) there are at least 1,200 breeding pairs distributed in at least 15 of 23 coastal management areas; (2) each of the 15 "secure" coastal management areas must have at least 20 breeding pairs; and (3) each of the 15 "secure" coastal management areas must have a 3-year mean reproductive rate of at least 1.0 young fledged per breeding pair.

The recovery plan states that delisting of the California least tern may be considered when: (1) at least 1,200 breeding pairs are distributed in at least 20 of 23 coastal management areas; (2) each of the 20 "secure" coastal management areas must have a 5-year mean reproductive rate of at least 1.0 young fledged per breeding pair; and (3) the San Francisco Bay, Mission Bay, and San Diego Bay are included within the 20 secure management areas with 4, 6, and 6 secure colonies respectively.

California least tern 5-year status review

The 5-year review for the California least tern (Service 2006b) states that the recovery criteria in the recovery plan do not reflect the best available and most up-to date information on the biology

of the species and its habitat. Since the completion of the recovery plan, new information about the species population dynamics and its threats had been discovered. In addition, the California least tern population in California had increased from 600 pairs in 1973 to approximately 7,100 pairs in 2005, and the number of sites used by the species had nearly doubled since the time of listing, with most of the California least tern colonies occurring in Southern California. While the number of California least terns had increased at the San Francisco Bay colonies, no increase in the number of colonies had been observed in the Bay area, as required by the recovery plan's delisting criteria. Despite the level of production (fledged young per year) declining and continuing on a downward trend (Marschaleck 2006), new information suggested that the California least tern population was continuing to increase.

While the 5-year review acknowledged the increasing least tern population, it reiterated that habitat for the species had been degraded throughout its range, and competing human activities continued to threaten the California least tern. At the time the 5-year review was published, the remaining nesting colonies were concentrated in five southern California counties and located on small sites within wildlife refuges, military installations, and other public lands requiring intensive management. Within these managed sites, the species was vulnerable to predation, invasive non-native plants, and human-related disturbance. Without continued intensive management of these sites, threats of habitat loss and predation could reverse the population growth that had been observed. Therefore, the 5-year review for the California least tern stated that threats to the species' habitat had been ameliorated not eliminated, and recommended to reclassify the California least tern from endangered to threatened.

Light-footed Clapper Rail

The light-footed clapper rail is one of three subspecies of *Rallus longirostris* in California, all of which are listed as endangered. The light-footed clapper rail was listed as endangered in October, 1970 (35 FR 16047). A recovery plan was adopted in 1977 and revised in 1985 (Service 1985b). The light-footed clapper rail is a fully protected species under California law (see California Fish and Game Code, Section 3511). The text that follows is taken primarily from the recovery plan (Service 1985b) and a report on the species' biology (Service 1980b).

The light-footed clapper rail currently ranges from southern Santa Barbara County south through Baja California, which is consistent with the historically reported range of the species. Once common in all salt marshes within this range, the distribution of the light-footed clapper rail has become extremely limited even though the limits of its range are unchanged. This is due to the extensive loss of suitable habitat throughout its range. The light-footed clapper rail is a non-migratory species, although there is evidence of movement from home marshes following breeding.

The light-footed clapper rail is found in salt marshes/tidal sloughs, where cordgrass and pickleweed are the dominant vegetation. Density of nests is typically highest in tall cordgrass, and the largest numbers of light-footed clapper rails are in marshes with the most cordgrass. This species requires a healthy salt marsh environment with the correct vegetation for nesting,

abundant food in the form of crabs and invertebrates, and tidal flats interspersed with vegetation for foraging. These conditions are found in salt marshes with tidal influence sufficient to maintain a normal salinity range and prevent stagnation. If suitable habitat is present, other factors seem to have little influence on light-footed clapper rail numbers, as predation by itself is seldom limiting, and light-footed clapper rails are generally tolerant of human activity if it does not result in habitat degradation.

Light-footed clapper rails nest in the densest vegetation available. The nest is typically built on high ground in a salt marsh to prevent flooding of the nest by high tides, and concealed in tall vegetation for protection from predators. If nesting in cordgrass, the nest may be placed above the ground, while nests in pickleweed areas may be placed directly on the ground. Nests are constructed with whatever vegetation is available and are usually somewhat buoyant. Nesting in most areas begins by mid-March and concludes in July. Both sexes incubate the eggs, which number from 5 to 11, and hatching occurs in approximately 23 days. The young are precocial and are able to swim on the day of hatching. Some pairs may have two broods in a season.

Early records indicate that the light-footed clapper rail was hunted heavily for sport and food; however, the species' decline is attributed almost entirely to habitat loss as approximately 93 percent of salt marsh habitat in California has been lost to development (Service 1985b). Contaminants, particularly pesticides and heavy metals, in salt marshes may be contributing to declines of the light-footed clapper rail in otherwise suitable habitat.

Recovery plan for the light-footed clapper rail

The Service completed a recovery plan for the light-footed clapper rail in 1979 and revised the plan in 1985 (Service 1985b). The goal of the recovery plan is to downlist the light-footed clapper rail to threatened status. The recovery plan is skeptical that full recovery can be achieved given the extent of seemingly irreversible habitat loss that has occurred; however, the plan states that, after downlisting, "it may be possible to devise additional actions that when implemented may warrant considering the light-footed clapper rail for delisting (page 22)." The decline of the light-footed clapper rail is attributed almost entirely to habitat loss as approximately 93 percent of salt marsh habitat in California has been lost. Therefore, the primary components of the species' recovery are restoring suitable coastal marsh habitat, protecting all remaining suitable habitat, and managing this habitat for the benefit of the light-footed clapper rail.

The recovery plan specifies that the light-footed clapper rail may be considered for downlisting when:

1. The breeding population of light-footed clapper rails in California is at least 800 pairs;
2. Approximately 10,000 acres of suitably managed wetland habitat are adequately protected; and
3. The protected habitat consists of at least 50 percent of marsh vegetation suitable for light-footed clapper rails in at least 20 marsh complexes.

Light-footed clapper rail 5-year status review

The Service completed a five-year status review for the light-footed clapper rail in 2009 (Service 2009) and reported that downlisting criteria 1 (population size of at least 800 pairs), and 2 (at least 10,000 acres of protected habitat) have not been met. The 5-year review documents some loss of coastal salt marsh habitat since listing, but acknowledges that State and Federal laws will likely prevent major habitat loss due to development in the future. The 5-year review notes that conservation actions including habitat restoration, opening wetlands to full tidal influence, artificial nest placement, and captive breeding/translocation to augment smaller populations of light-footed clapper rails have occurred to benefit the species. While the species' population numbers had been improving, there was a dramatic decrease in the light-footed clapper rail populations at two of the largest colonies in California from 2007 to 2008 (in the years following completion of the 5-year review, this population decline appears to have been reversed (California Department of Fish and Game 2012)). The 5-year review concludes that substantial threats to the light-footed clapper rail remain including indirect effects to habitat (e.g., siltation, contaminants); the small amount of habitat remaining for the species to occupy; genetic consequences of small, isolated populations; automobile strikes; and climate change. Therefore, the 5-year review recommended that the Service maintain the species' endangered status.

ENVIRONMENTAL BASELINE

Service regulations 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). The action area for this consultation includes the entire Point Mugu Sea Range; the restricted-access maritime and airspace areas R-2519 and R-2535 around Pt. Mugu and SNI, respectively (see Figures 2 and 3 in the BA); and all land areas within 2,000 feet of the 8 shooter sites at Pt. Mugu (Alpha, Bravo, Charlie, and Nike-Zeus Pads; Buildings 738 and 761; Surfer's Point; and The Point) and the 4 shooter sites at SNI (Rock Crusher Point, Tender Point, Thousand Springs West, Balloon Launch), as described in the BA (see Figures 2 through 5 in the BA).

Within the action area, the western snowy plover is known to occur at both Pt. Mugu and SNI, while the California least tern and light-footed clapper rail are known to occur only at Pt. Mugu.

Status of the Species in the Action Area

Western snowy plover at San Nicolas Island

The snowy plover is a year-round resident of SNI, nesting and foraging on beaches, in the intertidal zone, and on back dunes (see Figure 7 of the BA). The species' population numbers are typically lowest at the beginning of the breeding season and increase in Fall as wintering birds arrive. Over the last 5 years, an average of 54.6 western snowy plovers were observed on SNI during breeding season surveys and 113.8 during winter surveys (Navy 2014a). The available data suggest that snowy plover nests on SNI hatch at a low rate (average of 20.9 percent since 2009) due to inclement weather, predation, and other, often unknown, causes. However, we note that the these figures and underlying data are an incomplete picture of the

status of the western snowy plover on SNI, because access restrictions and staffing limitations have prevented the Navy from conducting rigorous survey and monitoring of the species on SNI.

The SNI portion of the action area in which we expect western snowy plovers to occur includes sandy beach, back dunes, and suitable uplands within 2,000 feet of Rock Crusher Point, Tender Point, Thousand Springs West, and Balloon Launch. We expect western snowy plovers to occur in these areas year-round, although the species' numbers will vary by season and from year to year. While western snowy plovers have been documented using the small beaches within 2,000 feet of Balloon Launch and the beaches immediately north and south of Rock Crusher Point, we expect the majority of western snowy plovers in the SNI action area to occur at Tender Beach.

Tender Beach and Tender Point provide high-quality plover habitat regularly used by plovers for breeding and non-breeding activities. Tender Beach is approximately 0.9 mile long, about 60 to 75 feet wide between the base of the dunes and the mean high tide line, and is backed by a relatively extensive dune system dominated by native plant species. The beach is relatively flat and lacking in vegetation, but it has a substantial amount of driftwood and kelp, which provide food and cover for chicks and adults (Navy 2011a). This area has consistently supported the highest number of snowy plovers on the island, especially late in the season. Although not always the case, Tender Beach typically supports approximately 40 to 60 percent of wintering snowy plovers and approximately 35 to 55 percent of breeding snowy plovers on SNI (Navy 2010, 2011, 2012, 2013b, 2014). In 2013, Tender Beach appeared to be especially important as it supported 28 of 32 (87.5 percent) known western snowy plover nests on SNI, as well as 67.6 percent of snowy plovers observed during May surveys and 81.3 percent observed during January surveys.

Western snowy plover at Point Mugu

Western snowy plovers occur on the beaches and adjacent areas at Pt. Mugu and, on occasion, are observed over one mile inland. The species uses the majority of the sandy beaches and salt pans at Pt. Mugu for foraging, nesting, and resting. Over the last 5 years, an average of 66.4 western snowy plovers were observed on Pt. Mugu during breeding season surveys (Service 2014) and 53.2 during winter surveys (Page 2014). The Pt. Mugu portion of the action area in which we expect western snowy plovers to occur includes the coastline from L Avenue to the Mugu Lagoon barrier beach eastern arm, and inland two thousand feet from the mean high tide line. We expect western snowy plovers to occur in this area year-round, although the species' numbers will vary by season and from year to year.

Western snowy plover breeding at Pt. Mugu typically occurs from the beginning of April to mid-September. In the Pt. Mugu portion of the action area, western snowy plovers primary nest on sandy beaches on the western and eastern arms of the Mugu Lagoon barrier beach. Individuals are also found nesting on salt pans adjacent to Mugu Lagoon and selected developed sites, such as Alpha and Bravo Pads.

The Alpha Pad, Bravo Pad, Charlie Pad, and Nike-Zeus Pad are located on previously developed and disturbed land that is within or adjacent to western snowy plover habitat. Western snowy plovers regularly nest and roost on the stretch of beach in front of these pads, as well as on Family Beach (Navy 2011b, 2012b, 2013c, 2014b). Proposed activities at these Pads include directed energy shooting sites, small arms firing, missile launches, non-lethal laser target sites from the ocean surface, and placement of vans during offshore flare testing and training.

California least tern

Point Mugu supports the largest least tern colony in Ventura County in part because the base and adjacent beaches are a relatively secure breeding and foraging area for the species due to restricted public access and other conservation measures implemented by the Navy. The species arrives from April to mid-May and departs by late August to mid-September. California least terns at Pt. Mugu forage over Mugu Lagoon, Ormond Lagoon, drainage ditches, and the ocean immediately offshore, and roost and nest on beaches and salt pans primarily in the vicinity of three areas: Ormond Beach East, Holiday Beach, and Mugu Lagoon Barrier Beach East (see Figure 6 of the BA). The Pt. Mugu portion of the action area in which we expect California least terns to occur includes the coastline from L Avenue to the Mugu Lagoon barrier beach eastern arm, and within two thousand feet of the mean high tide line on both the inland and ocean sides. We expect California least terns to occur in these areas throughout the breeding season. The action area does not include the Ormond Beach East colony, which is the largest at Pt. Mugu.

Over the last 5 years, the Navy estimates an average of between 566 and 677 breeding pairs of California least terns at Pt. Mugu (Navy 2014b) and an average of 750 nesting attempts. However, in 2013 the colony at Pt. Mugu was far smaller (288 to 361 pairs) than average and far fewer nests than average were attempted (346). The cause of this decline is unknown; the Navy hypothesizes that it could be related to a decline in prey availability or the poor nest success at Pt. Mugu in 2012.

The Alpha Pad, Bravo Pad, Charlie Pad, and Nike-Zeus Pad are located on previously developed and disturbed land that is within or adjacent to California least tern habitat. Least terns regularly nest and roost on the stretch of beach in front of these pads. Proposed activities at these Pads include directed energy shooting sites, small arms firing, missile launches, non-lethal laser target sites from the ocean surface, and placement of vans during offshore flare testing and training.

Light-footed clapper rail

The light-footed clapper rail is a year-round resident of Pt. Mugu. Mugu Lagoon is the northernmost marsh in California occupied by light-footed clapper rail. The Lagoon contains approximately 2,500 acres of potential light-footed clapper rail habitat, which is over 25 percent of the habitat available for the species rangewide (Service 2009). Mugu Lagoon represents a relatively secure breeding and foraging site due to restricted public access (although light-footed clapper rails are generally tolerant of human activity if it does not result in habitat degradation (Service 2001)) and other conservation measures implemented by the Navy. Light-footed clapper rail habitat at Pt. Mugu occurs on the southern side of Mugu Lagoon from the runway

south to Laguna Road, on both sides of the mouth of Calleguas Creek, and south along the Mugu Lagoon barrier beach eastern arm (see Figure 8 of the BA). Most clapper rail territories occur between the runway and G Avenue. The Pt. Mugu portion of the action area in which we expect light-footed clapper rails to occur includes all clapper rail habitat on the southern side of Mugu Lagoon between L Avenue and G Avenue, and the clapper rail habitat within 2,000 feet of The Point. We expect light-footed clapper rails to occur in these areas year-round.

Habitat for the light-footed clapper rail at Mugu Lagoon is not the typical cordgrass marsh described in the species account. Rather, nesting occurs in stands of southwestern spiny rush (*Juncus acutus spp. leopoldii*) with pickleweed, saltgrass, and alkali-heath on hummocks isolated from upland access by creeks, mudflats, or low marsh. In all locations where they occur, light-footed clapper rails forage along the mudflat-marsh interface, along mudbanks, and shallow tidal creeks. The Navy's Integrated Natural Resources Management Plan (Navy 2002) provides for protection of clapper rail nesting and foraging areas, as well as additional recovery programs including population and nesting monitoring and predator management.

The light-footed clapper rail population at NBVC has been increasing over the last few years, due to both successful breeding and introductions of captive-reared birds. Over the last 5 years, the Navy estimates an average of 38.8 light-footed clapper rails occurred at Pt. Mugu including an average of 16.4 breeding pairs. In 2013, surveyors confirmed at least 52 light-footed clapper rails Pt. Mugu, including 23 breeding pairs. This is the sixth largest population of light-footed clapper rails in California and the highest number of pairs found at Pt. Mugu since monitoring began in 1980. Monitors found evidence of successful breeding by at least 17 of the 23 pairs (73.9 percent) in 2013 (Navy 2014b).

Factors Affecting the Species in the Action Area

Western snowy plover at SNI

Western snowy plovers on San Nicolas Island are affected by a variety of natural stressors including inclement weather, predation, and pinnipeds (Navy 2014a). Strong winds can reduce reproductive success when unattended eggs are blown out of the nest and wind driven sand damages egg shells leading to egg loss or nest abandonment. Nests can be washed away during very high tides and high surf. Several native species that occur on SNI, including island foxes, gulls, and American kestrels, are known to prey on western snowy plover eggs, chicks, and/or adults. A recently emerging threat to the western snowy plover on San Nicolas Island is increasing pinniped populations which can overwhelm plover breeding beaches and may force western snowy plovers to nest farther from the beach in less typical habitat. 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.

Beaches and adjacent habitats on SNI with nesting snowy plovers are closed to recreational activities during the snowy plover nesting season from March 1 through September 15, and signs are posted and barricades are placed to prevent human trespass. The Navy enforces these

measures to prevent human presence from displacing plovers from nests and exacerbating other adverse effects (i.e., weather, 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. Activities with the potential to adversely affect the species include missile and target launches, reverse osmosis plant operation, recreation, natural resource management and research, amphibious training exercises, explosive ordnance disposal, and routine construction projects and utilities maintenance. In general, the Service expected these activities to cause indirect disturbance (e.g., flushing, physiological stress) from noise and presence of researchers, missiles, etc.; as well as occasional egg loss, nest abandonment, injury, or mortality due to recreation, training, maintenance activities, etc. The Navy implements measures to avoid or minimize the likelihood of adverse effects of these activities on the western snowy plover, and the five most recent end-of-year reports (Navy 2010a, 2011a, 2012a, 2013b, 2014a) pursuant to this biological opinion indicate that the ongoing activities appear to have minor to no effects on the species on SNI.

Factors affecting the western snowy plover, California least tern, and light-footed clapper rail at Pt. Mugu

Western snowy plovers and California least terns at Pt. Mugu are affected by a variety of natural stressors including inclement weather and predation. Strong winds can reduce reproductive success when unattended eggs are blown out of the nest and wind driven sand damages egg shells leading to egg loss or nest abandonment. Nests can be washed away during very high tides and high surf. Many predator species that occur at Pt. Mugu, including coyotes, opossums, domestic cats, gulls, common ravens, and a variety of raptors, are known to prey on western snowy plover and California least tern eggs, chicks, and/or adults. These predators can have a substantial impact on snowy plover breeding success, and the Navy implements a predator control program to minimize the effects of predation on the snowy plover.

Beaches and adjacent habitats with nesting populations of snowy plovers are closed to recreational activities year-round at Pt. Mugu, and signs are posted and barricades are placed to prevent human trespass. The Navy enforces these measures to prevent human presence from displacing snowy plovers and least terns from nests and exacerbating other adverse effects (i.e., weather, predation). However, western snowy plovers, California least terns, and light-footed clapper rails regularly use the beaches and other habitat adjacent to and near the developed pads and buildings (e.g., Bravo Pad, Building 761) on which ongoing military activities occur.

The June 6, 2001, the programmatic biological opinion for ongoing activities at Naval Base Ventura County (i.e., Pt. Mugu)(1-8-99-F-24) addressed impacts from Navy activities on the western snowy plover, California least tern, and light-footed clapper rail. Activities with the potential to adversely affect one or more of these species include target drone launches; aircraft overflights including the annual air show; maintenance of roads, facilities, and utilities; missile launches and associated operations; law enforcement operations; pest management; vehicle

traffic; and recreation. In general, the Service expected these activities to cause indirect disturbance (e.g., flushing, physiological stress) from noise and presence of vehicles, aircraft, etc.; as well as occasional injury, mortality, nest abandonment, and/or egg loss due to falling debris, and collisions with vehicles, aircraft, etc. The Navy implements measures to avoid or minimize the likelihood of adverse effects from these activities on the western snowy plover, California least tern, and light-footed clapper rail; and the five most recent end-of-year reports (Navy 2010b, 2011b, 2012b, 2013c, 2014b) pursuant to this biological opinion document occasional take but indicate that ongoing Navy activities appear to have minor effects on these species.

EFFECTS OF THE ACTION

The life histories of the western snowy plover, California least tern, and light-footed clapper rail share certain similar strategies that suggest the proposed Program would potentially affect these species in a similar manner. Specifically, in the action area, all three species are ground-nesting birds that complete their life cycle on or in proximity to beaches, the Pacific Ocean, and/or tidal marshes. Therefore, we will collectively address most of the expected effects of the proposed Program and address species-specific effects where appropriate.

The proposed activities would occur as either land-based or offshore. Because the subject species complete their life cycle in proximity to coastal beaches and marshes, and the offshore activities would occur far from land, we expect the potential effects, if any, of the offshore activities on the western snowy plover, California least tern, and light-footed clapper rail to be discountable. Therefore, proposed activities that would occur far from shore, such as ship activity, sea surface targets, and offshore projectile impacts, will not be discussed further.

Personnel and vehicles associated with the proposed program would be operating within eyesight, and potentially nearby, populations of western snowy plovers, California least terns, and light-footed clapper rails. Typically, on-the-ground operations would include only several personnel and vehicles operating at the established pads/shooting locations. However, five times per year, the Navy would conduct a “small scale” personnel event during which 30 to 40 personnel would conduct operations at Pt. Mugu and SNI. In addition, once per year the Navy would conduct a “large scale” personnel event during which 600 personnel would conduct operations at Pt. Mugu. We expect the potential impacts on listed species to be positively correlated with the number of personnel in the action area.

To varying degrees, western snowy plovers, California least terns, and light-footed clapper rails are sensitive to nest and habitat disturbances (Page et al. 1977). Of the three species, clapper rails are probably least sensitive to human activity, and snowy plovers and least terns that nest near human developments are somewhat accustomed to and less likely to be disturbed by human presence (Page et al. 1977). When the disturbance threshold is reached, individuals will flush from their location or otherwise exhibit a startle response. While a single or few instances of flushing may have limited effects on an individual, in part due to an abundance of suitable

habitat nearby the proposed countermeasures sites, repeated flushing may displace the individuals and/or cause exhaustion. When incubating birds leave nests in response to human and vehicle presence, the nest is exposed to inclement weather and increased predation. Increased or repeated vehicle and human activity can result in nests being abandoned, chicks becoming separated from adults, and reproductive failure (Service 2006a). Eggs can be cracked by adult birds that are forced to quickly leave the nest. Human activity may also increase visitation by predators, resulting in increased predation on the species. Ground-nesting birds have cryptic nests and eggs that can easily go unseen and be crushed by humans or vehicles moving through a nesting area.

Human/vehicle presence at existing/developed pads and buildings may cause some temporary disturbance including flushing of adult birds; however the primary disturbance mechanisms will be visual and auditory inputs from operation of countermeasures systems. The impacts discussed below could be compounded if the Navy operates multiple shooter sites simultaneously for countermeasures testing and training.

The directed energy countermeasures use a narrowly focused beam that would be aimed at aerial targets. This should preclude direct impacts from these systems on western snowy plovers and California least terns on the ground. As California least terns are aerial foragers, there is a remote possibility of a directed energy beam hitting a flying least tern. The potential effects range from disturbance, to injury or death. We do not expect the operation of directed energy systems, as described in the BA, to affect the light-footed clapper rail because these systems make relatively little noise and would be fired facing away from light-footed clapper rail habitat.

If light-emitting countermeasures systems (e.g., flares, lasers, burning missile/rocket fuel) are used at night and illuminate roosting areas, it could disturb roosting birds causing them to flush, be exposed to predation, and expend energy. If this happens during the breeding season, eggs or chicks could be exposed to inclement weather, increased predation risk, or separated from adults, ultimately leading to loss of those eggs or chicks and failure of that breeding attempt.

Small arms countermeasures systems include weapons that fire projectiles up to 5 inches in diameter. However, the 5-inch projectiles would only be fired from a boat at sea to a target at sea, and we do not expect firing of 5-inch shells to adversely affect the western snowy plover, California least tern, or light-footed clapper rail. Small arms systems firing up to 35 millimeter projectiles would be fired from the existing shooting sites and could adversely affect the subject species. These weapons would be aimed at aerial targets, and the projectiles would land at sea without impacting the subject bird species. As California least terns are aerial foragers, there is a remote possibility of a projectile hitting a flying least tern, which would cause injury and death.

The small arms systems also discharge sabots and “pushers,” which would fall in a conical pattern on the beach and ocean to a distance of 890 feet from the firing point. Although the “debris cone” would cover a relatively small area of habitat, the Navy estimates that a firing event could discharge 800 to 1,500 sabots and pushers. Any western snowy plovers or

California least terns in the debris cone would, at a minimum, be flushed from the area and could be struck and injured by debris. If nests are in the debris cone, eggs could be struck and destroyed. If sabots or pushers fall into nests, those nests will likely be abandoned even if the eggs remain intact. The Navy will retrieve the sabots and pushers that remain on land after a firing event, and this would minimize the impacts from the small arms systems; however, the personnel collecting the debris could adversely affect western snowy plovers or California least terns by potentially entering a nesting area or flushing birds from feeding, breeding, or sheltering activities. We do not expect light-footed clapper rails to be affected by sabots and pushers as the weapons would be aimed away from light-footed clapper rail habitat.

The small arms systems and proposed countermeasures missile systems are extremely loud when firing, and this noise could adversely affect listed species as individuals react to the noise. Western snowy plovers, California least terns, and light-footed clapper rails reacting to noise disturbance by flushing may be exposed to predation, and extra energy expenditure. If this happens during the breeding season, eggs or chicks could be exposed to inclement weather, increased predation risk, or separated from adults, ultimately leading to loss of those eggs or chicks and failure of that breeding attempt. Repeated reaction to noise disturbance can result in exhaustion, nests being abandoned, chicks becoming separated from adults, and reproductive failure. If the noise is loud enough, permanent hearing damage could occur, reducing the likelihood of survival for that individual. We expect adverse effects from noise to be most dramatic closest to the firing weapon. The probability of adverse effects will decrease with distance as the volume attenuates and wind and wave noise masks the sound from the small arms.

The proposed electronic support systems would involve vehicles and other equipment deployed at existing pads, buildings, and shooter sites. We do not expect these systems to have any adverse effects on the western snowy plover, California least tern, or light-footed clapper rail that are not already identified and addressed under “Traffic” in the programmatic biological opinion (1-8-99-F-24).

Summary of Effects to the Western Snowy Plover, California Least Tern, and Light-Footed Clapper Rail

In determining whether a proposed action is likely to jeopardize the continued existence of a species, we consider the effects of the action with respect to the reproduction, numbers, and distribution of the species. We also consider the effects of the action on the recovery of the species. In that context, the following paragraphs summarize the effects of the proposed Program on covered species. We group the discussion of effects on the western snowy plover, California least tern, and light-footed clapper rail where the effects of the proposed Program would be similar, and we describe species-specific effects where appropriate.

Reproduction

Program operations that occur during the breeding season and create loud noise, falling debris, or illuminate breeding areas at night would temporarily reduce the quality of breeding habitat nearby shooting sites, and could cause nest abandonment and/or injury or death to adults, fledglings, and eggs. The noise and debris patterns could potentially affect a large proportion of breeding western snowy plovers on SNI (at Tender Point/Beach), and western snowy plovers and California least terns at Pt. Mugu (in habitat near Holiday Beach). We do not expect falling debris to affect the light-footed clapper rail, but the species could be affected by loud noise (although this species appears somewhat tolerant of elevated noise levels). However, the Program would not cause the loss of any breeding habitat, and the amount of habitat that would be temporarily affected is a very small portion of these species' breeding habitat rangewide. In addition, the Navy would enforce 500-foot avoidance buffers around western snowy plover, California least tern, and light-footed clapper rail nests during activities with a potential to impact these species; and the Navy would relocate or postpone operations if a nest is located within an avoidance buffer. The Navy also will retrieve debris from countermeasures operations, which will further minimize effects on breeding habitat for listed species. We expect these measures to greatly minimize noise disturbance and the effects of debris on breeding activity. Therefore, we expect few breeding western snowy plovers, California least terns, and light-footed clapper rails to be affected by Program activities, and the Program would not appreciably reduce these species' reproduction in the action area or rangewide.

Number

We are unable to determine the precise number of western snowy plovers that would occur in the action area and may be affected by Program activities, because the number of western snowy plovers in the action area varies between breeding and non-breeding seasons, and from year to year. In addition, Program activities would occur at various sites that may or may not be in proximity to western snowy plovers. The proposed activities could directly and indirectly affect individual western snowy plovers to the point of injury or death, although we expect injury or death of western snowy plovers to be uncommon. We expect that noise, human presence, bright light, and falling debris could displace western snowy plovers during nearly any Program activity that occurs within eyesight of western snowy plover habitat, although the proposed avoidance buffers will greatly reduce the chance of this happening during the breeding season. The number of western snowy plovers we expect to be affected by the Program is very small relative to the western snowy plover population rangewide. Therefore, we do not expect the Program to appreciably reduce the number of western snowy plovers rangewide.

We are unable to determine the precise number of California least terns that would occur in the action area and may be affected by Program activities, because (1) California least terns occur in the action area only during the breeding season, (2) the number of California least terns in the action area varies dramatically from year to year, (3) the species does not occur in the SNI portion of the action area, and (4) Program activities would occur at various sites that may or may not be in proximity to California least terns. The proposed activities could directly and indirectly affect California least terns to the point of injury, death, and/or reproductive failure;

however, the extent to which this could happen is largely dependent on the proportion of California least terns using Holiday Beach during a given breeding season. The Navy will implement measures to avoid or minimize the likelihood of adverse effects to the species, and we expect nest failure as a result of the Program to be uncommon and injury or death of adult California least terns to be extremely rare. The Navy's proposed avoidance buffers will ensure that the number of California least terns that could be affected by Program activities is small relative to the number occupying the action area and very small relative to the species' population rangewide. Therefore, we do not expect the Program to appreciably reduce the number of California least terns rangewide.

Based on consistent survey data (Navy 2014b), we anticipate that 25 to 35 light-footed clapper rails will occur at Pt. Mugu in 2014. We expect many of these to occur in the action area and be subject to effects from Program activities. We expect that Program activities could indirectly affect light-footed clapper rails and cause temporary displacement, reduction of habitat quality, increased predation, and egg loss. However, the Navy's proposed avoidance and minimization measures will ensure that light-footed clapper rails are not directly affected by Program activities and that indirect effects are minimal. Further, the light-footed clapper rail is relatively tolerant of elevated noise levels and human activity. Therefore, we expect that adverse effects to the light-footed clapper rail from the proposed Program will occur very rarely, if ever, and would affect a very small proportion of the light-footed clapper rail population rangewide. Therefore, we do not expect the Program to appreciably reduce the rangewide number of light-footed clapper rails.

Distribution

In the action area, western snowy plovers could occur near any of the proposed shooting sites at Pt. Mugu and SNI. The proposed Program activities could temporarily displace western snowy plovers from portions of the action area and could cause injury or death of a small number of western snowy plovers annually. However, the Navy would implement measures to minimize the risk of adverse effects on individuals, Program activities would affect a small proportion of the habitat available on Pt. Mugu and SNI, and no habitat would be permanently lost. In addition, the species' larger geographic range includes Washington, Oregon, and California, and the habitat and individual snowy plovers that could be affected on Pt. Mugu and SNI comprise a very small proportion of the species' rangewide habitat and population. Therefore, we do not expect the effects of the countermeasures Program to reduce the distribution of the western snowy plover in the action area or rangewide.

In the action area, California least terns could occur near the proposed shooting sites by Holiday Beach and Mugu Lagoon barrier beach eastern arm. The proposed Program activities could temporarily displace California least terns from portions of the action area and could cause injury or death of a small number of California least terns annually. However, the Navy would implement measures to minimize the risk of adverse effects on individuals, Program activities would affect a small proportion of the habitat available on Pt. Mugu and SNI, and no habitat would be permanently lost. In addition, the species occupies a relatively large geographic range (from the San Francisco area through Baja, Mexico) outside the action area, and the habitat and

individual least terns that could be affected on Pt. Mugu comprise a small proportion of the species' rangewide habitat and population. Therefore, we do not expect the effects of the countermeasures Program to appreciably reduce the distribution of the California least tern in the action area or rangewide.

In the action area, light-footed clapper rails could occur near any of the proposed shooting sites at Pt. Mugu. We do not expect light-footed clapper rails to be directly affected by Program activities; however, Program activities could indirectly affect light-footed clapper rails and cause temporary displacement, reduction of habitat quality, and egg loss. We expect these impacts to be extremely rare, because the Navy would implement measures to minimize the risk of adverse effects on light-footed clapper rails, the Program's effects on the species would be brief, light-footed clapper rails appear to be relatively tolerant of elevated noise levels and human activities, and no habitat would be lost. Therefore, we do not expect the effects of the countermeasures Program to reduce the distribution of the light-footed clapper rail in the action area or rangewide.

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 and, therefore, are not considered cumulative to the proposed project. Activities at Pt. Mugu and San Nicolas Island are not considered cumulative to the countermeasures program, because activities on Federal properties would have a Federal nexus and be considered Federal actions subject to section 7 of the Act. Additionally, we are not aware of any non-Federal actions that are reasonably certain to occur within the Point Mugu Sea Range that would affect the western snowy plover, California least tern, or light-footed clapper rail.

CONCLUSION

After reviewing (1) the current status of the western snowy plover, California least tern, and light-footed clapper rail; (2) the environmental baseline for these species in the action area; (3) the effects of the proposed action; and (4) the cumulative effects, it is our biological opinion that the Navy's countermeasures program, as proposed, is not likely to jeopardize the continued existence of the western snowy plover, California least tern, or light-footed clapper rail. We have reached these conclusions because:

1. No suitable habitat for the subject species will be lost.

2. We expect few California least terns, western snowy plovers, or light-footed clapper rails, to be injured or killed as a result of Program activities.

3. We expect failure of western snowy plover, California least tern, and light-footed clapper rail nests to be rare as a result of Program activities.

4. The Navy will implement measures to avoid and minimize adverse effects of the proposed Program on the western snowy plover, California least tern, and light-footed clapper rail.

5. We do not expect the Program to appreciably reduce the reproduction, numbers, or distribution of the western snowy plover, California least tern, or light-footed clapper rail.

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 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 intentional or negligent actions that create the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior 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 the Navy implement them for the exemption in section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activities 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)]

Western Snowy Plover

We expect the western snowy plover to be found year-round in any beach, back dune, or other suitable habitat throughout the action area, although the number of western snowy plovers in the action area will vary seasonally and annually. The Navy's proposed measures to avoid and minimize adverse effects will reduce the likelihood of take occurring as a result of Program activities. However, we expect the direct and indirect effects of Program activities to cause take of the western snowy plover.

Direct effects of the Program on western snowy plovers would be caused by falling debris (sabots and pushers). The debris would travel up to 890 feet, which is 390 feet farther than the Navy's proposed avoidance buffer for CIWS discharge. During the breeding season, debris falling into a nesting area could hit and destroy eggs and/or cause nest abandonment, which would have the same effect as egg destruction. However, the CIWS would be pointed out to sea, and we expect most falling debris that travels farther than 500 feet, to land in the ocean. In addition, the Navy would not fire CIWS when wildlife is between the CIWS and the target. Therefore, we anticipate that western snowy plover nests would be affected by falling debris only on rare occasions. We anticipate that 2 western snowy plover nests at Pt. Mugu and 1 western snowy plover nest at SNI would be destroyed or abandoned annually due to falling debris. In addition, we anticipate that 2 western snowy plovers at Pt. Mugu and 1 western snowy plover at SNI will be injured or killed annually by falling debris.

Indirect effects of the Program on western snowy plovers would be caused by noise, bright light at night, and the presence of humans and vehicles. Western snowy plovers at Pt. Mugu have been shown to be tolerant of noise and human presence (M. Ruane, Navy ecologist, *in litt* 2014) similar to that proposed for the countermeasures Program. In some instances, short-term, intensive, human activities have occurred nearby western snowy plover nests and the nests have fledged normally. Therefore, we expect the 500-foot avoidance buffer to largely preclude any adverse effects from CIWS and missile discharge. However, we expect a small proportion of breeding western snowy plovers within auditory and visual range (Auditory and visual range will change with weather conditions and topography; for the purposes of this analysis we will consider this range to be 1,000 feet.) of Program activities and abandon a nest. As the Navy has not committed to definite avoidance buffers for wintering western snowy plovers, we also expect a small number of wintering snowy plovers to be taken by harassment as they react repeatedly to noise, bright light, human presence, and falling debris. It is impossible to determine in advance how many individuals would have this type of reaction. Therefore, we estimate that 5 percent of snowy plover nests within 1,000 feet of Program activities will be abandoned annually, and 5 percent of wintering snowy plovers within 500 feet of Program activities will be harassed annually. The number of nests and wintering snowy plovers in these areas will vary as western snowy plover numbers and nesting locations vary from year to year; however, using average data from 2010 to 2013 (Navy 2011a, 2011b, 2012a, 2012b, 2013b, 2013c, 2014a, 2014b), this calculates to 2 nests at Pt. Mugu and 1 nest at SNI abandoned and 2 individuals harassed at Pt. Mugu and 1 individual harassed at SNI due to indirect effects of Program activities.

California Least Tern

We expect the California least tern to occupy the action area during the breeding season from April through mid-September. The species will be found on beaches and salt pans, as well as foraging nearby in the ocean, Mugu Lagoon, and the lagoon drainage channels primarily near Holiday Beach and the Mugu Lagoon barrier beach eastern arm. The number of California least terns in the action area will vary seasonally and annually. The Navy's proposed measures to avoid and minimize adverse effects will reduce the likelihood of take occurring as a result of

Program activities. However, we expect the direct and indirect effects of Program activities to cause take of the California least tern.

Direct effects of the Program on California least terns could be caused by falling debris (sabots and pushers) and projectiles. The debris would travel up to 890 feet, which is 390 feet farther than the Navy's proposed avoidance buffer for CIWS discharge. During the breeding season, debris falling into a nesting area could hit and destroy eggs and/or cause nest abandonment, which would have the same effect as egg destruction. However, the CIWS would be pointed out to sea, and we expect most falling debris that travels farther than 500 feet, to land in the ocean. Therefore, we anticipate that California least tern nests would be affected by falling debris only on rare occasions. We anticipate that 2 California least tern nests at Pt. Mugu would be destroyed or abandoned annually due to falling debris. In addition, we anticipate that 2 California least terns at Pt. Mugu will be injured or killed annually by falling debris.

California least terns are aerial foragers, and projectiles (including bullet-type projectiles and directed energy) could strike a least tern and cause injury or death. However, the countermeasures systems fire infrequently and only for a burst of a few seconds. In addition, the Navy would not fire CIWS when wildlife is between the CIWS and the target. Therefore, the chance of a California least tern being struck is remote. We anticipate that 1 California least tern would be wounded or killed by projectiles from the countermeasures systems over the term of the Program.

Indirect effects of the Program on California least terns would be caused by noise, bright light at night, and the presence of humans and vehicles. California least terns have been shown to be tolerant of noise and human presence (M. Ruane, *in litt* 2014) similar to that proposed for the countermeasures Program. In some instances, intensive human activities have occurred nearby California least tern nests and the nests have fledged normally. Therefore, we expect the 500-foot avoidance buffer to largely preclude any adverse effects from CIWS and missile discharge, which would create the loudest noise associated with the Program. However, we expect a small proportion of breeding California least terns within auditory and visual range of Program activities to react negatively to noise and human presence and abandon a nest. It is impossible to determine in advance how many individuals would have this reaction. Therefore, we estimate that 5 percent of California least tern nests within 1,000 feet of Program activities will be abandoned annually. The number of nests in this area will vary as California least tern numbers and nesting locations vary from year to year; however, using average nesting data from 2010 to 2013 (Navy 2011b, 2012b, 2013c, 2014b), this calculates to 4 nests at Pt. Mugu abandoned due to noise and human presence associated with Program activities.

Light-Footed Clapper Rail

We expect the light-footed clapper rail to be found year-round primarily in the marshes, mudflats, and lagoon channels between Beach Road and the open water of the lagoon, and between L Avenue and G Avenue, but smaller numbers of light-footed clapper rails will also

occur around the mouth of Calleguas Creek across from The Point. The Navy's proposed measures to avoid and minimize adverse effects will reduce the likelihood of take occurring as a result of Program activities. However, we expect indirect effects of Program activities to cause take of the light-footed clapper rail.

The Navy's proposed avoidance and minimization measures would prevent direct effects of personnel and vehicles on light-footed clapper rails and the species' habitat. In addition, the countermeasures systems would not be fired over light-footed clapper rail habitat, precluding potential effects from debris and projectiles. Therefore, we do not expect direct effects of the Program to cause take of the light-footed clapper rail.

Indirect effects of the Program on light-footed clapper rails would be caused by noise and the presence of humans and vehicles. Light-footed clapper rails at Pt. Mugu frequently nest adjacent to the airfield and roads, indicating a relatively high tolerance of regular noise and human

presence. Therefore, we expect the 500-foot avoidance buffer to largely preclude any adverse effects from CIWS or missile discharge, which would create the loudest noise associated with the Program. However, we expect a small proportion of light-footed clapper rails within auditory and visual range (Auditory and visual range will change with weather conditions and topography; for the purposes of this analysis we will consider this range to be 1,000 feet.) of Program activities to exhibit a startle response to noise and human presence and either damage one or more eggs in a nest or expose the nest to predation. It is impossible to determine in advance how many individuals would have this reaction. Therefore, we estimate that indirect effects of the Program will cause 5 percent of light-footed clapper rails within 1,000 feet of Program activities to startle and flush, causing nests to be lost due to egg damage, abandonment, or predation; and adult light-footed clapper rails being exposed to predation. The number of nests and adults in this area will vary as light-footed clapper rail numbers and nesting locations vary from year to year; however, using average nesting data from 2010 to 2013 (Navy 2011b, 2012b, 2013c, 2014b), this calculates to 1 nest and 1 adult every other year at Pt. Mugu lost due to indirect effects of noise and human presence associated with Program activities.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the western snowy plover, California least tern, or light-footed clapper rail. This incidental take statement does not exempt any activity from the prohibitions against take contained in section 9 of the Act that is not incidental to the action as described in this biological opinion. Western snowy plovers, California least terns, and light-footed clapper rails may be taken only within the defined boundaries of the action area as described in the Environmental Baseline section of this biological opinion.

REASONABLE AND PRUDENT MEASURES

The Service's evaluation of the effects of the proposed action includes consideration of the measures developed by the Navy, and repeated in the Description of the Proposed Action portion of this biological opinion, to minimize the adverse effects of the proposed action on the western snowy plover, California least tern, and light-footed clapper rail. The Service believes these measures are adequate and appropriate to minimize take of the western snowy plover, California least tern, and light-footed clapper rail. Therefore, we are not including any reasonable and prudent measures and terms and conditions in this incidental take statement. Any subsequent changes in the minimization measures proposed by the Navy may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR 402.16.

REPORTING REQUIREMENTS

For each year this biological opinion is in effect, the Navy must provide a written annual report describing Program activities during the previous year to the Service by January 31. The reports must contain information on (1) the type of activities that occurred in the action area (e.g., construction activities, monitoring, etc.), (2) the location of these activities, (3) a description of the habitat in which these activities occurred, (4) the number of listed species affected and the manner in which they were affected, (5) steps taken to avoid or minimize effects, (6) the results of any surveys conducted for the western snowy plover, California least tern, and the light-footed clapper rail in the previous year; (7) a record of observations of any other listed species observed during Program activities, and (8) any other pertinent information. The first report will be due January 31st following the first Program activities conducted pursuant to this biological opinion.

DISPOSITION OF DEAD OR INJURED SPECIMENS

Within three days of locating any a dead or injured western snowy plover, California least tern, or light-footed clapper rail, the Navy must make initial notification by telephone and writing to the Ventura Fish and Wildlife Office in Ventura, California, (2493 Portola Road, Suite B, Ventura, California 93003, (805) 644-1766) within 3 working days of the finding. The report must include the time and date, location of the carcass, a photograph, cause of death if known, and any other pertinent information.

Care must be taken in handling dead specimens to preserve biological material in the best possible state for later analysis. If any injured western snowy plovers, California least terns, or light-footed clapper rails survive; the Navy should contact us regarding their final disposition.

Any remains of dead western snowy plovers, California least terns, or light-footed clapper rails must be placed with educational or research institutions holding the appropriate State and Federal permits, such as 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).

REINITIATION NOTICE

This concludes formal consultation on the Navy's countermeasures testing and training program at Naval Air Station Point Mugu, San Nicolas Island, and the Point Mugu Sea Range. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, 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(a)(1)(B). Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions, please contact David Simmons of our staff at (805) 644-1766, extension 368.

Sincerely,

Stephen P. Henry
Acting Field Supervisor

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Appendix D

Public Comment

Overview

The Navy filed a formal Notice of Availability (NOA) – for the Draft Environmental Assessment (EA) for Countermeasures Testing and Training on the Point Mugu Sea Range in the Ventura County Star on May 3, 4 and 5, 2013, initiating a 19 day draft EA comment period. The comment period was extended one week to accommodate comment delays due to a major fire in the Ventura area the weekend of May 3, 2013 and the comment period closed on May 31, 2013. The Navy Region Southwest website included the NOA, a copy of the draft EA, and provided instruction 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 along with clarifications and modifications to the proposed conservation measures based on requirements in the final USFWS Biological Opinion.