Final

ENVIRONMENTAL ASSESSMENT/ OVERSEAS ENVIRONMENTAL ASSESSMENT

Point Mugu Sea Range Expansion of Unmanned Systems Operations

October 2014

Acronyms and Abbreviations

µg/m^3	micrograms per cubic meter
AAFL	Advanced Airship Flying Laboratory
ACHP	Advisory Council on Historic Preservation
ADS	active denial systems
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
AIS	automated identification system
APE	area of potential effect
APKWS	Advance Precision Kill Weapon System
ARPA	Archaeological Resources Protection Act
ASBS	Area of Special Biological Significance
ASW	anti-submarine warfare
AV	aerial vehicle
BASH	bird airstrike hazard
BAT	brilliant anti-armor technology
BLOS	beyond line-of-sight
BMP	best management practice(s)
BO	biological opinion
C3	command, control, and communications
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCC	California Coastal Commission
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CINMS	Channel Islands National Marine Sanctuary
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalent
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibel
DE	directed energy
DNL	Day-Night Average Noise Level
DoD	Department of Defense
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
E-O	electro-optical
EO	Executive Order
ESA	Endangered Species Act
EW	electronic warfare
FAA	Federal Aviation Administration
FACT	fast attack craft target
FOCUS	Fiber-Optic Communications Underwater System
GHG	greenhouse gases
GPS	global positioning system
HAPC	habitat area of particular concern
INRMP	Integrated Natural Resources Management Plan
HSMST	high speed maneuvering surface target
IED	improvised explosive device
IR	infrared
ISR	intelligence, surveillance, and reconnaissance
JDAM	Joint Direct Attack Munition
JLENS	Joint Land Attack Elevated Netted Sensor
LADAR	laser radar
LCS	Littoral Combat Ship
LIDAR	light detection and ranging
LOS	line-of-sight
LRF/D	laser range finder/designator
LTA	lighter-than-air
MBTA	Migratory Bird Treaty Act
MCM	mine countermeasures
MIO	maritime interdiction operations
MMA	Marine Managed Area
MMPA	Marine Mammal Protection Act
MPA	Marine Protected Area
MRA	Marine Resources Assessment
MS	maritime security
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	mean sea level
MST	mobile ship target
N	newton
NAAQS	National Ambient Air Quality Standards
NAS	National Airspace System
NAWCWD	Naval Air Warfare Center Weapons Division
NBVC	Naval Base Ventura County
NEPA	National Environmental Policy Act
NHPA	National Historical Preservation Act
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
NO_X	oxides of nitrogen
O_3	ozone
OEA	Overseas Environmental Assessment
OEIS	Overseas Environmental Impact Statement
OPNAVINST	Naval Operations Instruction
$PM_{2.5}$	particulate matter up to 2.5 micrometers in diameter
PM_{10}	particulate matter up to 10 micrometers in diameter
ppm	parts per million
RDAT&E	research, development, acquisition, test, and evaluation
R-2519	Restricted Area 2519
R-2535	Restricted Area 2535
RF	radio frequency
RIB	rigid inflatable boat
RONA	Record of Non-Applicability
RSO	Range Sustainability Office
RSTA	reconnaissance, surveillance, and target acquisition
SAR	synthetic aperture radar
SATCOM	satellite communication
SCB	Southern California Bight
SCCAB	South Central Coast Air Basin
SCM	Special Conservation Measure
SEL	Sound Exposure Level

Acronyms and Abbreviations

SHPO	State Historic Preservation Office
SIGINT	signal intelligence
SIP	State Implementation Plan
SOF	special operations forces
SO_X	oxides of sulfur
SPL	sound pressure level
SSM	surface-to-surface missile
SSV	semi-submersible vehicle
STUAS	small tactical unmanned aircraft system
SUA	special use airspace
SUW	surface warfare
SV	surface vehicle
TARS	Tethered Aerostat Radar System
UAS	unmanned aircraft system
UCLASS	unmanned carrier launched surveillance strike
UGV	unmanned ground vehicle
UMS	unmanned maritime system
U.S.	United States
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USSV-HS	unmanned sea service vehicle-high speed
UUV	unmanned underwater vehicle
VCAPCD	Ventura County Air Pollution Control District
VOC	volatile organic carbon
VTOL	vertical take-off and landing

FINAL ENVIRONMENTAL ASSESSMENT/OVERSEAS ENVIRONMENTAL ASSESSMENT

Lead Agency for the EA/OEA: U.S. Department of the Navy

Title of Proposed Action: Expansion of Unmanned Systems Operations, Point Mugu Sea Range, California

Designation: Environmental Assessment/Overseas Environmental Assessment

Abstract

The Naval Air Warfare Center Weapons Division (NAWCWD) Point Mugu Sea Range (Sea Range) is located in Ventura County along the Pacific Coast of Southern California and includes 36,000 sq mi (93,200 km^2) of ocean space; land areas at Naval Base Ventura County (NBVC) Point Mugu, San Nicolas Island, and Santa Cruz Island; and the special use airspace overlying the Sea Range. This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) 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 (Title 40 Code of Federal Regulations [CFR] Parts 1500-1508); Navy Procedures for Implementing NEPA (32 CFR Part 775); Executive Order (EO) 12114, Environmental Effects Abroad of Major Federal Actions, and Chief of Naval Operations Instruction (OPNAVINST) 5090.1C CH-1 18 Jul 2011, Environmental Readiness Program Manual. The NEPA process ensures that environmental impacts of proposed major federal actions are considered in the decision making process. Potential environmental impacts have been analyzed for all relevant or otherwise required issue areas, with separate sections on air quality; marine sediments and water quality; noise; biological resources; cultural resources; airspace, land, and water use; and public safety. No impacts are associated with other environmental resources or issues. No significant environmental impacts within U.S. territory or significant harm to the overseas environment have been identified for Alternative 1 – The Preferred Alternative, Alternative 2 – Expansion of Unmanned Aircraft Systems, or Alternative 3 – 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 Sea Range (Sea Range) is located in Ventura County along the Pacific Coast of Southern California. The Sea Range currently supports research, development, acquisition, test and evaluation (RDAT&E) of unmanned aircraft systems (UASs) as well as various categories of training activities. The current RDAT&E and training is addressed in the Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for the Point Mugu Sea Range, dated March 2002. The Navy proposes to increase the tempo of and extend its UAS RDAT&E operations and training capability and to include unmanned maritime system (UMS) operations on the Sea Range. The proposed UAS operations would be conducted at Naval Base Ventura County (NBVC) Point Mugu – including the Restricted Area 2519 (R-2519), at NBVC San Nicolas Island (SNI) – including the R-2535 restricted airspace, and within the associated special use airspace (SUA) over the Sea Range. All unmanned operations will be scheduled and managed by NAWCWD. In addition to the expanded unmanned systems operations, the Navy proposes to construct a hangar facility and administrative building on SNI, including new extension of roadways, tarmac, and aircraft parking areas.

This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses the potential environmental impacts of the proposed RDAT&E and training activities on the Sea Range, including components within as well as outside of the 12 nautical mile (nm) limit of the U.S. Territorial Seas. This EA/OEA has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321, as amended); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] 1500-1508, 1 July 1986); Department of the Navy Procedures for Implementing NEPA (32 CFR 775); Executive Order 12114, Environmental Effects Abroad of Major Federal Actions; and Chief of Naval Operations Instruction (OPNAVINST) 5090.1C CH-1 18 Jul 2011, *Environmental Readiness Program Manual* (Chapter 5), 30 October 2007.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the testing and training program proposed by NAWCWD, the action proponent, is to support U.S. Department of Defense (DoD) Unmanned Systems Integrated Roadmap, FY2011-2036, directives on the development of unmanned system applications vital to the National Defense through RDAT&E and training applications on the Sea Range.

The mission of NAWCWD includes operating the Sea Range to support the RDAT&E of advanced weapons technology, helping to ensure the battlespace dominance of our forces. There is a need for personnel to train with unmanned systems prior to deployment to theaters of ongoing military operations. Ensuring the technical readiness of unmanned systems with their associated control and support systems; as well as the readiness of military personnel operating them, are imperative to the successful employment of unmanned systems on the battlefield.

ALTERNATIVES

The consideration of viable action alternatives focused on means to achieve the purpose and need. Two action alternatives were identified:

- Alternative 1 – The Preferred Alternative includes expansion of the type and number of RDAT&E and training missions utilizing UASs and UMSs, as well as construction of new support facilities at SNI; and

- Alternative 2 – Expansion of UAS Operations includes the expansion of the type and number of RDAT&E and training missions utilizing UASs (but no introduction of UMS mission), as well as construction of new support facilities at SNI.

Both action alternatives include RDAT&E activities for unmanned systems and would include the use of missiles and manned aircraft and Navy vessels. Both action alternatives would use existing infrastructure and access roads, with the only new infrastructure involving the proposed construction and operation of the hangar facility with its associated new extension of roadways, tarmac, and aircraft parking areas.

In addition to the two action alternatives, Alternative 3 – The No-Action Alternative was analyzed as part of this EA/OEA.

ENVIRONMENTAL CONSEQUENCES

Resources analyzed in this EA/OEA include: air quality; marine sediments and water quality; noise; biological resources; cultural resources; airspace, land, and water use; and public safety. The environmental consequences associated with implementation of the action alternatives and No-Action Alternative are presented in Table ES-1. As shown in Table ES-1, implementation of the action alternatives (Alternative 1 – the Preferred Alternative or Alternative 2 – Expansion of UAS Operations) or the No-Action Alternative would result in no significant impacts to any resource area within the U.S. territory and would not cause significant harm to the overseas environment. The No-Action Alternative would not meet the purpose and need for the Proposed Action.

Table ES-1 Environmental Consequences of Alternatives

Resource Area	Alternative 1 Preferred Alternative	Alternative 2 UAS Expansion	Alternative 3 No-Action Alternative
Air Quality	o	o	o
Marine Sediments and Water Quality	o	o	o
Noise	o	o	o
Biological Resources	o	o	o
Cultural Resources	o	o	o
Airspace, Land, and Water Use	o	o	o
Public Safety	o	o	o

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

■ = Potentially significant impact or harm to the environment

FINAL ENVIRONMENTAL ASSESSMENT/OVERSEAS ENVIRONMENTAL ASSESSMENT

EXPANSION OF UNMANNED SYSTEMS OPERATIONS,

POINT MUGU SEA RANGE, CALIFORNIA

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CHAPTER 1
PURPOSE AND NEED

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 (93,200 km^2) Point Mugu Sea Range (Sea Range). The Sea Range currently supports research, development, acquisition, test and evaluation (RDAT&E) of unmanned aircraft systems (UASs) as well as various categories of training activities. The current RDAT&E and training is addressed in the Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for the Point Mugu Sea Range, dated March 2002. The Navy proposes to extend its UAS RDAT&E operations and training capability and to include unmanned maritime system (UMS) operations on the Sea Range. The proposed UAS operations would be conducted at Naval Base Ventura County (NBVC) Point Mugu – including the Restricted Area 2519 (R-2519), at NBVC San Nicolas Island (SNI) – including the R-2535 restricted airspace, and within the associated special use airspace (SUA) over the Sea Range. Figure 1-1 provides a geographic overview of the Sea Range. Figures 1-2 and 1-3 provide overviews of NBVC Point Mugu and SNI, respectively. All unmanned operations will be scheduled and managed by NAWCWD.

This Environmental Assessment/Overseas Environmental Assessment (EA/OEA) addresses the potential environmental impacts of the proposed RDAT&E and training activities on the Sea Range, including components within as well as outside of the 12 nautical mile (nm) limit of the U.S. Territorial Seas. This EA/OEA has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321, as amended); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] 1500-1508, 1 July 1986); Department of the Navy Procedures for Implementing NEPA (32 CFR 775); Executive Order (EO) 12114, Environmental Effects Abroad of Major Federal Actions; and Chief of Naval Operations Instruction (OPNAVINST) 5090.1C CH-1, *Environmental Readiness Program Manual* (Chapter 5), 18 July 2011.

1.1 PURPOSE OF THE PROPOSED ACTION

The purpose of the testing and training program proposed by NAWCWD, the action proponent, is to support U.S. Department of Defense (DoD) Unmanned Systems Integrated Roadmap FY2011-2036 (DoD 2011), directives on the development of unmanned system applications vital to the National Defense through RDAT&E and training applications on the Sea Range.

This requirement is for operationally realistic engagements over both maritime and land environments. The infrastructure needed to meet this requirement includes the following:

- maritime and land test ranges with environmental, range safety, explosive safety, laser safety, flight clearances, and frequency clearances;
- unmanned line-of-sight (LOS) and beyond line-of-sight (BLOS) range surveillance and data and communications relay;
- unmanned LOS and BLOS time, space, and position information instrumentation; and
- a hazard pattern prediction system and associated sensors to measure characteristics of the environment.
- adequate support facilities, hangars, and airfields.

Figure 1-1 Regional Location Point Mugu Sea Range

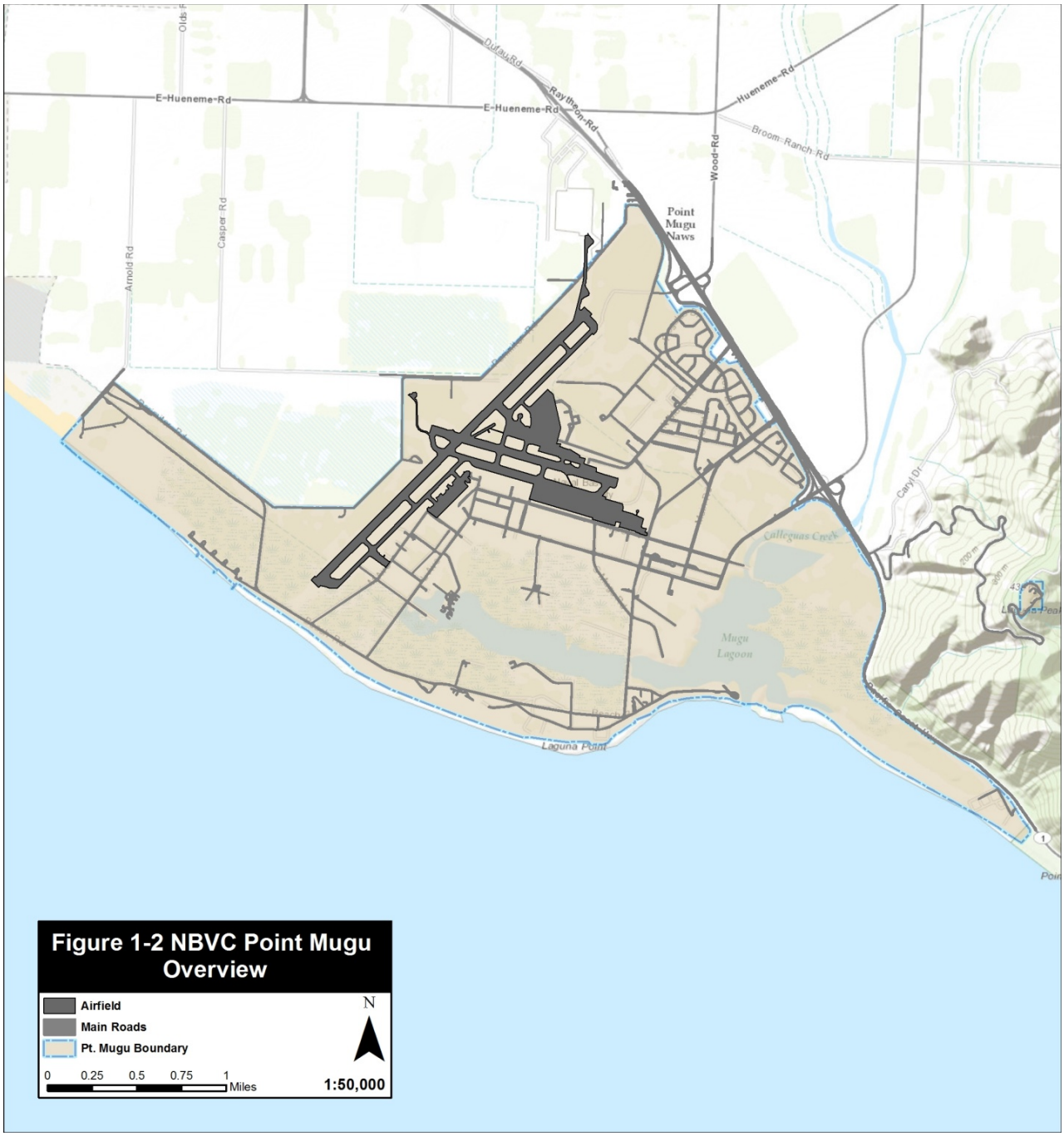
E-Hueneme-Rd
E-Hueneme-Rd
Hueneme-Rd
Broom Ranch Rd
Wood Rd
Point Mugu Naws
Arnold Rd
Casper Rd
Calleguas Creek
Mugu Lagoon
Laguna Point
Figure 1-2 NBVC Point Mugu Overview
Airfield
Main Roads
Pt. Mugu Boundary
N
0 0.25 0.5 0.75 1 Miles
1:50,000

Figure 1-3
San Nicolas Island Overview

1.2 NEED FOR THE PROPOSED ACTION

The mission of NAWCWD includes operating the Sea Range to support the RDAT&E of advanced weapons technology, helping to ensure the battlespace dominance of our forces. There is a need for the military to train with unmanned systems prior to deployment to theaters of ongoing operations. Ensuring the technical readiness of unmanned systems with their associated control and support systems, as well as the readiness of personnel operating them, are imperative to the successful employment of unmanned systems on the battlefield.

1.3 NEPA DOCUMENTS INCORPORATED BY REFERENCE

In accordance with the CEQ regulations for implementing the National Environmental Policy Act regulations (40 CFR 1502.21) material relevant to an EA may be incorporated by reference with the intent of reducing the document's size. Accordingly, one document is incorporated by reference in this EA/OEA because the actions addressed are applicable to the Proposed Action, *Final Environmental Impact Statement/Overseas Environmental Impact Statement, Point Mugu Sea Range* (Sea Range EIS/OEIS, [Navy 2002]). The Sea Range EIS/OEIS analyzes the ongoing test and training operations on Sea Range, as well as facility and equipment modernization proposed at the time of its publication as follows:

- 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. The expansion of unmanned systems operations associated the Proposed Action of this EA are similar to unmanned target and manned aircraft/vessel operations described in the 2002 EIS/OEIS. No significant, unmitigable environmental impacts of the Preferred Alternative of the EIS/OEIS were identified.

1.4 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

This EA/OEA covers the full range of environmental issues resulting from RDAT&E and training activities involving unmanned aircraft and maritime systems. The primary issues of concern in evaluating the potential impacts of the Proposed Action are the effects it could have on biological resources, cultural resources, air quality, and public health and safety. Consequently, these issues have received the greatest emphasis in the evaluations presented in this document. Specifically, the EA/OEA contains an evaluation of the following issues of concern.

- Air quality
- Maritime sediments and water quality
- Biological resources
- Noise
- Cultural resources
- Airspace, land, and water use
- Safety and occupational health

Considering the nature of the Proposed Action, negligible and insignificant impacts are expected for the following resource/issue areas:

- ***Geology and soils –*** The Proposed Action would involve limited construction in an existing disturbed area. Actions taken would not affect unique geological features, increase soil erosion, or impact soil sediment quality.
- ***Onshore water quality*** – No non-marine surface waters are present at the sites associated with the Proposed Action. Construction will occur in locations distant from surface waters. All NAWCWD activities would conform to the installation stormwater pollution prevention plan and associated best management practices (BMPs) which include eliminating discharges of sediment and other pollutants that could affect water quality. Any unanticipated spill would be controlled pursuant to the NBVC Contingency Plan (NBVC 2012).
- ***Aesthetics and visual resources*** – Proposed Action activities would be similar to those described in the 2002 Point Mugu Sea Range EIS/OEIS (Navy 2002).
- ***Infrastructure and utilities*** -Limited new infrastructure (short stretches of new road and taxiway) is needed to support the Proposed Action. Proposed activities would require relatively small increases of water use and would have negligible effects on other users of base infrastructure and utilities. Outside the new hangar construction, existing roads, facilities, and infrastructure would be utilized. No modifications to existing facilities (temporary lodging, meals, recreation, sanitation, etc.) are needed to accommodate the Proposed Action and associated personnel.
- ***Hazardous Materials and Waste*** – Materials used for operation and maintenance of unmanned systems would be the same as those used to support other aircraft and marine vessels, as described in the 2002 Point Mugu Sea Range EIS/OEIS and the SNI Roads and Airfield Repair Project EA of 2012. All standard operating procedures (SOPs) for the safe handling and disposal would be adhered to during the proposed unmanned systems operations.
- ***Socioeconomics*** - Proposed activities would not change existing economic impacts of the Point Mugu Sea Range or NBVC. The temporary increase in personnel at testing events would represent only marginal increases (less than 10%) to current activity levels. Proposed activities would involve temporary closures of air- and sea-space that are regularly closed already and would not further reduce access to commercial or recreation activities.

The resource areas listed above will not be discussed further in this EA/OEA.

1.5 DOCUMENT ORGANIZATION

This EA/OEA was prepared using a systematic, interdisciplinary assessment process, designed to provide decision makers with an organized analysis of the environmental consequences of implementing the Proposed Action. The organization of this EA/OEA is as follows:

- Chapter 1 discusses the purpose and need for the Proposed Action
- Chapter 2 describes the Proposed Action and alternative actions considered
- Chapter 3 describes the affected environment and environmental consequences with the implementation of each action alternative or the no-action alternative
- Chapter 4 addresses cumulative impacts under NEPA
- Chapter 5 discusses other NEPA considerations
- Chapter 6 lists the references cited in this EA/OEA
- Chapter 7 lists individuals, who participated in the preparation of this EA/OEA

- APPENDIX A provides the correspondence and comments received from agency review of this EA
- APPENDIX B provides the Record of Non-Applicability (RONA) as well as the air quality data and calculations supporting the RONA
- APPENDIX C summarizes the calculations used to estimate noise impacts
- APPENDIX D Summarizes public comment on the draft EA

1.6 REGULATORY COMPLIANCE

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

- Clean Air Act (CAA, 42 USC 7401 et seq.)
- Clean Water Act (CWA, 33 USC 1251 et seq.)
- Endangered Species Act (ESA,16 USC 1531 et seq., as amended)
- Marine Mammal Protection Act (MMPA, 16 USC 1361 et seq., as amended)
- Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA, 16 USC 1801 et seq.)
- Migratory Bird Treaty Act (MBTA, 16 USC 703 et seq.)
- Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*
- National Historic Preservation Act (NHPA, 16 USC 470 et seq.)
- Coastal Zone Management Act (CZMA, 16 USC 1451 et seq.)

Each of the above regulatory requirements is addressed within the context of the relevant section of this EA/OEA. 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 (Appendix A). Compliance with the federal Coastal Zone Management Act (CZM) has been accomplished through consultation with the California Coastal Commission (CCC) and the subsequent review thereof (Appendix A). In addition, consultation with the California State Historic Preservation Office (SHPO) was conducted in accordance with Section 106 of the NHPA (Appendix A)

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CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

This chapter provides an in-depth discussion of the Proposed Action and Alternatives. The chapter also provides background information on unmanned systems that may be applied across the alternatives considered in this EA/OEA.

The Alternative 1 (Preferred Alternative) description provides an overview of full expansion of the RDAT&E and training missions foreseen on the Sea Range, including construction of new support facilities at SNI. These facilities would include a new hangar for the storage and maintenance of unmanned systems and associated extension of roadways, tarmac, and aircraft parking areas connecting the hangar to the SNI airstrip.

Alternatives to the Preferred Alternative considered in this EA/OEA include: 1) conducting only the expanded UAS operations (no UMS operations introduced) and 2) the No Action Alternative.

2.1 UNMANNED AIRCRAFT SYSTEMS MISSIONS

Unmanned systems have been deployed in a wide variety of scenarios to meet military functions. Application of the unmanned systems allows the warfighter to conduct missions more effectively with reduced risk by reducing the military workload and exposure to direct enemy contact. Emerging technologies allow unmanned systems capabilities to support the Navy in missions previously unknown. Unmanned systems capabilities provide support to the following military missions.

- Reconnaissance and surveillance
- Security
- Attack
- Command, control, and communications support
- Combat Support
- Sustainment

Reconnaissance and surveillance is the primary mission met by UASs. Many UAS platforms provide full motion video surveillance, and increasingly new demands arise for wide-area search and multi-intelligence capability.

Security operations preserve friendly force combat power and freedom of maneuver, while providing information about the threat and terrain. UASs support security operations by providing information regarding the threat; and deny this threat the ability to observe and execute direct fire engagements on the protected force.

Attack operations supported by unmanned systems include close combat, interdiction attack, and strike missions. UASs support close combat by operating as a part of combined arms team when conducting decisive, integrated, air-ground operations, to close with and destroy the enemy through fire and maneuver. Strike missions require a continuous capability to immediately locate, strike, and conduct physical damage assessments of commanders' time sensitive targets throughout the area of operation.

Command, control, and communications (C3) support provides commanders with the ability to broaden the communication network throughout the extended and possibly austere area of operation, thus improving effective command and control. UASs with network extension payloads enable continuous network connectivity among networked weapon systems, sensors, personnel, and command posts at all echelons. This increased connectivity can be ensured while on the move, in complex/urban terrains, and in all weather conditions.

Combat Support Missions are ideally suited to UASs which include a wide variety of military intelligence, engineering, military police, and chemical operations as well as combat identification to distinguish friend, enemy, neutral, and noncombatant.

Sustainment functions of UASs include the delivery of supplies and materials to forward deployed units. Future UASs may conduct autonomous supply operations as well as extraction of damaged parts for repair. Sustainment/cargo unmanned system assets could provide responsive and precise transport of small, high value payloads.

2.1.1 Payloads

The functions and capabilities of unmanned systems largely depend on the payloads conveyed. Unmanned systems payloads can include sensors, communications relay equipment, weapons, and cargo.

Sensor payloads include optical, radar, laser rangefinder, laser designation, explosive hazards detection, and environmental measurements. Types of sensors deployed on unmanned systems can include:

- Electro-optical (E-O) imagery
- Infrared (IR) imagery
- Meteorological / Maritime sensors
- Moving target indicator
- Light detection and ranging (LIDAR)
- Laser radar (LADAR)
- Electromagnetic detector
- Signal intelligence (SIGINT)
- Measurement and signatures intelligence
- Laser range finder/designator (LRF/D)

Communications relay payloads provide the capability to extend the range of voice and data transmissions and allow troops to share uninterrupted voice, data, and real-time video. Often unmanned systems are equipped with multi-language transmission and data translation capabilities. These capabilities are important factors for ensuring successful communications and data sharing.

Weapons employ both lethal and non-lethal effects and can be directed at humans, property, or material. Lethal weapons conveyed on unmanned systems include missiles and bombs (both live and inert). These munitions are usually in the 500-pound class or less and are often Global Positioning System (GPS) or laser-guided. The weapons can be deployed in air-to-air, air-to-surface, surface-to-air, surface-to-surface, and underwater scenarios. Hazardous constituents found in live and inert weapons are discussed in Section 3.2 below. Examples of lethal weapons include:

- Brilliant Anti-Armor Technology (BAT) weapon.
- AGM-124 Air-to-Ground Missile
- Joint Direct Attack Munition (JDAM)
- GPS Guided Munitions

Non-lethal weapons deployed on unmanned systems are often directed energy (DE) equipment. For Sea Range applications only the less complex DE systems such as Low Power Lasers, Active Denial Systems (ADS), Improvised Explosive Device (IED) Neutralizer, and Counter-Vehicle radio frequency (RF) Disabling capabilities are expected. The following examples are candidate applications:

- Low power lasers designed to “dazzle” snipers and the operators of small surface ship threats (jet skis, small boats), and to counter visible and infrared sensors and night vision systems. The power levels of these types of systems range from less than a watt to 10s of watts of average power.
- ADS is a non-lethal, counter personnel, narrow beam, line-of-sight DE weapon that uses a controllable millimeter wave (95-GHz) beam to produce an irresistible heating sensation on the adversary’s skin (10 milliwatts per square centimeter) that causes an immediate deterrence effect.

- The IED neutralizer, based on commercial off-the shelf components, which has been tested in theater operations. A variant is being developed for possible unmanned operations.
- Counter-Vehicle RF- directed energy systems are being developed to disable vehicles through engaging and disrupting the occupants similar to ADS or by stopping the vehicles by damaging the electronic controls.

2.2 CLASSIFICATIONS OF UNMANNED AIRCRAFT SYSTEMS

Table 2-1 provides categories commonly accepted for the grouping of UAS. These categories are based on the attributes of weight, operating altitude, and speed. These attributes allow categorization without respect to UAS mission, propulsion type, or payload.

Table 2-1 UAS Groups

UAS Group	Maximum Gross Takeoff Weight (lbs)	Normal Operating Altitude (ft)	Speed
Group 1	0-20	<1,200 AGL	100 knots
Group 2	21-55	<3,500 AGL	<250 knots
Group 3	<1,320	<18,000 MSL	
Group 4	>1,320		Any Airspeed
Group 5		>18,000 MSL	

Source: Joint Unmanned Aircraft Systems Center of Excellence (JUAS COE)
Note: AGL = above ground level, MSL = mean sea level

UAS platforms include both traditional fixed-wing aircraft and rotary-wing aircraft (e.g., helicopters) with the capability to take off and land vertically. The sections below describe UAS platforms that could be operated at the Sea Range.

2.2.1 Groups 1 & 2 UAS

Group 1 Air Vehicles (AVs) are typically hand-launched portable systems employed at the small unit level or for base security. These systems are capable of providing "over the hill" or "around the corner" type reconnaissance, surveillance, and target acquisition. Payloads are modular and can include E-O, IR, and synthetic aperture radar (SAR). Group 1 UAS have small logistics footprints.

In training exercises, UAS groundcrews would typically include one person to operate the AV and one to maintain the system, for a total of two groundcrew members. Test and evaluation of Group 1 UAS can include up to 15 personnel located in a command center.

Table 2-2 provides examples of Group 1 AVs considered for use in this EA/OEA. The table includes parameters that were used in the analysis of environmental impacts associated with their use. These parameters include the size of the vehicle, the method used to launch the vehicle, the engine type or fuel used for propulsion, and the infrastructure support needed to operate Group 1 UAS.

Group 2 AVs are typically medium-sized, catapult-launched, mobile systems that usually support brigade-level and lower intelligence, surveillance, and reconnaissance (ISR)/reconnaissance, surveillance, and target acquisition (RSTA) requirements. These systems operate at altitudes less than 3,500 feet above ground level (AGL) with local to medium range. They usually operate from unimproved areas and do not usually require improved runways. Payloads may include sensor balls with E-O/IR and LRF/D capabilities. Group 2 UAS have small logistics footprints. Table 2-3 provides a summary of Group 2 UASs considered in this EA/OEA.

Table 2-2 Example Group 1 AVs

AV	Size (lb)	Launch Type	Engine/ Fuel Type	Infrastructure Support Required
WASP III	1	Hand	Battery	Zero field footprint, recovery does not require equipment or runway
TACMAV	0.8	Hand	Battery	Zero field footprint, recovery does not require equipment or runway
Dragoneye/ Swift (RQ-14A/B)	5.5	Hand or slingshot	Battery	Zero field footprint, recovery does not require equipment or runway
BUSTER	13	Hand or catapult	Gasoline/ JP-5	Very small field footprint, recovery does not require equipment or runway
Raven (RQ-11B/C)	5	Hand	Battery	Zero field footprint, recovery does not require equipment or runway
FPASS	8	Slingshot	Battery	Zero field footprint, recovery does not require equipment or runway
T-Hawk (RQ-16A)	19.7	Vertical take-off & landing (VTOL)	Gasoline	Zero field footprint, recovery does not require equipment or runway
Pointer	11	Hand or vehicle mount	Battery	Zero field footprint, recovery does not require equipment or runway
Aqua/Terra Puma	10	Hand	Battery	Zero field footprint, recovery does not require equipment or runway

In Group 2 UAS training exercises, groundcrews would typically include two persons to operate the AV and one to maintain the system, for a total of three groundcrew members. Test and evaluation of Group 2 UAS can include up to 15 personnel located in a command center.

Table 2-3 Example Group 2 AVs

AV	Size (lb)	Launch Type	Engine/ Fuel Type	Infrastructure Support Required
ScanEagle	40	Catapult	JP-5	Small field footprint, recovery by near-vertical recovery system (Skyhook)
Silver Fox	20	Catapult or runway	Gasoline/JP-5	Small field footprint, recovery by net or undeveloped landing strip
Aerosonde	33	Catapult	Gasoline	Small field footprint, recovery by net or undeveloped landing strip

2.2.2 Group 3 UAS

Group 3 AVs are generally significantly larger than Groups 1 and 2 AVs. They operate at medium altitudes and have medium to long range and endurance. Group 3 UAS payloads may include sensor balls with E-O/IR, LRF/D, SAR, moving target indicator, SIGINT, communications relay, explosive hazards detection, and electromagnetic detection. Some Group 3 AVs carry weapons but usually have reduced endurance when carrying weapons payloads. These UAS usually operate from unimproved areas and may not require improved runways. Group 3 UAS typically require ground support equipment leading to a relatively large logistics footprint. Table 2-4 provides a summary of Group 3 UAS considered in this EA/OEA.

In Group 3 UAS training exercises, groundcrews would typically include three persons to operate the AV and three to maintain the system, for a total of six groundcrew members. Test and evaluation of Group 3 UAS can include up to 15 personnel located in a command center.

Table 2-4 Example Group 3 AVs

AV	Size (lb)	Launch Type	Engine/ Fuel Type	Infrastructure Support Required
Shadow (RQ-7B)	375	Catapult or runway	Gasoline	Small field footprint, recovery by undeveloped runway (can be assisted by arrestor wire)
Neptune (RQ-15A)	130	Catapult (can be shipboard)	Gasoline	Often launched from vessels, small field footprint (when launched from land)
XPV-1	130	Runway	Gasoline	Small field footprint, recovery by undeveloped runway (can be assisted by arrestor wire)
XPV-2	130	Runway	Gasoline or hydrogen fuel cell	Small field footprint, recovery by undeveloped runway (can be assisted by arrestor wire)
Small Tactical UAS (STUAS)	130	Catapult	JP-5 & JP-8	Small field footprint, recovery via Skyhook system

2.2.3 Groups 4 & 5 UAS

Group 4 UAS are relatively large systems that operate at medium to high altitudes and have extended range and endurance. Group 4 payloads may include E-O/IR, radars, lasers, communications relay, SIGINT, automated identification systems (AIS), and weapons. Group 4 AVs must meet airworthiness standards, as defined by FAA Order 8130.34B - *Airworthiness Certification of Unmanned Aircraft Systems and Optionally Piloted Aircraft*, prior to operations within the National Airspace System (NAS).

Group 4 UAS normally require improved areas for launch and recovery (i.e., runways). These UASs possess logistics footprints similar to manned aircraft of similar size and must meet stringent airspace requirements. Lack of satellite communication (SATCOM) links could inhibit BLOS capabilities for some Group 4 UAS. Table 2-5 provides a summary of Group 4 UAS considered in this EA/OEA.

Table 2-5 Example Group 4 AVs

AV	Size (lb)	Launch Type	Engine/ Fuel Type	Infrastructure Support Required
Hunter (MQ-5B)	1,620	Runway	Gasoline	Developed runway required (landing can be assisted by arrestor wire)
Fire Scout (MQ-8C)	6,000	VTOL	JP-5/JP-8	Minimal field footprint, VTOL
Predator ER/MP (MQ-1A/B/C)	3,200	Runway	Diesel, AV Gas	Developed runway required
Hummingbird (A-160)	6,500	VTOL	Gasoline	Minimal field footprint, VTOL

Group 5 represents the largest UAS. They operate in medium to high altitudes and typically have the greatest range/endurance and airspeed. Group 5 UAS perform specialized missions including broad area surveillance and penetrating attacks. Payloads may include E-O/IR, radars, communications relay,

SIGINT, AIS, weapons, and supplies. Group 5 AVs must meet airworthiness standards prior to operations within the NAS.

In Group 5 UAS training exercises, groundcrews would typically include five persons to operate the AV and four to maintain the system, for a total of nine groundcrew members. Test and evaluation of Group 5 UAS can include up to 15 personnel located in a command center.

Group 5 UAS require improved areas for launch and recovery. These UAS possess logistics footprints similar to manned aircraft of similar size and must meet stringent airspace requirements. Table 2-6 provides a summary of Group 5 UAS considered in this EA/OEA.

Table 2-6 Example Group 5 AVs

AV	Size (lb)	Launch Type	Engine/Fuel Type	Infrastructure Support Required
Reaper (MQ-9A)	10,500	Runway	JP-5/JP-8	Developed runway required
Global Hawk (RQ-4)	32,500	Runway	JP-8	Developed runway required
Triton	26,750	Runway	JP-8	Developed runway required
Global Observer	6,300	Runway	Liquid hydrogen	Developed runway required
Unmanned Carrier-Launched Surveillance Strike (UCLASS)	46,000	Runway	JP-5/JP-8	Developed runway required

2.2.4 Lighter-than-Air UAS

Airships and aerostats have been used historically for military surveillance and anti-submarine warfare. Unlike fixed-wing aircraft or helicopters, aerostats and airships are lighter-than-air (LTA); typically using helium to stay aloft. Airships are traditionally manned, and use engines to fly. Aerostats are tethered to the ground, by a cable that also provides power.

This class of UAS would occasionally require routine use of range assets located at the Sea Range complex for system performance and interoperability testing. LTA AVs may be aloft for extended periods of time for Range Clearing operations. Types of testing include: ISR, communications, navigation, electronic warfare, weapons, and interoperability with other ground, surface, air, subsurface vehicles and control stations. Table 2-7 provides a summary of LTA UAS considered in this EA/OEA.

In LTA UAS training exercises, groundcrews would typically include two to three persons to operate the AV and three to five groundcrew members to maintain the system, for a total of five to eight groundcrew members. Test and evaluation of LTA UAS can include up to 15 personnel located in a command center.

Table 2-7 Example LTA AVs

AV	Length (ft)/ Volume (ft^3)	Engine/Fuel Type	Endurance (day)/ Max. Altitude (ft)	Operation Description
Advanced Airship Flying Laboratory (AAFL)	200/ 275,000	JP-5/JP-8	2/ 20,000	ISR platform, 2,000 lb capacity
Tethered Aerostat Radar System (TARS)	208/ 420,000	Tethered	30/ 15,000	Radar sensors, 1,200 lb capacity
Joint Land Attack Elevated Netted Sensor (JLENS)	233/ 590,000	Tethered	30/ 15,000	System of two aerostats, one with SuR and the other with PTIR
Rapid Aerostat Initial Deployment (RAID)	49/ 10,200	Tethered	5/ 1,000	E-O/IR platform, 200 lb capacity
Rapidly Elevated Aerostat Platform (REAP)	31/ 2,600	Tethered	10/ 300	E-O/IR platform, 35 lb capacity
Persistent Threat Detection System (PTDS)	114/ 64,000	Tethered	30/ 5,000	E-O/IR platform, 500 lb capacity

2.3 UNMANNED MARITIME SYSTEM CLASSIFICATIONS

There are seven mission classes that describe UMS operations. These include:

- Mine Countermeasures (MCM)
- Anti-Submarine Warfare (ASW)
- Maritime Security (MS)
- Surface Warfare (SUW)
- Special Operations Forces (SOF) Support
- Electronic Warfare (EW)
- Maritime Interdiction Operations (MIO) Support

To meet these missions, UMS utilize many hull and craft types. The most common types include:

- Semi-submersible craft,
- Conventional planning hull craft
- Hydrofoils, and
- Other craft types.

There are three standard vehicle classes and one non-standard surface vehicle (SV) class of UMS that are utilized to accomplish the seven unmanned system missions:

- **Harbor Class –** Based on the Navy Standard (see Naval Ships' Technical Manual Chapter 583) seven-meter Rigid Inflatable Boat (RIB) focused on the MS Mission, with a robust ISR capability and a mix of lethal and non-lethal armament. The Harbor Class SV can be supported by the majority of our Fleet, since it will use the standard seven-meter interfaces.
- **Snorkler Class –** A roughly seven-meter semi-submersible vehicle (SSV) which supports MCM towing (search) missions, ASW (Maritime Shield) and is also capable of supporting special missions that can take advantage of its relatively stealthy profile.
- **Fleet Class –** A purpose-built SV, consistent with the handling equipment and weight limitations of the current 11-meter RIB. Variants of the Fleet Class will support MCM Sweep, Protected Passage ASW, and "high-end" SUW missions.

- **X- Class –** Small, non-standard class of systems capable of supporting SOF requirements and MIO missions. It provides a "low-end" ISR capability to support manned operations and is launched from small manned craft such as the 11-meter RIB or the Combat Rubber Raiding Craft.

In UMS training exercises, groundcrews would typically include one to two persons to operate the SV and one to three groundcrew members to maintain the system, for a total of two to five groundcrew members. Test and evaluation of UMS can include up to 15 personnel located in a command center.

This EA/OEA does not include any payload systems utilizing sonar or other subsurface acoustic sources. As such, SVs associated with MCM and ASW missions are not included within the scope of this EA/OEA. Semi-submersible craft are also excluded from this EA/OEA. Table 2-8 provides examples of UMS analyzed in this EA/OEA.

Table 2-8 Example SVs

SV	Craft Type	Vehicle Class	Operation Description
SPARTAN	7- and 11-meter RIB	Fleet Class	Manually-operated (remote control) RIB platform for E-O/IR, SIGINT, and missile systems.
Unmanned Sea Service Vehicle – High Speed (USSV-HS)	11-meter hydrofoil	Fleet Class	High-speed hydrofoil platform supporting EW mission.
Protector – Harbor Class SV	7- and 9-meter RIB	Harbor Class	Platform for mini-Typhoon weapon system and E-O sensors, supports MIO and other missions
Sea Doo	4-meter converted sports craft	X-Class	Platform for E-O/IR and ISR sensors, often used for security and electronic warfare applications
Zodiac	7-meter RIB	Harbor Class	Platform for E-O/IR and ISR sensors
Odyssey SV	11-meter rigid hull craft	Fleet Class	ISR platform with stealth capabilities
Mobile Ship Target (MST)	266-foot ship	Fleet Class	Large unmanned platform to represent ship-sized threat, can carry up to 50-ton payload
High Speed Maneuvering Surface Target (HSMST)	11-meter RIB	Fleet Class	Unmanned platform to represent high-speed threat, can carry passive RF and IR systems
Fast Attack Craft Target (FACT)	50-foot craft	Fleet Class	Unmanned platform to represent missile-capable patrol boat

2.4 ALTERNATIVES DEVELOPMENT

Analysis of the Proposed Action alternatives provides the decision maker and the public a clear understanding of the relevant issues and a basis for choosing among identified options. The alternatives must support the need and purpose of the Proposed Action and be consistent with the goals, policies, management strategy, and mission requirements of NAWCWD and NBVC.

The criteria provided in this section establish a minimum set of requirements that should be met in order for an alternative to be considered viable. While an alternative may not fully meet all selection criteria, it may be retained to provide an environmental baseline for comparison but would not be selected as the Preferred Alternative. Retained alternatives are fully analyzed in Chapter 3 (Affected Environment and Environmental Consequences) of this EA/OEA.

The criteria used to select the alternatives discussed in this EA/OEA address the need to test fully integrated unmanned systems in a controlled field environment. For this EA/OEA, a viable alternative would:

- Present a broad range of airspace test areas in a maritime/littoral environment for operations of the UASs, UMSs, and the applicable subsystems;
- Allow full functioning of the UASs and UMSs for complete system evaluation with specialized subsystems;
- Provide for the testing of UASs and UMSs that would meet the DoD and Department of the Navy operational requirements;
- Provide a full range of instrumentation and data reduction capability;
- Include a wide range of surface and maritime targets and target areas for evaluation of Navy UAS weapons delivery system effectiveness;
- Support operation of all UAS and UMS subsystems integration (e.g., electrical, hydraulic, avionics, engines, flight controls);
- Permit operations of both unmanned systems and the associated subsystems without restrictions that would invalidate test results;
- Permit a teaming environment for multiple UASs or UASs in association with UMSs;
- Allow continued operation of manned aircraft in parallel with UAS operations; and
- Provide an environment that meets federal, state, DoD, and Navy requirements.

2.5 ALTERNATIVE 1 – THE PREFERRED ALTERNATIVE

Currently NBVC approves UAS operations on case-by-case basis. In calendar years 2012 and 2013, operations using UAS occurred on 25 and 49 days respectively. The Preferred Alternative of this EA/OEA would be to expand the annual number of UAS operations on the Sea Range, utilizing the R-2519 and R-2535 restricted airspace and the SUA of the Sea Range. Unmanned systems operations would occur up to 250 days per year, with each event having durations within the range of 1 hour to 7 days.

Alternative 1 includes multiple types of UASs and UMSs, composed of AVs and surface vehicles (SVs) of one category to a multitude of groups. Operation and maintenance of the unmanned systems requires personnel responsible for the launch and recovery of the vehicles, command and control of the vehicles, and maintenance of the unmanned systems and associated equipment.

Each unmanned system includes the necessary components to perform an operational mission. Systems may include multiple AVs/SVs (and possibly multiple UAS/UMS Groups), launch/recovery platforms, ground control stations, communication links, and support equipment. Support equipment may include

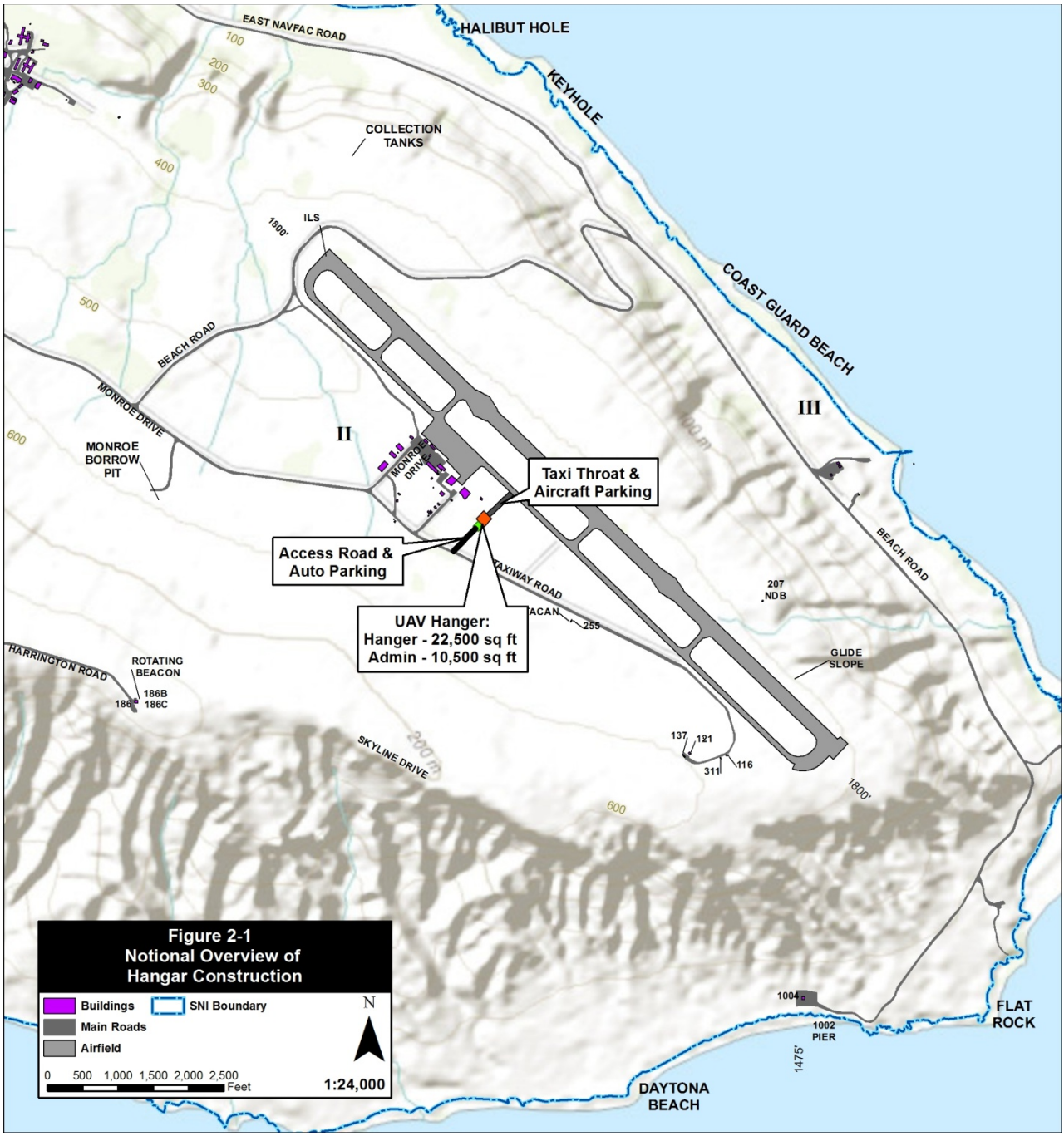
catapult and rail launch platforms, net or cable recovery systems, communications, radar tracking, and maintenance equipment. Command centers can be permanent buildings at NBVC Point Mugu and SNI, or the command centers can be mobile truck/van units or ship-based systems.

Some UASs/UMSs can be launched from Navy vessels based out of Port Hueneme and operating on the Sea Range. The AVs/SVs would be controlled from shipboard command centers or facilities at NBVC Point Mugu. Any activities that occur within buildings at Point Mugu, Port Hueneme, or SNI would be the same as those that already occur, and no building renovations are proposed. Existing activities were analyzed in the Sea Range EIS/OEIS (Navy 2002). New operations would occur from the ships' decks at sea and would not require land-based launch or recovery. Many of the UASs used in these operations would utilize vertical take-off and landing (VTOL) technology, while others would be launched via catapult. Some UASs, such as the Neptune RQ-15, can land on water due to their fuselage and/or skid design.

It is assumed that all UMSs will be launched from Port Hueneme. Storage and maintenance of all SVs would be conducted in existing facilities. In addition to the UMSs, manned vessels associated with the Proposed Action include Littoral Combat Ship Designs 1 and 2 (LCS-I and LCS-II) and U.S. Coast Guard Cutters. The LCS and Cutters would be used as launch and recovery platforms for UASs.

2.5.1 Construction

Under the Preferred Alternative, there would be no new construction activities at NBVC Point Mugu or Port Hueneme. There would; however, be a new hangar complex built on SNI, southeast of existing airfield support facilities (see Figure 2-1). This complex would include a 22,500 ft^2 (2,090 m^2) hangar, a 10,500 ft^2 (975 m^2) administrative/office building, a tarmac taxiway (or taxi throat) and aircraft parking area (21,780 ft^2 [2,023 m^2]), and an access road and auto parking area (87,120 ft^2 [8,094 m^2]). While the exact final design of this facility is not known at this time, all construction would occur on previously disturbed areas and directly adjacent to existing facilities. Figure 2-1 provides a notional overview of the proposed construction activity on SNI.


EAST NAVFAC ROAD
HALIBUT HOLE
KEYHOLE
COLLECTION TANKS
ILS
COAST GUARD BEACH
BEACH ROAD
MONROE DRIVE
MONROE BORROW PIT
II
III
Taxi Throat & Aircraft Parking
Access Road & Auto Parking
UAV Hanger:
Hanger - 22,500 sq ft
Admin - 10,500 sq ft
TAXIWAY ROAD
207 NDB
GLIDE SLOPE
HARRINGTON ROAD
ROTATING BEACON
186B
186C
SKYLINE DRIVE
137
121
311
116
1004
1002 PIER
FLAT ROCK
DAYTONA BEACH
Figure 2-1
Notional Overview of
Hangar Construction
Buildings
SNI Boundary
Main Roads
Airfield
N
0 500 1,000 1,500 2,000 2,500 Feet
1:24,000

2.5.2 Flight Operations

All UAS operations described in this EA would operate within the 36,000-square mile (93,200 km^2) SUA over the Pacific Ocean. In general, most AV flights would take off and land at NBVC Point Mugu, while a smaller percentage of AV flights would be based at SNI. It is assumed that most LTA AV would operate at NBVC Point Mugu. Table 2-9 provides a summary of the assumed operations tempo analyzed in this EA/OEA. This tempo will set a baseline for UAS operations on the Sea Range. The exact aircraft to be used cannot be forecast and may change over time. For the sake of providing a basis of analysis, surrogate aircraft providing a range of aircraft size, type, and operational parameters have been chosen to represent each UAS Group. The surrogates chosen by no means restrict the UASs that may be operated at the Sea Range but rather provide representatives of each UAS class.

Table 2-9 Assumed UAS Flight Tempo

UAS Group *Surrogates*	Sorties/year	Breakout – Percent (Number)	
		Pt Mugu	SNI
Group 1	500	75% (375 sorties)	25% (125 sorties)
Puma	*320*	*240 sorties*	*80 sorties*
Pointer	*180*	*135 sorties*	*45 sorties*
Group 2	200	75% (150 sorties)	25% (50 sorties)
ScanEagle	*200*	*150 sorties*	*50 sorties*
Group 3	250	80% (200 sorties)	20% (50 sorties)
STUAS	*150*	*120 sorties*	*30 sorties*
Shadow	*100*	*80 sorties*	*20 sorties*
Group 4	377	89% (337 sorties)	11% (40 sorties)
Fire Scout	*277*	*257sorties*	20 sorties
Hunter	*100*	*80 sorties*	20 sorties
Group 5	100	85% (85 sorties)	15% (15 sorties)
TRITON	*25*	*21 sorties*	*4 sorties*
UCLASS	*75*	*64 sorties*	*11 sorties*
LTA	20	75% (15 sorties)	25% (5 sorties)
AAFL	*15*	*11 sorties*	*4 sorties*
JLENS	*5*	*4 sorties*	*1 sorties*

Many UAS sorties would include more than one AV aloft at a time. Often two or more AVs would be flown to provide communications relay capabilities over a greater distance or can provide surveillance over a larger area. In such instances, a second AV would be launched prior to another's maximum time aloft, providing continuous mission support as it replaces the previous AV operation. Table 2-10 provides assumptions used to analyze UAS operations in a per sortie manner. It is assumed that each sortie includes AVs of one type. The values for distance traveled and time aloft represent single AV flights. As an example, one Puma sortie would represent three vehicles aloft for two hours, each with a flight path covering 60 miles (97 km).

Table 2-10 Assumed UAS Flight Details

NBVC POINT MUGU					
AV	**Aircraft/ sortie**	**Sorties/ year**	**Miles/ sortie**	**Hours/ sortie**	**Payloads**
Puma	3	240	60	2	E-O, IR, SAR
Pointer	2	135	60	2	E-O, IR, SAR
ScanEagle	2	150	1,000	20	E-O/IR, SAR, LRF/D
Shadow	3	80	500	7	E-O/IR, SAR, LRF/D, SIGINT, communications relay, moving target indicator, explosive detection
STUAS	3	120	800	10	E-O/IR, SAR, LRF/D, SIGINT, communications relay, moving target indicator, explosive detection
Hunter	1	80	1,400	18	E-O/IR, radar, laser sensors, AIS, DE weapons, lethal weapons, communications relay
Fire Scout	1	257	200	3.2	E-O/IR, radar, laser sensors, AIS, DE weapons, lethal weapons, communications relay
Triton	1	21	9,000	24	E-O/IR, radar, SIGINT, AIS, supplies, communications relay
UCLASS	1	64	4,400	9	E-O/IR, radar, SIGINT, AIS, DE weapons, lethal weapons, supplies, communications relay
AAFL	1	11	100	36	E-O/IR, SAR, SIGINT, communications relay, electronic warfare systems
JLENS	1	4	0 (tethered)	120	E-O/IR, SAR, SIGINT, communications relay, electronic warfare systems
NBVC SAN NICOLAS ISLAND					
AV	**Aircraft/ sortie**	**Sorties/ year**	**Miles/ sortie**	**Hours/ sortie**	**Payloads**
Puma	3	80	60	2	See above
Pointer	2	45	60	2	See above
ScanEagle	2	50	1,000	20	See above
Shadow	3	20	500	7	See above
STUAS	3	30	800	10	See above
Hunter	1	20	1,400	18	See above
Fire Scout	3	20	425	6	See above
Triton	1	4	9,000	24	See above
UCLASS	1	11	4,400	9	See above
AAFL	1	4	100	36	See above
JLENS	1	1	0 (tethered)	120	See above

Chase aircraft would be used in support of the Proposed Action. Helicopter sorties and F/A-18 sorties conducted in support of Fire Scout and UCLASS operations would not significantly change the existing numbers of sorties for these aircraft occurring on the Sea Range and analyzed in the Sea Range EIS/OEIS (Navy 2002). It is estimated that 10 helicopter sorties and 20 F/A-18 sorties would be conducted annually

in support of Fire Scout and UCLASS operations, respectively. All chase aircraft operations would be based at NBVC Point Mugu.

Some UAS flights will involve testing of kinetic weapons systems, comprised of approximately 30 annual sorties with missiles. For analysis purposes, it is assumed that missiles discussed in section 2.1.1 would be fired in equal quantities.

To eliminate the potential for new ground disturbance impacts, the launch and recovery of AVs at Point Mugu and SNI would occur solely on existing graded and/or paved areas, including but not limited to airstrips, roadways, and pad sites. NBVC Point Mugu sites would include but are not limited to Alpha/Beta/Charlie pads, the Correlated Orientation Tracking and Radar (COTAR) site, the Lagoon Landfill, the Point parking area, and the Marine Aviation Detachment site. At SNI, AVs would be launched and recovered from any existing pad, landing zone, paved areas, or unpaved graded ground that would not be adversely impacted or from the newly constructed hangar facility's tarmac or taxiways. Group 3, 4, and 5 AVs would be restricted to any existing site large enough to accommodate them without impacts to sensitive natural and cultural resources. Figure 2-2 provides an overview of representative launch/recovery sites at NBVC Point Mugu, and Figure 2-3 highlights representative sites on SNI.

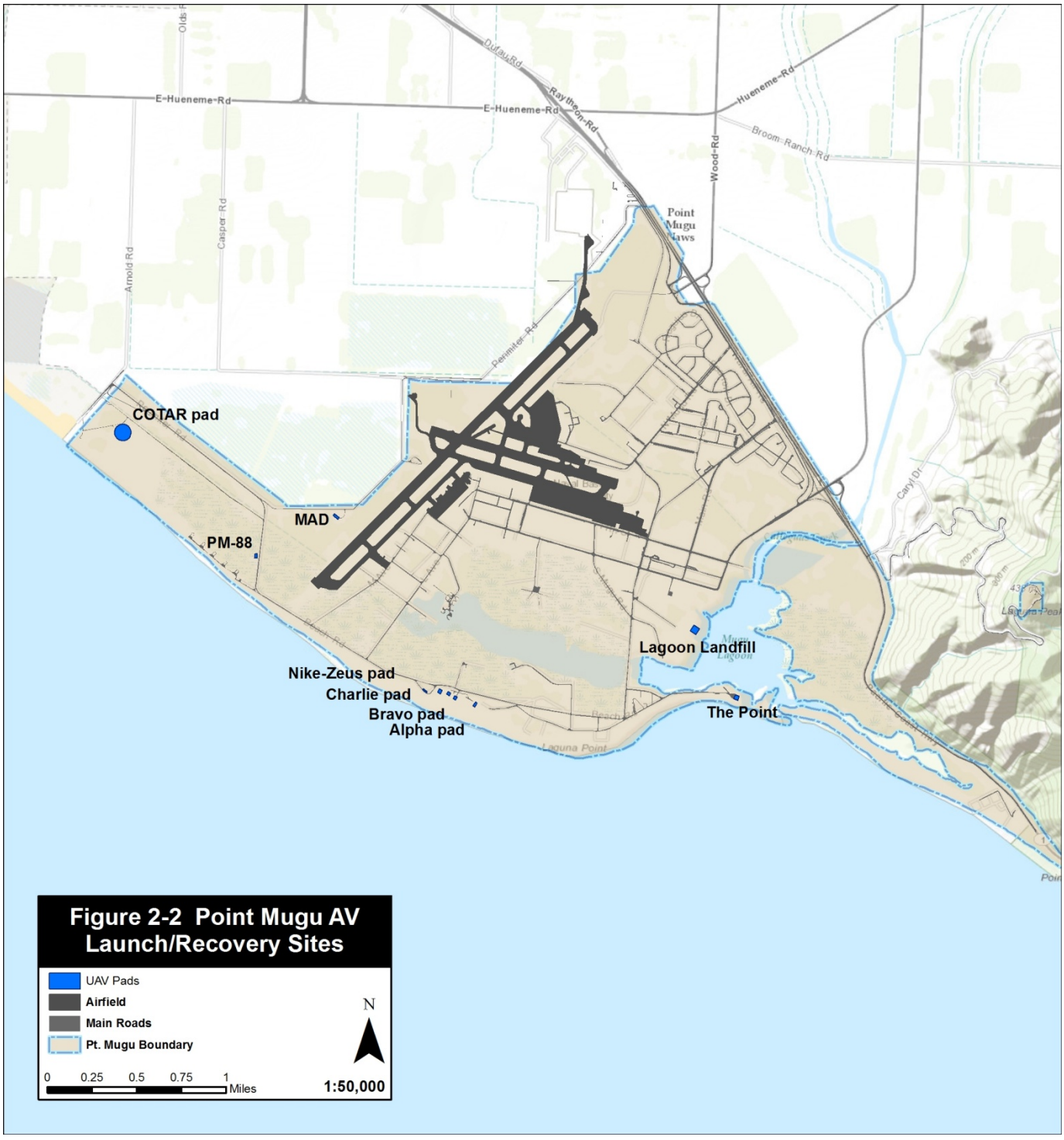

E-Hueneme-Rd
E-Hueneme-Rd
Hueneme-Rd
Broom Ranch Rd
Wood-Rd
Casper Rd
Arnold Rd
Perimter Rd
Point Mugu Naws
COTAR pad
MAD
PM-88
Lagoon Landfill
Nike-Zeus pad
Charlie pad
Bravo pad
Alpha pad
The Point
Laguna Point
Figure 2-2 Point Mugu AV Launch/Recovery Sites
UAV Pads
Airfield
Main Roads
Pt. Mugu Boundary
N
0 0.25 0.5 0.75 1 Miles
1:50,000

Figure 2-3 San Nicolas Island AV Launch/Recovery Sites.

2.5.3 Ground Activities

The UAS ground activities would consist of ground system testing, maintenance, preparation, and flight tracking activities. Both scheduled and unscheduled maintenance activities would occur. Scheduled maintenance activities would include pre-flight and post-flight activities. Unscheduled maintenance would be performed as needed. Typical maintenance activities would include corrosion control, low-observable repair, AV wash down, system/subsystem repair, and servicing. Servicing would include adding petroleum, oil, hydraulic fluids, fuels, coolants, and refrigerants to the systems using solvents, sealants, epoxies, solder, and adhesives for repair activities; and charging and replacing batteries. These maintenance activities would be similar to existing maintenance performed on conventional manned aircraft and would utilize existing hazardous waste storage facilities, including satellite accumulation sites. All hazardous wastes would be managed and disposed in accordance with existing NBVC and NAWCWD procedures and plans.

Larger AVs would be fueled near the airstrips or in the hangars. Group 1 and 2 AVs could be fueled in the field. Preflight checks would be conducted prior to each takeoff (similar to manned aircraft pre-flight checks) and would include engine stabilization, pre-launch inspection, and taxiing the AVs to the active runway for those AVs launched from the runway. Fire Scout class UASs would launch from beach pads at NBVC Point Mugu. These existing pads would be large enough to accommodate the Fire Scout VTOL launch and recovery operations. Maintenance and flight preparation activities would occur in hangars, facilities, or on the ramp for most AVs; however, the small, hand-launched AVs could be prepared in the field.

Ground targets will be set up and maintained, primarily on SNI. These will include fixed box or building simulation type targets. Existing target sites will be used for these operations. Groundcrews will use pick-up trucks to set up and recover equipment, requiring two round trips between target sites and support facilities for each test operation. Maritime surface targets will be set up and maintained in accordance with current Sea Range operations.

2.5.4 Maritime Activities

All UMS and maritime vessel sorties will originate and terminate at Port Hueneme and will remain within the 36,000-square mile (93,200 km^2) Point Mugu Sea Range. These operations would be consistent with existing uses and would not change impacts discussed and analyzed in the Sea Range EIS/OEIS (Navy 2002). Table 2-11 provides a summary of assumed maritime sorties analyzed in this EA/OEA.

Table 2-11 Assumed Maritime Vessel Tempo

Surface Vehicles		
SV	**UMS/sortie**	**Sorties/year**
SPARTAN	1	30
USSV-HS	1	20
Protector – Harbor Class SV	1	30
Odyssey SV	2	10
Sea Doo	6	20
Zodiac	1	15
MST	1	10
HSMST	4	10
FACT	2	10
Conventional Maritime Vessels		
Vessel	**Vessels/sortie**	**Sorties/year**
LCS-I	1	15
LCS-II	1	10
U.S. Coast Guard Cutter	1	5

2.6 ALTERNATIVE 2 – EXPANSION OF UAS OPERATIONS

Under this alternative, only the expansion of UAS operations would be conducted, as provided in Sections 2.5.2 and 2.5.3. UMS operations would not occur on the Point Mugu Sea Range, and such operations and combined UMS/UAS operations would occur elsewhere. This alternative would meet the UAS RDAT&E and training mission at the Sea Range. However, UAS/UMS interoperability activities would have to be conducted somewhere outside the Sea Range.

2.7 ALTERNATIVE 3 – THE NO-ACTION ALTERNATIVE

Under the No Action Alternative, the expansion of UAS operations and introduction of UMS operations would not occur. The consequences of the No Action Alternative would be to deny expanded testing, evaluation, and training use of UASs as described in this EA at the Sea Range. The No Action Alternative would erode the RDAT&E and training mission of NAWCWD by denying use of the Sea Range to support the expanded testing and development of these emerging technologies.

2.8 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

This section provides description of two alternatives considered for full analysis but determined not to be carried forward. Rationale for the deletion of these two alternatives is also provided.

2.8.1 Conducting Proposed Operations at Other Ranges

Under this alternative, the Proposed Action operations would be conducted at another range within the DoD complex. After a review of candidate ranges, only the Sea Range provided the required combination of accessible land, air, sea space, and infrastructure. Furthermore, the Sea Range provides separation from potential conflicts with other military or public uses to readily accommodate the necessary open air maritime testing/training use of unmanned systems. Considering this, it was determined that this alternative would not be carried forward for further analysis.

2.8.2 Expand Restricted Airspace

For this alternative, the restricted airspace over the Point Mugu Sea Range would be expanded to accommodate UAS operations. It was determined that the AV flights associated with the Proposed Action would not impact existing flight operations at NBVC Point Mugu or SNI. The restricted airspace provides

more than adequate airspace needed to conduct all operations; therefore, this alternative was not carried forward for further analysis.

2.8.3 Introduction of Unmanned Underwater and Ground Vehicle Operations

Under this alternative, unmanned underwater vehicles (UUVs) with low frequency sonar systems (associated with UUVs or towed from SVs) operations would be introduced to the Point Mugu Sea Range. Introduction of low frequency acoustic systems would likely result in significant impacts to sensitive populations of fish, turtle, and marine mammal species that reside within the Sea Range. UUVs with low frequency sonar systems are beyond the scope of an EA/OEA and would require EIS/OEIS-level analysis.

Testing and training operations utilizing large scale unmanned ground vehicles (UGVs) would not be feasible given the lack of space available on the Point Mugu Sea Range for such activities. Open space is very limited at NBVC Point Mugu and SNI for the testing of large off-road UGVs, and neither site has simulated environments needed to test large scale UGVs in urban settings. Considering these constraints, introduction of new large scale UGVs capabilities is not included in this EA/OEA.

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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 San Nicolas Island 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*

Unless otherwise specified, the resources description generally applies to all project sites within the specified project area. All manned and unmanned vessels would be based from NBVC Port Hueneme. It is assumed that these operations are consistent with current ongoing operations. For purposes of this EA/OEA, all maritime vessel activities are considered part of the Point Mugu Sea Range operations. 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.

Operation of UMS would not have effects on the following resource areas:

- Noise;
    - Rationale – UMS would produce sound levels equal to or less than vessels currently used at Port Hueneme and on the Sea Range.
- Marine sediments and water quality;
    - Rationale – The addition of UMS operations would be consistent with existing vessel operations at Port Hueneme and on the Sea Range (as assessed in the Point Mugu Sea Range EIS/OEIS [Navy 2002]) and would not release significant amounts of contaminants.
- Airspace, land, and water use;
    - Rationale – UMS operations would not lead to significant increases in the air, land, or water use of the Sea Range, as assessed in the Point Mugu Sea Range EIS/OEIS (Navy 2002).
- Public health and safety.
    - Rationale – UMS would operate in areas restricted to public use and would be consistent with current operations at Port Hueneme and on the Sea Range.

Current annual operation tempos on the Point Mugu Sea Range include 960 ship and 93 surface target operations. Most UMS considered in this EA are smaller than the existing vessel fleet. Furthermore, the proposed 185 UMS operations are insignificant when compared to the existing operations tempo. As such, UMS operations are not further discussed in the environmental consequence assessments associated with the four resource areas noted above.

3.1 AIR QUALITY

3.1.1 Affected Environment

3.1.1.1 Definition of Resource

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

Air quality in a given location is defined by pollutant concentrations in the atmosphere and is generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). One aspect of significance is a pollutant's concentration in comparison to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards, established by the United States Environmental Protection Agency (USEPA), are termed the National Ambient Air Quality Standards (NAAQS) (Table 3.1-1). The NAAQS represent maximum acceptable concentrations that generally may not be exceeded more than once per year; the annual standards are never allowed to be exceeded. State standards, established by the California Air Resources Board (CARB), are termed the California Ambient Air Quality Standards (CAAQS). The CAAQS are at least as restrictive as the NAAQS and include pollutants for which national standards do not exist.

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

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

Table 3.1-1 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 (Pb)	30 day average	1.5 µg/m^3	†	†
	Calendar quarter	†	1.5 µg/m^3	Same as primary standard
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm (42 µg/m^3)	†	†
Vinyl Chloride (chloroethene)	24 hour	0.01 ppm (26 µg/m^3)	†	†

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 2012a; USEPA 2012a.

3.1.1.2 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 also subject to the severity of the nonattainment status.

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

and their consequences would be performed to assess whether there is a likelihood of a significant impact to air quality.

State and Local Requirements

The CAA requires each state to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce federal air quality standards throughout the state. SIP documents are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated. In California (Point Mugu included), 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.

Existing Conditions

Climate and Meteorology

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

On average, the Sea Range surrounding SNI generally experiences frequent northwesterly surface winds. However, such conditions are interrupted by: 1) cool season storms (with southerly winds) and periods of dry offshore northeast winds (Santa Ana winds); 2) mainly warm season coastal eddies with southeast winds over the inner waters; and 3) alternating land/sea breeze circulations as one approaches the mainland coast. Due to the influence of the continent on the overall wind flow, in addition to the eddies and other complicating factors nearshore, there is a strong tendency for the relatively persistent northwesterly winds in the outer Sea Range to become more westerly as the air approaches the mainland.

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. And the lowest average temperature, 49.1°F (9.5ºC), occurs in February. Point Mugu receives 14.7 in (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] 2012a). Prevailing winds are westerly, with an average speed of 7.7 knots (8.8 mph or 14.2 km/hr) (Windfinder 2012a).

SNI is arid; total precipitation at SNI averages 5.23 in (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 2012b). Prevailing winds are northwesterly, with an average speed from that direction of 11.3 knots (13 mph or 20.9 km/hr) (Windfinder 2012b).

Attainment Status and De minimis thresholds

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 2012b, USEPA 2008). Ventura County is classified as a nonattainment area for the state O_3, $PM_{2.5}$, and PM_{10} standards (CARB 2012b).

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 2012b); 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, 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.

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 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 December 29, 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 Council on Environmental Quality (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 Executive Orders, most recently, Executive Order 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 jointly address GHG pollutants.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by Executive Order 13123 and the Energy Policy Act of 2005, the Navy has implemented a number of renewable energy projects. The types of projects currently in operation within the Navy Region Southwest include thermal and photovoltaic solar systems, geothermal power plants, and wind generators. The military also purchases one-half of the biodiesel fuel sold in California. The Navy continues to promote and install new renewable energy projects within the Navy Region Southwest (Navy 2006).

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

3.1.2 Environmental Consequences

3.1.2.1 Approach to Analysis

Criteria pollutant emissions resulting from proposed testing 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 two separate analyses, described below:

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

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

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

3.1.2.2 Alternative 1 – The Preferred Alternative

Impacts

Estimated emissions occurring within the SCCAB at Point Mugu within 3 nm (5.6 km) (subject to the General Conformity Rule) and within 12 nm (22 km) (subject to NEPA) as a result of implementation of the Preferred Alternative are shown in Tables 3.1-2 and 3.1-3, respectively.

Since SNI and the offshore region within 3 nm (5.6 km) of the island are classified as attainment/unclassified by the USEPA, the provisions of the General Conformity Rule do not apply. Table 3.1-4 provides estimated air emissions occurring at SNI due to implementation of the Preferred Alternative.

Table 3.1-2 Alternative 1 Emissions – SCCAB (<3 nm)

Component	Pollutant (tons/year)					
	VOCs [1]	**NO_X [1]**	**CO**	**SO_X**	**PM_{10}**	**CO_2**
Unmanned Aircraft Systems	2.400	1.550	40.70	9.660	0.317	495
Chase Aircraft	0.563	0.410	1.57	0.026	0.409	200
Unmanned Maritime Systems	0.836	1.200	16.70	--	1.210	136
Manned Vessels	0.488	2.920	6.28	1.100	0.151	1,374
Subtotal	**4.287**	**6.080**	**65.25**	**10.786**	**2.087**	**2,205**
de minimis threshold	50	50	NA	NA	NA	
Exceeds *de minimis* threshold?	No	No	No	No	No	

Note:[1] Effective June 19, 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.

Table 3.1-3 Alternative 1 Emissions – SCCAB (3-12 nm)

Component	Pollutant (tons/year)					
	VOCs [1]	**NO_X [1]**	**CO**	**SO_X**	**PM_{10}**	**CO_2**
Unmanned Aircraft Systems	0.7660	0.3420	1.020	0.0250	0.0830	97.20
Unmanned Maritime Systems	3.3400	4.8000	66.600	--	4.8600	544
Manned Vessels	2.4400	14.6000	31.400	5.520	0.7550	6,871
Missiles	0.0006	0.0008	0.042	0.0023	0.0028	0.65
Subtotal	**6.5466**	**19.7428**	**99.062**	**5.5473**	**5.7008**	**7,512.85**
de minimis threshold	50	50	NA	NA	NA	
Exceeds *de minimis* threshold?	No	No	No	No	No	

Note:[1] Effective June 19, 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.

Table 3.1-4 Alternative 1 Emissions – SNI

Component	Pollutant (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**CO_2**
Construction	0.335	2.120	1.290	0.00323	0.108	281
Unmanned Aircraft Systems	0.588	0.215	0.945	2.41000	0.100	115
Subtotal	**0.923**	**2.335**	**2.235**	**2.41323**	**0.208**	**396**

Note: *De minimis* threshold is not applicable.

Conformity Applicability Analysis

The estimated emissions associated with Alternative 1 would be below *de minimis* threshold levels for conformity for the SCCAB (Ventura County, excluding SNI). Therefore, implementation of 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 Record of Non-Applicability (RONA) has been prepared by the U.S. Navy (Appendix B). Implementation of Alternative 1 would have no significant impact on air quality at or near SNI or Point Mugu, and would not significantly harm the global commons under EO 12114.

Greenhouse Gases

Implementation of the Alternative 1 would lead to emissions of approximately 9,200 metric tons (10,100 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 Alternative 1 would amount to approximately 0.00014% of the total CO_{2e} emissions generated by the U.S (6,633.2 million metric tons) (USEPA 2011). 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.

Mitigation Measures

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

3.1.2.3 Alternative 2 – Expansion of UAS Operations

Impacts

The air pollutant emissions associated with Alternative 2 would be very similar to those of Alternative 1 with the exception that no UMS operations would occur. It is assumed that manned vessels would still be used under this alternative both as a platform for Fire Scout launches and as instrumentation relays for the UASs.

Estimated emissions occurring within the SCCAB at Point Mugu within 3 nm (5.6 km) (subject to the General Conformity Rule) and within 12 nm (22 km) (subject to NEPA) as a result of implementation of Alternative 2 are shown in Tables 3.1-5 and 3.1-6, respectively.

Since SNI and the offshore region within 3 nm (5.6 km) of the island are classified as attainment/unclassified by the USEPA, the provisions of the General Conformity Rule do not apply. Table 3.1-7 provides estimated air emissions occurring at SNI due to implementation of Alternative 2.

Conformity Applicability Analysis

The estimated emissions associated with the 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. 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. Alternative 2 would have no significant impact on air quality at or near SNI or Point Mugu, and would not significantly harm the global commons under EO 12114.

Table 3.1-5 Alternative 2 Emissions – SCCAB (<3 nm)

Component	Pollutant (tons/year)					
	VOCs [1]	**NO_X [1]**	**CO**	**SO_X**	**PM_{10}**	**CO_2**
Unmanned Aircraft Systems	2.400	1.550	40.70	9.660	0.317	495
Chase Aircraft	0.563	0.410	1.57	0.026	0.409	200
Manned Vessels	0.488	2.920	6.28	1.100	0.151	1,374
Subtotal	**3.451**	**4.880**	**48.55**	**10.786**	**0.877**	**2,069**
de minimis threshold	50	50	NA	NA	NA	
Exceeds de minimis threshold?	No	No	No	No	No	

Note:[1] Effective June 19, 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.

Table 3.1-6 Alternative 2 Emissions – SCCAB (3-12 nm)

Component	Pollutant (tons/year)					
	VOCs [1]	**NO_X [1]**	**CO**	**SO_X**	**PM_{10}**	**CO_2**
Unmanned Aircraft Systems	0.7660	0.3420	1.020	0.0250	0.0830	97.2
Manned Vessels	2.4400	14.6000	31.400	5.5200	0.7550	6,871
Missiles	0.0006	0.0008	0.042	0.0023	0.0028	0.65
Subtotal	**3.2066**	**14.9428**	**32.462**	**5.5473**	**0.8408**	**6,968.85**
de minimis threshold	50	50	NA	NA	NA	
Exceeds *de minimis* threshold?	No	No	No	No	No	

Note:[1] Effective June 19, 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.

Table 3.1-7 Alternative 2 Emissions – SNI

Component	Pollutant (tons/year)					
	VOCs	NO_X	CO	SO_X	PM_{10}	CO_2
Construction	0.335	2.120	1.290	0.00323	0.108	281
Unmanned Aircraft Systems	0.588	0.215	0.945	2.41000	0.100	115
Subtotal	**0.923**	**2.335**	**2.235**	**2.41323**	**0.208**	**396**

Note: *De minimis* thresholds are not applicable.

Greenhouse Gases

Implementation of the Alternative 2 would lead to emissions of approximately 8,560 metric tons (9,430 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 0.00013% of the total CO_{2e} emissions generated by the U.S (6,633.2 million metric tons) (USEPA 2011). Emissions under this alternative are also below the 25,000 metric tons of CO_{2e} level proposed in the draft NEPA guidance provided by the CEQ.

Mitigation Measures

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

3.1.2.4 Alternative 3 – The No-Action Alternative

Impacts

Under Alternative 3, the proposed expansion of unmanned systems would not occur and existing conditions as described in Section 3.1.1.3 would remain unchanged. Therefore, no significant impacts to air quality would occur.

Mitigation Measures

Implementation of Alternative 3 would not result in significant air quality impacts; therefore, no mitigation measures are proposed or required.

3.2 MARINE SEDIMENTS AND WATER QUALITY

3.2.1 Affected Environment

3.2.1.1 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.

3.2.1.2 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 Clean Water Act, as amended (33 USC 1251 et seq.) and the Safe Drinking Water Act (42 USC 300f et seq.). Both laws are enforced by the USEPA. The Clean Water Act 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 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 Clean Water Act delegated to states, such as the National Pollutant Discharge Elimination System, which regulates point sources of pollutants. The State Water Resources Control Board 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 State Water Resources Control Board 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).

3.2.1.3 Existing Conditions

Sea Range

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).

There are two Areas of Special Biological Significance (ASBS) designated by the State of California within or adjacent to the Sea Range. These areas have been designated to protect marine species or biological communities from an undesirable alteration in "natural water quality". ASBS regulations prohibit discharges into ASBS as well as to any nearby waters that could affect the natural water quality. These ASBS are:

- 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; 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. Discharges incidental to military research, development, testing, and evaluation of, and training with, guided missiles and other weapon systems, fleet training exercises, small-scale amphibious warfare training, and special warfare training are allowed in the SNI and Begg Rock ASBS (State Water Resources Control Board 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).

A potential source of water pollution 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. As noted in the Sea Range EIS/OEIS, an increase in oil leaks, accidental spills, discharge of formation water, drill mud, sediment, debris, and sludge in the area have decreased water quality (Navy 2002).

Marine Bathymetry and Sediments

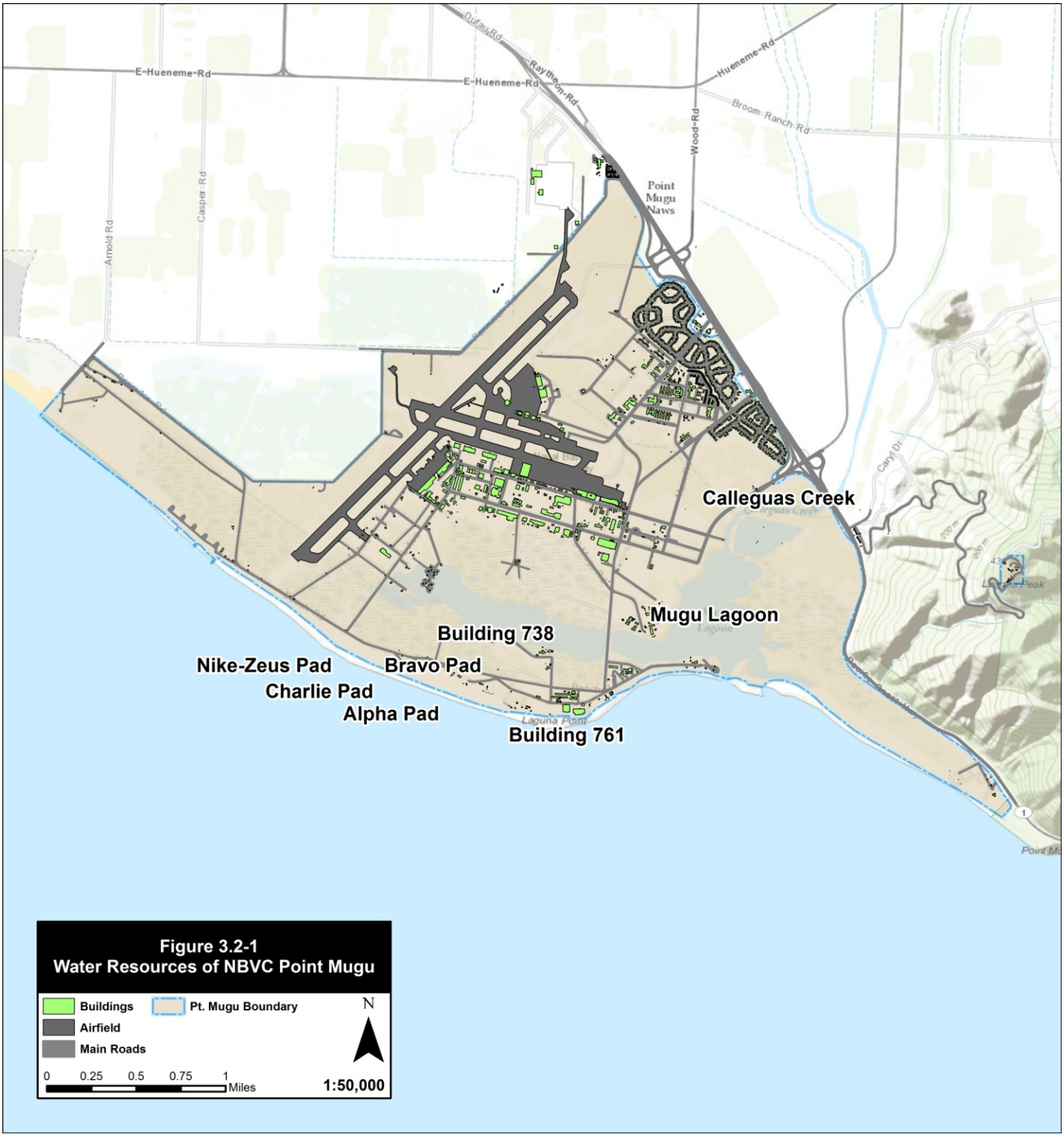
Much of the ocean floor in the northern portion of the SCB consists of the Santa Barbara, Santa Cruz, and Santa Monica basins (Navy 2002). The Santa Barbara Basin has a gradual slope that reaches depths of 1,970 ft (600 m). The relatively wide and irregular Santa Monica Basin has two submarine canyons with depths exceeding 2,300 ft (1,500 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 (Figure 3.2-1). R-2519 includes the majority of the Point Mugu, a portion of the Ventura County Game Reserve, and extends southwest and southeast into the Santa Barbara Channel. Surface currents in this area generally flow southeast along the coastline after mixing further offshore.


E-Hueneme-Rd
E-Hueneme-Rd
Hueneme-Rd
Broom Ranch Rd
Wood Rd
Arnold Rd
Casper Rd
Point Mugu Naws
Calleguas Creek
Mugu Lagoon
Building 738
Nike-Zeus Pad
Bravo Pad
Charlie Pad
Alpha Pad
Building 761
Figure 3.2-1
Water Resources of NBVC Point Mugu
Buildings
Pt. Mugu Boundary
Airfield
Main Roads
N
0 0.25 0.5 0.75 1 Miles
1:50,000

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 2,140 ac (866 ha) of water and tidal flats. The lagoon runs parallel to the coast for 3.5 mi (5.6 km) and is never greater than 0.6 mi (1.0 km) wide. Mugu Lagoon has been designated a significant ecological resource protected by the CWA. Unlike most lagoons along the California coast, it is relatively undisturbed and provides a habitat for a diverse assemblage of marine organisms (Section 3.4, *Biological Resources*). Mugu Lagoon is regionally significant as it is one of the last lagoons left in southern California containing unique and sensitive resources.

With the exception of freshwater influences generated during storm events (mainly from Calleguas Creek), Mugu 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 likely do not cause much mixing. (NBVC, 2002)

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 Rd, the southern border of the marshland. Building 761, Surfer's Point, and The Point are adjacent to the Mugu Lagoon ASBS.

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.

Nearshore Bathymetry and Sediments

The eastern third of NBVC Point Mugu is adjacent to a subsurface canyon that drops off steeply to depths reaching depths greater than 2,200 ft (670 m) within 6 nm (11 km). The area that borders NBVC 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 feet (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 into Point Mugu. It originates in the Santa Susana Mountains and flows for approximately 37 mi (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. Conejo Creek drains an area of approximately 66 sq mi (171 km^2) and is the largest tributary to Calleguas Creek, joining approximately 5 mi (8 km) upstream from the Pacific Ocean. Revlon Slough is the second largest tributary, draining 52 sq mi (135 km^2) and joining Calleguas Creek about 1 mi (1.6 km) upstream from the Pacific Ocean. Oxnard Drainage Ditches No. 2 and No. 3 also discharge 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. The land and water surface underlying the R-2535 includes all of San Nicolas Island and the coastal waters within approximately 2 to 3 nm (3.7 to 5.6 km) of the island's shoreline. (Navy 2002)

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)

SNI is part of Ventura County and is situated in Watershed 11, which also includes Anacapa, Santa Barbara, San Clemente, and Santa Catalina Islands. The ocean waters surrounding San Nicolas Island and Begg Rock to a distance of 1 nm (1.85 km) offshore or to the 300-foot (91.4 m) isobath, whichever is greater, have been designated as an ASBS based on their relatively pristine water quality. The dry season occurs between May and September, and the wet season occurs between November and March when SNI receives 87 percent 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 San Nicolas Island. (Navy 2002)

Nearshore Water Quality

The quality of ocean water in the immediate area of SNI is relatively pristine. Receiving waters at Blue Whale Cove, located approximately 1,500 ft (460 m) southeast of the Carrier Reef project site, represent an area impacted by launch-pad runoff and exceeded the reporting limit for hexavalent chromium (0.01 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)

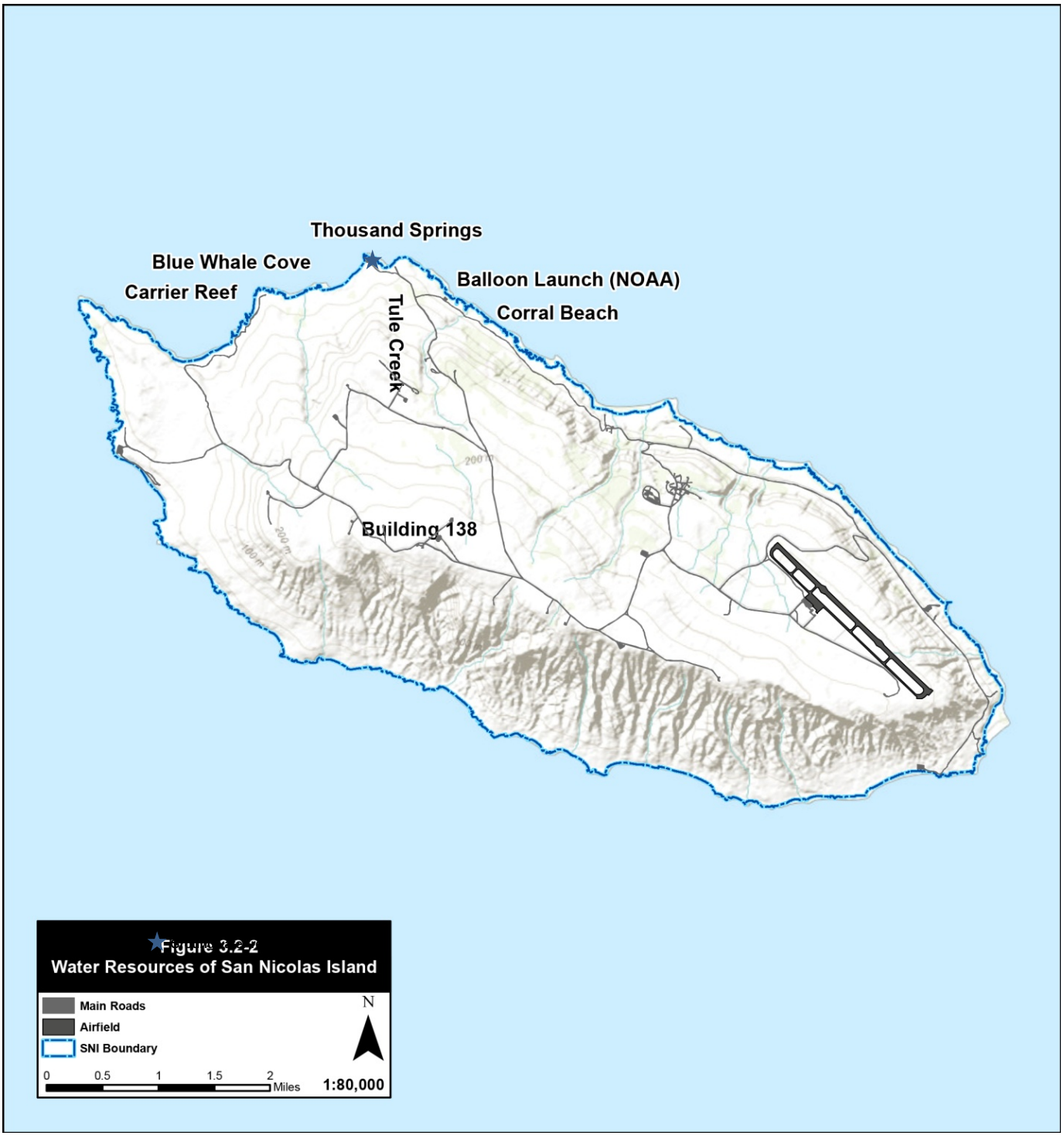
Most of the marine water pollution within the SCB area stems from municipal discharges originating on the mainland. Another potential source of water pollution offshore comes from the oil and gas development industry. As activity increases from offshore oil and gas development, the potential for discharge 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, the distance of SNI from the mainland, the large diluting volume of the ocean, and the shelves and basins near the mainland where many pollutants settle ensure high water quality at the island.

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

The mouth of the only perennial stream, 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 (Figure 3.2-2).


Thousand Springs
Blue Whale Cove
Carrier Reef
Balloon Launch (NOAA)
Corral Beach
Tule Creek
Building 138
Figure 3.2-2
Water Resources of San Nicolas Island
Main Roads
Airfield
SNI Boundary
N
0 0.5 1 1.5 2 Miles
1:80,000

3.2.2 Environmental Consequences

3.2.2.1 Approach to Analysis

The 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 EIS/OEIS.

3.2.2.2 Alternative 1 – The Preferred Alternative

Impacts

Alternative 1 activities are consistent with current activities at the Point Mugu Sea Range, at Point Mugu and R-2519, and at SNI and R-2535, and implementation of the Alternative 1 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 San Nicolas Island and Begg Rock ASBS. Section 3.4, *Biological Resources*, discusses the potential biological impacts to these two ASBSs in detail. Similarly, implementation of Alternative 1 would not result in any changes to freshwater resources or to marine bathymetry.

All proposed activities at Point Mugu would use existing facilities, roads, and launch pads. On SNI, proposed construction activities for the new hangar facility would implement erosion control techniques that would prevent sediment runoff to surface water resources on the island. These erosion controls would eliminate any sedimentation in groundwater recharge areas or discharge to nearshore. Therefore, the use of these sites would neither increase sedimentation within nearby groundwater recharge areas nor increase discharges into the nearshore waters.

As the proposed construction will total more than one acre (0.405 ha) in ground disturbance, prior to construction the Navy will apply with the California State Water Resources Control Board for a General Permit for Discharges of Stormwater Associated with Construction Activity (2009-000-DWQ/NPDES No. CAS000002). In compliance with the Construction General Permit, the Navy would develop and implement a Stormwater Pollution Prevention Plan. In accordance with the Energy Independence and Security Act of 2007 (Public Law 110-140), the Navy will use site planning, design, construction, and maintenance strategies to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the construction site on SNI. The construction will follow practices defined in Unified Facility Criteria (UFC) 3-210-10N. An effective combination of these runoff reduction measures and other sediment/erosion control best management practices would ensure the water quality of surrounding wetlands and the Pacific Ocean.

In addition to the above stormwater pollution prevention measures, all hazardous materials associated with the proposed construction activities would be acquired and tracked through the NBVC Hazardous Material Center.

The primary water quality and marine sediment impacts associated with Alternative 1 would result from the release of hazardous constituents contained in UASs and the missiles fired from UASs. For the purposes of this EA, it is assumed that four AVs (two Puma, one Pointer, and one ScanEagle) would crash on the water or experience hard water landings resulting in sinking of the AVs. These AVs would most likely be Group 1 or 2 UAS as Groups 3, 4, and 5 must meet more stringent airworthiness standards and loss of these larger systems would yield great loss of financial and technical resources. As such,

redundant systems are installed in Groups 3, 4, and 5 UASs to ensure a higher level of reliability and lower probability of accidents occurring.

In general, the single largest hazardous constituent of missiles is the solid propellant. Missile propellants typically contain ammonium perchlorate (NH_4ClO_4), aluminum compounds, copper, and organic lead compounds. A surface-to-air missile typically consumes 99 to 100 percent of its propellant when it functions properly. The remaining solid propellant fragments (less than one percent of initial propellant weight) sink to the ocean floor and undergo physical and chemical changes in the presence of seawater. Tests show that water penetrates only 0.06 in (0.14 cm) into the propellant during the first 24 hours of immersion, and that fragments slowly release ammonium and perchlorate ions (Fournier and Brady 2005). These ions rapidly disperse into the surrounding seawater, so local concentrations are extremely low. (Navy 2009)

When live ordnance functions properly, 99.997 percent of the explosives contained therein are converted to inorganic compounds (USACE 2003). Rockets and missiles have a 3.37 percent failure rate (Rand 2005). The values provided in Table 3.2-1 are calculated assuming one missile per year does not properly detonate, or a failure rate of 3.3 percent.

The use of missiles, airborne and sea surface targets, and flares was previously analyzed in the Point Mugu Sea Range EIS/OEIS and impacts were found to be far from a significant threshold (Navy 2002). Many times the AVs that strike the water surface are reusable and are recovered unless they break into multiple pieces and sink. In this case, hazardous liquids within the UASs (such as hydraulic fluids) may be released. Should a UAS or missile 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.

Table 3.2-1 summarizes the hazardous constituents associated with the annual UAS and missile usage associated with Alternative 1. The total mass of solid, hazardous constituents distributed annually over the Sea Range from the missiles would total up to 75.4 lb (34.2 kg), representing approximately 0.02 percent of the activity proposed in the EIS/OEIS.

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 organisms (e.g., barnacles). The large volume of water in the SCB, combined with the constant circulation, would quickly dilute any leached hazardous substances.

Mitigation Measures

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

Table 3.2-1 Alternative 1 Dispersed Hazardous Materials Components

	Fuel (lbs)	Solid Propellant (lbs)	Explosives (lbs)	Batteries (lbs)	Total (lbs)
Puma AV	--	--	--	3.09	3.09
Pointer AV	--	--	--	1.54	1.54
ScanEagle AV	12.1	--	--	2.20	14.3
APKWS	--	0.7	6.9×10^{-5}	15.4	16.1
JDAM	--	--	2.3	19.8	22.1
Griffin	--	2.9	0.0039	15.4	18.3
Annual Total	12.1	3.6	2.3	57.4	75.4
2002 EIS/OEIS Total	8,760	4,260	97.8	2,330	378,000
% EIS/OEIS Total	0.14	0.085	2.36	2.46	0.02

3.2.2.3 Alternative 2 – Expansion of UAS Operations

Impacts

The impacts of Alternative 2 would be the same as those of Alternative 1, with the exception that SVs would not be used. The expected impacts to marine sediments and water quality would thus be lower than Alternative 1 impacts. Therefore, impacts to marine sediments and water quality would not be significant.

Mitigation Measures

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

Alternative 3 – The No-Action Alternative

Under Alternative 3 the proposed expansion of unmanned systems operations on the Sea Range would not occur and existing conditions would remain unchanged. Therefore, no significant impacts to marine sediments and water quality would occur.

Mitigation Measures

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

3.3 NOISE

3.3.1 Affected Environment

3.3.1.1 Definition of Resource

Noise is defined as unwanted sound that interferes with normal human activities or otherwise diminishes the quality of the environment. Noise is usually the largest and most pervasive environmental problem associated with aircraft operations. Although many other sources of noise are present in the project areas, aircraft noise is readily identifiable. The potential impacts of the Alternative 1 in changing the levels of aircraft noise affecting communities must be considered.

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, the time of day, and the distance between the noise source and the receptor (e.g., a person or animal). Noise from aircraft operations at military bases are usually viewed in terms of Day-Night Average Noise Level (DNL), which accounts for the infrequent nature of flights as well as penalizing nighttime operations (those operations that occur after 10:00 pm and before 7:00 am) due to their higher level of community annoyance. The DNL is the average noise level over a 24-hour period. In California, a similar noise metric, Community Noise Equivalent Level (CNEL) is used by the FAA. Community Noise Equivalent Level is similar to DNL, except that it also includes a lesser noise penalty for flights in the evening hours of 7:00 pm to 10:00 pm.

In some cases, the DNL or CNEL of a given area cannot be used, and another metric, Sound Exposure Level (SEL) is used to show the noise effects of single overflights from different aircraft types on populations in the vicinity of Alternative 1s. Sound Exposure Level measures the cumulative noise effects of single flights, compressed into a one-second noise exposure event. This is useful for comparing how various sounds will affect local noise environments. Individual time-varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of the net impact of the entire acoustic event, but it does not directly represent the sound level heard at any given time.

Noise is commonly measured using a logarithmic scale expressed in decibels (dB). Sound measurements are further refined by using an A-weighted decibel (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.

For example, during an aircraft flyover, SEL would include both the Maximum Noise Level (L_{max}) and the lower noise levels produced during onset and recess periods of the overflight. The L_{max} represents the highest noise level reached during a noise event. As an aircraft approaches, the sound of the aircraft begins to increase above ambient noise levels. The closer the aircraft approaches, the louder it is until the aircraft is at its closest point directly overhead that the maximum noise level is generated. As the aircraft passes, the noise level decreases until the sound level decreases back to ambient levels. The SEL associated with an aircraft overflight would be comprised of all three of these noise levels. This metric best reflects what people generally and instantaneously respond to when an aircraft flyover occurs.

As the SEL also considers the duration of a noise event, SEL values are typically higher than the maximum noise level measured for most noise events. The SEL for actions analyzed in this document (see Appendix C) were derived using the SELCalc2, Flyover Noise Calculator, with default settings

(USAF, 2005). Table 3.3-1 provides example noise sources compared to aircraft and their potential effects on human receptors.

Table 3.3-1 Example Noise Sources and Their Effects on Human Receptors

Example Noise Sources	Sound Level (dBA)	Decibel Effect
Jet take-off at 25 meters	150	Eardrum rupture
Aircraft carrier deck	140	
Military jet take-off from aircraft carrier with afterburner at 20 meters	130	
Thunderclap, chain saw, oxygen torch	120	32 times as loud as 70 dB, painful
Steel mill, auto horn at 1 meter, turbofan aircraft take-off at 70 meters, riveting machine, live rock music	110	16 times as loud as 70 dB, average human pain threshold
Jet take-off at 305 meters, outboard motor, power lawnmower, motorcycle, farm tractor, jackhammer, Boeing 707 or DC-8 aircraft at one nautical mile, Bell J-2A helicopter at 35 meters	100	Eight times as loud as 70 dB, serious damage possible after eight-hour exposure
Boeing 737 or DC-9 at one nautical mile, motorcycle at 8 meters, newspaper press	90	Four times as loud as 70 dB, likely damage after eight-hour exposure
Garbage disposal, dishwasher, freight train at 15 meters, car wash at 7 meters, diesel truck (40 mph at 15 meters), diesel train (45 mph at 35 meters)	80	Twice as loud as 70 dB, possible damage after eight hours of exposure
Passenger car (65 mph at 8 meters), freeway 15 meters from pavement edge, vacuum cleaner	70	Arbitrary base of comparison, upper 70's are annoyingly loud to some receptors
Conversation in restaurant, background music, air conditioning unit at 35 meters	60	Half as loud as 70 dB, fairly quiet
Quiet suburb, conversation at home, large electrical transformers at 35 meters	50	One-fourth as loud as 70 dB
Library, bird calls, lowest limit of urban sound	40	One-eighth as loud as 70 dB
Quiet rural area	30	One-sixteenth as loud as 70 dB, very quiet
Whisper, rustling leaves	20	
Breathing	10	Barely audible
Minimum threshold of hearing	0	

Source: FICON 1992.

3.3.1.2 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 U.S.C. §§ 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.

3.3.1.3 Existing Conditions

Sea Range

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 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). The EIS/OEIS analysis found that the Sea Range areas with the highest distributed sound level, between 60 and 65 dB (based on an onset-rate adjusted monthly day-night average sound level), were those adjacent to SNI or to its west.

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 (NBVC 2011). 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 off-base acreage exposed to CNEL values above 65 is about 1,800 acres (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 dB 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).

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 F/A-18 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 (SPL) at 500 ft (150 m) of 107 dB re 20 µPa. The A-weighted SEL was 109 db re $(20\ \mu Pa)^2$s.

Missiles and targets are also launched from SNI. The A-weighted SPL 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 NBVC Point Mugu (see previous subsection). Small arms firing, in support of testing activities, have historically occurred at Rock Crusher Point. Minimal noise data for small arms firing are available. The Point Mugu Sea Range EIS/OEIS described noise associated with the Close-in Weapons System, 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 would expose a rectangular-shaped patch of 4,994 sq ft (494 m^2) to noise of 145 dB SEL re 20 µPa. This activity does not occur at Point Mugu. However, it has historically occurred at Rock Crusher Point on SNI.

3.3.2 Environmental Consequences

3.3.2.1 Approach to Analysis

The 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 is discussed in Section 3.4, *Biological Resources*.

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

3.3.2.2 Alternative 1 – The Preferred Alternative

Impacts

Small Aerial Vehicles

Under Alternative 1, there would be 645 small AV (Puma, Pointer, ScanEagle, and STUAS) sorties conducted annually at Point Mugu and 205 sorties at SNI. These sorties would yield 3,540 and 1,100

annual takeoff and landing operations, respectively. Nearly all of these sorties would be conducted in near-shore areas, away from the Point Mugu and SNI airstrips and administrative facilities.

Small AVs are generally used from low-altitude surveillance and reconnaissance, and as such, detection avoidance is critical to achieving mission objectives. Continuing research and development programs strive to decrease AV internal combustion engine exhaust noise via innovative muffler design (NWUAV 2012). Investigators are also working to reduce the noise generated by AV propeller operations (GTRI 2009). Small AV operations associated with Alternative 1 would not yield harmful noise levels to receptors outside the test groups performing the RDAT&E operations. For AV launch and recovery operations that may exceed 85 dBA, groundcrews will be required to wear hearing protection, as prescribed by DODI 6055.12, OPNAVINST 5100.23, and current SOPs.

Large Aerial Vehicles

Alternative 1 would involve 502 large AV (Shadow, Hunter, Fire Scout, Triton, and UCLASS) sorties at Point Mugu and 75 sorties at SNI. These sorties would yield 1,324 and 310 annual takeoff and landing operations, respectively. The 1,324 operations at Point Mugu represents approximately four percent of the total 36,100 annual operations conducted at NBVC Point Mugu in 2011 (NBVC 2012). The proposed increase in flight operations is below the 10 percent threshold for "notable" increases as described in the Point Mugu EIS/OEIS (2002). Furthermore, the large AVs would generally pose lower SEL numbers than other aircraft operating at NBVC (See Table 3.3-2 and Appendix C). The SEL calculations provided were derived using the SELCalc2, Flyover Noise Calculator, with default settings. The AV and chase aircraft flights would depart from Runway 21 and would climb out directly towards the Sea Range. The action proposed in the EIS/OEIS 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. Thus, the flight operations associated with Alternative 1 would not contribute measurably to existing cumulative CNEL noise levels and would be difficult to distinguish from other operating aircraft.

For the reasons described above, implementation of Alternative 1 would not yield significant noise impacts to human receptors.

Table 3.3-2 Representative SEL Values for Manned and Unmanned Aircraft

Aircraft (engine type)	SEL Values (dBA) at Distances (feet) [1]			
	500	1,000	2,000	5,000
F-18	122.9	116.9	110.5	100.5
C-130	95.6	90.5	84.9	76.4
E-2	97.5	92.9	88.0	80.9
F-35	125.0	118.1	110.5	100.5
Shadow [2]	81.4	74.6	66.9	54.0
Fire Scout [3]	90.5	85.8	80.6	72.5
Triton [4]	92.1	87.1	81.4	72.6
UCLASS [5]	117.3	112.0	104.6	95.0

Notes:
1. SEL values calculated using SELCalc2, Flyover Noise Calculator, with default settings.
2. Values provided in Stryker Brigade Combat Team EIS (Army 2008).
3. SEL values calculated using Bell 206 (OH-58 configuration) as a surrogate aircraft.
4. SEL values calculated using Cessna 500 as a surrogate (same assumption as EA/OEA for the BAMS UAS DT Program [Navy 2012]).
5. SEL values calculated using F-15 (P220) as a surrogate (same engine used for both aircraft).

Mitigation Measures

Implementation of Alternative 1 would not result in significant noise impacts; therefore, no mitigation measures are proposed or required.

3.3.2.3 Alternative 2 – Expansion of UAS Operations

Impacts

Implementation of Alternative 2 would involve the same aircraft operations tempo and would have similar impacts. Therefore, based upon the information provided in 3.3.2.2, implementation of Alternative 2 would not yield significant noise impacts to human receptors.

Mitigation Measures

Implementation of the Alternative 2 would not result in significant noise impacts; therefore, no mitigation measures are proposed or required.

3.3.2.4 Alternative 3 – The No-Action Alternative

Impacts

Under the No-Action Alternative, there would be no increase in aircraft operations or other RDAT&E operations, and existing conditions would remain unchanged. Therefore, no significant noise impacts to human receptors would occur.

Mitigation Measures

Implementation of the No-Action Alternative would not result in significant noise impacts; therefore, no mitigation measures are proposed or required.

3.4 BIOLOGICAL RESOURCES

3.4.1 Affected Environment

3.4.1.1 Definition of Resource

Biological resources include plants and animals and the habitats in which they occur. For this analysis, terrestrial and marine biological resources are considered in separate subsections, with some overlap in the coverage of transitional habitats and the associated species of coastal wetlands, tidal flats and beaches. Terrestrial biological resources discussed include vegetation communities, wildlife, and special status species. Marine biological resources discussed include marine habitats, fish and fisheries, essential fish habitat, marine birds, marine mammals, and special-status species. 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.

3.4.1.2 Terrestrial Biological Resources

Terrestrial biological resources at NBVC Point Mugu and at SNI are discussed below. Additional detail can be found in the Integrated Natural Resources Management Plans (INRMPs) for Point Mugu and SNI, respectively (NBVC 2002, 2010).

Terrestrial Vegetation Communities

Point Mugu

Using a modified habitat classification from Zedler et al. (1992), the 2002 Point Mugu INRMP (NBVC 2002) mapped habitat types based on dominant plant species and physiognomy (Figure 3.4-1). The areas of habitat types and jurisdictional wetlands within the installation as a whole are provided in Table 3.4-1.

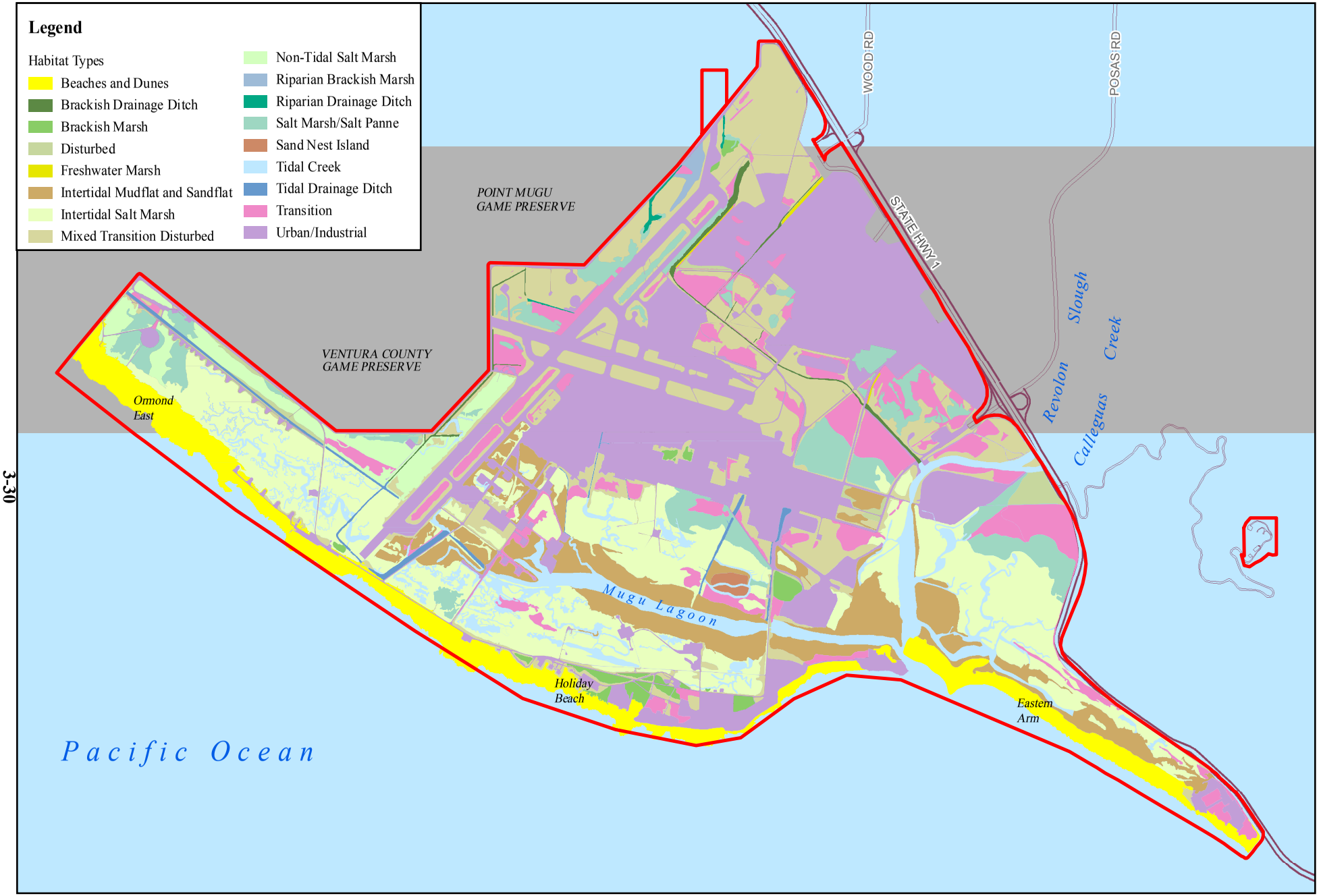
Table 3.4-1. Dominant Habitat Types at Point Mugu

Habitat Community	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 2,140 ac (866 ha) of marsh lands that provides habitat for numerous invertebrate, fish, bird, and plant species (Vartanian 2013). 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, the non-wetland areas of NBVC Point Mugu provide relatively minor amounts of plant and wildlife habitat and beach habitats.



Source: Navy 2009

Figure 3.4-1
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 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 percent of its native plants with the southern California mainland, 85 percent with the four Northern Channel Islands, 84 percent with the other three Southern Channel Islands, and 53 percent 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 percent) of introduced plant species (NBVC 2010).

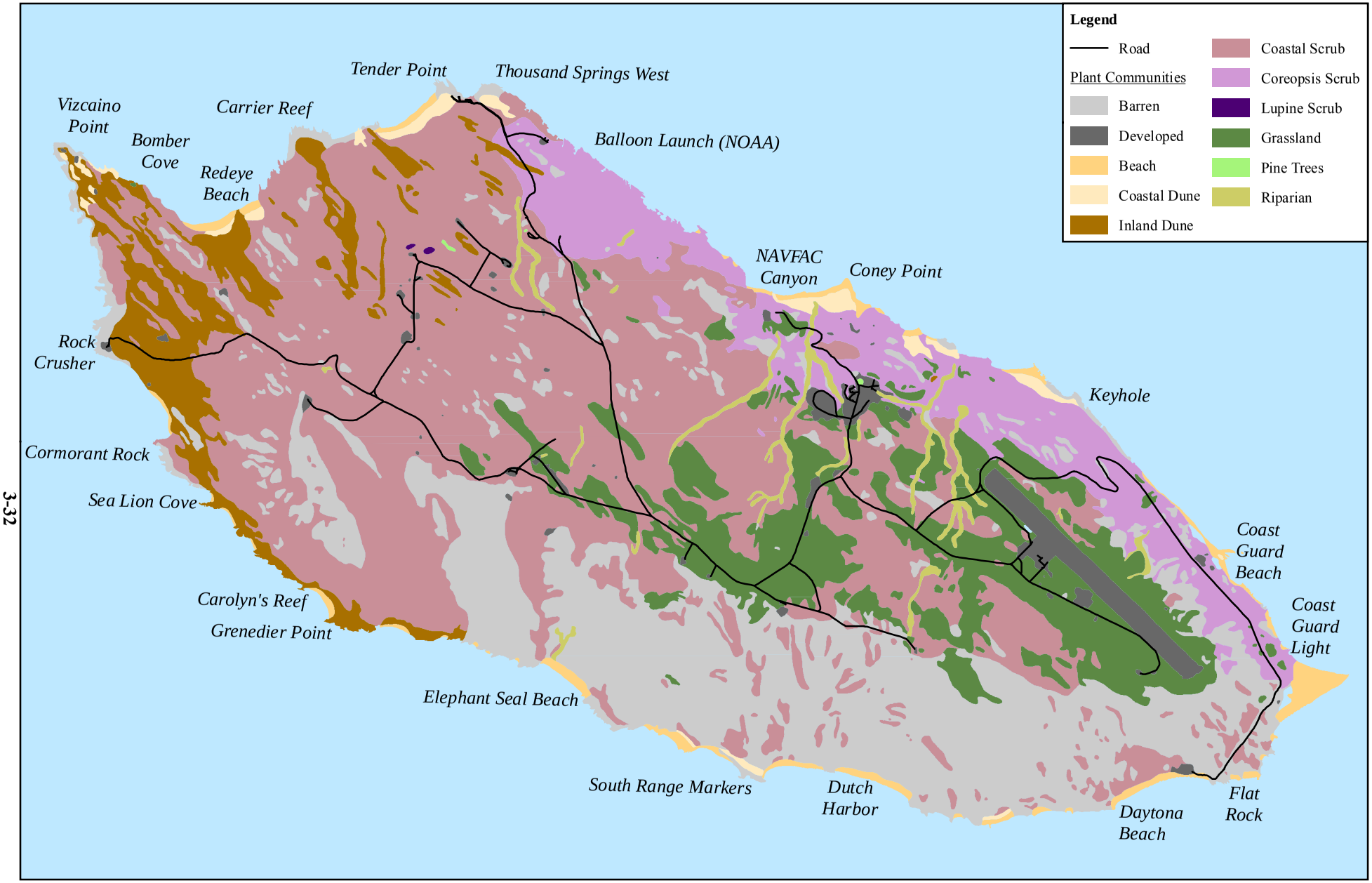
Approximately 11 percent of the island's native vascular plant taxa are endemic to the Channel Islands, ranking it in the middle amongst other Channel Islands. Two vascular plant taxa found only on SNI are the SNI buckwheat (*Eriogonum grande* var. *timorum*) and the SNI malacothrix (*Malacothrix foliosa*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

Figure 3.4-2 shows the vegetation on SNI based on classification and mapping by Halvorson et al. (1996). Unvegetated and developed (barren) areas are included. Vegetation communities include scrub communities covering 7,355acres (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 acres (1,404 ha) (Junak 2008). Table 3.4-2 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 (NBVC 2010).

Table 3.4-2. Vegetation of San Nicolas Island

Community	Area (acres)	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: NBVC 2010.



0 0.5 1 Kilometers

0 0.5 1 Miles

Source: Halverson, et al 1996

Figure 3.4-2
Vegetation Communities at SNI

The vast majority of the proposed construction area is grassland; any non-grassland areas within the proposed construction area are previously developed. The grassland community on SNI is a mixture of native and non-native species covering 1,739 acres (704 ha). The grassland on the mesa, in the vicinity of the airfield and the proposed construction area, is dominated by non-native species (NBVC 2010).

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 Migratory Bird Treaty Act (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 Executive Order 13186.

Amphibians are uncommon in salt marsh but can occur in the adjacent freshwater habitats. Reptiles are common in the salt marsh. The southern Pacific rattlesnake (*Crotalus organus 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) [formerly California Department of Fish and Game (CDFG)] Species of Special Concern (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 endemic species (island horned lark [*Eremophila alpestris insularis*], San Clemente Island house finch [*Carpodacus mexicanus clementae*], and dusky orange-crowned warbler [*Vermivora celata sordid]*). Gulls and cormorants establish large seasonal breeding colonies on the west end of SNI. Numbers of nesting birds have increased in recent years due to protection from human activities (NBVC 2010). Nesting areas for Brandt's cormorants are shown on Figure 3.4-3. Of the bird species breeding on SNI, the western snowy plover (*Charadrius alexandrinus nivosus*) is the only species protected by the federal Endangered Species Act; the plover is listed as threatened and is discussed in further detail below.

The California brown pelican (*Pelecanus occidentalis californicus*) 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) (Figure 3.4-3). They are expected to be present foraging in the shallow water and offshore of the project areas.

Raptors are uncommon visitors to SNI, with the exception of American kestrels (*Falco sparverius*) and barn owls (*Tyto alba*), which are permanent residents. In addition, SNI also supports a wintering population of burrowing owls (*Athene cunicularia*) (NBVC 2010). All migratory birds in the project area are protected by the Migratory Bird Treaty Act (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.

Point Mugu

Salt Marsh Bird's Beak. The federally and state-listed endangered salt marsh bird's beak (*Chloropyron maritimum* ssp. *maritimum*) 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), salt marsh bird's beak areas are protected, as well as enhanced, by exotic plant removal.

Salt marsh bird's beak habitat at Point Mugu is shown in Figure 3.4-4. 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.

0 0.5 1 Kilometers

0 0.5 1 Miles

Sources: Navy 1994, 2006, 2012

Figure 3.4-3
Brown Pelican Roosts, Snowy Plover Nesting Areas, and Brandt's Cormorant Nesting Areas at SNI

0 0.5 1 Kilometers
0 0.5 1 Miles

Sources: Navy 2005, 2012b

Figure 3.4-4
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 percent 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 five in 2008. In 2011, 16 pairs were detected (CDFG 2011b). Light-footed clapper rail habitat at Point Mugu is shown in Figure 3.4-4.

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.

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 mid-April and late 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 3.4-5. 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 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, two pairs and one fledgling were located at the Holiday Beach Salt Panne, and one 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.

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. Therefore, the least Bell's vireo is not discussed further in this EA.

Tidewater Goby. The tidewater goby was designated as endangered fish species by the USFWS on March 7, 1994. Prior to 2011, the last recorded observation of tidewater goby in Calleguas Creek was on June 6, 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. 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. None of the project areas associated with the Proposed Action have suitable habitat for tidewater gobies and are, thus, not discussed further in this EA.

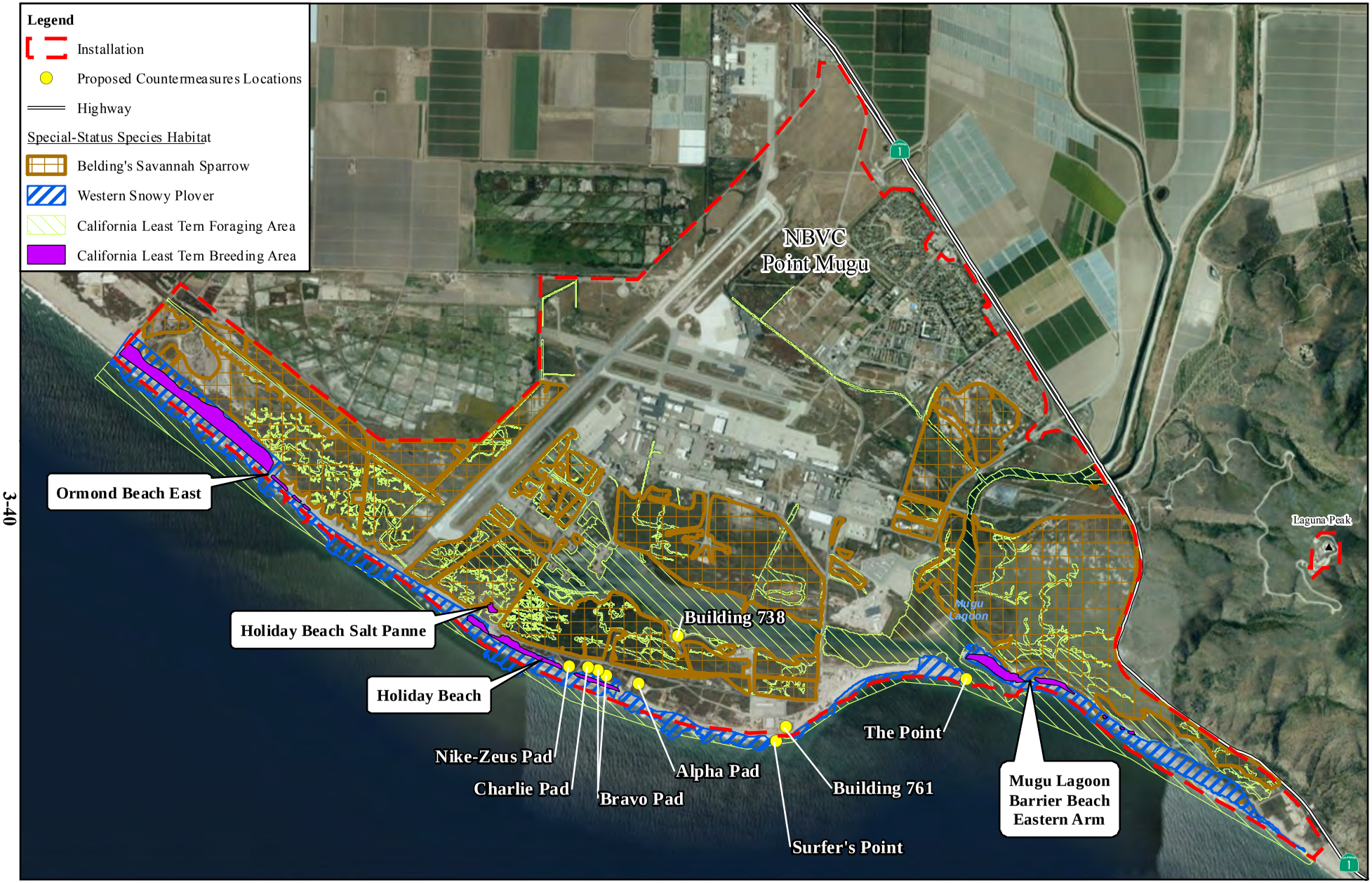


Figure 3.4-5
Snowy Plover, Least Tern, and Savannah Sparrow Habitats at Point Mugu

Sources: Navy 2005, 1993, 2012b

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 (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 (see Figure 3.4-5), on the western and eastern arms of the Mugu Lagoon barrier beach. Breeding season 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, 2011a). The beach pads at Point Mugu are located on previously developed and disturbed land that is within or adjacent to western snowy plover habitat. The highest density of wintering plovers is found on 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. Under the Navy's INRMP (NBVC 2002), snowy plover nesting and foraging areas are protected. Additional recovery programs are implemented, such as population and nesting monitoring and predator management.

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 percent 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 percent 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 3.4-5). 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.

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 island 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 southern shore. They may be found in any habitat that provides abundant cover. In prickly-pear (*Opuntia* sp.) habitats, the majority of lizards are found in older stands of cactus where growth is thick and dead pads have accumulated on the ground providing adequate refuge (USFWS 1984). Island night lizards are expected to occur within the previously disturbed construction area only in low numbers with widely dispersed individuals (NBVC 2010). Fellers, et al. (1998) found few to no lizards in the grasslands surrounding the proposed construction area.

Predators of the island night lizard include the SNI fox. Feral cats previously preyed on the island night lizard, but were eradicated 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).

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). Snowy plovers are year-round residents of SNI, although wintering populations from other areas are transient. Snowy plovers nest and forage on beaches and in the intertidal zone at SNI (see Figure 3.4-3). Tender Beach provides 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 mi (1.4 km) long and is backed by a relatively extensive dune system dominated by native plant species. The beach is about 60-75 ft (18-23 m) wide between the base of the dunes and the mean high tide line in many areas. The beach proper is relatively flat and lacking in vegetation; however it has a substantial amount of driftwood which provides cover for chicks (Navy 2011).

The results of surveys from 2005 through 2011 are shown in Table 3.4-3. During the snowy plover breeding season surveys, an average of 35 percent 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 percent of SNI plovers occur on Tender Beach (excluding high and low outliers).

Table 3.4-3. 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

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

Regular monitoring of the entire Tender Beach area throughout the breeding season has not been conducted since 1993. Monitoring efforts are confined to the Tender Point area, and observations are not regularly conducted 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 2011). Since 2009, regular nest surveys have shown relatively low nest success due to depredation, tides, winds, and abandonment (Ruane 2012).

San Nicolas Island Fox. The SNI fox subspecies is listed by the state as threatened. The subspecies on Santa Catalina, Santa Cruz, San Miguel, and the Santa Rosa Islands are listed as federally endangered due to precipitous declines in their populations. SNI foxes are omnivorous, foraging on insects, vegetation, mice, 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).

3.4.1.3 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 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 Southern California Bight (SCB). The SCB encompasses the area from Point Conception south to Mexico and is influenced by two major oceanic currents: the southward flowing, cold-water California Current and the northward flowing, warm-water California Countercurrent. These currents mix in the SCB and strongly influence patterns of ocean water circulation, 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 percent 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 the project area, tidal flats are typically dissected by meandering tidal creeks and channels. Tidal flats can be classified into sand flat and mudflat 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 of 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 over 75 percent of the mainland shoreline and approximately 23 percent of the Channel Islands

coastlines. The Channel Islands National Marine Sanctuary contains approximately 47 mi (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 bipiicata*). Typical plants along coastal shoreline areas in the project area 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 (Navy 2008). Refer to Chapter 3 of the MRA for specific haulout, rookery, and nesting sites within the project area.

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 central and southern California 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 CDFG, and the beds at SNI could be available to commercial harvesters in the future. Kelp beds extend out as far as 3 nm (5.6 km) from shore on the western shores of SNI and are found just outside the intertidal to 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 three percent 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 300 to 600 ft (100-200 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).

Artificial Habitats

Artificial habitats (artificial reefs, shipwrecks, oil and gas structures, and fish aggregating devices) physically alter the structure of the seafloor and the water column and under optimal conditions, artificial habitats generate and enhance benthic and fish communities, which in turn benefit offshore/onshore economies. Although all types of artificial habitats occur within the Sea Range, the only potential artificial habitat at or near SNI are shipwrecks. Artificial habitats are discussed further in the MRA (Navy 2008).

Marine Protected Areas (MPAs) and Marine Managed Areas (MMAs)

MPAs are "any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein." MMAs are similar to MPAs in that they have conservation or management purpose, defined boundaries, and some legal authority to protect resources. MMAs encompass a wider range of management intents, which include areas of protection for geological, cultural, or recreational resources. MMAs may also include areas that are managed for reasons other than conservation (e.g., security zones, shellfish closures, sewage discharge areas, and pipeline and cable corridors). In general, MPAs are sites implemented with conservation measures that do not vary on a yearly basis (Navy 2008). The Point Mugu Sea Range includes or is adjacent to several areas with special designations or protections. These areas are discussed in detail in the 2008 MRA (Navy 2008), and are discussed below in brief. Note that EFH, and the Cowcod Conservation Area, are discussed separately within the EFH subsection, below.

Channel Islands National Marine Sanctuary. The CINMS encompasses a variety of unique marine habitats including kelp forests, surf and eel grasses, intertidal, nearshore subtidal, deep water benthic habitat, and water column habitat and was established for resource protection, research, education, and public use. Because of the ecological uniqueness, the CINMS provides habitat to 492 species of marine algae, four species of seagrasses, over 5,000 species of invertebrates, 481 species of fish, four species of sea turtles, 33 cetaceans, seven pinnipeds, sea otters, and over 195 species of birds. As shown in Figure 3.4-6, the sanctuary encompasses waters within 6 nm (11.1 km) of the northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa islands) and Santa Barbara Island; it does not include the

waters surrounding SNI. California state waters extend 3 nm (5.6 km) from the shores off each of these islands. Within these boundaries there are several regulatory agencies (i.e., federal, state, and local) that have overlapping jurisdiction and various activities which are prohibited "except as may be necessary for national defense" (Navy 2008).

Areas of Special Biological Significance (ASBS). The state of California designated 34 coastal regions under the 1972 California Ocean Plan as State Water Quality Protection Areas, formally known as 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 (300 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; 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. Discharges incidental to military research, development, testing, and evaluation of, and training with, guided missiles and other weapon systems, fleet training exercises, small-scale amphibious warfare training, and special warfare training are allowed in the SNI and Begg Rock ASBS (State Water Resources Control Board 2012).

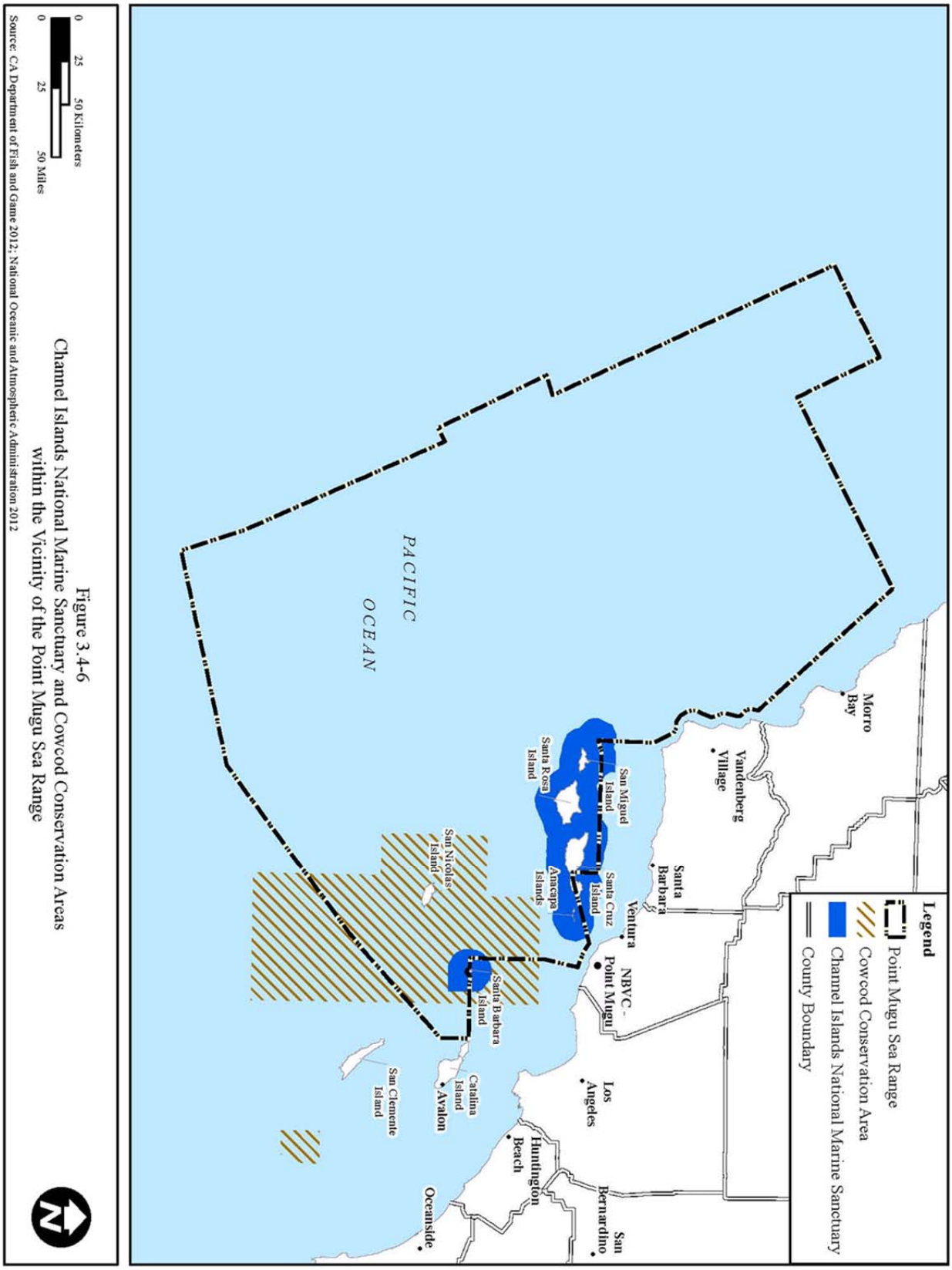
Fish and Fisheries

The project area is situated in a region of diverse ichthyofauna and highly productive fisheries. Of the 554 species and 144 families of California marine fishes, approximately 481 species (87 percent) and 129 families (90 percent) occur in the SCB. Predominant ecosystems found in the project area 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 guttas*; 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*; oceanshrimp, *Panadalus jordani*; warty sea cucumber, *Parastichopus parvimensis*; and others), and kelp beds (Navy 2008).

Essential Fish Habitat (EFH)

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 the NMFS on any action that would adversely affect EFH.



Source: CA Department of Fish and Game 2012; National Oceanic and Atmospheric Administration 2012

Figure 3.4-6
Channel Islands National Marine Sanctuary and Cowcod Conservation Areas
within the Vicinity of the Point Mugu Sea Range

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 within the project area 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). All five of these areas occur within or are adjacent to the Point Mugu Sea Range (Navy 2008) and are listed below:

- **Estuaries** – inland extent of the estuary HAPC is defined as mean higher high water, or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 parts per thousand during the period of average annual low flow. The seaward extent is an imaginary line closing the mouth of a river, bay, or sound; and to the seaward limit of wetland emergents, shrubs, or trees occurring beyond the lines closing rivers, bays, or sounds. This HAPC also includes those estuary influenced offshore areas of continuously diluted seawater. The Mugu Lagoon is the primary estuary area near the Point Mugu Sea Range.
- **Seagrass** – includes those waters, substrate, and other biogenic features associated with eelgrass species (*Zostera* spp.), widgeon grass (*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 [<20 m]) within the Point Mugu Sea Range are designated as potential seagrass range. Eelgrass is found within the Mugu Lagoon, and surfgrass surrounds Anacapa Island and parts of SNI (particularly the northwestern coast). 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.). Dense forests of kelp grow in rocky nearshore habitats along the entire California coast. 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

GIS. However, at finer scales through direct observation, it may be possible to further distinguish between hard and soft substrate in order to define the extent of this HAPC. Two rocky reef monitoring sites exist at the southeast corner of SNI (Navy 2008).

- **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. Several small Areas of Interest are scattered around the northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa islands). Two large Areas of Interest are located near Santa Barbara Island. One large Area of Interest is located to the west of SNI, and a second large area is located to the south of SNI (Navy 2008).

SNI is also located within a Cowcod Conservation Area (Figure 3.4-6) (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, were created to help recover cowcod populations, which are found from about 70-350 meters in depth, primarily in the SCB.

Marine Birds

The varied and unique coastal topography found in the Sea Range provides habitat for a diversity of bird species associated with the marine environment. The complex physiography of the SCB combined with the southward flowing California Current creates persistent upwelling along the coast and off of the Channel Islands. Numerous sub-mesoscale eddies (which are often associated with upwelling) form throughout the SCB as a result of the merging of currents and the interaction of surface and deepwater currents with submerged geologic features. The upwelling creates nutrient "hotspots" where seabirds concentrate. More than 195 species of birds use coastal or offshore aquatic habitats in the Sea Range. Many of the birds regularly travel in and out of the Sea Range while in search of food, migrate through the area, or use only specific parts of the area. Several seabird species have their northern or southern limit in this region (Navy 2008).

The nearshore, offshore, and shallow water areas surrounding SNI and the mainland 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 acre (0.02 to 1.14 birds per ha). In the area immediately surrounding SNI the density has been estimated at 0.1 bird per acre (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).

SNI provides important breeding habitat for several seabird species, including the western gull, Brandt's cormorant, and black oystercatcher. Gulls and cormorants seasonally establish large breeding colonies on the west end of SNI. Numbers of nesting birds have increased in recent years due to protection from human activities (NBVC 2010). California brown pelican roosting areas, western snowy plover habitat, and nesting areas for Brandt's cormorants are shown on Figure 3.4-3.

Marine Mammals

Forty-six marine mammal species have confirmed or possible occurrence at Point Mugu, SNI, or on 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, the 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 Marine Mammal Protection Act (MMPA).

Marine Fish and Invertebrates

The project area around SNI is known to support the following ESA-listed fish or invertebrate species: tidewater goby (*Eucyclogobius newberryi*), white abalone (*Haliotis sorenseni*), and black abalone (*Haliotis cracherodii).* The occurrence of the Southern California steelhead in the waters of the Sea Range is possible given its historic use of the Santa Clara River (NMFS 2011a), but the likelihood of any interaction with or effect of the project is considered remote and discountable; hence this species will not be discussed further. Since tidewater gobies do not occur on the Channel Islands, the likelihood of any interaction with or effect of the project on tidewater gobies is considered remote and discountable; hence this species will also not be discussed further.

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 the National Oceanic and Atmospheric Administration 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 acre (1 ha) search area. Surveys were limited in coverage due to poor weather conditions and restraints on access to waters near SNI that are used for military exercises (Pinkard-Meier and Butler 2008). Fisheries landing data collected during the peak of the abalone fishing period indicated that less than one half of one percent of all landings came from SNI, and this species has not been sighted at SNI for many years (Hobday and Tegner 2000).

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 marine gastropods with a flattened shell, reaching a diameter of about 4 inches (10 centimeters) at 4-8 years, and growing more slowly thereafter (NMFS 2008b).The 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 20thcentury (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 1/m^2, 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 Sea Range (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 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 National Oceanic and Atmospheric Administration, 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, acoustics, and hearing abilities.

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 3.4-4). Numbers of harbor seals at NBVC Point Mugu appear to be steadily increasing. 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 CDFG 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.

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 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 3.4-7 and 3.4-8). 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 3.4-4 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.

Table 3.4-4. 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.

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 52 individuals (B. Hatfield unpublished data). 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 3.4-8). Individuals are seen swimming along the kelp beds that line the coast of SNI on rare occasions (USFWS 2003).

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 [NCCOS] 2005; Navy 2008). Blue whales (*Balaenoptera musculus*) may occur within three 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 in the waters of the Sea Range: loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), eastern Pacific green (*Cheloniamydas*), 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 (based on 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.

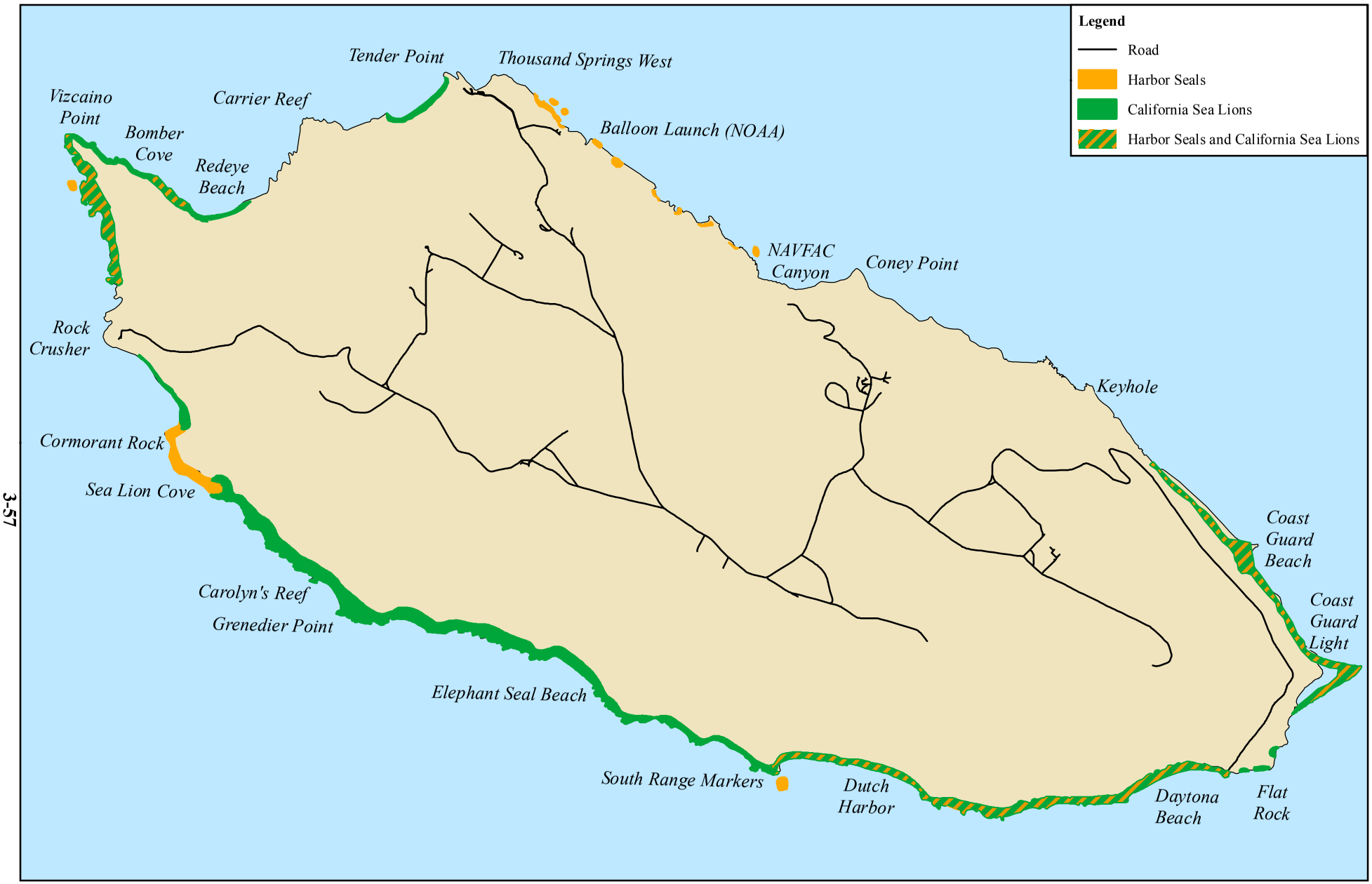
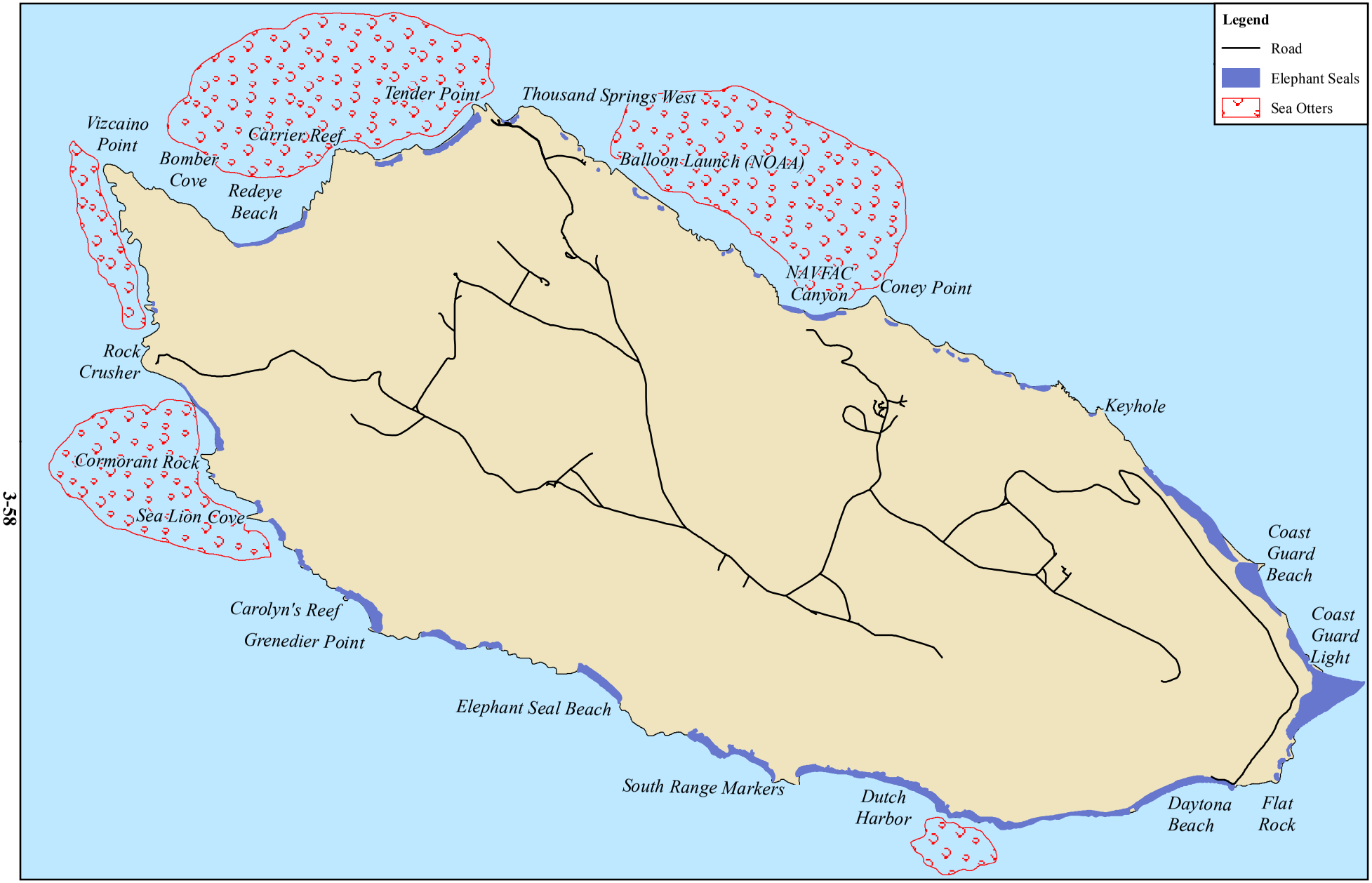


Figure 3.4-7
Harbor Seal and California Sea Lion Haulouts at SNI



0 0.5 1 Kilometers

0 0.5 1 Miles

Sources: Hatfield 1997; Navy 2012

Figure 3.4-8
Elephant Seal Haulouts and Sea Otters at SNI

3.4.2 Environmental Consequences

3.4.2.1 Approach to Analysis

This description of environmental consequences addresses potential impacts from ground disturbing activities from construction on SNI; visual stimuli and noise from UAV and UMS operation (including associated support craft); and visual stimuli, noise, and contaminants from debris from weapons testing on the marine environments within the project area. The noise and visual appearance of aircraft could disturb animals on land or the surface of the water, whereas the movement of vessels, the impact of the weapons upon targets, and the resulting debris could also affect marine species and/or habitats. Factors used to assess the significance of impacts to biological resources include the extent or degree to which the action would affect legally protected, sensitive, or otherwise important (commercially, recreationally, scientifically, or ecologically) habitats or species. Potential consequences of both direct and indirect impacts are considered.

Because of the frequency with which aircraft would overfly the marine and terrestrial environments, special consideration is given to the potential for noise impacts, particularly for 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.

In the following sections, the potential impacts of activities associated with the Proposed Action are analyzed by biological resource.

3.4.2.2 Alternative 1 – Preferred Alternative

Proposed activities at the Sea Range would be consistent with activities currently conducted within these locations. Section 3.4.2.5, *Special Conservation Measures*, provides the various conservation measures included as part of Alternative 1.

Terrestrial Biological Resources

Terrestrial Vegetation Communities and Wildlife

At SNI, the proposed new hangar complex, including a hangar, administrative office building, tarmac taxiway, aircraft parking area, access road, and auto parking area, would be located adjacent to existing airfield support facilities. This area has been previously disturbed and is composed primarily of non-native annual grasses. Runoff would not change from existing conditions. Therefore, no significant impacts to plant communities, habitat, or wildlife would result from the proposed construction activities on SNI. Potential construction impacts to terrestrial special status species on SNI are discussed below.

Noise and visual stimuli from UAVs, as well as support aircraft overflights, could disturb wildlife on land. However, the Special Conservation Measures (SCMs; Section 3.4.2.5) will generally restrict UAV and supporting aircraft flights to a minimum of 1,000 ft (305 m) AGL. Lower altitude flights would only involve small and quiet UAVs that will have minimal if any effects on terrestrial wildlife. At 1,000 ft (305 m) AGL, received SELs from large manned or unmanned aircraft would range from 74.6 to 118.1 dBA (see Table 3.3-2 in Section 3.3, *Noise*). As such, overflights by large aircraft, as well as Fire Scout launching from the beach pads at NBVC Point Mugu, could disturb wildlife, but any such disturbance will be brief and not significant. Furthermore, Fire Scouts will not be launched from the beach pads at NBVC Point Mugu during the snowy plover nesting season. Additionally, all Group 4 and 5 UAVs, including the Fire Scout, will follow heavily used, established flight patterns at Point Mugu and SNI and would not launch from Tender Point on SNI; the increased tempo of activities would therefore be similar to those that already occur at Point Mugu and at SNI. Furthermore, Group 1 and 2 UAVs are expected to

have little to no impact to wildlife from visual or noise stimuli due to their small size and limited range. The SCMs would also eliminate the potential for new ground disturbance. As such, the proposed UAS mission activities would be similar to those that already occur at Point Mugu and at SNI and would not create any new ground disturbance. Given the level of continuing Navy activity around Point Mugu, the Mugu Lagoon, and SNI, the proposed increased tempo of activities similar to those that already occur would not significantly disrupt foraging, resting, or nesting behavior of terrestrial wildlife, including the SNI fox, island night lizard, birds, and mammals. Therefore, implementation of Alternative 1 would not result in any new impacts and there would be no significant impacts to terrestrial vegetation communities, terrestrial wildlife, or terrestrial special status species.

Potential impacts to species that occur in both the terrestrial and marine environment, such as California least terns and sea lions, are discussed below in the Marine Biological Resources sub-section.

UMS support aircraft will follow the same procedures and flight requirements as set forth above for UAS mission activities. As such, impacts from support aircraft utilized during UMS mission activities would be similar to those described above for UAS mission activities. No other UMS mission activities are expected to impact the terrestrial environment. Therefore, implementation of Alternative 1's UMS mission activities would not result in significant impacts to terrestrial vegetation, terrestrial wildlife, or terrestrial special status species.

Terrestrial Special Status Species

As described above, UAS and UMS mission activities would not result in any significant impacts to terrestrial wildlife. For these reasons, UAS and UMS project activities would not result in any significant impacts to any terrestrial special status species. The only terrestrial species with potential to occur in the construction area are the SNI Fox and the island night lizard (NBVC 2010). Although the SNI fox occupies all island habitat types, their densities are lowest in barren areas and those comprised primarily of non-native annual grasses, such as the proposed and previously disturbed construction area. Therefore, there would be no significant impact to the SNI fox under Alternative 1.

The island night lizard is only expected to occur in the area with very low numbers and with widely scattered individuals. Furthermore, the construction area is relatively small when compared to the habitat available to the island night lizard and construction would not be located within any high quality habitat. Moreover, the USFWS has proposed delisting the island night lizard 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).

A qualified biologist authorized by the USFWS would survey the construction site for island night lizards prior to construction commencement and would relocate any individuals found to safe habitat. A designated monitor, also authorized by the USFWS, would be present during all construction activities that have potential to affect island night lizards to ensure that no island night lizards would be harmed, and any island night lizards found within the construction area would be relocated. All surveying, monitoring, and night lizard relocating would be consistent with the requirements of the Biological Opinion for Activities on San Nicolas Island (USFWS 2001). The Navy will consult with USFWS in advance of construction to confirm coverage under the existing Biological Opinion or, if required, would request a new authorization for incidental takes associated with the activity. Construction resulting from the implementation of Alternative 1 may affect, but is not likely to adversely affect, island night lizards. Therefore, no significant impacts to terrestrial special status species would result from the implementation of Alternative 1, including the proposed construction activities on SNI.

Marine Biological Resources

Marine Habitats and Invertebrates

Proposed UAV launches, flights, and supporting aircraft would have no effect on marine habitats or invertebrates. The proposed minimum distances from shore include allowances for sufficient depth and swell conditions. Surface targets will not be located within intertidal zone of SNI and, therefore, Alternative 1 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, and kelp growth rates are extremely high; any incidental damage from boat propellers would only temporarily reduce the top portion of a large plant. Otherwise, project-related vessel movement by UMSs and support surface craft would be the same as routinely occurs on the Sea Range and would be 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 would affect only a minute portion of the seabed. Therefore, activities associated with Alternative 1 would have no significant impact on marine invertebrates or plants. Vessels in the marine environment greater than 12 nm (22.2 km) from shore will be consistent with Sea Range usage described in the 2002 EIS/OEIS and would have negligible, if any, effect on marine invertebrates or plants; therefore, there would be no harm to the U.S. EEZ under EO 12114. Threatened and endangered marine invertebrates are discussed in the Marine Special-Status Species section, below.

Marine Birds

Marine birds on the Sea Range would be subjected to the occasional noise and visual stimuli created by aircraft flying over during UAV mission activities as well as during UMS support aircraft flights. However, level of activity associated with Alternative 1 is a small fraction of ongoing Navy activity, and the aircraft in most cases are smaller and less noisy than conventional aircraft. Potential effects will be minimized by implementation of the SCMs, which will generally require all UAV and support aircraft flights to maintain a minimum 1,000 ft (305 m) AGL. Lower altitude flights will only involve small and quiet UAVs. Flight over occupied snowy plover, least tern, and cormorant nesting areas will not in any case be conducted lower than 500 ft (152 m) AGL. At 1,000 ft (305 m), received SELs from large manned or unmanned aircraft would range from 74.6 to 118.1 dBA (see Table 3.3-2 in Section 3.3, *Noise*). As such, overflights by large aircraft, as well as Fire Scout or other large VTOL UAVs launching from the beach pads at NBVC Point Mugu, could disturb marine birds, but any such disturbance would be brief and not significant. Furthermore, Fire Scouts will not be launched from the beach pads at NBVC Point Mugu during the snowy plover nesting season. Additionally, all Group 4 and 5 UAVs, including the Fire Scout, will follow heavily used, established flight patterns at Point Mugu and SNI; the increased tempo of activities would therefore be similar to those that already occur at Point Mugu and at SNI. Other appropriate protective measures for flights below 1,000 ft (305 m) will be developed on an as-needed basis prior to testing to ensure no impacts would occur.

The proposed activities would incrementally increase the frequency with which above-normal noise and associated visual cues would occur. With the SCMs, any noise and visual stimuli would be of low intensity (relatively distant) and would not be expected to produce more than a momentary reaction from individual birds and is not expected to significantly disrupt important behaviors such as nesting, foraging,

and daily or seasonal migrations. As such, no impacts to numbers, distributions, or populations of migratory birds, would be anticipated to result from the proposed UAS mission activities and UMS support aircraft flights.

Before a weapon (including lasers) could 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 weapon being used, between the firing point and the target. A bird in flight or at a long distance might not be detectable, but the likelihood of a bird crossing a weapon's path upon its firing is remote.

As described above, marine bird densities range from less than 0.01 to 0.46 bird per acre (0.02 to 1.14 birds per hectare) within the Sea Range and near SNI the density has been estimated at 0.1 bird per acre (0.25 birds per hectare) (Navy 2002). Given these densities of birds within the Sea Range, the likelihood of a bird intercepting a weapon is extremely low and no significant impacts to sea birds abundance or distribution are expected to occur.

Although average densities are low, large numbers of birds can congregate in feeding frenzies on the water surface. In addition, seabirds may haul out or land on floating targets, particularly if they are unattended. The SCMs included as part of the proposed activities will ensure that seabirds are not present within the hazard zone when a weapon is fired. These passive methods of protection will not adversely affect marine seabirds.

Vessels and aircraft activity further than 12 nm (22 km) from shore would be widely dispersed and isolated from any breeding or feeding area for marine birds; therefore; there would be no harm to the U.S. EEZ under EO 12114. Endangered or threatened marine birds are discussed in the Marine Special-Status Species section, below.

Fish and EFH

There is no evidence that aircraft noise at sub-supersonic speeds has any effects on fishes (Manci et al. 1988). Project-related vessel traffic could disturb fish temporarily, but would not cause any harm to individuals. Weapon use and associated debris entering the water and sinking to the seafloor may disturb fish but would impact only a very small area of benthic habitat. The area of the seafloor that would be affected by weapon use and associated debris is an insignificant portion of the seafloor in the project area, and the likelihood of striking a fish is negligible (Navy 2002). Therefore, activities associated with Alternative 1 would have no effect on fish, including cowcod within the Cowcod Conservation Area.

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 affect." Temporary or minimal impacts, as defined below, are not considered to "adversely affect" EFH. "Temporary impacts" are those that are limited in duration and that allow the particular environment to recover without measurable impact. "Minimal impacts" are those that may result in relatively small changes in the affected environment and insignificant changes in ecological functions. The Proposed Action area includes EFH for coastal pelagic species, highly migratory species, and west coast groundfish. All project-related effects on EFH for coastal pelagic and highly migratory species meet the definitions of temporary and minimal. Routine vessel movement on the Sea Range, as would occur in conjunction with Alternative 1, 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 adverse effect on groundfish EFH and would not harm the U.S. EEZ under EO 12114.

Marine Special-Status Species

Abalone

There is no evidence of noise having any impact on marine invertebrates. Thus, aircraft and surface vessels would not disturb the black or white abalone. Both black abalone and white abalone have specific habitat requirements. Black abalone habitat is primarily in the intertidal zone, but are found to a depth of 20 ft (6 m), whereas white abalone occur on rock reef surrounded by sand in 98 to 213 ft (30 to 65 m) depth and have not been documented recently at Point Mugu or SNI (Navy 2008). By avoiding intertidal habitat, the majority of the Project Area is not overlapped by black or white abalone habitat. The only potential impact to black or white abalone would be from debris falling through the water column, within which the terminal velocity of 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 would affect only a minute portion of the seabed. Therefore, implementation of Alternative 1 would have no effect on or impact to endangered black abalone or white abalone and consultation with the NMFS is not required.

Marine Birds

Western Snowy Plover. Similar to other marine birds, the federally threatened western snowy plover may experience the noise and visual stimuli created by UAVs and support aircraft flying over shorelines. At 1,000 ft AGL or greater, noise levels for all types of UAVs are not expected to exceed 118.1 dBA (see Table 3.3-2 in Section 3.3, *Noise*) and would be below levels that could cause hearing damage or would be likely to disturb the birds. Overflight by low-flying (500 ft [152 m] AGL) aircraft, especially helicopters, is considered a potential source of disturbance to western snowy plovers (USFWS 2007); such activity will generally be prohibited through the SCMs that require UAV and support aircraft flights to maintain a minimum 1,000 ft (305 m) AGL altitude. Lower altitude flights will only involve small and quiet UAVs, and Fire Scouts will not be launched from the beach pads at NBVC Point Mugu during the snowy plover nesting season. Other appropriate protective measures for flights below 1,000 ft (305 m) will be developed on an as-needed basis prior to testing to ensure no impacts would occur.

Point Mugu and SNI are currently utilized for various military training activities that result in above-ambient noise levels. Although the frequency with which noise and associated visual cues occur would increase incrementally with Alternative 1, UAVs on the whole would be smaller and less noisy than the conventional aircraft being flown. The frequent nesting of snowy plovers around the edges of coastal military airfields, including NBVC Point Mugu and NAS North Island (NAWCWD 2002; USFWS 2007), as well as in other urban coastal environments where they have reduced predation pressure and disturbance on the ground, suggests that brief, high-altitude overflights at Point Mugu and at SNI would not deter nesting or affect nesting success. Therefore, if a UAV or support aircraft flight disturbed snowy plovers, they would be expected to resume nesting activities when the noise has subsided. Furthermore, by observing the SCMs, any noise and visual disturbances would be only momentary and of low intensity

(relatively distant) and would not be expected to lead to nest abandonment or cause substantial disruption of important nesting, resting, or foraging activities.

USFWS issued a Biological Opinion (BO) for Navy activities taking place at SNI in 2001 which included terms and conditions for Navy activities that may disturb listed species. Alternative 1 follows the terms and conditions set forth in the SNI BO (USFWS 2001) designed to protect the western snowy plover and is consistent with the western snowy plover and management requirements developed in the BO (USFWS 2001) and the INRMP (NBVC 2010). Specific conservation measures to minimize impacts to western snowy plover have been determined and are provided in Section 3.4.2.5.

With conservation measures in place, the temporary, minimal, and incremental disturbances created by Alternative 1 will not adversely affect the species. As such, the Navy requested concurrence from USFWS under Section 7 of the ESA regarding impacts to snowy plovers. Based on the USFWS concurrence (Appendix A) and with implementation of the proposed conservation measures (Section 3.4.2.5), there would be no significant impact to western snowy plovers under Alternative 1.

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 September. Similar to other marine birds, least terns may experience the noise and visual stimuli created by UAVs and support aircraft flying over shorelines. Nesting and foraging behavior of least terns can be affected by human activity (USFWS 2006b). However, a number of thriving least tern nesting colonies are in close proximity to busy, noisy locations such as highways and airfields. UAV and supporting aircraft flights will be restricted to an elevation of 1,000 ft (305 m) AGL or greater. At 1,000 ft (305 m) AGL or greater, noise levels for all types of UAVs are not expected to exceed 118.1 dBA (see Table 3.3-2 in Section 3.3, *Noise*), would otherwise be similar to existing activities near Point Mugu, and would be below levels that could cause hearing damage or would be likely to disturb the birds. Lower altitude flights will only involve small and quiet UAVs; Fire Scouts will not be launched from the beach pads at NBVC Point Mugu during the snowy plover nesting season (generally from the beginning of April to mid-September) which includes the majority of time least terns are present at Point Mugu (generally mid-April to late September); and occupied least tern nesting areas will not in any case be overflown at an altitude lower than 500 ft (152 m). Other appropriate protective measures for flights below 1,000 ft (305 m) would be developed on an as-needed basis prior to testing to ensure no impacts would occur.

With implementation of the proposed conservation measures (Section 3.4.2.5), implementation of Alternative 1 would have no effect on the species. Therefore, there would be no significant impact to California least terns under Alternative 1.

Marine Mammals

Pinnipeds hauled out on land often react to the airborne sound and/or sight of aircraft by becoming alert and, less often, by rushing or stampeding into the water. If they react, reactions tend to be strongest if the aircraft is flying low, passes nearly overhead, causes abrupt changes in sound, or causes a sonic boom.

Helicopters are used in studies of several species of seals hauled out and is considered an effective means of observation (Gjertz and Børset 1992; Bester *et al*. 2002), although they have been known to elicit behavioral reactions such as fleeing (Hoover 1988). In other studies, harbor seals showed no reaction to helicopter overflights (Gjertz and Børset 1992). Helicopter approach to landing typically caused the most severe response by California sea lions at a rocky haulout off Crescent City in northern California, although California sea lions were more tolerant than nearby Stellar sea lions (NOAA 2010).

Pinniped startle or flight reactions to airborne noise often habituate (i.e., reactions become less pronounced upon repeated exposure). Habituation occurs at different rates for different species, different populations, and different groups within a population as a function of age, sex, and time of day (Navy 2012). Pinnipeds hauling out at various places on or near the Point Mugu Sea Range often show little reaction to aircraft (see below). For example, harbor seals that haul out near the entrance to Mugu Lagoon are apparently habituated to the aircraft and helicopters that frequently fly overhead or nearby (Koski et al. 1998; NAWCWD 2002). Harbor seals hauled out in the Sea Range have reacted to aircraft overflights with alert posture and often with rapid movement, especially when the aircraft was visible. Seals rushed into the water in response to some sonic booms and to a few of the overflights by light aircraft, jets above 800 ft (244 m), and helicopters below 1,000 ft (305 m) (Koski et al. 1998; NAWCWD 2002).

Northern elephant seals and California sea lions at San Miguel Island, California, seemed less responsive than harbor seals. Jets above 1,000 ft (305 m) altitude produced no reaction; those below 1,000 ft (305 m) usually caused limited movement but no major reaction. Light aircraft flying directly overhead at altitudes of 490 to 590 ft (150 to 180 m) often elicited alert reactions and, in sea lions, movement (Richardson et al. 1995; Koski et al. 1998; NAWCWD 2002).

Greene et al. (1998) observed the reactions of California sea lions hauled out on SNI to 12 overflights by an FA-18 jet fighter aircraft as it simulated captive-carry sorties with an AGM-84E missile. The aircraft repeatedly passed over or near groups of sea lions at altitudes ranging from 500 to 2,000 ft (150 to 610 m) with varying power settings and speeds, and producing SEL levels of 108.8 dBA re 20 µPa at an altitude of 500 ft (150 m). Although received levels from several aircraft passes exceeded 100 dBA and a small proportion of the sea lions became alert, there were no significant disturbance responses to these overflights. In no case did the sea lions leave the beach, and they rarely exhibited alert reactions. The increase in airspeeds and decrease in altitudes were done gradually, so there may have been some habituation by the sea lions (Greene et al. 1998).

Under Alternative 1, UAV and support aircraft overflights of breeding or pupping marine mammals will occur at altitudes of 1,000 ft (305 m) AGL or greater, which will be higher than the overflights assessed by Greene et al (1998). At this altitude, received SELs from large manned or unmanned aircraft will range from 74.6 to 118.1 dBA (see Table 3.3-2 in Section 3.3, *Noise*). To minimize potential effects on pinnipeds, UAV and supporting aircraft flights will be restricted to an elevation of 1,000 ft (305 m) AGL or greater. Lower altitude flights will only involve small and quiet UAVs, and occupied pinniped rookeries during pupping/breeding seasons will not in any case be overflown at lower than 500 ft (152 m). Other appropriate protective measures for flights below 1,000 ft will be developed on an as-needed basis prior to testing to ensure no impacts would occur. Furthermore, near Point Mugu and SNI, Group 4 and 5 UAVs will follow existing flight routes and would otherwise be similar to that which routinely occurs in the area. Therefore, it is expected that pinniped reactions, if any, to UAV and supporting aircraft flights would be brief, inconsequential, and would not rise to the threshold of "takes" under the MMPA.

Pinnipeds and cetaceans known to occur in the proposed project area are highly mobile organisms, and would not be adversely impacted by the localized, short-term increase in vessel traffic associated UMS mission activities. The most likely response, if any, of marine mammals located on the sea surface during such activities would be to temporarily submerge.

Although average densities are low, large numbers of marine mammals (particularly sea lions) can congregate in feeding frenzies on the water surface. In addition, marine mammals may haul out or land on floating targets, particularly if they are unattended. The SCMs included as part of the proposed activities will ensure that marine mammals are not present within the hazard zone when a weapon is fired. The

likelihood of a weapon missing its target and striking a marine mammal is minimal, particularly when considering the SCMs included as part of the Proposed Action that include a requirement for a designated marine mammal observer to be present during such activities. For a weapon to strike a marine mammal, the timing would have to be such that the marine mammal surfaces or is near the surface and remained unseen at the exact point in time when weapon missed a target and hit the water. The passive methods of protection proposed by the SCMs would not adversely affect marine mammals. No reasonably foreseeable "takes" of marine mammals as defined by the MMPA would be anticipated, and no significant impacts would occur.

The southern sea otter is found on the sea surface more than any other marine mammal in the project area. The likelihood of an unmanned system or weapon striking one of these individuals, however, is considered negligible as the kelp beds this species frequents will be avoided. The testing locations will be selected to avoid the areas most heavily used by sea otters. Otherwise, the temporary passage of target vessels through areas where otters are present would not significantly disrupt important activities or be likely to result in a "take" as defined under the MMPA. There would be no significant impact of Alternative 1 on the southern sea otter.

Although it is possible that federally endangered large cetaceans (blue, fin, sei, and humpback whales) or the threatened southern sea otter would be on the Sea Range in the general region of testing activities, the SCMs would ensure that no marine mammals are present within hazard areas associated with UAS/UMS weapon firing. The likelihood of a UMS randomly striking and injuring a marine mammal in general is remote and discountable. Given the presence of these ESA-listed marine mammals on the Sea Range but the low likelihood of any interaction that could result in harm or behavioral disruption, the action will not affect ESA-listed marine mammals.

As suggested by the seafloor survey reported in Watters et al (2010), even in areas such as Southern California (within the SOCAL Range Complex) where the Navy has been undertaking trained training and testing activities for decades, the density of materials expended by the Navy is negligible in comparison to commercial fishing and urban refuse resulting in marine debris available on seafloor. Watters et al (2010) found an estimated 320 anthropogenic items per square kilometer on Southern California seafloor and encountered only one item (identified as "artillery") that was of likely military origin. The majority of material expended during Navy training and testing 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) and not be accessible to most marine mammals. Therefore, the additional marine debris that would result from the proposed project activities would not create a significant impact to marine mammals.

For reasons described above and with implementation of the proposed conservation measures, there would be no significant impacts to marine mammals under Alternative 1.

Vessels and aircraft activity further than 12 nm (22 km) from shore would be widely dispersed and isolated from any breeding or feeding area for marine mammals; therefore; there would be no harm to the U.S. EEZ under EO 12114.

Sea Turtles

Given the expected very low density of sea turtles on the Sea Range and in nearshore waters, the probability of direct interactions with project activities is very low. The most likely response, if any, to UAV or UMS activity by a turtle on the surface of the water would be to dive underwater. Individuals below the surface would not be impacted by airborne noise as such noise quickly attenuates across the sea

surface interface. UMS and other in-water project activities would generate low-level engine noise which routinely occurs in nearshore waters and throughout the Sea Range and would be unlikely to elicit behavioral reactions, much less have the potential to cause hearing damage. The likelihood of debris or a projectile striking a sea turtle is negligible given the rarity of sea turtles and SCMs that require a designated observer to search for sea turtles and marine mammals prior to such a weapon-testing event. Due to the low densities of sea turtles on the Sea Range and in nearshore waters, as well as the negligible likelihood of activities impacting individuals under any circumstances, there would be no effect or significant impact of Alternative 1 on loggerhead, leatherback, eastern Pacific green, or olive ridley sea turtles and consultation with the USFWS is not required.

In conclusion, Alternative 1 would not significantly impact marine special-status species on the Sea Range or in nearshore waters and would cause no significant harm to the overseas environment under EO 12114.

3.4.2.3 Alternative 2 – Expansion of UAS Operations

Impacts from construction and UAS missions under Alternative 2 would be the same as those described for Alternative 1. However, there would be no impacts from UMS missions under Alternative 2 since UMS activities would not occur under Alternative 2. Therefore, there would be no significant impacts to biological resources under Alternative 2.

3.4.2.4 Alternative 3 – No-Action Alternative

Under the no-action alternative, the proposed construction on SNI, expanded UAS mission activities, and UMS mission activities would not occur and existing conditions as described in Section 3.4.1 would remain unchanged. Therefore, implementation of the no-action alternative would have no significant impact on biological resources.

3.4.2.5 Special Conservation Measures (SCMs)

The following SCMs have been developed specifically for the Proposed Action and/or derived from the Island's INRMP, Point Mugu Sea Range EIS/OEIS, Letter of Authorization issued by the National Marine Fisheries Service for missile launches, and the Biological Opinion issued by the USFWS. These SCMs will apply to all action alternatives, as appropriate.

- The Proposed Action follows the terms and conditions set forth in the NBVC Point Mugu and SNI BO (USFWS 2002, USFWS 2001) designed to protect the western snowy plover, least tern, and clapper rail and is consistent with the management requirements developed in the BOs and the INRMP (NBVC 2010).
- UAV and supporting aircraft flights will be restricted to an elevation of 1,000 ft (305 m) AGL or greater. Lower altitude flights will only involve small and quiet UAVs. Active snowy plover, least tern, and clapper rail nests and occupied pinniped rookeries during pupping/breeding seasons will not in any case be overflown at lower than 500 ft (152 m). Other appropriate protective measures for flights below 1,000 ft (305 m) will be developed on an as-needed basis prior to testing to ensure no impacts would occur.
- Large UAVs will follow established flight patterns at Point Mugu and SNI.
- To eliminate the potential for new ground disturbance impacts, the launch and recovery of UAVs at Point Mugu and SNI will occur solely on existing graded and/or paved areas, including airstrips, roadways, and pad sites. Group 3, 4, and 5 AVs will be restricted to any existing sites large enough to accommodate them without impacts. These AVs have redundant systems in place

to prevent unplanned landings and will not be used on beach pads during sensitive bird species nesting seasons. Group 1 and 2 AVs could be launched from any existing site during sensitive bird nesting seasons but only if no active snowy plover, least tern, or clapper rail nests are within 500 ft (152 m) of the flight path.

- A designated observer will be present during all activities that involve weapons testing, firing, or launching to ensure that these activities will not result in a take of marine mammals, sea turtles, or birds. Standard range clearance procedures will be followed, which include looking for marine mammals, birds, and sea turtles in predicted debris and impact areas. If marine mammals, birds, or sea turtles are observed in or near a predicted debris or impact area, activities will be suspended or moved.
- Surface target maneuver circuits will be at least 0.1 nm (0.16 km) from any shoreline, beach, marine mammal haulout, tide pool, or known shipwreck. During weapons testing, surface target maneuver circuits will be at least 0.2 nm (0.37 km) from the shoreline.
- Flight testing will be scheduled among available testing locations to minimize repetitive noise exposures and overflights during marine mammal pupping seasons. The Range Sustainability Office will provide guidance for scheduling tests across the various locations throughout the testing season.
- Unmanned Systems operations will be conducted during daylight hours whenever possible. Night tests will only be conducted if range scheduling prevents daylight testing or if operationally required. If night operations are required, a suitable location will be selected to minimize disturbance to wildlife.
- Based on the most current information available, Navy biologists will provide direction to project participants regarding the locations of seabird rookeries and concentrations of marine mammals. These locations will be subject to seasonal restrictions and will not be overflown. Within safety and mission constraints, target placement and flight patterns will also be designed to maximize horizontal distance from these locations.
- Before a weapon (including lasers) could 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 weapon being used, between the firing point and the target. Additionally, the path from the a weapon firing point to the target will be monitored to ensure that weapons are not fired if and when wildlife is within the nominal hazard zone identified in the Risk Hazard Assessment.
- Targets mounted on floating structures will not be placed on horizontal surfaces where sea lions might haul out, and surfaces near a target may have "bird spikes" (www.nixalite.com) if proper mounting surface is available and operationally feasible.
- No weapon would be fired at any part of the CINMS.
- No project activities will occur in rocky intertidal habitat.
- A qualified biologist authorized by the USFWS will survey the construction site for island night lizards prior to construction commencement and will remove any individuals found to safe habitat. A designated monitor, also authorized by the USFWS, will be present during all construction activities that have potential to affect island night lizards to ensure that no island night lizards will be harmed, and any island night lizards found within the construction area will be relocated. All surveying, monitoring, and night lizard relocating will be consistent with the requirements of the Biological Opinion for Activities on SNI (USFWS 2001). The Navy will

consult with USFWS in advance of construction to confirm coverage under the existing Biological Opinion or, if required, will request a new authorization for incidental takes associated with the activity.

- The results of biological monitoring will be included in an annual report that will be submitted to the appropriate NMFS or USFWS contact summarizing activities related to this project.

3.4.2.6 Mitigation Measures

With implementation of proposed conservation measures, there would be no significant impacts to wildlife species at Point Mugu, SNI, or the Sea Range. Therefore, no mitigation measures are proposed or required.

3.5 CULTURAL RESOURCES

3.5.1 Affected Environment

3.5.1.1 Definition of Resource

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

Archaeological resources consist of the material remains of prehistoric and/or historic human activity. The Archaeological Resources Protection Act of 1979 (ARPA) 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 U.S.C. 470bb).

Architectural resources include manmade structures including, but not limited to, standing buildings, dams, bridges, and canals. Under the National Historic Preservation Act of 1966 (NHPA), only architectural resources over the age of 50 years are considered for protection; however, younger structures can be afforded the same protection under special circumstances.

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

3.5.1.2 Regulatory Setting

The 1966 NHPA (PL 89-665, as amended by PL 96-515; 16 U.S.C. 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 criteria specified by SHPO.

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 U.S.C. 470 [Supp. 1, 1971]);
- Native American Graves Protection and Repatriation Act (PL 101 – 601; U.S.C. 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 Department of Defense [DoD] activities).

Section 101(d)(6)(B) of the 1966 NHPA requires federal agencies to consult with federally-recognized 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 government-to-government coordination.

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.

3.5.1.3 Existing Conditions

Point Mugu has been completely 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).

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). Building N138 on SNI was determined by consensus to be eligible for the NRHP in 1999. There are no designated traditional cultural properties culturally-affiliated with SNI and no federally-recognized tribes on the island.

Prehistoric sites at SNI consist primarily of middens (involved with processing of food) within 330 yd (300 m) of the shoreline (Martz 2002). Middens on SNI typically contain the remains of fish, marine mammals, shellfish, and food processing tools (e.g., bifaces, scrapers, and milling equipment). Other prehistoric site types commonly encountered on SNI include habitations, lithic reduction sites, rock art, and thermal features. In some instances, human burials may be associated with habitations or other prehistoric sites.

Historic sites on SNI include the remnants of fishing and ranching activities that occurred on the island from the 1850s until 1943. Fishing camps on SNI are typically found on the northwestern and southeastern tips of the island while evidence of ranching activities is generally encountered on the terraces above NAVFAC Beach (NAWCWD 1997).

3.5.2 Environmental Consequences

3.5.2.1 Approach to Analysis

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

The APE represents the geographic area within which an undertaking would take place and may cause an effect to the ambient environment, including historic properties. The proposed actions to implement expansion of unmanned systems operations on the Point Mugu Sea Range require a variety of air, marine,

and land-based environments. Current activities conducted on the Point Mugu Sea Range are similar to those proposed in this EA, and as a result Point Mugu and SNI would continue to provide land-based support of these types of activities. Since the proposed UMS operations occur on the ocean surface, there is no potential to impact submerged cultural resources. Components of the Proposed Action include construction at the SNI airfield and the launch and recovery of UASs. The APE for the Proposed Action at Point Mugu includes the Point Mugu airstrip and existing roadways and pad sites that would be used for the launching of Groups 1 and 2 UASs.

The Proposed Action APE at SNI includes the hangar construction site (Figure 2-1), the SNI airstrip, and existing roadways and pad sites.

3.5.2.2 Alternative 1 – Preferred Alternative

Impacts

Alternative 1 requires the construction of a hangar with a new parking lot and tarmac connecting to the SNI airstrip. Figure 2-1 provides a notional overview of the construction site. This construction would occur on an approximately 3.45-acre (1.40-hectare) site. No archaeological or historic properties are located at this site. Therefore, ground disturbance associated with Alternative 1 construction would have no impact on cultural resources.

The launch and recovery of AVs at Point Mugu and SNI would occur on existing airstrips, roadways, and pad sites. Most large AVs (Groups 3, 4, and 5) would take off and land from existing runway locations and are not expected to impact terrestrial resources. Fire Scout would launch from existing beach pad sites at Point Mugu and would not impact cultural resources. Large AVs would not be launched from Tender Point on SNI.

Smaller UASs (Groups 1 and 2) would take off and land from existing roadways and pad sites. Occasionally Group 1 and 2 AVs would be unable to land at primary recovery sites, potentially impacting terrestrial cultural resources. Prior to UAS operations NAWCWD, in consultation with the NBVC Cultural Resources Program Manager, would define an alternate landing location that avoids identified cultural resource sites. The alternate landing site would only be intended for use of AVs under positive control.

Given the small size and slow approach speed of the landing AV, the footprint of any unintended event is expected to be small. Should an unintended landing event on SNI occur outside primary or alternate landing sites, NAWCWD archaeologist, who would be on-site during the operation, would evaluate the location and determine any impacts before project personnel are allowed on the site. Recovery of the AV would only be allowed after the determination that no impact has occurred. Should it be determined that an impact to cultural resources exists, a qualified Navy archaeologist would be contacted for guidance.

Manned vessels and, at times, UMS will be launched from Port Hueneme. All docking and loading operations would be conducted at established facilities.

Considering the information provided above, no significant impacts to onshore cultural resources are anticipated through the implementation of the construction and unmanned systems operations associated with Alternative 1.

Offshore impacts on cultural resources would be limited to potential effects from debris settling directly on a submerged resource of significance and affecting its integrity. No known shipwrecks are located near the offshore target areas. A predictive model of shipwrecks within the Point Mugu Sea Range indicates that shipwreck remains are most likely to be found no greater than 1 km (0.54 nm) from shore

(NAWCWD 1999). Furthermore, a Navy study found that a majority (32 of 45) identified shipwrecks occurred within two miles (3.2 km) of SNI or Begg Rock (JRP 2010). The location of the offshore targets farther than 2 mi (3.2 km) offshore thereby reduces the likelihood of a shipwreck being present. Owing to the density of seawater, the terminal velocity reached by sinking objects is relatively slow (compared to falling objects in air). As a result, debris is unlikely to land with sufficient force to damage any object on the bottom, and in any case would affect only a minute portion of the seabed. Therefore, implementation of Alternative 1 would have no effect on cultural resources in the global commons under EO 12114.

Mitigation Measures

Implementation of Alternative 1 would not result in significant impacts on cultural resources; therefore, no mitigation measures are proposed or required.

3.5.2.3 Alternative 2 – Expansion of UAS Operations

Impacts

The onshore, nearshore, and offshore actions associated with Alternative 2 would be very similar as Alternative 1. There would be lower levels of marine vessel traffic, as UMS operations would not be introduced on the Sea Range. Consequently, impacts of Alternative 2 are nearly identical to those discussed for Alternative 1, if not lower. Therefore, Alternative 2 would not have significant impacts to cultural resources.

Mitigation Measures

Implementation of Alternative 2 would not result in significant impacts on cultural resources; therefore, no mitigation measures are proposed or required.

3.5.2.4 Alternative 3 – The No-Action Alternative

Impacts

Under the No-Action Alternative, expansion of unmanned systems operations would not occur and existing conditions would remain unchanged. Therefore, no significant impacts to cultural resources would occur.

Mitigation Measures

Implementation of the No-Action Alternative would not result in significant impacts on cultural resources; therefore, no mitigation measures are proposed or required.

3.6 AIRSPACE, LAND, AND WATER USE

3.6.1 Affected Environment

3.6.1.1 Definition of Resource

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

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

3.6.1.2 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.

3.6.1.3 Existing Conditions

Airspace

Point Mugu Sea Range

Air traffic routes for civilian aircraft with instrument flight rules (IFR) 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. 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 part of the Outer Sea Range and are located west (seaward) of the imaginary line between SNI and San Miguel 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 NBVC Point Mugu airfield to NBVC Point Mugu 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 IFR 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 an aircraft carrier and then land aboard ship. Approximately 36,000 military air operations occur annually at the NBVC Point Mugu Airfield (NBVC 2011).

San Nicolas Island and R-2535

The San Nicolas Island 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 only authorized air traffic into the airfield are those approved by NAS Point Mugu and generally include aircraft involved in T&E 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 Sea Range

The Point Mugu Sea Range includes several of the Channel Islands (Figure 1-1). However, except for San Nicolas Island (discussed below), no land within the Sea Range will be affected as part of the Proposed Action.

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 (CZMA) 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 (914 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 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 Point Mugu, SNI is owned and operated by the Navy as a major element of the Sea Range. Most of SNI is used as a range instrumentation site to support Point Mugu Sea Range operations. SNI facilities support all aspects of range operations, 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-km) concrete or asphalt concrete runway and facilities to support testing operations. Adjoining the airfield are a control tower, hangars, ground control approach capabilities, and one fire station located near the airfield. Additional facilities include extensive range, support, and fuel storage facilities; machine/repair shops and storage buildings; and ordnance and launching facilities.

Port Hueneme

Manned vessels and, at times, UMS would be launched from Port Hueneme. All docking and launching operations would be conducted at existing dock facilities.

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.

NAWCWD 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, NAWCWPNS 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 2011c).

Oil and gas production. Numerous oil platforms 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. However, Point Mugu is designated a classified or secure base, and public admittance is generally not allowed. A few beach areas 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 Navy 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 (Navy 2002). 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 (36.6 m) of water around SNI; fall and winter are the most important seasons for these fisheries. Commercial passenger fishing vessels frequently offer 1-day sport fishing excursions either from the Ventura or Santa Barbara harbors.

DoD employees, base contractors, and active duty personnel launch recreational fishing boats from Cissy Cove and fish 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 also must abide by SNI area closures due to environmental laws protecting certain wildlife and respect cultural resources areas, such as Indian middens located near coastal 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 (Navy 2010). Furthermore, restrictions are enacted to clear the appropriate range areas of non-participants before military operations are conducted.

Port Hueneme

Manned vessels and UMS will be launched from existing docks structures at Port Hueneme. From Port Hueneme, these surface vessels would transverse the waters near coast out to 3 nm (5.6 km) offshore to the Sea Range.

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 NBVC 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 was conducted with the California Coastal Commission (Appendix A).

3.6.2 Environmental Consequences

3.6.2.1 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.

3.6.2.2 Alternative 1 – The Preferred Alternative

Impacts

Airspace

Proposed activities at the Point Mugu Sea Range, at NBVC Point Mugu and R-2519, and at SNI and R-2535 would be consistent with activities currently conducted within these locations. Alternative 1 includes 1,427 sorties representing 6,274 takeoff and landings at Point Mugu and SNI. Of these, approximately 730 operations would be conducted at the Point Mugu airfield representing two percent of the current 36,100 annual airfield operations. The increased flight operations and missiles usage would represent only marginal increases (less than 10%) to current activity levels.

The types of safety issues and procedures that could affect airspace use are discussed in Section 3.7, *Public Safety*, and would not result in a significant impact. Furthermore, Alternative 1 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 San Nicolas Island 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 Sea Range airspace. 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.

Therefore, implementation of 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 Use

Land use associated with Alternative 1 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 events, the increased air operations and missile launches, would represent only marginal increases (less than 10%) to current activity levels. In accordance with existing safety procedures, access to portions of Point Mugu and SNI would be temporarily restricted during testing operations. AV launches would be conducted from sites designated for RDAT&E purposes including airfield areas, roadways, and missile launch sites.

Activities associated with Alternative 1 would involve temporary closure of AV launch and recovery sites. 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 activities would be allowed to continue during unmanned systems RDAT&E operations. Given the marginal increase in activities and minor disruptions due to temporary closures, Alternative 1 would not yield significant land use impacts.

Water Use

The Navy maintains control over waters within 300 yd (0.27 km) of Point Mugu and SNI, within which public access is restricted. Military training, fishing, and recreational uses offshore from the vicinity of a test site at Point Mugu or SNI would be limited during unmanned system activities. Restrictions on public use of the area within 3 nm (5.6 km) of Point Mugu and SNI are already provided for in the designation of the Naval Restricted Area (33 CFR 334.980). In addition, a NOTMAR would be published 15 days prior to the planned offshore activities. Public and military vessels would be restricted from the testing and surrounding areas. The standard protocol of publishing descriptions of Navy activities in the NOTMAR, and the use of marine radio channels for communicating with approaching vessels, would ensure that vessels transiting through the area avoid the waters while testing activities are underway (Section 3.7, *Public Safety*). All offshore uses associated with the proposed testing and training are consistent with military testing and training activities. Therefore, implementation of Alternative 1 would not have significant impacts to water use.

Alternative 1 would involve 30 missile launches from UASs over the Sea Range waters. For safety, areas beneath or near flight paths of missiles and targets would be cleared of non-participating vessels for each event. Closure locations would vary by event and would temporarily interrupt commercial and recreational fishing in the area but would not prevent fishermen from access or from maximizing revenues over the course of the fishing season (Navy 2002). NAWCWD personnel have implemented successful communication procedures with commercial fishermen at San Nicolas Island to minimize effects to commercial activities (Navy 2002). Alternative 1 would not affect any fish populations or fish habitat and would have only a minor, but non-significant impact on fishing activity. Therefore, while there could be temporary, adverse impacts on individual commercial fishermen, the impact of Alternative 1 would be less than significant on the overall economy of Ventura County and the regional commercial fishing industry.

Mitigation Measures

Implementation of Alternative 1 would not result in significant airspace, land use, or water use impacts. Therefore, no mitigation measures are proposed or required.

3.6.2.3 Alternative 2 – Expansion of UAS Operations

Impacts

The airspace, land use, and water use impacts associated with Alternative 2 would be very similar to those of Alternative 1 with the exception that no UMS operations would occur. It is assumed that manned vessels would still be used under this alternative both as a platform for Fire Scout launches and as instrumentation relays for the UASs. Considering this, there would be no significant airspace, land, or water use impacts associated with the implementation of Alternative 2.

Mitigation Measures

Implementation of the Alternative 2 would not result in significant airspace, land, or water use impacts. Therefore, no mitigation measures are proposed or required.

3.6.2.4 Alternative 3 – The No-Action Alternative

Impacts

Under the No-Action Alternative, no expansion of unmanned systems operations on the Sea Range would occur. Therefore, no significant impacts to airspace, land, or water use would occur.

Mitigation Measures

Implementation of the No-Action Alternative would not result in significant airspace, land, or water use impacts. Therefore, no mitigation measures are proposed or required.

3.7 PUBLIC HEALTH AND SAFETY

3.7.1 Affected Environment

3.7.1.1 Definition of Resource

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

The primary safety issues associated with the proposed action include those inherent to flight operations, missile firings, and operation of Navy vessels. The safety policy of NAWCWD is to take every reasonable precaution in the planning and execution of all operations that occur on the Sea Range, NBVC Point Mugu and R-2519, and SNI and R-2535 to prevent injury to people and damage to property. This involves implementing extensive measures for risk mitigation as well as increased range control in the areas determined to have the highest risk to public safety.

3.7.1.2 Regulatory Setting

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

The sections below provide an overview of existing safety and occupational health policies and procedures in place at the Sea Range, with specific directives and standards that apply to the testing and training activities associated with the proposed action. Key among these directives are OPNAVINST 5100.23G, *The Navy Safety and Occupational Health Program Manual* (30 Dec 2005), DoD Directive 3200.11, *Use, Management, and Operation of Department of Defense Major Range and Test Facilities*, and DoD Directive 4540.01, *Use of International Airspace by U.S. Military Aircraft and for Missile/Projectile Firings* (28 Mar 2007);

3.7.1.3 Existing Conditions

Sea Range safety policy, procedures, and guidance are covered in NAVAIR Instruction 3700.3, *Range Safety Policy* (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 sq mi (93,200 square km^2) of SUA associated with the Sea Range. In addition, the airspace over the Point Mugu airfield, beach, and to 3 nm (5.6 km) offshore is a Restricted Area, and non-participating aircraft are precluded from entering this area. Another Restricted Area encompasses airspace over SNI to prevent access of unauthorized aircraft. In these areas, NAWCWD has the authority to control access of individuals, aircraft, and ships.

The unmanned systems operations would take place within Sea Range and Point Mugu and R-2519 boundaries where NAWCWD controls the airspace.

Access to SNI is strictly controlled. Access is granted for military-related activities and for pre-approved, non-military users, primarily for RDAT&E 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. Aircraft surveillance is necessary to ensure that the public remains clear of designated operational areas where they could be subjected to hazardous conditions. The range uses specially modified P-3 and S-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. This provides appropriate information to the FAA and its air traffic control agencies to route traffic around these Warning Areas and Restricted Areas when they are active (Warning Areas are located over non-Territorial Waters of the U.S.; Restricted Areas are located over land or Territorial Waters). Although a NOTAM does not preclude uncontrolled air traffic from entering a Warning Area even when the area is active, DoD Directive 4540.01, *Use of Airspace by U.S. Military Aircraft and For Missile/Projectile Firings*, provides guidance for operating within Warning Areas: non-participating aircraft are identified by radar, and contact with these aircraft is made by radio; if aircraft remain in a clearance area, even after being requested to leave, the Sea Range would delay, cancel, or move a test to a clear area.

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

3.7.2 Environmental Consequences

3.7.2.1 Approach to Analysis

This section evaluates potential human health and safety effects associated with the Proposed Action. The primary sources of public safety impacts from the Proposed Action would be aircraft flight operations and use of kinetic weapons.

3.7.2.2 Alternative 1 – Preferred Alternative

Impacts

Construction

It is anticipated that any construction activity would be conducted in accordance with Navy, NAWCWD, and NBVC regulations and plans. No impacts to the safety of personnel or members of the public are expected due to construction activities on SNI.

Aircraft Operations

The greatest risk to public health and safety arise from the operation of Groups 4 and 5 UAS. These UASs would operate in the National Airspace System under Instrument Flight Rules and would comply with all applicable procedures, clearances and instructions prescribed by NBVC Air Traffic Control (ATC), the NAVAIR Flight Clearance Office, and the FAA Certificate of Authorization (COA). The proposed UAS flight activity would be consistent with the management and safety requirements currently in place at Point Mugu and SNI. To decrease the risk to public safety, the following safety operations would be implemented:

- Groups 4 and 5 UAS would be operated within the glide range of emergency divert airfields, whenever possible;
- Group 4 and 5 UAS would not be operated over highly populated areas;
- Contact with ATC would be maintained to support traffic de-confliction within restricted and warning areas;
- Weather monitoring would be conducted to identify high turbulence areas and other meteorological activity that may precipitate modification of planned operations;
- Groups 4 and 5 UAS would be operated with at least two operational command/communication links;
    - UAS would automatically transmit a FAA-required code if communication links are lost;
    - Mission plans would be developed to safely and predictably provide for UAS operation even if communication links are lost;
- All UAS would operate within their prescribed altitude limits;
- Flight termination systems (e.g., parachute release, engine kill system) would be used if control of UASs could not be maintained.

Most Groups 4 and 5 UAS flights would spend approximately 15 minutes of each operational day within territorial waters (within 12 nm [22.2 km] of the coastline).

Waterfowl congregate in the Mugu Lagoon and other wetland areas in the vicinity of Point Mugu and the airfield. These and other birds present bird airstrike hazard (BASH) potential for aircraft operating up to an elevation of 20,000 ft AGL. To reduce the risk of UAS collisions with birds, all flights will be conducted in accordance with the Point Mugu BASH Plan.

Through the implementation of the measures provided above, Alternative 1 flight activities would not yield significant impacts to public safety.

Kinetic Weapons

Kinetic weapons to be used in the unmanned systems RDAT&E activities will include missiles fired from UAS platforms. 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 Point Mugu Sea Range EIS/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 (Navy 2002). Based on technical studies, 11 foot-pounds (49 N) 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 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 in (10 mm) in diameter. Considering this, aircraft are excluded from test areas involving such debris.

During testing 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 has been implemented by NBVC Point Mugu to informing 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. Occupational safety and health impacts would also be insignificant, given the adherence to stringent procedures and the implementation of administrative and engineered controls.

Mitigation Measures

Implementation of Alternative 1 would result in no significant public safety impacts. Therefore, no mitigation measures are proposed or required.

3.7.2.3 Alternative 2 – Expansion of UAS Operations

Impacts

The public safety impacts associated with Alternative 2 would be very similar to those of Alternative 1 with the exception that no UMS operations would occur. Considering this, there would be no significant public safety impacts associated with the implementation of Alternative 2.

Mitigation Measures

Implementation of the Alternative 2 would result in no significant public safety impacts. Therefore, no mitigation measures are proposed or required.

3.7.2.4 Alternative 3 – The No Action Alternative

Impacts

Under the No-Action Alternative, no expansion of unmanned systems operations on the Sea Range would occur. Therefore, no significant public safety impacts would occur.

Mitigation Measures

Implementation of the No-Action Alternative would not result in significant public safety impacts. Therefore, no mitigation measures are proposed or required.

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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 CH-1 18 Jul 2011, require that the cumulative impacts of a proposed action be assessed. According to Council on Environmental Quality regulations, the analysis of cumulative impacts in an EA should consider the potential environmental impacts resulting from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

4.1 DEFINITION OF CUMULATIVE IMPACTS

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

To analyze cumulative impacts, a cumulative impacts region must be identified for which impacts of the proposed action and other past, proposed, and reasonably foreseeable actions would be cumulatively recorded or experienced. Baseline conditions for the cumulative effects region are as described in the Affected Environment sections of Chapter 3 of this EA/OEA. 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 unmanned systems RDAT&E activities 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 FUTURE ACTIONS

4.2.1 Point Mugu Sea Range Training and Operations

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

4.2.2 Laser Testing

An EA/OEA was prepared for the 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 per day. This would increase under the proposed project to 216,000 gallons per day. The proposed outfall design is currently being evaluated. An EA will be prepared once the proposed action and alternatives have been determined.

4.2.4 NBVC and SNI Natural Resource Management Programs

The NBVC and SNI INRMPs established a management framework for natural resources and Navy training at NBVC and on SNI. The plans describe existing and anticipated Navy operations and recommendations to protect and enhance environmental resources (NBVC 2002, 2010). The proposed action follows the management guidelines provided in the plans. Countermeasures testing and training would follow aircraft altitude restrictions and test sites have been sited to avoid sensitive resources and other Navy land uses to the maximum extent practicable.

4.2.5 Development of Wind Energy Facilities on SNI

An EA was prepared for the Navy proposal to construct up to 11, 155-ft (47-m) tall, 100-kW 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 (Naval Facilities Engineering Command [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.

4.2.6 SSM-1 KAI Missile Testing at San Nicolas Island

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

4.2.7 San Nicolas Island FOCUS Cable Repair

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

4.2.8 SNI Directed Energy Test Site

Construction and operation of a Directed Energy Test Site (also referred to as the "test site") 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), 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 site. 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.

4.2.9 Countermeasures Testing on the Sea Range

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

4.2.10 San Nicolas Island Roads and Airfield Repair Project

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

4.2.11 Collection of Sea Lions from San Nicolas Island

An EA was prepared for the Naval Sea Systems Command Explosive Ordnance Disposal/Counter Radio-Controlled Improvised Explosive Device Electronic Warfare Program Office to obtain a sufficient number of suitable California sea lions to support the mission requirements of the Navy Marine Mammal Program. The reasonable action alternatives were developed after careful consideration of a suite of potential alternatives discussed in detail in the EA. The action alternatives carried forward for analysis involve collecting young sea lions from SNI, or obtaining releasable sea lions from stranding networks. The number of animals obtained each year would vary, but by statute not more than 25 sea lions would be obtained for the Navy Marine Mammal Program each year (10 U.S.C. § 7524). In order to reduce the need to collect sea lions or obtain releasables from stranding networks, the Navy would continue to seek available non-releasable sea lions from stranding networks, as well as sea lions from zoos and aquariums. However, the number of suitable sea lions available from these sources has been unpredictable and inadequate for the requirements of the Navy Marine Mammal Program. The collection from SNI is selected, sea lions would be collected each fall beginning in October of 2012, and continue every year thereafter as needed to satisfy Navy requirements. No significant impacts were identified in the EA.

While the proposed action of the EA would involve capture of marine mammals (sea lions), 10 U.S.C. § 7524 governs the action without regard to the MMPA.

4.2.12 West Coast Home Basing of the MQ-4C UAS at NBVC Point Mugu, California

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 consistent (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. A draft EA has been prepared, and no significant impacts were identified (NBVC 2013).

4.2.13 Navy MQ-4C Triton [Broad Area Maritime Surveillance (BAMS) Unmanned Aircraft System (UAS)] Developmental Test Program

NAVAIR Program Manager Air (PMA)-262 prepared an EA/OEA that evaluated the potential effects from conducting the United States Navy MQ-4C Triton [Broad Area Maritime Surveillance (BAMS) Unmanned Aircraft System (UAS)] Developmental Test (DT) Program. The purpose of the MQ-4C Triton DT Program is to demonstrate and evaluate the capabilities of the UAS in a variety of realistic operational profiles based on technical performance specifications, concept of operations, and operating criteria. The Program is needed to verify the MQ-4C Triton can safely meet established performance criteria – provide mission required data or services in the mission radius (minimum 2,000 nautical miles), 24-hours a day for 7 consecutive days. The scope of the proposed MQ-4C Triton DT Program is for a 3-year period using up to three unmanned aircrafts for approximately a total of 2,270 flight hours, of which an average of 2 flights per week with duration of about 8 hours would be conducted at the proposed test locations. Under the Preferred Alternative, 220 flight hours would occur at NBVC Point Mugu and in the Sea Range. The MQ-4C Triton would spend ninety percent of its time for each flight at approximately 50,000-58,000 ft. AGL/MSL within the restricted, warning, and MOAs along the West Coast, over the Sea Range, out over the Pacific Ocean towards Hawaii, and in the Western inland ranges (e.g., NAWCWD China Lake, Nellis AFB, NAS Fallon, etc.).

4.3 CUMULATIVE IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

This section addresses the cumulative impacts of the proposed action alternatives in combination with the relevant past, present, and planned actions described above. The most germane planned action to the Proposed Action is the underway Point Mugu Sea Range training and operations described in the Point Mugu Sea Range EIS/OEIS (Navy 2002). The Proposed Action has been evaluated with and against the cumulative impacts analysis in the EIS/OEIS as well as the other projects described above, and this cumulative impacts assessment is consistent with the Point Mugu Sea Range EIS/OEIS cumulative

impacts assessment. Accordingly, the implementation of the proposed action would result in no significant cumulative impacts for any of the applicable resource areas.

4.3.1 Air Quality

The Proposed Action alternatives would conform to the applicable State Implementation Plan and would not require 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 alternatives would not have a cumulative impact on air quality.

4.3.2 Marine Sediments and Water Quality

The Proposed Action alternatives would have only short-term, localized effects, if any, on sediment and water quality. As described in the Point Mugu Sea Range EIS/OEIS, previous, ongoing, and proposed future actions in support of training and RDAT&E are not expected to measurably affect sediment quality, nor to result in violations of water quality standards and criteria because pollutants are released in relatively small quantities and are widely dispersed in the environment. Due to the limited scope of potential sediment and water quality impacts associated with the Proposed Action alternatives, the action would have only minor, temporary effects, if any, and would not measurably add to quantities of pollutants in the marine environment. Hence there would be no cumulative impact on marine sediments and water quality.

4.3.3 Noise

The Proposed Action alternatives 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; have 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 or Alternative 2 would not have a significant cumulative impact on noise.

4.3.4 Biological Resources

Implementation of the Proposed Action alterniatves 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. When combined with the effects of other past, present, and foreseeable project activities, implementation of the Proposed Action alternatives is unlikely to have any additional cumulative effect on plant and animal populations at Point Mugu and on SNI.

4.3.5 Cultural Resources

Implementation of the Proposed Action alternatives would not adversely impact cultural resources. The Proposed Action alternatives would not result in disturbance of known archaeological sites. The proposed construction activities at the SNI airfield would be conducted in an area with no identified archaeological or historic properties, and would therefore lead to no adverse effects at the SNI site. The Navy's cultural

resource management program at Point Mugu and on SNI assures that potentially significant cultural resources are protected and are not subject to incremental degradation. Therefore, the Proposed Action alternatives, in conjunction with other past, present, and foreseeable activities, would not result in cumulative impacts to cultural resources.

4.3.6 Airspace, Land and Water Use

Implementation of the Proposed Action alternatives 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 alternatives, 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. Therefore, implementation of the Proposed Action alternatives, in conjunction with other past, present, and foreseeable actions would not result in cumulative impacts to land or water use.

4.3.7 Public Safety

Scheduling procedures associated with test and training events would be in accordance with existing Sea Range coordination procedures to ensure the safety of participants as well as non-participants. These procedures ensure that unmanned systems operations 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 alternatives would not have a cumulative effect on public safety.

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 Executive Order 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, unmanned systems operations would be conducted at the Sea Range, Point Mugu, and SNI. The unmanned systems operations would not result in a significant irreversible or irretrievable commitment of resources. Fuel for the necessary construction and operation of vehicles would be a commitment of resources; however, this use of fuel would have a negligible impact on fossil fuel resources and human labor associated with Navy operations and training. Missiles and UASs would fall into the ocean in the Sea Range, and some would 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

Unmanned systems operations would occur at the Sea Range, 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 affected. Therefore, Executive Order 12898 and 13045 are satisfied.

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CHAPTER 7 PREPARERS

This EA/OEA was prepared by Epsilon Systems Solutions, Inc. (Epsilon) for Naval Air Warfare Center Weapons Division. Members of the professional staff are listed below:

Technical Analysts

Peer Amble (Cardno TEC)

Brad Beacham

Beau DeBoer

Mark Dimsha

Mike Dungan (Cardno TEC)

Chris Duran

Christopher Noddings (Cardno TEC)

Rick Spaulding (Cardno TEC)

GIS & Graphic Design

Sean Kajiwara

Daniel Veazey

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Appendix A

Agency Correspondence

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

August 21, 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-0211-13**, U.S. Navy Negative Determination, Unmanned Systems Operations, Naval Base Ventura County

Dear Captain Vasquez:

The Coastal Commission staff has reviewed the above-referenced negative determination for the Navy's Point Mugu Sea Range Expansion of Unmanned Systems Operations at Naval Base Ventura County. The program would increase the capability for unmanned systems testing and training on the Point Mugu Sea Range and at San Nicolas Island (SNI). While the Commission has reviewed past comprehensive proposals for Navy Mugu Sea Range testing and training activities (CD-002-01), these unmanned operations were not specifically covered in past consistency documents. The operations would involve unmanned aerial systems (UAS) and unmanned maritime systems (UMS), within airspaces near Point Mugu and SNI, as well as the Special Use Airspace over the Sea Range. Operations would occur up to 250 days per year, with durations of between 1 hour and 7 days. The systems would be controlled from command centers either at Point Mugu or SNI, or from mobile units (i.e., trucks, vans, or ships).

The project would also include construction of a hangar complex on SNI, southeast of the existing airfield. This complex would include a 22,500 sq. ft. hangar, a 10,500 sq. ft administrative/office building, and associated paving and other activities. New development would be limited to existing developed/disturbed areas and would avoid effects on native vegetation.

The project would not affect public access or public safety, and the Navy will publish Notices to Mariners and Notices to Airmen 15 days before the operations. Recreational boats and some recreational activities may be temporarily inconvenienced; however the areas around Point Mugu, Port Hueneme, and SNI are already controlled by the Navy, and the baseline recreational use would be low. Additionally, the overall number of days when surface waters on the Sea

Range are closed to transit annually would not change from the baseline discussed in the Sea Range EIS. We therefore agree with the Navy that the overall effects on recreation would be limited and temporary (and consistent with public safety and military security needs).

Effects from noise on sensitive habitat from operations such as aircraft overflights would be minimized through implementation of Special Conservation Measures (SCMs), including maintaining specified altitudes over sensitive areas and during sensitive breeding periods. Ground level disturbances would be minimized such that they would avoid disrupting foraging, resting, or nesting behavior of terrestrial wildlife, including the SNI fox, island night lizard, birds, and mammals. Attachment A lists the measures to be included to protect western snowy plovers and other sensitive wildlife species, and which have been worked out through the Navy's Integrated Natural Resources Management Plan (INRMP), its Point Mugu Sea Range EIS/OEIS, and its coordination with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). Water quality would be protected through development of a stormwater pollution prevention plan (SWPPP), along with site-specific Best Management Practices (BMPs), standard erosion control measures, and spill prevention and containment measures.

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), the Laser Testing and Training Program (ND-017-09), and the Countermeasures Testing and Training Program (ND-0207-13). With the measures incorporated into the activities to minimize effect on sensitive habitat, marine resources, water quality, public access and recreation, 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

Attachment

1. Special Conservation Measures

cc: Ventura District Office

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

August 12, 2013

Reply in Reference To: USN_2013_0711_001

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

RE: Unmanned Aerial Systems Environmental Assessment, Naval Base Ventura County, San Nicolas Island, Ventura County, CA

Dear Captain Vasquez:

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

The Navy proposes to expand unmanned aerial systems testing and evaluation capabilities at Naval Base Ventura County, San Nicolas Island. This action will require the construction of a new hangar, administrative building, and associated driveway and parking area. The combined square footage for this undertaking totals approximately 82,120 square feet.

You define the Area of Potential Effects (APE) as the immediate construction area, as depicted on the map accompanying your letter. The APE was graded and filled at the time the airport was built. While the project is in the early planning stages and the vertical APE has yet to be determined, you note that the island has been surveyed in its entirety, resulting in the recordation of approximately 600 prehistoric sites. The closest of these sites (CA-SNI-356) is located approximately 1,500 feet from the proposed construction area. No buildings are within the APE.

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The Navy has assured that steps will be taken to avoid affecting historic properties. Personnel will only use existing road beds during testing activities. Upon arrival, as part of the existing protective measures already in place on the Island, NBVC cultural resource staff will accompany personnel to the work sites. Personnel will then be briefed on how to identify and avoid archaeological sites that may be present in the area. In addition, cultural staff will mark all areas that are off-limits because of the presence of cultural resources. As per the present protocol on SNI, during all activities personnel will not travel off roads or trails, or traverse undeveloped areas. Considering these measures along with the fact that no buildings or archaeological sites are located in the APE, the Navy feels the project will not affect historic properties.

Having reviewed this information, I have the following comments:

1) I concur that the Area of Potential Effects (APE) has been properly determined and documented pursuant to 36 CFR Parts 800.4 (a)(1) and 800.16 (d);

2) I further concur that the finding of No Historic Properties Affected is appropriate pursuant to 36 CFR Part 800.4(d)(1) and that the documentation supporting this finding has been provided pursuant to 36 CFR Part 800.11(d);

3) Please be reminded that in the event of an inadvertent discovery or a change in project description, you may have additional responsibilities under 36 CFR Part 800.

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

Sincerely,

Carol Roland-Nawi, Ph.D.

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

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-I-0331

February 24, 2014

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

Subject: Unmanned Systems Operations Program on Naval Base Ventura County, Point Mugu and San Nicolas Island, Ventura County, California

Dear Captain Vasquez:

We are responding to your request, dated June 27, 2013, and received in our office on July 3, 2013, for our concurrence that the proposed Unmanned Systems Operations Program (Program) may affect, but is not likely to adversely affect, the federally endangered California least tern (*Sterna antillarum browni*) and light-footed clapper rail (*Rallus longirostris levipes*), and the federally threatened western snowy plover (*Charadrius nivosus nivosus*). Your request and our response are made pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act).

The U.S. Navy (Navy) proposes to operate unmanned aircraft (UAV) on Naval Base Ventura County, specifically at Naval Air Station Point Mugu (Pt. Mugu) and San Nicolas Island (SNI), and train personnel on the use of these systems. The Navy sorts UAV into six categories. The smallest UAV weighs less than a pound, is launched by hand, and is relatively quiet. The largest UAV weighs as much as a 12-passenger commercial jet (approximately 46,000 pounds) and requires an established runway similar to those maintained at Pt. Mugu and SNI. Navy personnel would launch smaller UAV by hand or catapult from existing concrete or graded pads, and would launch the larger UAV from runways in a process similar to manned aircraft of comparable size. One UAV, or multiple UAV simultaneously, would conduct operations over the Point Mugu Sea Range, which covers thousands of square miles west of mainland Southern California south of Monterey County. Each UAV flight would include takeoff, operational activity (communications, surveillance, firing at offshore targets, etc.), and landing. In the environmental assessment accompanying your letter, the Navy estimates that 11 to 25 percent of UAV flights would occur at SNI, with the balance occurring at Pt. Mugu.

After reviewing the project description for the Program, we determined that the proposed activities are consistent with the Description of the Proposed Action section of the programmatic biological opinion for ongoing activities at the Naval Base Ventura County (NBVC), which we

issued to the Navy on June 6, 2001 (consultation number 1-8-99-F-24). Specifically, the programmatic biological opinion addresses all aircraft stationed at Pt. Mugu, all "transient" aircraft, and the operation of these aircraft. We do not expect the proposed Program to have any additional effects on listed species at Pt. Mugu beyond those already analyzed in biological opinion number 1-8-99-F-24. Therefore, the potential effects of the proposed Program on the California least tern, light-footed clapper rail, and western snowy plover at Pt. Mugu are covered by the programmatic biological opinion, and further consultation pursuant to section 7 of the Act is not necessary. If the proposed action changes such that it may affect listed species at Pt. Mugu in a manner not analyzed in biological opinion 1-8-99-F-24, or if new information reveals the presence of additional listed species that may be adversely affected in the project area, the Navy should contact us immediately and suspend all activities until the appropriate level of consultation is completed.

The programmatic biological opinion we issued to the Navy on October 15, 2001, for ongoing activities at SNI (consultation number 1-8-01-F-14) does not cover the types of activities the Navy is proposing under the Program. In addition, while the California least tern and light-footed clapper rail do occur at Pt. Mugu, neither species occurs on, or in the vicinity of, SNI, and we do not expect the proposed activities on SNI to affect the California least tern and light-footed clapper rail. Therefore, the remainder of this letter will consider your request for concurrence for Program activities that may affect the western snowy plover at SNI.

The western snowy plover is a year-round resident of SNI, although the species' numbers and locations vary between breeding and wintering seasons, and from year to year. Several of the paved/graded pads proposed to be used to launch and retrieve the smaller UAV are adjacent to or nearby habitat known to support the western snowy plover. Program activities could affect the species as individual plovers react to human presence; flying UAV; noise generated by UAV and other Program vehicles; and noise and/or light from weapons discharge.

As part of the Program, the Navy will implement measures to avoid adverse effects to the western snowy plover. These measures include those listed in the Description of the Proposed Action and Terms and Conditions sections of the programmatic biological opinions for activities at Pt. Mugu and San Nicolas Islands (consultation numbers 1-8-99-F-24 and 1-8-01-F-14, respectively). While the full suite of measures can be found in the biological opinions, we are listing a specific subset of these measures below, because they are relevant to avoiding potential adverse effects of the Program on the western snowy plover.

1. The south side of San Nicolas Island is closed by the Navy's Environmental Protection Office (EPO) to all activities to protect the western snowy plover. This closure also provides protection for marine mammals and other sensitive wildlife species.
2. All western snowy plover nesting areas are closed for the duration of the breeding season. Signs and barricades are erected to denote closures and the EPO patrols the beaches periodically.
3. The EPO conducts consistent monitoring of listed species and their habitat to assess the potential for adverse effects from Navy activities.

4. All permanent and visiting personnel are required to attend an environmental briefing that emphasizes Federal and Navy regulations pertaining to the protection of listed species and describes the beach closures and their enforcement.
5. Potential perches for avian predators are removed when feasible.
6. All rotorcraft shall be requested to fly at or above 500 feet above ground level (AGL) over listed species habitat, or shall be directed one mile offshore or one mile to the north of listed species habitat without altitude limits. This request applies to all Navy, Department of Defense (DOD), and non-DOD rotorcraft.
7. All fixed-wing aircraft shall be operated in accordance with Federal Aviation Administration regulations and the NBVC air operations manual and, when able, should avoid flying over listed species habitat at less than 500 feet AGL, or if able shall fly one-half mile offshore or one mile to the north of listed species habitat without altitude limits. NBVC tower will issue the foregoing to all aircraft transient aircraft or aircraft operating within class "D" airspace.
8. Navy Air Operations shall draft changes for the appropriate flight information publications warning of the noise critical areas associated with listed species habitat.
9. Navy Air Operations shall prepare a supplement to its operating manual that describes the height and distance recommendations.
10. All pilots and air traffic controllers on NBVC will be briefed annually on the local operating procedures to include recommended flight patterns, heights, and distances from habitat of listed species.

In addition to the above measures taken from the programmatic biological opinions, the Navy is proposing the following measures to further avoid and minimize effects of the Program on the western snowy plover:

1. In general, UAV and supporting aircraft flights will be restricted to an elevation of 1,000 feet AGL or greater. Lower altitude flights will only involve small and quiet UAV. The Navy will require that operating flights of any UAV maintain an altitude of 500 feet or greater over western snowy plovers during the nesting season. To avoid disturbing wintering plovers, the Navy will require UAV that have the potential to disturb snowy plovers (or other listed species) maintain an altitude of 200 feet or greater. Other appropriate protective measures for flights below 1,000 feet will be developed on an as-needed basis prior to testing to ensure no impacts would occur.
2. Large UAV will follow established flight patterns at Pt. Mugu and SNI.
3. To eliminate the potential for new ground disturbance impacts, the launch and recovery of UAV at Pt. Mugu and SNI will occur solely on existing graded and/or paved areas, including airstrips, roadways, and pad sites. Group 3, 4, and 5 UAV will be restricted to any existing sites large enough to accommodate them without impacts. These UAV have redundant systems in place to prevent unplanned landings and will not be used on beach pads during sensitive bird species nesting seasons. Group 1 and 2 UAV could be launched from any existing site during sensitive bird nesting seasons but only if no active western snowy plover nests are within 500 feet of the flight path.

4. A designated observer will be present during all activities that involve weapons testing, firing, or launching. Standard range clearance procedures will be followed, which include looking for marine mammals, birds, and sea turtles in predicted debris and impact areas. If marine mammals, birds, or sea turtles are observed in or near a predicted debris or impact area, activities will be suspended or moved.
5. Surface target maneuver circuits will be at least 0.1 mile from any shoreline, beach, marine mammal haulout, tide pool, or known shipwreck. During weapons testing, surface target maneuver circuits will be at least 0.2 mile from the shoreline.
6. Flight testing will be scheduled among available testing locations to minimize repetitive noise exposures and overflights during marine mammal pupping seasons. This measure would also benefit the western snowy plover.
7. Unmanned Systems operations will be conducted during daylight hours whenever possible. Night tests will only be conducted if range scheduling prevents daylight testing or if operationally required. If night operations are required, a suitable location will be selected to minimize disturbance to wildlife.
8. Based on the most current information available, Navy biologists will provide direction to project participants regarding the locations of seabird rookeries and concentrations of marine mammals. These locations will be subject to seasonal restrictions and will not be overflown lower than 1000 feet AGL. Within safety and mission constraints, target placement and flight patterns will also be designed to maximize horizontal distance from these locations.
9. Before a weapon (including lasers) could 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 weapon being used, between the firing point and the target. Additionally, the path from the weapon firing point to the target will be monitored to ensure that weapons are not fired if and when wildlife is within the hazard zone.

We concur with your determination that the proposed activities on SNI may affect, but are not likely to adversely affect, the western snowy plover. Our concurrence is based on the following:

1. The Navy will restrict the altitude and frequency of UAV overflight of plover colonies/flocks during both the breeding and non-breeding seasons. In addition, the Navy will enforce seasonal beach closures, avoidance buffers around western snowy plover nests, and restrictions on placement of targets for UAV operations. We expect these measures to avoid, or reduce to an insignificant level, potential adverse effects of UAV operation, human presence, UAV support vehicles, and weapons discharge on the western snowy plover on SNI;
2. The vast majority of proposed Program operations will occur at Pt. Mugu, reducing the potential for adverse effects to the western snowy plover on SNI; and
3. No habitat for the western snowy plover would be degraded or lost.

This concludes consultation on the subject Program pursuant to section 7(a)(2) of the Act. If the proposed action changes in any manner such that it may affect listed species in any manner not

previously analyzed or if new information reveals the presence of additional listed species that may be adversely affected in the project area, the Navy should contact us immediately and suspend all activities until the appropriate level of consultation is completed.

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

Sincerely,

Roger P. Root
Assistant Field Supervisor

Appendix B

Record of Non-Applicability and Air Quality Calculations

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/023
12 Sep 13

MEMORANDUM

From: Head, NAVAIR Ranges Sustainability Office

Subj: EXPANSION OF UNMANNED SYSTEMS OPERATIONS -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 Expansion of Unmanned Systems Operations 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 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, San Nicolas Island has been determined to be separate and distinct from the South Central Coast Air Basin (SCCAB). San Nicolas Island is in attainment/

unclassified of the NAAQS for all criteria pollutants; therefore, the provisions of the General Conformity Rule and *de minimis* thresholds do not apply. Due to the lack of major emitting sources on the San Nicolas Island 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 unmanned systems operations 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 EXPANSION OF UNMANNED SYSTEMS OPERATIONS

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 NBVC Point Mugu, SNI, and the Sea Range, 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, San Nicolas Island has been determined to be separate and distinct from the South Central Coast Air Basin (SCCAB). San Nicolas Island is in attainment/ unclassified of the NAAQS for all criteria pollutants; therefore, the provisions of the General Conformity Rule and *de minimis* thresholds do not apply. Due to the lack of major emitting sources on the San Nicolas Island 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 unmanned systems operations 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 (NAWCWD).

Location: The Point Mugu Sea Range, NBVC Point Mugu, and San Nicolas Island, California.

Proposed Action Name: Point Mugu Sea Range Expansion of Unmanned Systems Operations

Proposed Action Summary: The Proposed Action includes multiple types of unmanned aircraft systems (UASs) and unmanned maritime systems (UMSs), composed of aerial vehicles (AVs) and surface vehicles (SVs) of one category to a multitude of groups. Operation and maintenance of the unmanned systems requires personnel responsible for the launch and recovery of the vehicles, command and control of the vehicles, and maintenance of the unmanned systems and associated equipment.

Each unmanned system includes the necessary components to perform an operational mission. Systems may include multiple AVs/SVs (and possibly multiple UAS/UMS Groups), launch/recovery platforms, ground control stations, communication links, and support equipment. Support equipment may include catapult and rail launch platforms, net or cable recovery systems, communications, radar tracking, and maintenance equipment. Command centers can be permanent buildings at NBVC Point Mugu and SNI, or the command centers can be mobile truck/van units or ship-based systems.

Under the Proposed Action, there would be no new construction activities at NBVC Point Mugu or Port Hueneme. There would; however, be a new hangar complex built on SNI, southeast of existing airfield support facilities. This complex would include a 22,500 ft^2 (2,090 m^2) hangar, a 10,500 ft^2 (975 m^2) administrative/office building, a tarmac taxiway and aircraft parking area (21,780 ft^2 [2,023 m^2]), and an access road and auto parking area (87,120 ft^2 [8,094 m^2]).

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 are 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.

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

Affected Air Basin: South Central Coast Air Basin

Table 1 Proposed Action Emissions – SCCAB (<3 nm)

Component	Pollutant (tons/year)					
	VOCs [1]	**NO_X [1]**	**CO**	**SO_X**	**PM_{10}**	**CO_2**
Unmanned Aircraft Systems	3.70	1.78	43.5	9.69	0.530	726
Chase Aircraft	0.563	0.410	1.57	0.026	0.409	200
Unmanned Maritime Systems	0.836	1.20	16.7	--	1.21	136
Manned Vessels	0.488	2.92	6.28	1.10	0.151	1,374
Subtotal	**5.59**	**6.31**	**68.0**	**10.82**	**2.30**	**2,436**
de minimis threshold	50	50	NA	NA	NA	
Exceeds *de minimis* threshold?	No	No	No	No	No	

Note:[1] Effective June 19, 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.

Table 2 Proposed Action Emissions – SNI

Component	Pollutant (tons/year)					
	VOCs	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**CO_2**
Construction	0.335	2.12	1.29	0.00323	0.108	281
Unmanned Aircraft Systems	0.588	0.215	0.945	2.41	0.100	115
Subtotal	**0.923**	**2.34**	**2.24**	**2.42**	**0.208**	**396**
de minimis threshold	NA	NA	NA	NA	NA	
Exceeds *de minimis* threshold?	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 [1]	**NO_X [1]**	**CO**	**SO_X**	**PM_{10}**	**CO_2**
Unmanned Aircraft Systems	2.07	0.573	3.79	0.057	0.296	329
Unmanned Maritime Systems	3.34	4.80	66.6	--	4.86	544
Manned Vessels	2.44	14.6	31.4	5.52	0.755	6,871
Missiles	0.0006	0.0008	0.042	0.0023	0.0028	0.65
Subtotal	**7.85**	**20.0**	**101.8**	**5.58**	**5.91**	**7,744**
de minimis threshold	50	50	NA	NA	NA	
Exceeds *de minimis* threshold?	No	No	No	No	No	

Note:[1] Effective June 19, 2008, Ventura County (excluding SNI) has been classified as a "serious" nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3

Emission Calculations – Proposed Action

ScanEagle			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	1.42E-01	5.00	29.11	0.39	18.22	2.19	14.20	2849	0.0875	0.101
Climb out	1.11E-01	10.00	29.11	0.39	18.22	2.19	14.20	2849	0.0875	0.101
Approach	4.74E-02	15.00	29.11	0.39	18.22	2.19	14.20	2849	0.0875	0.101
Idle (taxi in)	1.11E-02	5.00	29.11	0.39	18.22	2.19	14.20	2849	0.0875	0.101
Idle (taxi out)	1.11E-02	5.00	29.11	0.39	18.22	2.19	14.20	2849	0.0875	0.101

Source = AP-42

Shadow			Emission Factors (lb/min)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	3.61E-01	5.00	1.30E-02	9.53E-03	6.03E-03	5.12E-04	6.25E-04	0.936		
Climb out	3.29E-01	10.00	1.30E-02	9.53E-03	6.03E-03	5.12E-04	6.25E-04	0.936		
Approach	2.53E-01	15.00	1.30E-02	9.53E-03	6.03E-03	5.12E-04	6.25E-04	0.936		
Idle (taxi in)	2.53E-02	5.00	1.30E-02	9.53E-03	6.03E-03	5.12E-04	6.25E-04	0.936		
Idle (taxi out)	2.53E-02	5.00	1.30E-02	9.53E-03	6.03E-03	5.12E-04	6.25E-04	0.936		

STUAS			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	2.50E-02	5.00	29.11	0.39	18.22	2.19	14.20	2849	0.0875	0.101
Climb out	1.94E-02	10.00	29.11	0.39	18.22	2.19	14.20	2849	0.0875	0.101
Approach	8.33E-02	15.00	29.11	0.39	18.22	2.19	14.20	2849	0.0875	0.101
Idle (taxi in)	1.94E-02	5.00	29.11	0.39	18.22	2.19	14.20	2849	0.0875	0.101
Idle (taxi out)	1.94E-02	5.00	29.11	0.39	18.22	2.19	14.20	2849	0.0875	0.101

Hunter			Emission Factors (lb/min)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	8.88E-01	5.00	3.20E-02	2.35E-02	1.48E-02	1.26E-03	1.54E-03	2.30E+00		
Climb out	8.10E-01	10.00	3.20E-02	2.35E-02	1.48E-02	1.26E-03	1.54E-03	2.30E+00		
Approach	6.22E-01	15.00	3.20E-02	2.35E-02	1.48E-02	1.26E-03	1.54E-03	2.30E+00		
Idle (taxi in)	6.22E-02	5.00	3.20E-02	2.35E-02	1.48E-02	1.26E-03	1.54E-03	2.30E+00		
Idle (taxi out)	6.22E-02	5.00	3.20E-02	2.35E-02	1.48E-02	1.26E-03	1.54E-03	2.30E+00		

Data source = USAF 2002 (for Bell 407)

Fire Scout			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
TO/CO	11.61	6.80	0.30	6.33	3.59	0.40	0.31	2849	0.0875	0.101
Approach	3.78	6.80	15.02	2.52	37.71	0.40	2.95	2849	0.0875	0.101
Idle (taxi in)	2.66	7.00	64.28	1.58	31.45	0.40	1.44	2849	0.0875	0.101
Idle (taxi out)	2.66	8.00	64.28	1.58	31.45	0.40	1.44	2849	0.0875	0.101

Data source = USAF 2002

BAMS			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	34.33	2.00	0.01	15.06	0.45	0.40	1.58	2849	0.0875	0.101
Climb out	27.33	1.00	0.01	12.35	0.69	0.40	1.58	2849	0.0875	0.101
Approach	20.17	5.00	0.02	9.57	1.20	0.40	1.58	2849	0.0875	0.101
Idle (taxi in)	11.00	15.00	0.02	6.02	3.33	0.40	1.58	2849	0.0875	0.101
Idle (taxi out)	11.00	25.00	0.02	6.02	3.33	0.40	1.58	2849	0.0875	0.101

Data source = USAF 2002

UCLASS			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	162.94	1.00	2.30	29.26	0.86	0.40	1.01	2849	0.0875	0.101
Climb out	97.38	0.50	3.51	22.13	0.86	0.40	1.21	2849	0.0875	0.101
Approach	65.21	3.00	4.88	12.32	1.92	0.40	1.03	2849	0.0875	0.101
Idle (taxi in)	38.20	10.00	7.57	4.60	3.52	0.40	0.26	2849	0.0875	0.101
Idle (taxi out)	38.20	30.00	7.57	4.60	3.52	0.40	0.26	2849	0.0875	0.101

Data source =
USAF 2002 2 Lycoming Engines

AAFL			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Idle	8.9	120	40.98	1.2	895.17	0.4	1.58	2849	0.0875	0.101
Pattern	37.31	240	10.18	8.08	689.59	0.4	1.58	2849	0.0875	0.101

Chase Helicopter for Fire Scout. Data Source = AESO Memo. No. 9929A

			Emission (lb)							
Mode	Total Fuel used (lb)		VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
LTO	661.00		1.40	3.40	12.30	0.30	2.30	3000		
Cruise (1 hr)	1200.00		0.70	7.70	7.50	0.50	5.00	3864		

Chase F/A-18 for UCLASS. Data Source = AESO Memo. Nos. 9815G/9933D

			Emission (lb)							
Mode	Total Fuel used (lb)		VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
LTO	2058.00		53.74	13.09	139.40	0.82	16.17	6101		
Terrain following (30 min)	3318.00		1.46	22.36	8.10	1.33	21.10	10465		

ScanEagle	Emissions per operation							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	2.07E-02	2.77E-04	1.30E-02	1.56E-03	1.01E-02	2.03E+00	6.22E-05	7.18E-05
Climb out	3.22E-02	4.30E-04	2.02E-02	2.42E-03	1.57E-02	3.15E+00	9.68E-05	1.12E-04
Approach	2.07E-02	2.77E-04	1.30E-02	1.56E-03	1.01E-02	2.03E+00	6.22E-05	7.18E-05
Idle (taxi in)	1.61E-03	2.15E-05	1.01E-03	1.21E-04	7.85E-04	1.58E-01	4.84E-06	5.59E-06
Idle (taxi out)	1.61E-03	2.15E-05	1.01E-03	1.21E-04	7.85E-04	1.58E-01	4.84E-06	5.59E-06
TOTAL	7.681E-02	1.026E-03	4.808E-02	5.784E-03	3.747E-02	7.517E+00	2.309E-04	2.665E-04

Shadow	Emissions per operation							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	6.50E-02	4.77E-02	3.02E-02	2.56E-03	3.12E-03	4.68E+00		
Climb out	1.30E-01	9.53E-02	6.03E-02	5.12E-03	6.25E-03	9.36E+00		
Approach	1.95E-01	1.43E-01	9.05E-02	7.68E-03	9.37E-03	1.40E+01		
Idle (taxi in)	6.50E-02	4.77E-02	3.02E-02	2.56E-03	3.12E-03	4.68E+00		
Idle (taxi out)	6.50E-02	4.77E-02	3.02E-02	2.56E-03	3.12E-03	4.68E+00		
TOTAL	5.200E-01	3.813E-01	2.413E-01	2.049E-02	2.499E-02	3.744E+01		

STUAS	Emissions per operation							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	3.64E-03	4.86E-05	2.28E-03	2.74E-01	1.78E-03	3.56E-01	1.09E-05	1.26E-05
Climb out	5.66E-03	7.56E-05	3.54E-03	4.26E-01	2.76E-03	5.54E-01	1.70E-05	1.96E-05
Approach	3.64E-02	4.86E-04	2.28E-02	2.74E+00	1.77E-02	3.56E+00	1.09E-04	1.26E-04
Idle (taxi in)	2.83E-03	3.78E-05	1.77E-03	2.13E-01	1.38E-03	2.77E-01	8.51E-06	9.82E-06
Idle (taxi out)	2.83E-03	3.78E-05	1.77E-03	2.13E-01	1.38E-03	2.77E-01	8.51E-06	9.82E-06
TOTAL	5.134E-02	6.861E-04	3.214E-02	3.866E+00	2.505E-02	5.025E+00	1.543E-04	1.781E-04

Hunter	Emissions per operation							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	1.60E-01	1.17E-01	7.42E-02	6.30E-03	7.69E-03	1.15E+01		
Climb out	3.20E-01	2.35E-01	1.48E-01	1.26E-02	1.54E-02	2.30E+01		
Approach	4.80E-01	3.52E-01	2.23E-01	1.89E-02	2.31E-02	3.45E+01		
Idle (taxi in)	1.60E-01	1.17E-01	7.42E-02	6.30E-03	7.69E-03	1.15E+01		
Idle (taxi out)	1.60E-01	1.17E-01	7.42E-02	6.30E-03	7.69E-03	1.15E+01		
TOTAL	1.279E+00	9.381E-01	5.935E-01	5.040E-02	6.149E-02	9.210E+01		

Fire Scout	Emissions per operation							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	2.37E-02	0.4995687	0.2833257	0.0315683	0.0244654	224.84536	0.006906	0.007971
Approach	0.386074	0.0647741	0.9692978	0.0102816	0.0758268	73.230696	0.002249	0.002596
Idle (taxi in)	1.196894	0.0294196	0.585599	0.007448	0.0268128	53.04838	0.001629	0.001881
Idle (taxi out)	1.367878	0.0336224	0.669256	0.008512	0.0306432	60.62672	0.001862	0.002149
TOTAL	2.975E+00	6.274E-01	2.507E+00	5.781E-02	1.577E-01	4.118E+02	1.265E-02	1.460E-02

BAMS	Emissions per operation							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	6.87E-04	1.03E+00	3.09E-02	2.75E-02	1.08E-01	1.96E+02	6.01E-03	6.93E-03
Climb out	2.73E-04	3.38E-01	1.89E-02	1.09E-02	4.32E-02	7.79E+01	2.39E-03	2.76E-03
Approach	2.02E-03	9.65E-01	1.21E-01	4.03E-02	1.59E-01	2.87E+02	8.82E-03	1.02E-02
Idle (taxi in)	3.30E-03	9.93E-01	5.49E-01	6.60E-02	2.61E-01	4.70E+02	1.44E-02	1.67E-02
Idle (taxi out)	5.50E-03	1.66E+00	9.16E-01	1.10E-01	4.35E-01	7.83E+02	2.41E-02	2.78E-02
TOTAL	1.178E-02	4.985E+00	1.636E+00	2.547E-01	1.006E+00	1.814E+03	5.572E-02	6.432E-02

UCLASS	Emissions per operation							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	3.75E-01	4.77E+00	1.40E-01	6.52E-02	1.65E-01	4.64E+02	1.43E-02	1.65E-02
Climb out	1.71E-01	1.08E+00	4.19E-02	1.95E-02	5.89E-02	1.39E+02	4.26E-03	4.92E-03
Approach	9.55E-01	2.41E+00	3.76E-01	7.83E-02	2.02E-01	5.57E+02	1.71E-02	1.98E-02
Idle (taxi in)	2.89E+00	1.76E+00	1.34E+00	1.53E-01	9.93E-02	1.09E+03	3.34E-02	3.86E-02
Idle (taxi out)	8.67E+00	5.27E+00	4.03E+00	4.58E-01	2.98E-01	3.26E+03	1.00E-01	1.16E-01
TOTAL	1.307E+01	1.528E+01	5.936E+00	7.741E-01	8.222E-01	5.513E+03	1.693E-01	1.955E-01

AAFL	Emissions per operation							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Idle	43.767	1.282	956.042	0.427	1.687	3042.732	0.093	0.108
Pattern	91.156	72.352	6174.865	3.582	14.148	25511.086	0.784	0.904
TOTAL	134.922	73.633	7130.906	4.009	15.835	28553.818	0.877	1.012

Emission Factors (lb/hp-hr)

Vessel	Engine hp	Fuel type	IN/OB	VOC	NOX	CO	PM	CO2	Class
SPARTAN	2 x 470 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D
USSV-HS	2 x 310 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D
Protector	280 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D
Odyssey	310 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D
Sea Doo	250 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D
Zodiac	260 hp	diesel	OB	7.78E-03	1.28E-02	2.65E-01	1.32E-05	1.85E+00	MO4D
MST	2 x 671 hp	diesel	IN	2.27E-02	1.12E-02	3.41E-01	6.00E-02	1.83E+00	MS4D
HSMST	2 x 200 hp	diesel	OB	7.78E-03	1.28E-02	2.65E-01	1.32E-05	1.85E+00	MO4D
FACT	2 x 310 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D

Emission Factors (lb/hr)

Vessel	VOC	NOX	CO	PM	CO2
SPARTAN	3.13E+00	8.79E+00	7.44E+01	6.22E-02	8.40E+02
USSV-HS	2.06E+00	5.80E+00	4.91E+01	4.10E-02	5.54E+02
Protector	9.32E-01	2.62E+00	2.22E+01	1.85E-02	2.50E+02
Odyssey	1.03E+00	2.90E+00	2.45E+01	2.05E-02	2.77E+02
Sea Doo	8.32E-01	2.34E+00	1.98E+01	1.65E-02	2.23E+02
Zodiac	1.01E+00	1.67E+00	3.45E+01	1.72E-03	2.40E+02
MST	1.53E+01	7.50E+00	2.29E+02	4.03E+01	1.22E+03
HSMST	1.56E+00	2.57E+00	5.30E+01	2.65E-03	3.70E+02
FACT	2.06E+00	5.80E+00	4.91E+01	4.10E-02	5.54E+02

	Emission Factors (lb/hr)					
	VOC	NOX	CO	SO2	PM	CO2
LCS-I	8.00	48.90	104.00	17.90	2.50	23693
LCS-II	8.00	48.90	104.00	17.90	2.50	23693
USCG Clipper	8.80	47.10	107.80	21.00	2.60	18955

Clipper assumed CG-47 class designator
LCS DDG-
2

Hangar	22,250	sq ft	bulldozing	3.435
Admin	10500	sq ft	grading	3.435
Tarmac	2	acre		
Parking	0.5	acre		
access rd	8000	sq ft		

Graded acres	3.435
Bulldozer acres	3.435
Grading days	20
Bulldozing days	20
Hours/day	8
Soil percent silt, s	15
Soil percent moisture, M	2
Fraction of TSP, J	0.5
Mean vehicle speed, S	5
Dozer path width (ft)	10

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

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

Total Emissions (lb)

	ROG	CO	NOX	SOX	PM	CO2	CH4
Grader	22.18	117.30	168.18	0.22	9.24	19827.44	2.00
Dozer	14.78	93.71	114.57	0.18	6.08	16221.90	1.33
Total (lb)	36.96	211.00	282.75	0.41	15.32	36049.34	3.33
Total (ton)	1.85E-02	1.06E-01	1.41E-01	2.03E-04	7.66E-03	1.80E+01	1.67E-03

Construction 120 days

	no. of equip.	hours/ day	days of service	MaxHP	ROG	CO	NOX	SOX	PM	CO2	CH4
excavator	1	6	30	250	0.1180	0.3480	1.0099	0.0018	0.0333	159	0.0106
dump truck	1	6	60	250	0.1326	0.3761	1.1048	0.0019	0.0368	167	0.0120
roller	1	6	40	120	0.0921	0.4030	0.5906	0.0007	0.0494	59.0	0.0083
paver	1	6	40	175	0.1695	0.7742	1.3079	0.0014	0.0720	128	0.0153
air compressor	1	8	120	50	0.0831	0.2446	0.2134	0.0003	0.0201	22.3	0.0075
generator	2	10	120	50	0.0785	0.2545	0.2731	0.0004	0.0213	30.6	0.0071
concrete truck	1	6	60	175	0.1457	0.8685	1.2772	0.0018	0.0645	160	0.0131
concrete pump truck	1	6	60	250	0.1175	0.4096	1.4689	0.0023	0.0416	201	0.0106
water truck	1	6	100	250	0.1326	0.3761	1.1048	0.0019	0.0368	167	0.0120
forklift (heavy duty)	1	6	60	175	0.1265	0.7246	0.9750	0.0014	0.0534	125	0.0114

Construction Emissions

	MaxHP	ROG	CO	NOX	SOX	PM	CO2	CH4
excavator	250	21.23	62.63	181.78	0.32	6.00	28562.89	1.92
dump truck	250	47.72	135.41	397.73	0.67	13.27	59956.35	4.31
roller	120	22.10	96.73	141.75	0.17	11.85	14157.30	1.99
paver	175	40.68	185.82	313.90	0.35	17.28	30788.52	3.67
air compressor	50	79.74	234.80	204.84	0.28	19.32	21380.41	7.19
generator	50	188.44	610.72	655.38	0.95	51.17	73495.15	17.00
concrete truck	175	52.47	312.65	459.78	0.65	23.21	57672.05	4.73
concrete pump truck	250	42.29	147.46	528.79	0.82	14.98	72492.96	3.82
water truck	250	79.54	225.68	662.89	1.12	22.11	99927.25	7.18
forklift	175	45.53	260.87	351.01	0.51	19.21	44963.87	4.11
Total (lb)		619.73	2272.77	3897.84	5.83	198.40	503396.76	55.92
Total (ton)		0.31	1.14	1.95	2.91E-03	0.10	251.70	0.03
total from grading		1.85E-02	1.06E-01	1.41E-01	2.03E-04	7.66E-03	1.80E+01	1.67E-03
TOTAL (ton)		0.33	1.24	2.09	3.12E-03	0.11	269.72	0.03

HHDT-DSL (pounds/mile)	
CO	**8.464E-03**
NOx	**2.418E-02**
ROG	**2.016E-03**
SOx	**4.092E-05**
PM10	**1.185E-03**
PM2.5	**1.006E-03**
CO2	**4.213E+00**
CH4	**9.261E-05**
Passenger Vehicles (pounds/mile)	
CO	**6.604E-03**
NOx	**6.548E-04**
ROG	**7.023E-04**
SOx	**1.069E-05**
PM10	**9.185E-05**
PM2.5	**5.939E-05**
CO2	**1.103E+00**
CH4	**6.312E-05**

	#	mi/day	days	ROG	CO	NOX	SOX	PM	CO2	CH4
Pick-up truck	4	25	120	7.023E-04	6.604E-03	6.548E-04	1.069E-05	9.185E-05	1.103E+00	6.312E-05
semi-trailer	2	20	60	2.016E-03	8.464E-03	2.418E-02	4.092E-05	1.185E-03	4.213E+00	9.261E-05

Operations Emissions

	ROG	CO	NOX	SOX	PM	CO2	CH4
Pick-up truck	8.43	79.24	7.86	0.13	1.10	13230.86	0.76
semi-trailer	4.84	20.31	58.03	0.10	2.84	10110.70	0.22
Total (lb)	13.27	99.56	65.89	0.23	3.95	23341.57	0.98
Total (ton)	0.007	0.050	0.033	0.000	0.002	11.671	0.000
Total from construct	0.33	1.24	2.09	3.12E-03	1.07E-01	269.72	2.96E-02
TOTAL	0.335	1.292	2.123	0.003	0.109	281.394	0.030

SCCAB <3 nm

UAS	Ops or hrs below 3000'	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
ScanEagle	300	2.30E+01	3.08E-01	1.44E+01	1.74E+00	1.12E+01	2.26E+03	6.93E-02	7.99E-02
SE <3000'	4	9.93E+01	1.33E+00	6.22E+01	7.48E+00	4.85E+01	9.72E+03	2.99E-01	3.45E-01
Shadow	240	1.25E+02	9.15E+01	5.79E+01	4.92E+00	6.00E+00	8.99E+03	0.00E+00	
<3000'	1	2.81E+02	2.06E+02	1.30E+02	1.11E+01	1.35E+01	2.02E+04	0.00E+00	0.00E+00
STUAS	360	1.85E+01	2.47E-01	1.16E+01	1.39E+03	9.02E+00	1.81E+03	5.56E-02	6.41E-02
<3000'	3	2.36E+02	3.15E+00	1.48E+02	1.78E+04	1.15E+02	2.31E+04	7.09E-01	8.18E-01
Hunter	80	1.02E+02	7.50E+01	4.75E+01	4.03E+00	4.92E+00	7.37E+03	0.00E+00	0.00E+00
<3000'	5	7.68E+02	5.63E+02	3.56E+02	3.02E+01	3.69E+01	5.53E+04	0.00E+00	0.00E+00
Fire Scout	257	7.64E+02	1.61E+02	6.44E+02	1.49E+01	4.05E+01	1.06E+05	3.25E+00	3.75E+00
<3000'	3	2.63E+03	4.41E+02	6.59E+03	6.99E+01	5.16E+02	4.98E+05	1.53E+01	1.77E+01
BAMS	21	2.47E-01	1.05E+02	3.44E+01	5.35E+00	2.11E+01	3.81E+04	1.17E+00	1.35E+00
UCLASS	64	8.36E+02	9.78E+02	3.80E+02	4.95E+01	5.26E+01	3.53E+05	1.08E+01	1.25E+01
AAFL	11	1.48E+03	8.10E+02	7.84E+04	4.41E+01	1.74E+02	3.14E+05	9.65E+00	1.11E+01
JLENS	480 gen. hrs.	3.77E+01	1.31E+02	1.22E+02	1.90E-01	1.02E+01	1.47E+04	3.40E+00	
	Total (#/yr)	7.40E+03	3.57E+03	8.70E+04	1.94E+04	1.06E+03	1.45E+06	4.47E+01	4.77E+01
	total (tpy)	3.70E+00	1.78E+00	4.35E+01	9.69E+00	5.30E-01	7.26E+02	2.24E-02	2.39E-02

Chase

F/A-18	20	1104.00	709.00	2950.00	43.00	745.40	331320.00
Helo	10	21.00	111.00	198.00	8.00	73.00	68640.00
	Total (#/yr)	1125.00	820.00	3148.00	51.00	818.40	399960.00
	total (tpy)	0.5625	0.41	1.574	0.0255	0.4092	199.98

UMS	Ops/yr	hr/op	VOC	NOX	CO	PM	CO2
SPARTAN	30	2	1.88E+02	5.27E+02	4.46E+03	3.73E+00	5.04E+04
USSV-HS	20	2	1.24E+02	3.48E+02	2.94E+03	2.46E+00	3.32E+04
Protector	30	2	5.59E+01	1.57E+02	1.33E+03	1.11E+00	1.50E+04
Odyssey	2 x 10	2	6.19E+01	1.74E+02	1.47E+03	1.23E+00	1.66E+04
Sea Doo	6 x 20	2	4.99E+01	1.40E+02	1.19E+03	9.92E-01	1.34E+04
Zodiac	15	2	6.07E+01	1.00E+02	2.07E+03	1.03E-01	1.44E+04
MST	10	2	9.15E+02	4.50E+02	1.37E+04	2.42E+03	7.35E+04
HSMST	4 x 10	2	9.34E+01	1.54E+02	3.18E+03	1.59E-01	2.22E+04
FACT	2 x 10	2	1.24E+02	3.48E+02	2.94E+03	2.46E+00	3.32E+04
		Total (#/yr)	1.67E+03	2.40E+03	3.33E+04	2.43E+03	2.72E+05
		total (tpy)	8.36E-01	1.20E+00	1.67E+01	1.21E+00	1.36E+02

Vessel	Ops/yr	hr/op	VOC	NOX	CO	SOX	PM	CO2
LCS-I	15	4	480	2934	6240	1074	150	1421580
LCS-II	10	4	320	1956	4160	716	100	947720
USCG Clipper	5	4	176	942	2156	420	52	379100
		Total (#/yr)	976	5832	12556	2210	302	2748400
		total (tpy)	0.488	2.916	6.278	1.105	0.151	1374.2

SNI		VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Construction	(tons)	0.335	2.123	1.291	0.00323	0.108	281.39	0.0301	

UAS	Ops or hrs below 3000'	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
ScanEagle	100	7.6809646	0.1026415	4.807529	0.5783811	3.746812	751.73714	0.023088	0.02664986
SE <3000'	4	3.31E+01	4.43E-01	2.07E+01	2.49E+00	1.62E+01	3.24E+03	9.95E-02	1.15E-01
Shadow	60	31.2	22.879992	14.4768	1.22928	1.4996798	2246.4	0	0
<3000'	1	7.02E+01	5.15E+01	3.26E+01	2.77E+00	3.37E+00	5.05E+03	0.00E+00	0.00E+00
STUAS	90	4.6208486	0.0617489	2.892197	347.9526	2.2540725	452.24314	0.01389	0.01603249
<3000'	3	5.89E+01	7.88E-01	3.69E+01	4.44E+03	2.88E+01	5.77E+03	1.77E-01	2.05E-01
Hunter	20	25.584	18.761593	11.87098	1.0080096	1.2297375	1842.048	0	0
<3000'	5	9.59E+00	7.04E+00	4.45E+00	3.78E-01	4.61E-01	6.91E+02	0.00E+00	0.00E+00
Fire Scout	60	178.47134	37.643085	150.4487	3.4685952	9.4648949	24705.069	0.758755	0.87582029
<3000'	3	613.17648	102.87648	1539.473	16.3296	120.4308	116307.58	3.5721	4.123224
BAMS	4	0.0471076	19.941918	6.543899	1.018944	4.0248288	7257.4286	0.222894	0.25728336
UCLASS	11	143.731	168.12089	65.29351	8.5146749	9.0447079	60645.772	1.862585	2.14995541
	Total (#/yr)	1176.3667	430.13415	1890.452	4824.36	200.43873	228963.46	6.730032	7.76837982
	total (tpy)	0.5881833	0.2150671	0.945226	2.41218	0.1002194	114.48173	0.003365	0.00388419

SCCAB (3-12 nm)

UAS	Ops or hrs below 3000'	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Shadow	1	2.81E+02	2.06E+02	1.30E+02	1.11E+01	1.35E+01	2.02E+04	0.00E+00	0.00E+00
Hunter	3	4.61E+02	3.38E+02	2.14E+02	1.81E+01	2.21E+01	3.32E+04	0.00E+00	0.00E+00
Fire Scout	257	7.64E+02	1.61E+02	6.44E+02	1.49E+01	4.05E+01	1.06E+05	3.25E+00	3.75E+00
<3000'	3	2.63E+03	4.41E+02	6.59E+03	6.99E+01	5.16E+02	4.98E+05	1.53E+01	1.77E+01
	Total (#/yr)	4.13E+03	1.15E+03	7.58E+03	1.14E+02	5.92E+02	6.57E+05	1.86E+01	2.14E+01
	total (tpy)	2.07E+00	5.73E-01	3.79E+00	5.70E-02	2.96E-01	3.29E+02	9.28E-03	1.07E-02

UMS	Ops/yr	hr/op	VOC	NOX	CO	PM	CO2
SPARTAN	30	8	7.51E+02	2.11E+03	1.79E+04	1.49E+01	2.02E+05
USSV-HS	20	8	4.95E+02	1.39E+03	1.18E+04	9.84E+00	1.33E+05
Protector	30	8	2.24E+02	6.28E+02	5.32E+03	4.44E+00	6.01E+04
Odyssey	10	8	2.48E+02	6.95E+02	5.89E+03	4.92E+00	6.65E+04
Sea Doo	20	8	2.00E+02	5.61E+02	4.75E+03	3.97E+00	5.36E+04
Zodiac	15	8	2.43E+02	4.00E+02	8.27E+03	4.13E-01	5.77E+04
MST	10	8	3.66E+03	1.80E+03	5.49E+04	9.66E+03	2.94E+05
HSMST	10	8	3.73E+02	6.16E+02	1.27E+04	6.35E-01	8.88E+04
FACT	10	8	4.95E+02	1.39E+03	1.18E+04	9.84E+00	1.33E+05
		Total (#/yr)	6.69E+03	9.59E+03	1.33E+05	9.71E+03	1.09E+06
		total (tpy)	3.34E+00	4.80E+00	6.66E+01	4.86E+00	5.44E+02

Vessel	Ops/yr	hr/op	VOC	NOX	CO	SOX	PM	CO2
LCS-I	15	20	2.40E+03	1.47E+04	3.12E+04	5.37E+03	7.50E+02	7.11E+06
LCS-II	10	20	1.60E+03	9.78E+03	2.08E+04	3.58E+03	5.00E+02	4.74E+06
USCG Clipper	5	20	8.80E+02	4.71E+03	1.08E+04	2.10E+03	2.60E+02	1.90E+06
		Total (#/yr)	4.88E+03	2.92E+04	6.28E+04	1.11E+04	1.51E+03	1.37E+07
		total (tpy)	2.44E+00	1.46E+01	3.14E+01	5.53E+00	7.55E-01	6.87E+03

SCCAB <3 nm

	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
UAV	2.40E+00	1.55E+00	4.07E+01	9.66E+00	3.17E-01	4.95E+02	1.53E-02	1.57E-02
Chase	5.63E-01	4.10E-01	1.57E+00	2.55E-02	4.09E-01	2.00E+02		
UMS	8.36E-01	1.20E+00	1.67E+01		1.21E+00	1.36E+02		
Marine Vessels	4.88E-01	2.92E+00	6.28E+00	1.11E+00	1.51E-01	1.37E+03		
total (tpy)	4.29E+00	6.08E+00	6.53E+01	1.08E+01	2.09E+00	2.20E+03	1.53E-02	1.57E-02

SCCAB (3-12 nm)

	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
UAS	7.66E-01	3.42E-01	1.02E+00	2.45E-02	8.28E-02	9.72E+01	2.17E-03	2.50E-03
UMS	3.34E+00	4.80E+00	6.66E+01		4.86E+00	5.44E+02		
Marine Vessels	2.44E+00	1.46E+01	3.14E+01	5.53E+00	7.55E-01	6.87E+03		
total (tpy)	6.55E+00	1.97E+01	9.90E+01	5.55E+00	5.69E+00	7.51E+03	2.17E-03	2.50E-03

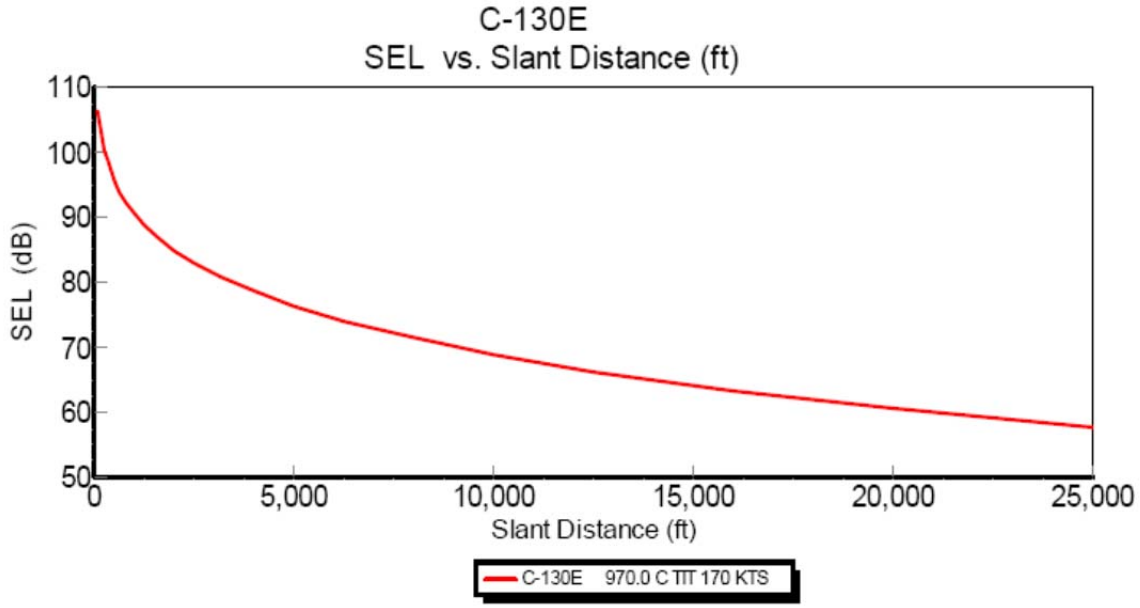
SNI

	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Construction	3.35E-01	2.12E+00	1.29E+00	3.23E-03	1.08E-01	2.81E+02	3.01E-02	
UAS	5.88E-01	2.15E-01	9.45E-01	2.41E+00	1.00E-01	1.14E+02	3.37E-03	3.88E-03
total (tpy)	9.23E-01	2.34E+00	2.24E+00	2.42E+00	2.08E-01	3.96E+02	3.35E-02	3.88E-03

Appendix C

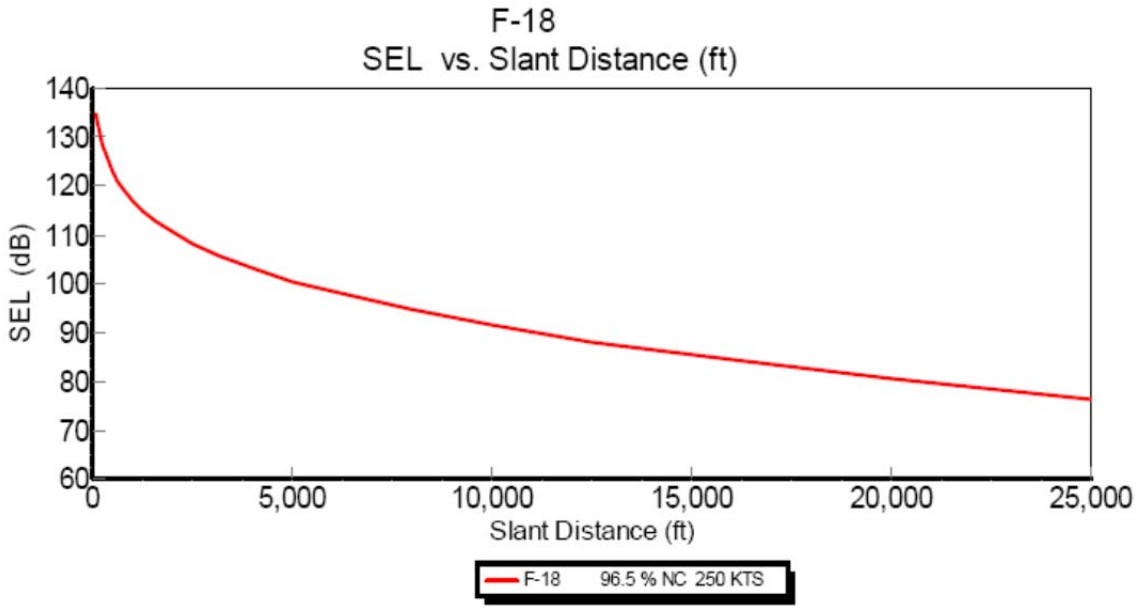
Noise Analysis Supporting Calculations

The following noise analysis calculations were derived using the SELCalc2 Program with standard settings.



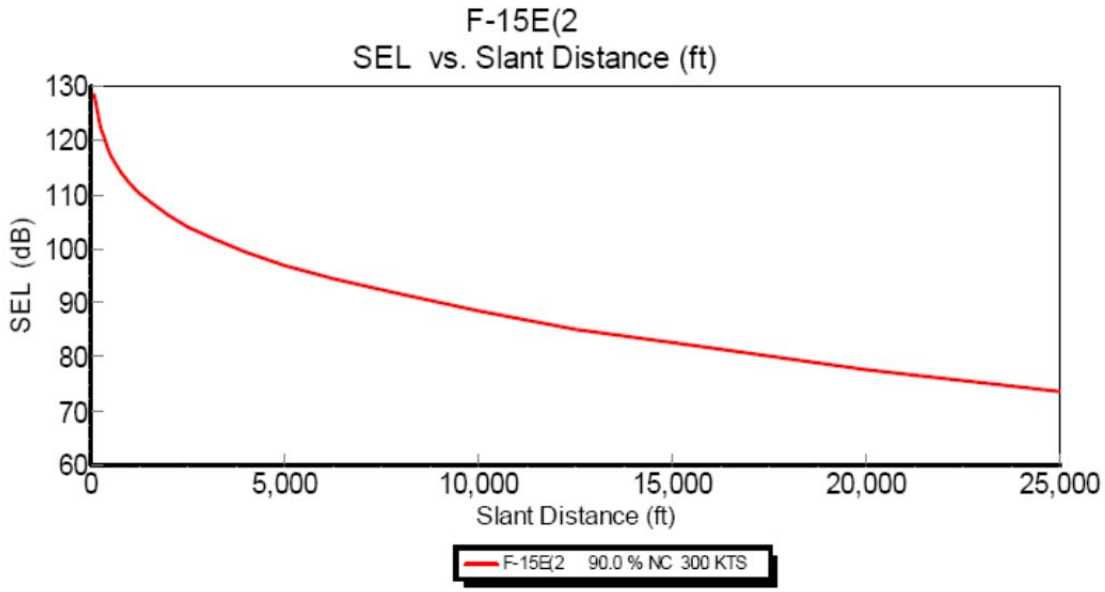
Aircraft: C-130E
Power: 970.0 C TIT
Airspeed: 170 KTS
Temp: 59 F
Humidity: 70 %
Configure: TAKEOFF POWER

Distance (ft)	SEL (dB)
100	106.3
125	104.8
160	103.4
200	101.8
250	100.3
315	98.8
400	97.2
500	95.6
630	93.9
800	92.2
1000	90.5
1250	88.7
1600	86.8
2000	84.9
2500	82.9
3150	80.8
4000	78.7
5000	76.4
6300	74.0
8000	71.4
10000	68.8
12500	66.1
16000	63.3
20000	60.5
25000	57.7



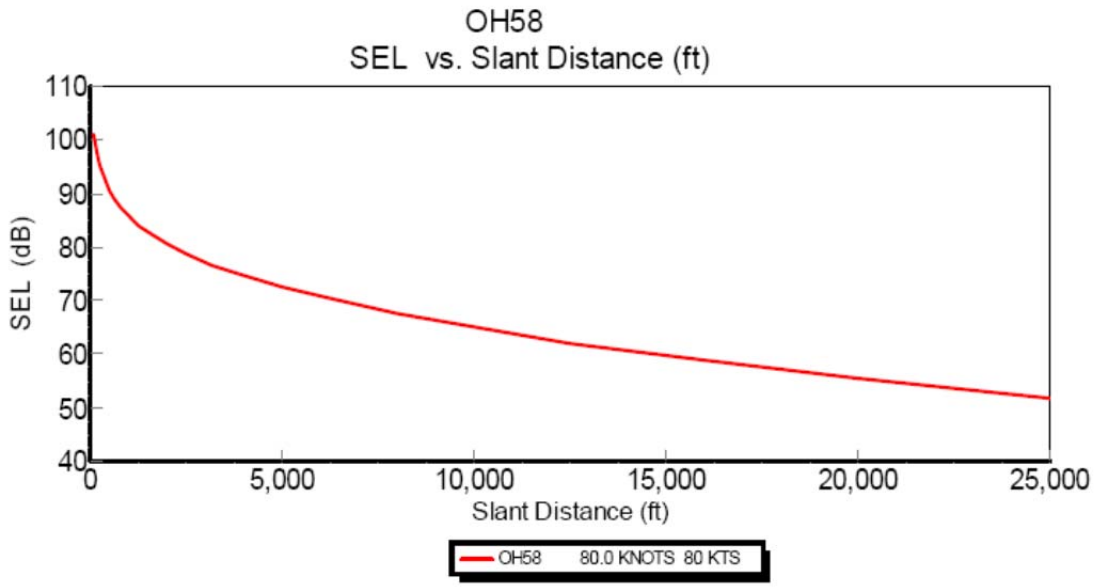
Aircraft: F-18
Power: 96.5 % NC
Airspeed: 250 KTS
Temp: 59 F
Humidity: 70 %
Configure: TAKEOFF POWER

Distance (ft)	**SEL (dB)**
100	134.6
125	133.0
160	131.5
200	129.9
250	128.2
315	126.5
400	124.8
500	122.9
630	121.0
800	119.0
1000	116.9
1250	114.8
1600	112.7
2000	110.5
2500	108.2
3150	105.7
4000	103.2
5000	100.5
6300	97.7
8000	94.7
10000	91.5
12500	88.1
16000	84.4
20000	80.5
25000	76.3



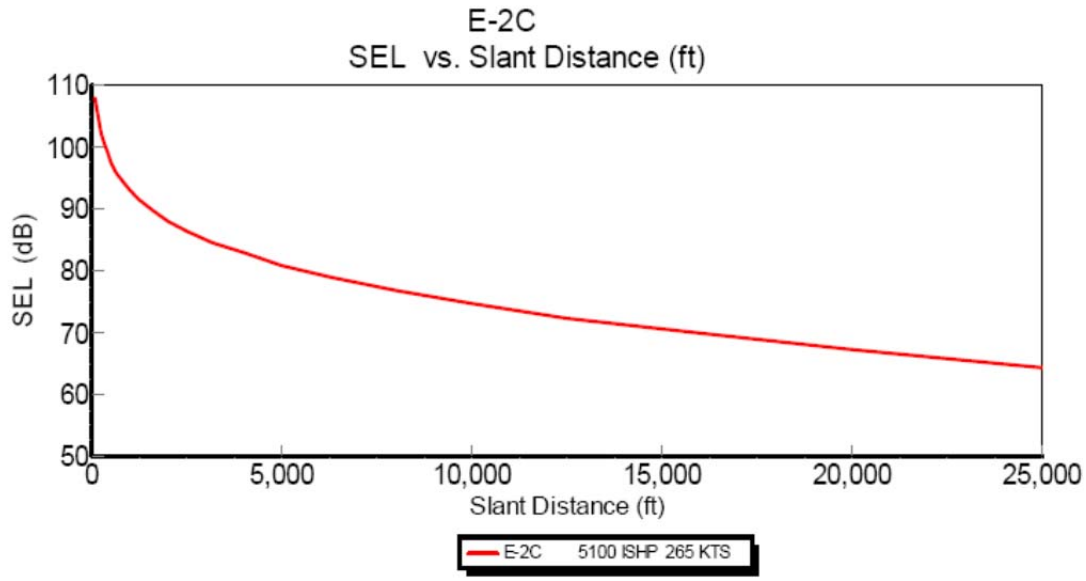
Aircraft: F-15E(2
Power: 90.0 % NC
Airspeed: 300 KTS
Temp: 59 F
Humidity: 70 %
Configure: TAKEOFF POWER

Distance (ft)	vs. SEL (dB)
100	128.3
125	126.8
160	125.3
200	123.8
250	122.2
315	120.6
400	119.0
500	117.3
630	115.6
800	113.8
1000	112.0
1250	110.1
1600	108.2
2000	106.1
2500	104.0
3150	101.8
4000	99.4
5000	97.0
6300	94.3
8000	91.5
10000	88.4
12500	85.1
16000	81.6
20000	77.8
25000	73.7



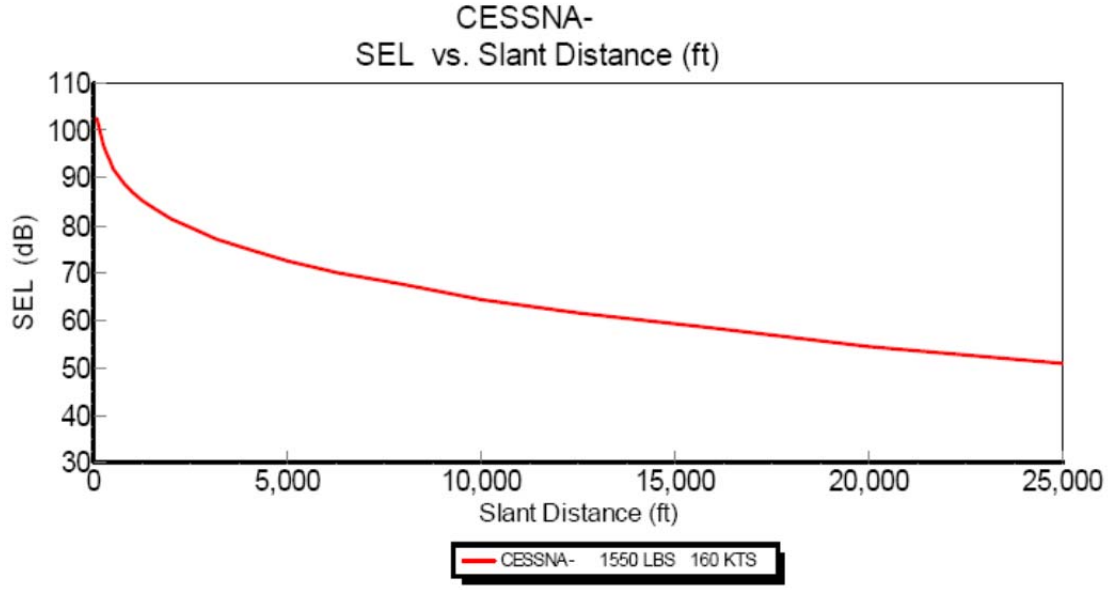
Aircraft: OH58
Power: 80.0 KNOTS
Airspeed: 80 KTS
Temp: 59 F
Humidity: 70 %
Configure: LFO LITE 80 KTS

Distance (ft)	vs. SEL (dB)
100	100.9
125	99.4
160	98.0
200	96.5
250	95.1
315	93.6
400	92.1
500	90.5
630	89.0
800	87.4
1000	85.8
1250	84.1
1600	82.4
2000	80.6
2500	78.7
3150	76.7
4000	74.7
5000	72.5
6300	70.2
8000	67.7
10000	65.0
12500	62.1
16000	58.9
20000	55.5
25000	51.8



Aircraft: E-2C
Power: 5100 ISHP
Airspeed: 265 KTS
Temp: 59 F
Humidity: 70 %
Configure: TAKEOFF POWER

Distance (ft)	SEL (dB)
100	107.8
125	106.3
160	104.9
200	103.4
250	102.0
315	100.5
400	99.0
500	97.5
630	96.0
800	94.5
1000	92.9
1250	91.3
1600	89.7
2000	88.0
2500	86.3
3150	84.6
4000	82.8
5000	80.9
6300	79.0
8000	76.9
10000	74.7
12500	72.4
16000	69.9
20000	67.2
25000	64.3



Aircraft: CESSNA-
Power: 1550 LBS
Airspeed: 160 KTS
Temp: 59 F
Humidity: 70 %
Configure: TAKEOFF

Distance (ft)	vs. SEL (dB)
100	102.7
125	101.2
160	99.8
200	98.3
250	96.8
315	95.2
400	93.7
500	92.1
630	90.4
800	88.7
1000	87.0
1250	85.2
1600	83.3
2000	81.4
2500	79.4
3150	77.2
4000	75.0
5000	72.6
6300	70.1
8000	67.4
10000	64.5
12500	61.4
16000	58.2
20000	54.6
25000	50.9

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Appendix D

Public Comment

Overview

The Navy filed a formal Notice of Availability (NOA) for the draft EA for Expansion of Unmanned Systems Operations on the Point Mugu Sea Range in the Ventura County Star on July 5, 6, and 7, 2013, initiating a 21-day draft EA comment period which concluded on July 26, 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.