# Environmental Assessment for Shoreline Protection Repair and Enhancements Naval Base Ventura County, Point Mugu

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# EXECUTIVE SUMMARY

Naval Base Ventura County (NVBC), Point Mugu has a number of mission critical assets and infrastructure located immediately adjacent to the shoreline and exposed to the Pacific Ocean. The shoreline and beaches at NBVC Point Mugu have a long history of erosion and shoreline retreat, which has increasingly threatened base assets and infrastructure, including buildings and roads. Over the years, shoreline protection structures, including groins and revetments, have been constructed to protect these assets and infrastructure. However, storms and other high water events have damaged the Central and West revetments and caused coastal flooding. Building PM-812, which houses airfield lighting equipment, has recently flooded despite efforts to protect the building and equipment. Beach Road, which runs parallel to the coastline and provides access to the buildings and other assets located along the coastline, has also flooded and remains partially blocked by sand and debris.

A Shoreline Protection Study was conducted to assess the short- and long-term vulnerabilities of mission-critical and ecological assets and to develop possible strategies to reduce or eliminate those vulnerabilities (U.S. Department of the Navy 2012a). The strategies were formalized into a Shoreline Protection Plan, which outlines specific, pre-design recommendations for stabilizing the NBVC Point Mugu shoreline (U.S. Department of the Navy 2012b). The Study concluded that the Central Revetment and the West Revetment are failing to protect mission-critical assets located along the shoreline, including buildings PM-750, PM-758, PM-767, PM-761, PM-7020, and PM-6-31 located behind the Central Revetment; and Runway 03-21, Building PM-812, and Beach Road located behind the West Revetment. As outlined in the Shoreline Protection Plan and under the three proposed alternatives, the revetments would be repaired and enhanced by expanding their width and height, while eroding beach sand would be restored to the adjacent dune at the eastern end of the West Revetment. In addition, the down-coast (eastern end) of the West Revetment would be extended to protect Beach Road and Building PM-812.

The purpose of the Proposed Action is to ensure the continued protection of mission critical infrastructure and valuable ecological resources along the most at-risk locations of the NBVC Point Mugu coastline. The Proposed Action is needed because the shoreline, roads, infrastructure, and natural resources along the NBVC Point Mugu coast are at risk from erosion and coastal flooding. Sand on the beaches and in the littoral zone is eroding at an accelerated rate due to a deficit in sand moving down-coast, causing the loss of beach area, flooding of infrastructure, damage to revetments, and loss of coastal beach habitat. The Proposed Action would protect mission critical infrastructure at NBVC Point Mugu and help to preserve and replenish beach habitat behind or adjacent to the revetments.

Three Alternatives for implementing the Proposed Action and the No Action Alternative were analyzed in the EA. Under Alternative 1, the Preferred Alternative, the United States (U.S.) Department of the Navy (Navy) would repair and expand the Central and West revetments; extend the eastern end of the West Revetment by approximately 125 feet (ft.); replenish the sand dune at the eastern end of the West Revetment; relocate airfield lighting equipment and infrastructure currently housed in Building PM-812 to a site farther inland at Tide Gate #844; recontour the dune at Ormond Beach and Holiday Beach; and repair and repave Beach Road. Under Alternative 2, the same actions would occur except that the relocation site for Building PM-812 would be at the PM-81 site off South M Avenue instead of the Tide Gate #844 site. Under Alternative 3, the West Revetment would not be extended, equipment and infrastructure in Building PM-812 would not be relocated, and Beach Road would not be repaired. All other actions described under Alternative 1 would be conducted. Under the No Action Alternative, none of the proposed activities would be conducted.

Resources that have the potential to be impacted by the action alternatives are described and analyzed in the EA and include: topography and sediments, water resources, biological resources (e.g., protected species, vegetation, birds, mammals, fish and Essential Fish Habitat [EFH], invertebrates, and reptiles and amphibians), air quality and climate change, noise, cultural resources, public health and safety, coastal uses and resources, and transportation and traffic. The results of the analysis conclude that no significant impacts would occur to any resource by implementing the action alternatives. Environmental protective measures would be incorporated into an Environmental Protection Plan and used by the construction contractor to avoid or minimize impacts to environmental resources.

# TABLE OF CONTENTS

**1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION ..... 1-1**

**1.1 INTRODUCTION ..... 1-1**
**1.2 PROJECT LOCATION ..... 1-1**
**1.3 BACKGROUND ..... 1-4**
**1.4 PURPOSE OF AND NEED FOR THE PROJECT ..... 1-8**
**1.5 DECISION TO BE MADE ..... 1-8**
**1.6 SCOPE OF ANALYSIS ..... 1-8**
1.6.1 RESOURCES NOT CARRIED FORWARD FOR DETAILED ANALYSIS ..... 1-9
**1.7 INTERGOVERNMENTAL COORDINATION ..... 1-10**
**1.8 PUBLIC AND AGENCY PARTICIPATION ..... 1-10**

**2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES ..... 2-1**

**2.1 REASONABLE ALTERNATIVE SCREENING FACTORS ..... 2-1**
**2.2 PROPOSED ACTION ..... 2-2**
**2.3 ALTERNATIVES ..... 2-2**
2.3.1 NO ACTION ALTERNATIVE ..... 2-3
2.3.2 ALTERNATIVE 1: SHORELINE PROTECTION (PREFERRED) ALTERNATIVE ..... 2-3
2.3.3 ALTERNATIVE 2: SOUTH M AVENUE ALTERNATIVE ..... 2-20
2.3.4 ALTERNATIVE 3: BEACH SAND REPLENISHMENT (WITH REVETMENT REPAIR) ..... 2-22
2.3.5 SUMMARY OF ALTERNATIVES ..... 2-23
**2.4 ALTERNATIVE CONSIDERED BUT NOT CARRIED FORWARD FOR DETAILED ANALYSIS ..... 2-23**
2.4.1 MANAGED RETREAT ALTERNATIVE ..... 2-23
**2.5 ENVIRONMENTAL PROTECTION MEASURES ..... 2-24**
2.5.1 ENVIRONMENTAL PROTECTION PLAN ..... 2-24
2.5.2 BIOLOGICAL RESOURCES ..... 2-24

**3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES ..... 3-1**

**3.1 TOPOGRAPHY AND SEDIMENTS ..... 3-1**
3.1.1 AFFECTED ENVIRONMENT ..... 3-1
3.1.2 ENVIRONMENTAL CONSEQUENCES TO TOPOGRAPHY AND SEDIMENTS ..... 3-5
**3.2 WATER RESOURCES ..... 3-9**
3.2.1 REGULATORY SETTING ..... 3-9
3.2.2 STORM WATER RUNOFF ..... 3-9
3.2.3 AFFECTED ENVIRONMENT ..... 3-10
3.2.4 ENVIRONMENTAL CONSEQUENCES TO WATER RESOURCES ..... 3-13
**3.3 BIOLOGICAL RESOURCES ..... 3-17**
3.3.1 AFFECTED ENVIRONMENT ..... 3-17
3.3.2 ENVIRONMENTAL CONSEQUENCES TO BIOLOGICAL RESOURCES ..... 3-30
**3.4 AIR QUALITY AND CLIMATE CHANGE ..... 3-44**
3.4.1 AIR POLLUTANTS ..... 3-44

3.4.2 AFFECTED ENVIRONMENT ....3-48
3.4.3 ENVIRONMENTAL CONSEQUENCES TO AIR QUALITY AND CONTRIBUTIONS TO CLIMATE CHANGE ....3-50
**3.5 NOISE ....3-55**
3.5.1 CHARACTERISTICS OF SOUND ....3-55
3.5.2 HUMAN HEALTH AND RESPONSE TO NOISE ....3-57
3.5.3 PROPAGATION OF SOUND IN THE ENVIRONMENT ....3-57
3.5.4 SOUND ATTENUATION EFFECTS IN THE ENVIRONMENT ....3-57
3.5.5 GUIDANCE ON NOISE ENVIRONMENT ....3-58
3.5.6 AFFECTED ENVIRONMENT ....3-58
3.5.7 ENVIRONMENTAL CONSEQUENCES TO THE EXISTING NOISE ENVIRONMENT ....3-61
**3.6 CULTURAL RESOURCES ....3-63**
3.6.1 AFFECTED ENVIRONMENT ....3-63
3.6.2 ENVIRONMENTAL CONSEQUENCES TO CULTURAL RESOURCES ....3-64
**3.7 PUBLIC HEALTH AND SAFETY ....3-66**
3.7.1 AFFECTED ENVIRONMENT ....3-66
3.7.2 ENVIRONMENTAL CONSEQUENCES TO PUBLIC HEALTH AND SAFETY ....3-70
**3.8 COASTAL USES AND RESOURCES ....3-73**
3.8.1 THE COASTAL ZONE MANAGEMENT ACT ....3-73
3.8.2 CALIFORNIA COASTAL COMMISSION POLICIES ....3-73
3.8.3 SEA LEVEL RISE AND CLIMATE CHANGE ....3-74
3.8.4 ENVIRONMENTAL CONSEQUENCES TO COASTAL USES AND RESOURCES ....3-75
**3.9 TRANSPORTATION AND TRAFFIC ....3-76**
3.9.1 AFFECTED ENVIRONMENT ....3-76
3.9.2 ENVIRONMENTAL CONSEQUENCES TO TRANSPORTATION AND TRAFFIC ....3-79

**4 CUMULATIVE IMPACTS ANALYSIS ....4-1**

**4.1 INTRODUCTION ....4-1**
**4.2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ....4-1**
**4.3 RESOURCE-SPECIFIC CUMULATIVE IMPACTS ....4-5**
4.3.1 TOPOGRAPHY AND SEDIMENTS ....4-5
4.3.2 WATER RESOURCES ....4-6
4.3.3 BIOLOGICAL RESOURCES ....4-6
4.3.4 AIR QUALITY AND CLIMATE CHANGE ....4-6
4.3.5 NOISE ....4-10
4.3.6 CULTURAL RESOURCES ....4-10
4.3.7 PUBLIC HEALTH AND SAFETY ....4-10
4.3.8 COASTAL USES AND RESOURCES ....4-11
4.3.9 TRANSPORTATION AND TRAFFIC ....4-11

**5 OTHER NEPA CONSIDERATIONS ....5-1**

**5.1 POSSIBLE CONFLICTS BETWEEN THE PROPOSED ACTION AND THE OBJECTIVES OF FEDERAL ACTS, EXECUTIVE ORDERS, POLICIES, AND PLANS ....5-1**
**5.2 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL OF ALTERNATIVES INCLUDING THE PROPOSED ACTION AND ALL CONSERVATION MEASURES BEING CONSIDERED ....5-3**

**5.3 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF NATURAL OR DEPLETABLE RESOURCES .....5-3**
**5.4 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY .....5-3**
**5.5 ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED AND ARE NOT AMENABLE TO MITIGATION .....5-3**

**6 REFERENCES .....6-1**

**7 LIST OF AGENCIES AND PERSONS CONSULTED .....7-1**

**8 LIST OF PREPARERS .....8-1**

**APPENDIX A: AIR QUALITY CALCULATIONS ..... A-1**

**APPENDIX B: CLEAN AIR ACT RECORD OF NON-APPLICABILITY (RONA) ..... B-1**

**APPENDIX C: AGENCY CORRESPONDENCE .....C-1**

**APPENDIX D: PROGRAMMATIC BIOLOGICAL OPINION ..... D-1**

## LIST OF TABLES

TABLE 1-1: CHRONOLOGY OF EVENTS THAT IMPACT THE NBVC POINT MUGU SHORELINE ..... 1-7
TABLE 1-2: APPLICABLE GUIDANCE, LAWS, AND REGULATIONS CONSIDERED ..... 1-11
TABLE 2-1: ESTIMATES OF THE AREA ASSOCIATED WITH EACH COMPONENT OF THE PROPOSED ACTION ..... 2-2
TABLE 2-2: ALTERNATIVES CONSIDERED IN THIS EA ..... 2-23
TABLE 3-1: PROTECTED SPECIES POTENTIALLY OCCURRING AT NBVC POINT MUGU AND WITHIN THE PROJECT AREA OF THE PROPOSED ACTION ..... 3-18
TABLE 3-2: FISH SPECIES LIKELY TO OCCUR IN AND AROUND NBVC POINT MUGU ..... 3-26
TABLE 3-3: AMBIENT AIR QUALITY STANDARDS ..... 3-47
TABLE 3-4: OZONE EXCEEDANCES FOR VCAPCD ..... 3-49
TABLE 3-5: ANNUAL BASELINE (2011) CRITERIAL AND PRECURSOR AIR POLLUTANT EMISSIONS FOR SOUTH CENTRAL COAST AIR BASIN AND VENTURA COUNTY ..... 3-49
TABLE 3-6: ANNUAL CRITERIA AND PRECURSOR AIR POLLUTANT EMISSIONS UNDER ALTERNATIVE 1 AND ALTERNATIVE 2* ..... 3-52
TABLE 3-7: ANNUAL CRITERIA AND PRECURSOR AIR POLLUTANT EMISSIONS UNDER ALTERNATIVE 3 ..... 3-54
TABLE 3-8: TYPICAL NOISE LEVELS IN THE ENVIRONMENT ..... 3-56
TABLE 3-9: REPRESENTATIVE SEL AT DEPARTURE FOR COMMONLY FLOWN AIRCRAFT AT NBVC POINT MUGU ..... 3-59
TABLE 3-10: PREDICTED NOISE LEVELS FOR CONSTRUCTION EQUIPMENT ..... 3-61
TABLE 4-1: PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS PROJECT LIST ..... 4-1
TABLE 4-2: ANNUAL GREENHOUSE GAS EMISSIONS FOR ALTERNATIVES 1, 2, AND 3 ..... 4-9
TABLE 5-1: SUMMARY OF ENVIRONMENTAL COMPLIANCE FOR THE PROPOSED ACTION ..... 5-1

## LIST OF FIGURES

FIGURE 1-1: LOCATION OF NBVC POINT MUGU ALONG THE CALIFORNIA COASTLINE ..... 1-2
FIGURE 1-2: SHORELINE PROTECTION STRUCTURES AT NBVC POINT MUGU ..... 1-3
FIGURE 1-3: MISSION-CRITICAL INFRASTRUCTURE AT NBVC POINT MUGU PROTECTED BY THE CENTRAL REVETMENT ..... 1-5
FIGURE 1-4: MISSION-CRITICAL INFRASTRUCTURE OF NBVC POINT MUGU PROTECTED BY THE WEST REVETMENT ..... 1-6
FIGURE 2-1: THE CENTRAL REVETMENT PROJECT AREA ..... 2-6

Figure 2-2: Mugu Submarine Canyon Headwall in Proximity to the Central Revetment ..... 2-7
Figure 2-3: Damage to the Central Revetment ..... 2-8
Figure 2-4: Profile View of Proposed Repairs to the Central Revetment ..... 2-9
Figure 2-5: Potential Project Laydown Areas for Construction and Repair of the Central Revetment ..... 2-10
Figure 2-6: Photograph of Potential Project Laydown Area ..... 2-10
Figure 2-7 Beach Road, the West Revetment, Revetment Extension (125 ft.), and Dune Replenishment Area ..... 2-11
Figure 2-8: Profile View of West Revetment Extension ..... 2-12
Figure 2-9. Potential Sources of Sand for Dune Replenishment at NBVC Point Mugu ..... 2-14
Figure 2-10: Building PM-812 Located at the Intersection of South M Avenue and Beach Road ..... 2-15
Figure 2-11: Building PM-812 Flooded During an Above Average High-Water Event in September 2011 ..... 2-15
Figure 2-12: Potential Relocation Sites for Airfield Lighting Equipment Housed in Building PM-812: Tide Gate #844 and South M Avenue ..... 2-17
Figure 2-13: Tide Gate #844 Relocation Site, Northwest of Runway 03-21, and MAD Road, Accessible from Perimeter Road ..... 2-18
Figure 2-14: A 300 ft. Section of Beach Road Near Building PM-812 at the Intersection of South M Avenue Has Been Reduced to One Lane Due to Storm Damage ..... 2-19
Figure 2-15: Dune Recontouring Sites at Ormond East Beach (Up-coast) and Holiday Beach (Down-coast) ..... 2-20
Figure 2-16: Relocation Area for Airfield Lighting Equipment on South M Avenue ..... 2-21
Figure 2-17. Concrete pad and infrastructure at PM-81, the South M Avenue Relocation Site. ..... 2-22
Figure 3-1: Topography of the Shoreline at the Central Revetment Facing West (up-coast) ..... 3-2
Figure 3-2: Cross-Section at the Existing Central Revetment ..... 3-2
Figure 3-3: Beach profile looking up-coast (west) from the Central Revetment ..... 3-3
Figure 3-4: Mugu Submarine Canyon in Proximity to the Central Revetment ..... 3-4
Figure 3-5: Noise-sensitive receptors in the vicinity of the Project Area at NBVC Point Mugu ..... 3-60
Figure 3-6: Area of Potential Effect for Cultural Resources at NBVC Point Mugu ..... 3-64
Figure 3-7: Accident Potential Zones in the Project Area ..... 3-67
Figure 3-8: Family Beach ..... 3-68
Figure 3-9: Explosive Safety Ordnance Alternate Route ..... 3-69
Figure 3-10: Installation Remediation (IR) Sites (IR 11 and IR 38) and the EOD site on Ormond Beach ..... 3-71
Figure 3-11: Major Roads Leading to NBVC Point Mugu ..... 3-78
Figure 3-12: Beach Road narrowing at the intersection with South M Avenue ..... 3-79

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ° | degree(s) |
| µg/m3 | micrograms per cubic meter |
| ac. | acre(s) |
| AICUZ | Air Installation Compatible Use Zone |
| APE | Area of Potential Effect |
| APZ | Accident Potential Zone |
| AQMP | Air Quality Management Plan |
| ASBS | Area of Special Biological Significance |
| BASH | Bird/Wildlife Aircraft Strike Hazard |
| BCC | Federal Bird Species of Conservation Concern |
| BGEPA | Bald and Golden Eagle Protection Act |
| BMP | Best Management Practice(s) |
| C | Celsius |
| CAA | Clean Air Act |
| CAAQS | California Ambient Air Quality Standards |
| CARB | California Air Resources Board |
| CDFW | California Department of Fish and Wildlife |
| CEQ | Council on Environmental Quality |
| C.F.R. | Code of Federal Regulations |
| CNEL | Community Noise Equivalent Level |
| CNO | Chief of Naval Operations |
| CO | Carbon Monoxide |
| $CO_2e$ | Carbon Dioxide Equivalent |
| CWA | Clean Water Act |
| CZMA | Coastal Zone Management Act |
| dB | decibel(s) |
| dBA | decibel(s), A-weighted |
| DL | Delisted |
| EA | Environmental Assessment |
| ECP | Erosion Control Plan |
| EFH | Essential Fish Habitat |
| EIR | Environmental Impact Report |
| EIS | Environmental Impact Statement |
| EISA | Energy Independence and Security Act |
| EO | Executive Order |
| EOD | Explosive Ordnance Disposal |
| EPM | Environmental Protective Measures |
| ESA | Endangered Species Act |
| F | Fahrenheit |
| FAA | Federal Aviation Agency |
| FE | Federal Endangered |
| fm | fathom(s) |
| FONSH | Finding of No Significant Harm |
| FONSI | Finding of No Significant Impact |
| FP | Fully Protected |
| FR | Federal Register |
| FT | Federal Threatened |
| ft. | foot/feet |
| $ft.^2$ | square foot/feet |
| GHG | Greenhouse Gas(es) |
| HAPC | Habitat Area of Particular Concern |
| HP | Horsepower |
| Hz | Hertz |
| ICRMP | Integrated Cultural Resources Management Plan |
| INRMP | Integrated Natural Resources Management Plan |
| IR | Installation Restoration |
| lb./hr | Pound(s) Per Hour |
| $L_{eq}$ | Average Sound Level |
| LID | Low Impact Development |
| MAD | Marine Air Detachment |
| MBTA | Migratory Bird Treaty Act |
| MHHW | Mean Higher High Water |
| MHW | Mean High Water |
| mi. | mile(s) |
| MLLW | Mean Lower Low Water |
| MLW | Mean Low Water |
| mm | millimeter(s) |
| MMPA | Marine Mammal Protection Act |
| MSL | Mean Sea Level |
| NAAQS | National Ambient Air Quality Standards |
| Navy | U.S. Department of the Navy |
| NBVC | Naval Base Ventura County |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| nm | nautical mile(s) |
| NMFS | National Marine Fisheries Service |
| $N_2O$ | Nitrous oxide |
| NOAA | National Oceanic and Atmospheric Administration |
| $NO_x$ | Nitrogen Oxide |
| NRHP | National Register of Historic Places |
| $O_3$ | Ozone |
| Pb | Lead |
| PBO | Programmatic Biological Opinion |
| PFMC | Pacific Fishery Management Council |

| | |
|---|---|
| PM | Particulate Matter |
| $PM_{10}$ | Particulate matter less than or equal to 10 micrometers in diameter |
| $PM_{2.5}$ | Particulate matter less than or equal to 2.5 micrometers in diameter |
| ppb | Parts per billion |
| ppm | Parts per million |
| ROC | Reactive Organic Compound |
| ROG | Reactive Organic Gas |
| RONA | Record of Non-Applicability |
| SHPO | State Historic Preservation Office |
| SIP | State Implementation Plan |
| $SO_2$ | Sulfur Dioxide |
| SSC | California Species of Special Concern |
| ST | State Endangered |
| SWRCB | State Water Resource Control Board |
| SWPPP | Storm Water Pollution Prevention Plan |
| TMDL | Total Maximum Daily Load |
| U.S. | United States |
| U.S.C. | United States Code |
| USACE | U.S. Army Corps of Engineers |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USGCRP | U.S. Global Change Research Program |
| UXO | Unexploded Ordnance |
| VCAPCD | Ventura County Air Pollution Control District |
| VOC | Volatile Organic Compound |
| yd. | yard(s) |
| $yd.^3$ | cubic yard(s) |

# 1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

## 1.1 INTRODUCTION

The United States (U.S.) Department of the Navy (Navy) has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321, as amended), its Council on Environmental Quality (CEQ) implementing regulations for procedural provisions of NEPA (40 Code of Federal Regulations [C.F.R.] 1500–1508 [1997]), and Navy Procedures Implementing NEPA (32 C.F.R. 775 [2004]). It presents an analysis of the potential environmental impacts of a Proposed Action to repair and enhance shoreline protection structures for the purpose of protecting mission-critical infrastructure (e.g., buildings and roads) from the effects of coastal flooding and damage from waves at Naval Base Ventura County (NBVC) Point Mugu, located in Ventura County, California.

NBVC Point Mugu is situated along a very dynamic stretch of coastline. Mission-critical infrastructure and valuable ecological resources are vulnerable to coastal erosion. The main cause of these vulnerabilities is a reduction in sand supply along the NBVC Point Mugu shoreline where sand is critical to maintaining a stable coastal system. The severity of coastal erosion may increase with a projected increase in the rate of sea level rise associated with climate change.

## 1.2 PROJECT LOCATION

Naval Base Ventura County was established in 2000 by consolidating Naval Air Station Point Mugu (which became known as NBVC Point Mugu) and the Construction Battalion Center Port Hueneme (which became known as NBVC Port Hueneme). NBVC Point Mugu and NBVC Port Hueneme are located approximately 5 miles (mi.) (8 kilometers [km]) apart, along the Pacific coast of California, in Ventura County (Figure 1-1). NBVC Point Mugu consists of 4,490 acres (ac.) (1,820 hectares [ha]), of which approximately 2,000 ac. (810 ha) are developed. As part of its mission, NBVC Point Mugu operates an airfield with two runways and a 36,000-square-mile sea test range extending more than 180 nautical miles (nm) seaward from shore. NBVC San Nicolas Island, located 60 mi. offshore within the sea test range, is used for littoral warfare training, including theater warfare exercises, and includes launching facilities and a 10,000-foot (ft.) runway.

NBVC Point Mugu is located between the City of Oxnard to the northwest and the Point Mugu State Park to the southeast (Figure 1-1). The site is fronted by approximately 6 mi. of shoreline and was initially established in the early 1940s as a place to stage, train, and supply the newly created U.S. Navy Construction Battalion (known as the Seabees). Shoreline protection structures in the form of groins and revetments were constructed through the years to protect mission-critical infrastructure as the shoreline eroded and assets became vulnerable to destructive waves during high water events (e.g., during storms). Existing shoreline protection structures at NBVC Point Mugu are shown in Figure 1-2.

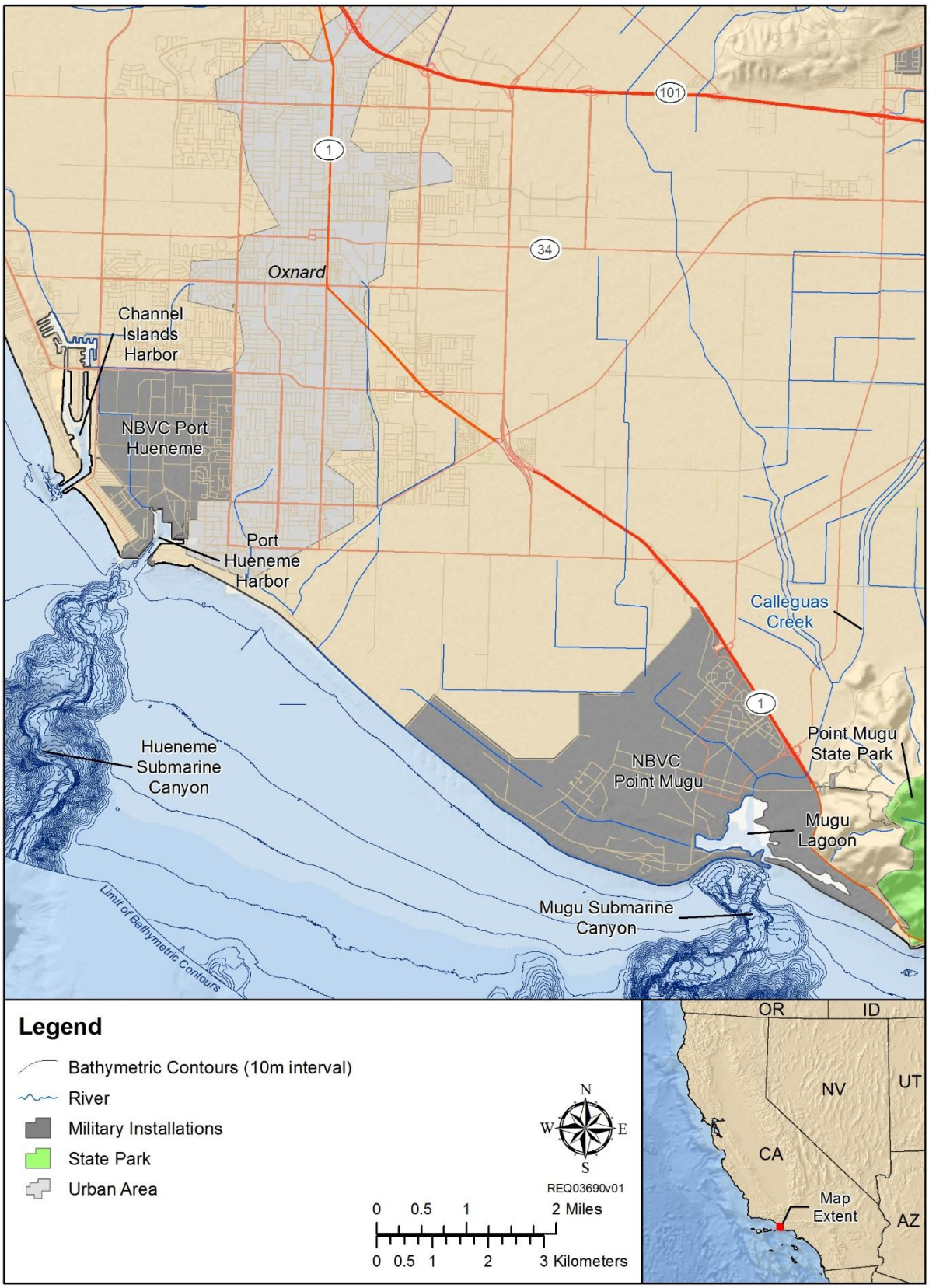


**Figure 1-1: Location of NBVC Point Mugu along the California Coastline**

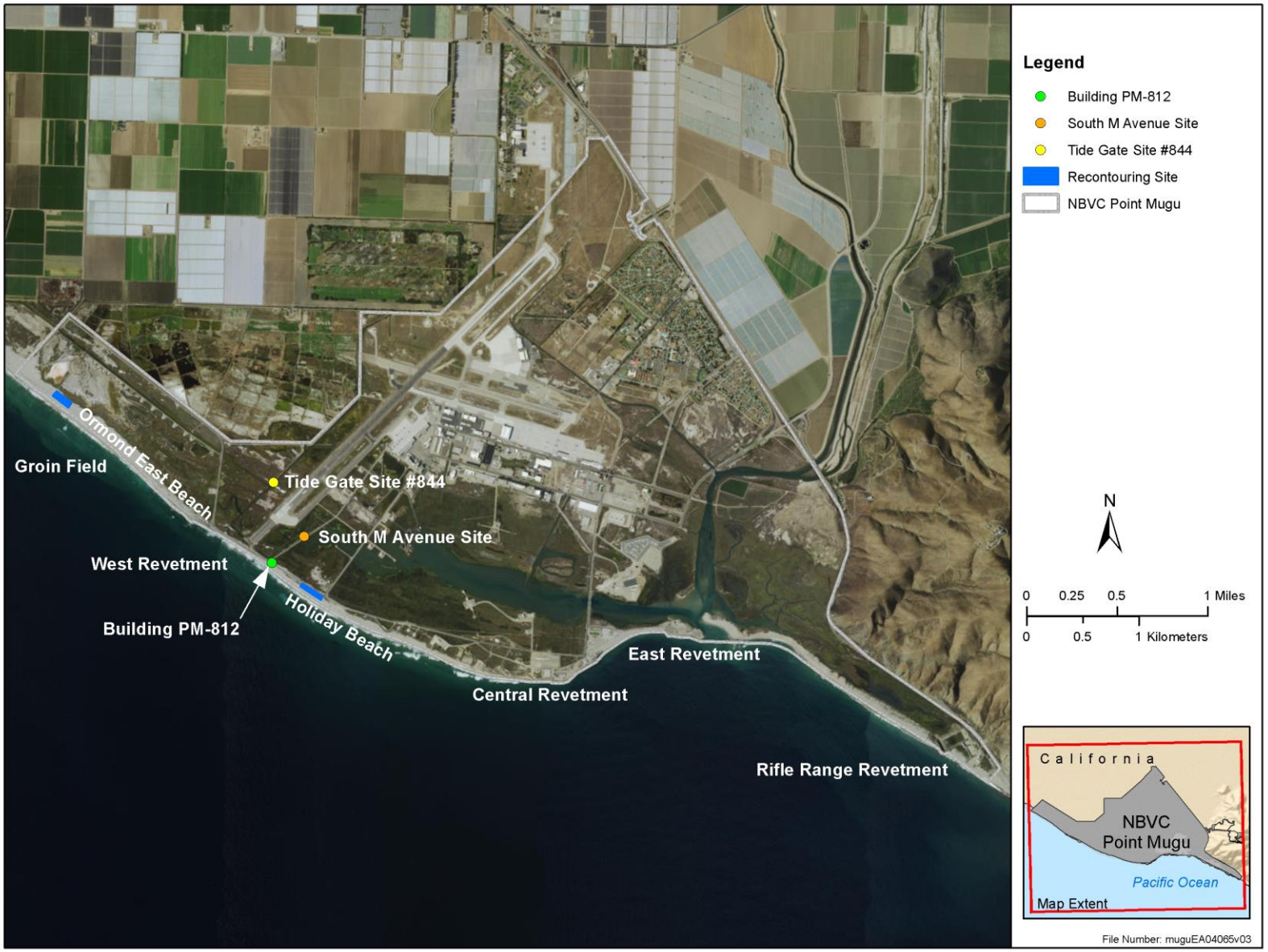


**Figure 1-2: Shoreline Protection Structures at NBVC Point Mugu**

## 1.3 BACKGROUND

A Shoreline Protection Study Report was prepared to assess the short- and long-term vulnerabilities of mission-critical and ecological assets and to develop a strategy to reduce or eliminate those vulnerabilities (U.S. Department of the Navy 2012a). The strategies were formalized into a Shoreline Protection Plan, which outlines specific, pre-design recommendations for stabilizing the NBVC Point Mugu shoreline (U.S. Department of the Navy 2012b). The Study Report concluded that the Central Revetment and the West Revetment are failing to protect mission-critical assets located along the shoreline, including buildings PM-750, PM-758, PM-767, PM-761, PM-7020, and PM-6-31 located behind the Central Revetment (Figure 1-3); and Runway 03-21, Building PM-812, and Beach Road located behind the West Revetment (Figure 1-4). The Shoreline Protection Plan recommends repairing and expanding the width and height of the revetments, extending the West Revetment down-coast to protect Building PM-812 and Beach Road, and restoring sand to the adjacent dunes at the down-coast end of the West Revetment.

Construction of shore protection structures along NBVC Point Mugu began in the late 1960s. These structures consisted of a groin field and four revetments, and were typically constructed as an emergency response measure to protect infrastructure from the effects of long-term shoreline retreat, storm related erosion, and flood damage. A chronology of the construction and maintenance of each of these shoreline protection structures is provided in Table 1-1.

Revetments are designed solely to protect property and infrastructure located on the landward side of the revetment by buffering the shoreline from the impact of breaking waves. Revetments essentially fix the landward boundary of the beach and have little effect on the alongshore movement of sand until they become exposed. However, once exposed, the revetments alter the natural beach profile response to landward migration of the shoreline.

The NBVC Point Mugu coastline recession is a result of a sand imbalance in which more sand is lost from beaches than supplied to them. The revetments do not cure this imbalance; they only fix the upper portion of the beach and shore face profile. Consequently, the loss of sand, coastal erosion and damage to the revetments from winter storms has left NBVC assets and natural resources at risk. Repair and extension of these revetments will protect vulnerable assets vital to the mission of NBVC Point Mugu.

Construction on the eastern section of the Central Revetment began in 1967 and was extended in 1968 along the west flank. The crest of the initial revetment varied from approximately 10 to 20 ft. above mean sea level (MSL). After the winter of 1983, the crest of the eastern portion was raised to approximately 20 ft. above MSL (23 ft. above mean lower low water [MLLW]). The Central Revetment has required emergency repairs and continuous maintenance after storm-related damage in 1983, 1988, 1995, and 1998. In 1997, about 950 ft. of the Central Revetment was improved by adding an outer layer of armor stone and extending the toe of the structure 20 to 40 ft. seaward. The El Niño winter of 1997–1998 damaged portions of the Central Revetment, requiring several gaps to be repaired and a flatter revetment with a 2:1 slope to be constructed.

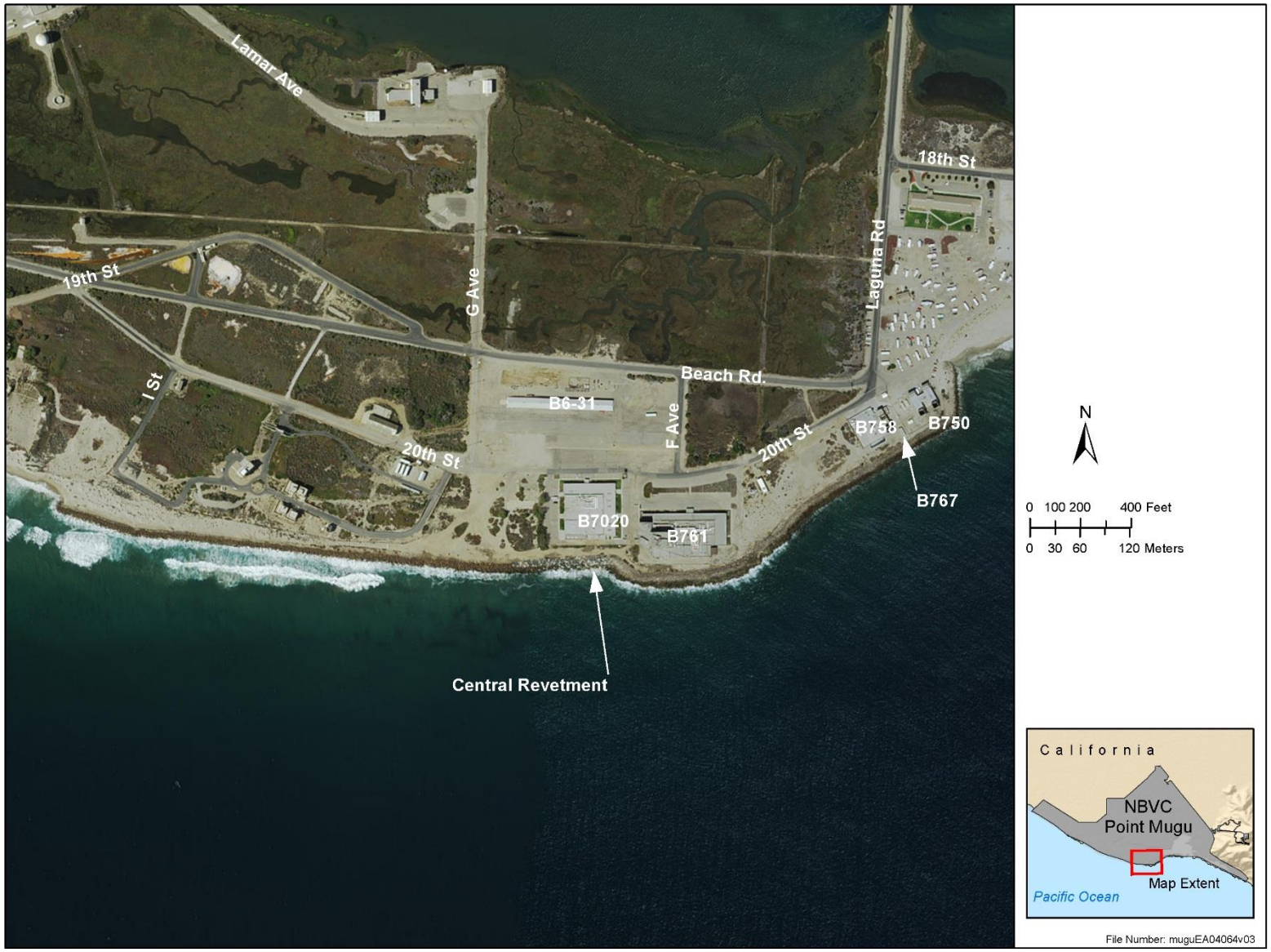


**Figure 1-3: Mission-Critical infrastructure at NBVC Point Mugu Protected by the Central Revetment**

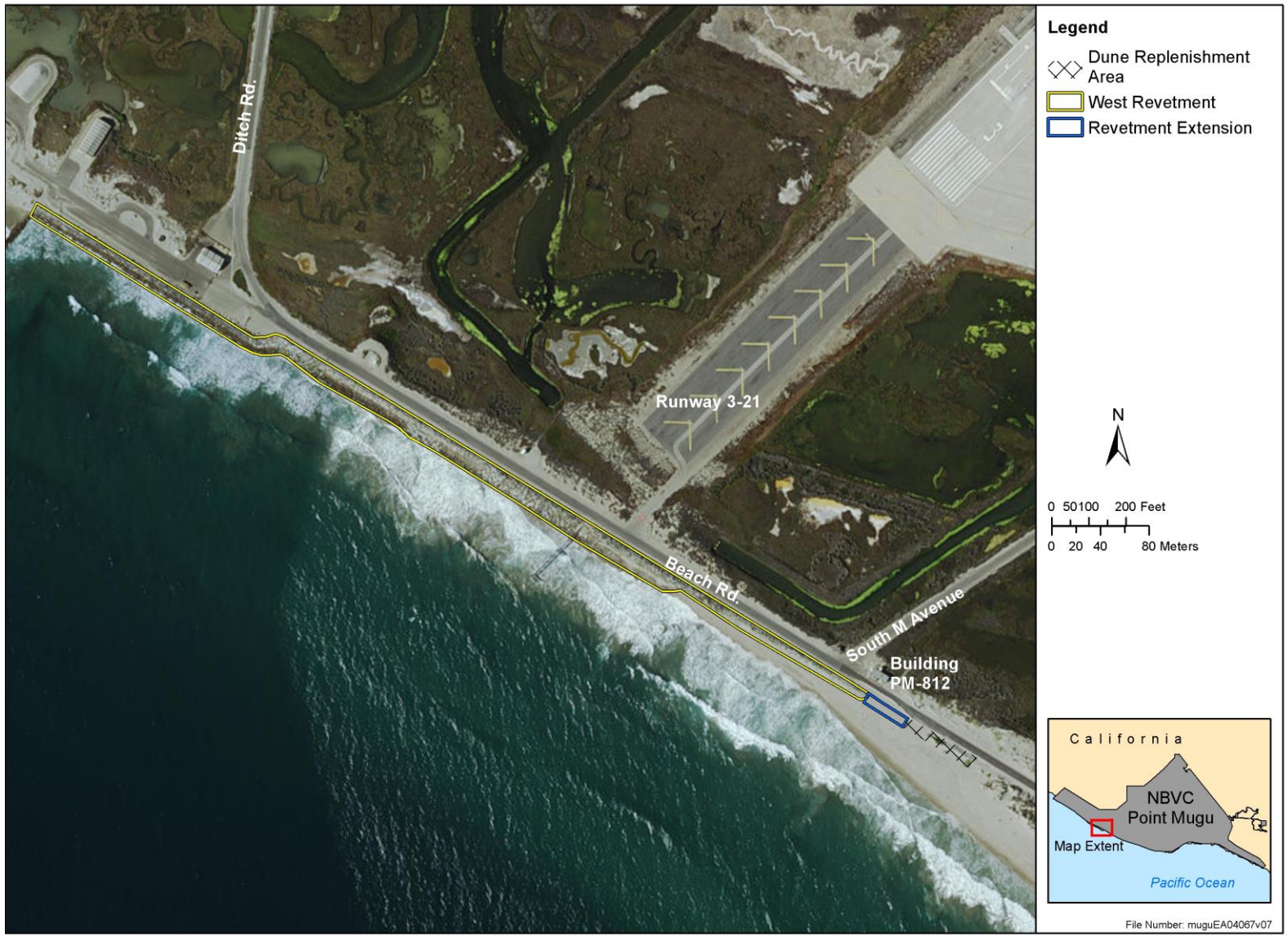


**Figure 1-4: Mission-Critical Infrastructure of NBVC Point Mugu Protected by the West Revetment**

**Table 1-1: Chronology of Events that Impact the NBVC Point Mugu Shoreline**

| Timeframe | Event Description |
|---|---|
| Pre-1938 | Natural shoreline condition. Shoreline from Point Hueneme to Mugu Rock was essentially stable (Herron and Harris, 1966). |
| 1938–1939 | Arrowhead jetties constructed at Port Hueneme, west jetty extended to head of Port Hueneme Submarine Canyon. 2,600,000 cubic yards (yd.$^3$) of material placed on down-coast (i.e., Hueneme Beach). |
| 1938+ | Up-coast beach advanced as sand built up against west jetty at Port Hueneme; down-coast retreated approximately 700 feet (ft.) from 1938 to 1948. |
| Mid 1950s | Erosion extended 8 miles down-coast to Naval Base Ventura County (NBVC) Point Mugu; emergency 500,000 yd.$^3$ beach fill placed to protect ammunition bunkers. |
| 1960 | Channel Islands Harbor constructed; 6,200,000 yd.$^3$ of sand placed on Hueneme and Ormond Beaches. |
| 1960+ | United States Army Corps of Engineers Sand Bypassing program at Channel Islands Harbor begins. |
| 1964 | Rifle Range Revetment was constructed. |
| 1967 | Three groins constructed by Navy to protect access road at NBVC Point Mugu. |
| 1967+ | West seawall constructed by Navy to protect access road at NBVC Point Mugu. |
| 1966–1968 | Navy constructed Central Revetment to protect research facilities and East Revetment to protect recreational facilities on the northwest side of Mugu Lagoon. Revetments were constructed under an emergency basis. |
| 1983 | Rifle Range, East and Central Revetments damaged during winter storms. Emergency repairs made to East and Central Revetments. |
| 1987 | North Rifle Range abandoned. Repairs to the remaining Rifle Range included sheet-pile and metal pontoon retaining walls along with a support dike. |
| 1988 | East and Central Revetments severely damaged; subsequent emergency repairs made. |
| Nov 1992 | East Revetment damaged (most damage occurred west of pier) and subsequently repaired. |
| 1994–1995 | East Revetment failed, recreational pier was destroyed. Most damage occurred at west end of revetment. |
| 1997 | Almost half of the East Revetment was removed and landward infrastructure relocated or removed. Western flank of East Revetment also re-established. |
| 1997 | Approximately 950 ft. of the Central Revetment was improved by adding outer layer of 6-ton armor stone along the central portion of the revetment and extending the toe 20-40 ft. seaward. |
| 1998–1999 | Central Revetment improvements to increase height, extend toe, and add outer layer of armor stone. |
| 2002 | Stone was added (capped) to the west end of the Central Revetment (west of Building PM-761) and stone was added to the eastern end of the West Revetment. |
| 2009–2010 | The east end of the West Revetment was extended 100 ft. |

The West Revetment was constructed in 1967 to counteract the typical erosion effects down-coast of a groin field and provide protection for the Building PM-812 and Beach Road. The initial crest elevation of the West Revetment ranged from 8 to 12 ft. above MSL and was increased in 1983 to an elevation of 14 ft. above MSL (17 ft. above MLLW). Improvements completed in 1999 increased the height of the structure, extended the toe, and added an outer layer of armor stone that varied from 2-ton to 6-ton stone. The larger stone was placed along the eastern portion of the seawall. In 2010, an extension of the West Revetment added 100 ft. to the east end, extending the revetment to just short of Building PM-812.

Building PM-812 was constructed in 1964 and has been subject to increased exposures due to the effects of shoreline erosion, including flooding. As shown in Table 1-1, a number of shoreline protection projects have taken place at NBVC Point Mugu, since Building PM-812 was constructed, to slow the landward recession of the shoreline. However, since 1938, the shoreline has moved progressively and consistently landward immediately seaward of Building PM-812 (U.S. Department of the Navy 2012a), necessitating the proposed relocation of the building farther inland.

Beach Road extends along nearly the entire coastline of NBVC Point Mugu, from the mouth of Mugu Lagoon and the East Revetment at its eastern end to the groin field at its western end (Figure 1-2 and Figure 1-4,). Beach Road provides access to multiple coastal assets on the base, including mission-critical infrastructure behind the Central Revetment (Figure 1-3) and is used to transport explosive ordnance across the base.

## 1.4 Purpose of and Need for the Project

The purpose of the Proposed Action is to protect mission critical infrastructure and valuable ecological resources along the most at-risk locations of the NBVC Point Mugu coastline.

The Proposed Action is needed, because the shoreline, roads, infrastructure, and natural resources along the NBVC Point Mugu coast are at risk from erosion and coastal flooding. Sand on the NBVC Point Mugu beaches and in the littoral zone is eroding at an accelerated rate due to a deficit in sand transported into the area from up-coast, increasing the susceptibility of infrastructure to flooding and causing the loss of beach area, damage to revetments, and loss of coastal beach habitat. The landward retreat of the Mugu Submarine Canyon and its role in transporting sand out of the littoral zone contributes to coastal erosion. The Proposed Action would protect mission critical infrastructure and help to preserve and replenish beach habitat at NBVC Point Mugu.

## 1.5 Decision to be Made

The decision to be made as a result of the analysis in this EA is to determine if an Environmental Impact Statement (EIS) needs to be prepared. An EIS will need to be prepared if it is determined that the Preferred Alternative or another alternative ultimately selected for implementation would have significant impacts to the human or natural environment. Should an EIS be deemed unnecessary based on the effects analysis of the alternative selected for implementation, the selection would be documented in a Finding of No Significant Impact (FONSI).

## 1.6 Scope of Analysis

Council on Environmental Quality regulations, NEPA, and Navy procedures for implementing NEPA specify that an EA should address only those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact. Resource areas analyzed in detail in this EA include topography and sediments, water resources, biological resources, air quality, noise, cultural resources, public health and safety, coastal uses and resources, and transportation and traffic.

### 1.6.1 Resources Not Carried Forward for Detailed Analysis

Several resources were considered but were not carried forward for detailed analysis in this EA, because potential impacts from implementation of the proposed alternatives would be non-existent or would be considered negligible. They are as follows: land use and agricultural resources, airspace management, socioeconomics and environmental justice, visual quality, recreational resources, and utilities.

#### 1.6.1.1 Land Use and Agricultural Resources

Implementation of the proposed alternatives would not adversely affect land use or agricultural resources, and is in compliance with the NBVC Activity Overview Plan (September 2006). There would be no land use category changes as a result of the Proposed Action. The alternatives would not result in impacts to agricultural resources, as it would not change the existing land use within the project boundaries and would not convert any agricultural uses to non-agricultural uses. In addition, the Proposed Action would not introduce any new land use controls. Accordingly, the Navy eliminated further examination of land use and agricultural resources in this EA.

#### 1.6.1.2 Airspace Management

Implementation of the proposed alternatives would not involve any activities that would impact military airspace or military aircraft operations conducted within military airspace. None of the activities associated with the Proposed Action would interfere with military airspace. Accordingly, the Navy eliminated further examination of airspace management in this EA.

#### 1.6.1.3 Socioeconomics/Environmental Justice

Implementation of the proposed alternatives would not adversely affect socioeconomic resources and would comply with Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-income Populations*, and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. The Proposed Action would occur entirely on Navy lands; no disproportionate impacts to schools, children, or minority populations would occur, and the scale of the alternatives would result in only minor effects to the economy. No minority or low-income communities are known to exist in the vicinity of the Project Area and no such groups would be disproportionately affected. Accordingly, the Navy eliminated further examination of socioeconomics and environmental justice in this EA.

#### 1.6.1.4 Visual Quality

Implementation of the proposed alternatives would not result in a significant impact to the visual quality of the shoreline or wetland areas where construction activities would occur. Although the Central and West revetments would be expanded by increasing the width and height of both revetments and the length of the West Revetment would be extended, the visual quality along the shoreline would be consistent with the existing conditions. The two proposed relocation sites for the equipment and infrastructure housed in Building PM-812 are partially developed or disturbed areas. Constructing a new building similar in size to Building PM-812 to house airfield lighting equipment would not change the visual quality of either area and would be consistent with the landscape at NBVC Point Mugu. In addition, there are no sensitive visual receptors in the vicinity of the Project Area. Accordingly, the Navy eliminated further examination of effects to visual quality in this EA.

#### 1.6.1.5 Recreational Resources

Implementation of the proposed alternatives would not result in significant impacts associated with access to recreational resources along the shoreline. Access to recreational areas on NBVC Point Mugu is

limited to base personnel and their families or guests. NBVC Point Mugu, its beaches, or other recreational areas are not open to the general public. While construction activities at the revetments may interfere with base personnel accessing some adjacent beach areas, any conflicts would be temporary and intermittent, and other beach areas would remain accessible. Accordingly, the Navy eliminated further examination of recreational resources in this EA.

#### 1.6.1.6 Utilities

Implementation of the proposed alternatives would not require alterations or repairs to existing utilities and infrastructure. New construction for the relocation of airfield lighting equipment and infrastructure currently housed in Building PM-812 would require tie-in or connection to existing utilities. Any new utilities requirements are expected to be similar to existing requirements at the current location of Building PM-812. Therefore, no impacts on utilities or utility capacity would be expected. Accordingly, the Navy has eliminated further examination of utilities in this EA.

## 1.7 INTERGOVERNMENTAL COORDINATION

The Navy coordinated with the agencies listed in Table 1-2 below to obtain approvals and permits, as needed, to support the Proposed Action. Copies of the intergovernmental correspondence will be provided in the final EA.

## 1.8 PUBLIC AND AGENCY PARTICIPATION

The Navy initiated the public participation process by publishing a Notice of Availability of the Public Draft EA in the *Ventura County Star* newspaper, which ran from 31 October to 2 November 2015 and the *Los Angeles Times* newspaper, which ran from 31 October to 2 November 2015. The Navy made copies of the Public Draft EA available to the public in the following public libraries: Ray D. Prueter Library in the City of Port Hueneme and Camarillo Public Library in Camarillo, for a 30-day public review and comment period from 30 October to 30 November, 2015. In addition, the Navy posted the Public Draft EA to the Commander, Navy Region Southwest website (www.cnic.navy.mil/NBVC_Shoreline_Protection_EA) for public review, and scoping letters sent to the public or other agencies containing the same information as the public notice were mailed to interested parties in the community and local government agencies. The Navy will consider and respond to all substantive comments received. A summary of the comments received and the Navy's responses to comments will be provided in the final EA. A Notice of Availability for the Final EA and FONSI will also be published in the *Ventura County Star* and *Los Angeles Times* along with the addresses of the libraries listed above, which will be provided with hard copies of both the Final EA and the FONSI.

**Table 1-2: Applicable Guidance, Laws, and Regulations Considered**

| Regulation | Agency | Permit/Approval | Regulated Activity |
|---|---|---|---|
| National Historic Preservation Act of 1966, as amended (16 U.S. Code [U.S.C.] 470 et seq. and amendments) | California State Historic Preservation Officer | Section 106 Consultation | Federal undertakings that affect properties listed in or eligible for listing in the National Register of Historic Places |
| Coastal Zone Management Act (16 U.S.C. 1452-1465) | California Coastal Commission | Coastal Consistency Determination or Negative Determination | Federal actions that may impact coastal uses and resources |
| Clean Air Act (42 U.S.C. 7401 et seq.) | United States Environmental Protection Agency | Conformity Determination or Record of Non-Applicability | Federal implementation of a proposed action may result in air quality impacts that could exceed the levels noted in 40 Code of Federal Regulations 93.153 |
| Clean Water Act (33 U.S.C. §1251 et seq.) | United States Army Corps of Engineers | Compliance determination document (Individual Permit and Certification) | Federal action that may result in the discharge of pollutants in surface waters of the United States |
| Rivers and Harbors Act (33 U.S.C. §401, 403) | United States Army Corps of Engineers | Compliance determination document (Individual Permit) | Federal action that would excavate, fill, or alter the course, condition, or capacity of any port, harbor, channel, or other waters including the construction of breakwaters, jetties, and other structures |
| Magnuson-Stevens Fishery Conservation and Management Act and Sustainable Fisheries Act (16 U.S.C. §1801 et seq.) | National Marine Fisheries Service | Essential Fish Habitat Consultation | Federal action that may affect essential fish habitat |
| Endangered Species Act (ESA) (1973, as amended) | United States Fish and Wildlife Service (USFWS) | Coverage under Programmatic Biological Opinion (under Section 7 of ESA) | Federal action that may result in a take of a threatened or endangered species |
| Migratory Bird Treaty Act (16 U.S.C. §703 et seq.) | United States Fish and Wildlife Service (USFWS) | Not Applicable | Federal action that may result in a take of a migratory bird species |
| Executive Order (EO) 13693 (Planning for Federal Sustainability in the Next Decade) | The White House | Not Applicable | EO outlining Federal policy to maintain leadership in sustainability and greenhouse gas emission reductions |
| Department of Defense 2014 Climate Change Adaptation Roadmap | United States Department of Defense | Not Applicable | Federal guidelines to identify and assess the effects of climate change on the Department, integrate climate change considerations across the Department and manage associated risks, and collaborate with internal and external stakeholders on climate change challenges |

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# 2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

CEQ Regulations for Implementing the Procedural Provisions of the NEPA establish a number of policies for federal agencies, including "using the NEPA process to identify and assess the reasonable alternatives to the Proposed Action that will avoid or minimize adverse effects of these actions on the quality of the human environment" (40 C.F.R. 1500.2(e)).

The analysis presented in this EA is supported primarily by the results of a 2012 shoreline protection study that evaluated potential options for protecting infrastructure assets at NBVC Point Mugu (U.S. Department of the Navy 2012a). The study assessed both the short- and long-term vulnerabilities of mission-critical and ecological assets located along the coastline and developed potential strategies to reduce or eliminate those vulnerabilities. A subsequently developed shoreline protection plan evaluated strategies for protecting mission-critical assets located along the shoreline (U.S. Department of the Navy 2012b). Implementation of some of those strategies is analyzed in the EA.

This EA carries forward for detailed analysis only those alternatives that would meet the purpose of and need for the project, as defined in Chapter 1 (Purpose of and Need for the Proposed Action) and that meet the requirements outlined in a set of "screening factors" defined below in Section 2.1 (Reasonable Alternative Screening Factors).

## 2.1 REASONABLE ALTERNATIVE SCREENING FACTORS

The purpose of the Proposed Action is to protect mission-critical infrastructure and valuable ecological resources along the most at-risk locations of the NBVC Point Mugu coastline. The Proposed Action is needed, because the shoreline, roads, infrastructure, and natural resources along the coastline are at risk of erosion and coastal flooding.

In addition to meeting the purpose and need for the Proposed Action, the requirements outlined in four screening criteria are used to identify reasonable alternatives.

1. Maintain efficient and effective operational capabilities of mission-critical assets and infrastructure;
2. Replace and increase sand retention or implement a managed retreat strategy;
3. Minimize impacts to environmental resources;
4. Keep project and lifecycle costs at a manageable level.

The following four alternatives are carried forward for analysis in this EA. Section 2.4 (Alternative Considered But Not Carried Forward for Detailed Analysis) briefly describes alternatives considered but not carried forward for detailed analysis, because they did not meet the screening requirements.

Alternatives for implementing the Proposed Action have the potential to impact different areas within the Project Area. The total area, or footprint, for each component of the Proposed Action, and for the overall Project Area, is estimated to be approximately 22.28 ac. (Table 2-1). The total area includes both areas that would be used temporarily (e.g., laydown areas) and those that would be changed permanently (e.g., the revetments). The exact areas of potential impact will be calculated once specific areas have been identified and engineering plans have been prepared.

**Table 2-1: Estimates of the Area Associated With Each Component of the Proposed Action**

| Proposed Activity | Geographic Extent of Estimate | Area Estimate (Acres) |
|---|---|---|
| Repair and Expand Central Revetment | Area of Central Revetment (Figure 2-1) | 4.43 |
| Repair, Expand, and Extend West Revetment | Area of West Revetment (Figure 2-4) | 3.5 |
| Extend West Revetment | Area of Extension (Figure 2-4) | 0.18 |
| Replenish Sand Dune at Eastern End of West Revetment | Area between end of West Revetment and nearest down-coast dune/elevation change (Figure 2-3) | 0.15 |
| Relocate equipment in Building PM-812 to Tide Gate #844 location (preferred location) | Area estimate to accommodate new Building PM-812 | 0.13* |
| Maintain and Repair Beach Road | Area of single lane segment of Beach Road at South M Avenue (Figure 2-4) | 0.08 |
| Relocate equipment in Building PM-812 to South M Avenue (PM-81 location) (alternate location) | Area estimate to accommodate new Building PM-812 | 0.13* |
| Project Laydown Areas (disturbed) | Areas highlighted in Figure 2-10 | 8.21 |
| Recontouring Sites | Areas highlighted in Figure 2-7 | 5.6 |
| **Total Project Area*** | | **22.28** |

*Only the area for one relocation site is totaled.

## 2.2 PROPOSED ACTION

Under the Proposed Action, the Navy would repair and expand the Central and West revetments, extend the eastern end of the West Revetment, replenish sand dune along the shoreline at the eastern end of the West Revetment, relocate airfield equipment and infrastructure currently housed in Building PM-812, recontour the dune at Ormond Beach and Holiday Beach, and repair and repave Beach Road. These actions are described in detail under Section 2.3 (Alternatives) below.

## 2.3 ALTERNATIVES

The historic shoreline retreat and current sediment budget along the NBVC Point Mugu shoreline puts several coastal areas at risk of immediate damage (e.g., Beach Road and Building PM-812) and other areas that may become vulnerable in the long-term, such as infrastructure behind the Central Revetment (U.S. Department of the Navy 2012a). The purpose of this section is to identify a range of reasonable alternatives that would provide both short-and long-term protection to mission-critical infrastructure and significant ecological resources located along the coastline. Three broadly defined strategies are available to develop alternatives that will reduce or eliminate the negative impacts of shoreline erosion and retreat along the NBVC Point Mugu shoreline:

1. Managed retreat, wherein structures and other facilities that are damaged or endangered by continuing erosion are relocated or abandoned;
2. Construct a structure, such as a seawall or revetment, to limit the continuing damage or threat of damage; and/or

3. Initiate a program of periodically replenishing the beach with sand to provide the desired level of protection, perhaps in conjunction with sand retention structures.

This section defines four alternatives, including the No Action Alternative, for implementing the Proposed Action based on these general strategies.

### 2.3.1 NO ACTION ALTERNATIVE

The No Action Alternative is based on the "Do-Nothing" alternative described in the 2012 shoreline study (U.S. Department of the Navy 2012a). Under the No Action Alternative, the existing shoreline protection devices and the infrastructure along the NBVC Point Mugu coastline would remain in their present location and condition. The Navy would not repair and expand the Central or West revetments, extend the West Revetment down-coast, replenish sand along the shoreline at the eastern end of the West Revetment to refortify the dunes, relocate airfield lighting equipment in Building PM-812, or repair and repave Beach Road near the intersection of South M Avenue. Recent events (e.g., the high water event in September 2011) as well as the history of shoreline retreat documented in the shoreline protection study (U.S. Department of the Navy 2012a) indicate that future high water events potentially causing damage to base infrastructure are possible and even likely. If these events were to occur, they could interfere with base operations, including air operations and the transport of explosive ordnance, if buildings (e.g., Building PM-812) critical to base operations are flooded and Beach Road becomes impassible because sand and debris are blocking the road.

Based on the results of the shoreline study (U.S. Department of the Navy 2012a), the on-going trend of coastal erosion is likely to continue, which would expose the revetments and the infrastructure they protect to further damage from storms or other high water events. Findings from recent site inspections have identified deficiencies in the existing shoreline protective devices. Evaluation of the historic shoreline position and trends in shoreline change indicate these problem areas would persist and likely worsen in the future (U.S. Department of the Navy 2012a).

Building PM-812 would be subject to continued flooding and damage during high-water events and may eventually be damaged beyond repair over the long-term. Beach Road would continue to erode and degrade limiting access to base assets. The overall rate of coastal erosion would be expected to increase as the existing revetments are further degraded by continuous wave action, high-water events (e.g., storms), and the landward retreat of the Mugu Submarine Canyon headwall.

For these reasons, the No Action Alternative would not meet the purpose and need for the proposed action; however, as required by NEPA, it is carried forward as a baseline analysis in this EA.

### 2.3.2 ALTERNATIVE 1: SHORELINE PROTECTION (PREFERRED) ALTERNATIVE

Under Alternative 1 (Preferred Alternative) the Navy would:

- Repair and increase the width and height of the Central Revetment
- Repair and increase the width and height of West Revetment
- Extend the eastern end of the West Revetment approximately 125 ft. down-coast.
- Replenish the sand dune along the shoreline down-coast of the eastern end of the West Revetment
- Relocate airfield lighting equipment in Building PM-812 to the site at Tide Gate #844
- Construct a new building at Tide Gate #844 to house the airfield lighting equipment and associated infrastructure

- Demolish Building PM-812
- Repair and repave Beach Road near the intersection of South M Avenue
- Recontour dunes at Holiday Beach or Ormond East Beach

#### 2.3.2.1 Revetment Descriptions

Rock revetments have been used along the NBVC Point Mugu shoreline since the late 1960s to protect mission-critical infrastructure located in close proximity to the shoreline.

A quarry rock revetment is typically composed of one or more layers of stones protected with an armor layer of large-sized quarry stone. Underlying geotextile filter fabric is often used to relieve hydrostatic pressure and prevent backfill soil from escaping through voids in the rock. Revetments are relatively easy to maintain and are the least expensive form of permanent shore protection. In addition to being economical, rock revetments are also flexible structures. This flexibility can accommodate minor settling and even displacement of some stones without complete loss of protection. Damage from waves exceeding the design wave is usually progressive and can be repaired, as witnessed throughout the history of the rock revetments along the NBVC Point Mugu coastline.

##### 2.3.2.1.1 Sand Dunes Description

A sand dune is a mound or ridge of sandy substrate located landward of the intertidal zone and marking the landward extent of a beach. Sand dunes are heavily influenced by the wind and may shift location or change shape and size depending on the severity and direction of prevailing winds. A typical, naturally occurring beach profile with a significant dune may consist of a relatively flat intertidal zone and dry beach (e.g., area above Mean Higher High Water [MHHW]) adjacent to a fore dune and a larger, established rear dune inland of the fore dune. A hollow is often present between the fore dune and rear dune; this is a result of onshore winds pushing sand up the dune face and creating a lee area behind the dune (Trefil 1984).

Dunes with established, well-rooted vegetation are more stable and less prone to the scouring effects of winds and waves than dunes with little to no vegetation, because the roots of plants and shrubs help to hold sand in place. In addition to winds, high waves from storms may erode part of a dune. However, after the storm passes and the waves subside the normal tidal cycle resumes and much of the eroded sand that was transported offshore may be exposed at low tide, dry in the sun, and be blown onshore, naturally replenishing the dune (Trefil 1984).

Well-established dunes can serve as natural, protective barriers for infrastructure located along the coastline. Anthropogenic influences, such as building homes and other structures on the dunes and grading beaches for recreation, have resulted in severe erosion of dunes, leaving infrastructure along the shoreline vulnerable (Nordstrom et al. 2000). Various structures can be installed along the shoreline to sustain a dune; however, dunes formed in the presence of manmade structures may have a different profile depending on the type of structure and its location on the beach (Nordstrom et al. 2000). Constructed sand retention structures, both on and offshore (e.g., sand fences or groins) are designed to mimic natural shoreline sand retention features (e.g., dune vegetation). Two factors influencing the longshore transport of sand are: (1) orientation of the structure relative to the shoreline, and (2) the “mechanism” and direction of sediment transport. Structures positioned perpendicular to the shoreline (e.g., a groin or jetty) are blocking structures, designed to prevent longshore transport of sediment. The groins located up-coast of the West Revetment are examples of blocking structures. Sand transported down-coast from Port Hueneme Harbor is captured on the up-coast side of the groins, resulting in a

wider beach immediately up-coast of the groins. On the down-coast side of the groins, sand is eroded as part of the littoral transport process; however, the up-coast supply of sand that would normally replenish the beach is blocked by the groins, resulting in a narrower beach down-coast of the groins (U.S. Department of the Navy 2012a).

Structures that are parallel to the shoreline and within the tidal zone are wave-blocking structures, and include breakwaters, revetments, and artificial reefs. The primary influence of shore-parallel structures is to reduce the incoming wave energy, and thereby locally reduce the entrainment and alongshore transport of sediment (Nordstrom et al. 2000).

The sand supply and sand storage capacity along the NBVC Point Mugu shoreline is controlled by both natural processes and anthropogenic influences (Patsch and Griggs 2008). Waves and tides affect the alongshore transport of sand and the availability of sand to the beaches and dunes at NBVC Point Mugu. Sand delivery into the littoral zone at NBVC Point Mugu is directly controlled by the artificial sand, bypassing structures at Port Hueneme and Channel Islands Harbor (Herron and Harris 1966; Patsch and Griggs 2006). The construction of the harbors blocked sand transported down-coast, reducing the amount of sand transported into the littoral zone at NBVC Point Mugu (U.S. Department of the Navy 2012a). Subsequently, breakwaters were constructed offshore of the harbors that allowed sand to bypass the harbors and be transported down-coast (Herron and Harris 1966).

#### 2.3.2.2 Central Revetment Repair and Expansion

The Central Revetment protects mission-critical infrastructure along the coastline, including Buildings PM-761 and PM-7020, which are located landward of the revetment, and is the highest and longest coastal revetment on NBVC Point Mugu (Figure 2-1). The shoreline protected by the revetment is the most vulnerable to concentrated wave energy refracted into this segment of shoreline by the Mugu Submarine Canyon. Environmental resources in this area are limited due to the presence of the revetment.

The Central Revetment protects the west shoulder of the embayment created by the recession of the Mugu Submarine Canyon. Wave refraction at the canyon head focuses wave energy toward the eastern reach of the Central Revetment, resulting in a greater incidence of damage and a history of required repairs to the revetment. In addition to the increased wave energy, this reach of the revetment is also vulnerable to the on-going landward retreat of the canyon headwall, which is presently within 100 ft. of the revetment (Figure 2-2). The headwall is represented on the map by seaward slope of the seafloor at an approximately constant slope reaching a depth of 230 ft. within 2,461 ft. from shore. The shallow depth of the headwall is within the littoral zone, allowing longshore currents to transport sediments into the canyon and offshore rather than retaining the sediments along the nearshore beaches.

The rate of headwall retreat is proportional to the exposure of the headwall substrate, which is composed of loosely compacted and easily erodible sand and silty sand, to disturbance from bottom currents and wave energy. When subject to physical forces from oscillatory wave action and sand transport, the headwall substrate is easily eroded. However, when a sufficient layer of sand covers the headwall substrate, recession of the headwall occurs at a slower rate. If the headwall recession rate is 1–2 ft. per year, as some investigators estimate (Moffatt & Nichol 1995) (assuming 95 percent of headwall is covered by littoral sand), it will reach the revetment in the next 50 to 100 years. By that time, preventing the revetment from being undermined by the retreating headwall will be difficult. Mission-critical infrastructure protected by the Central Revetment includes Buildings PM-761 and PM-7020 (Figure 2-1).

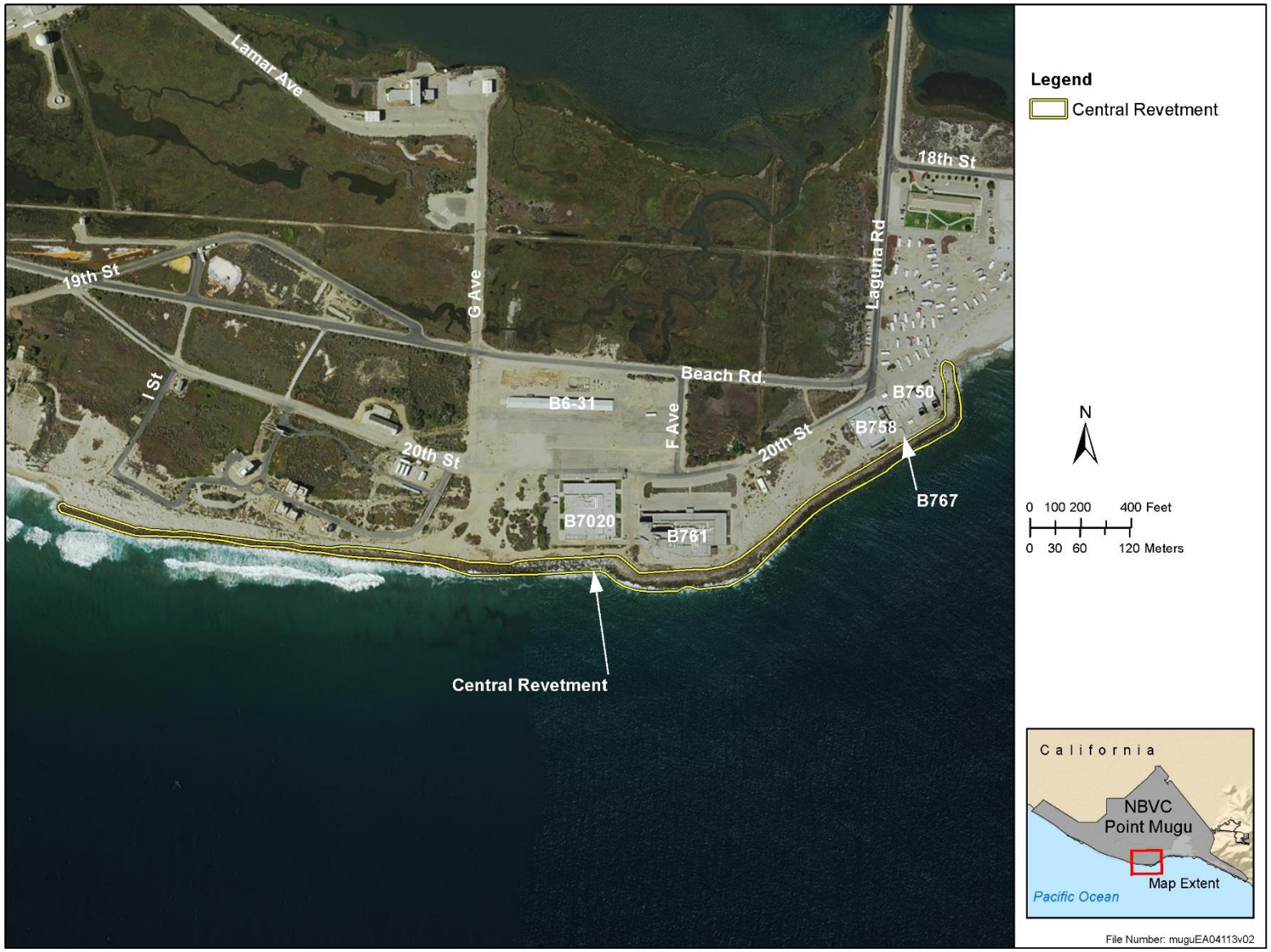



**Figure 2-1: The Central Revetment Project Area**

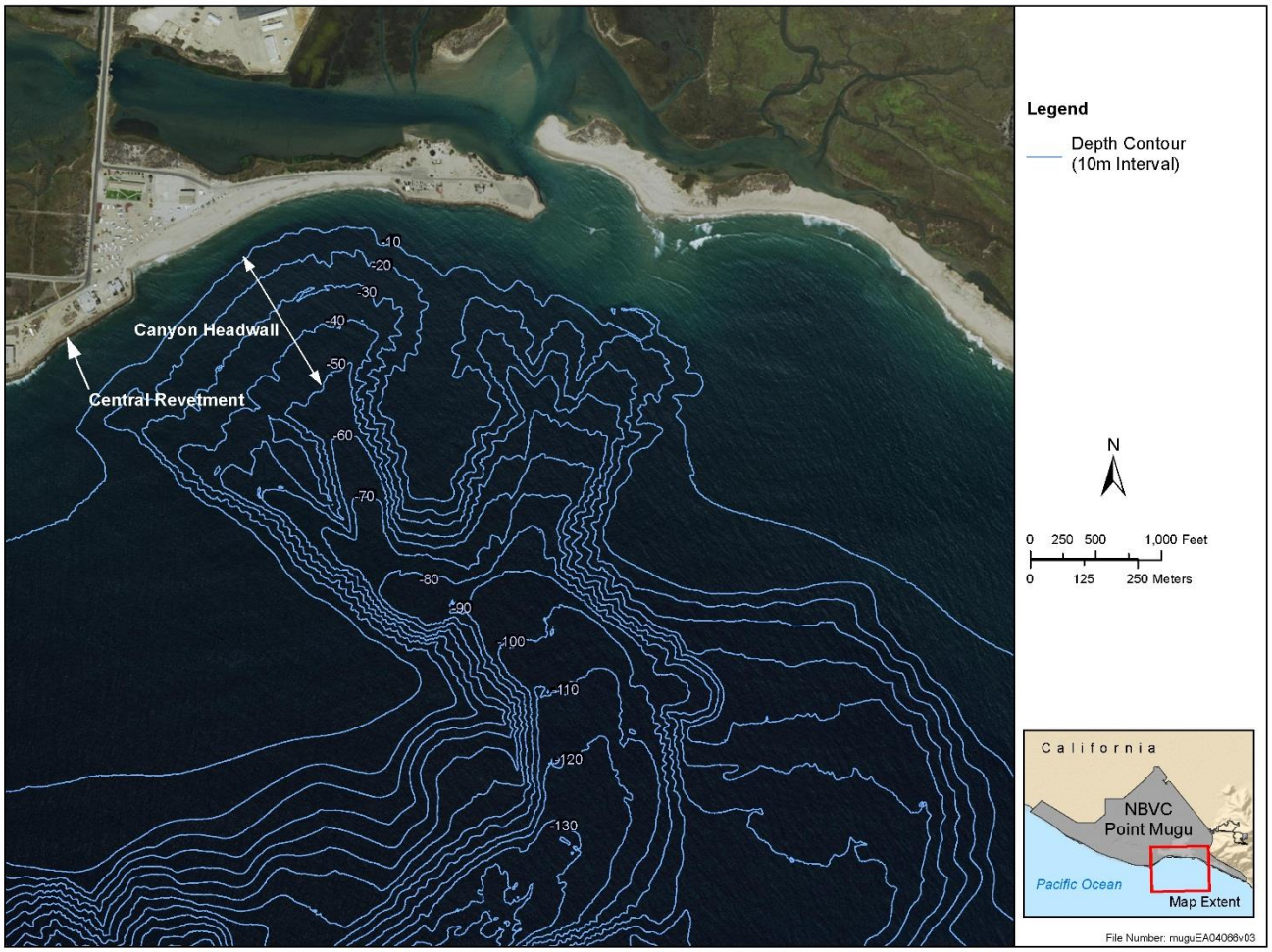


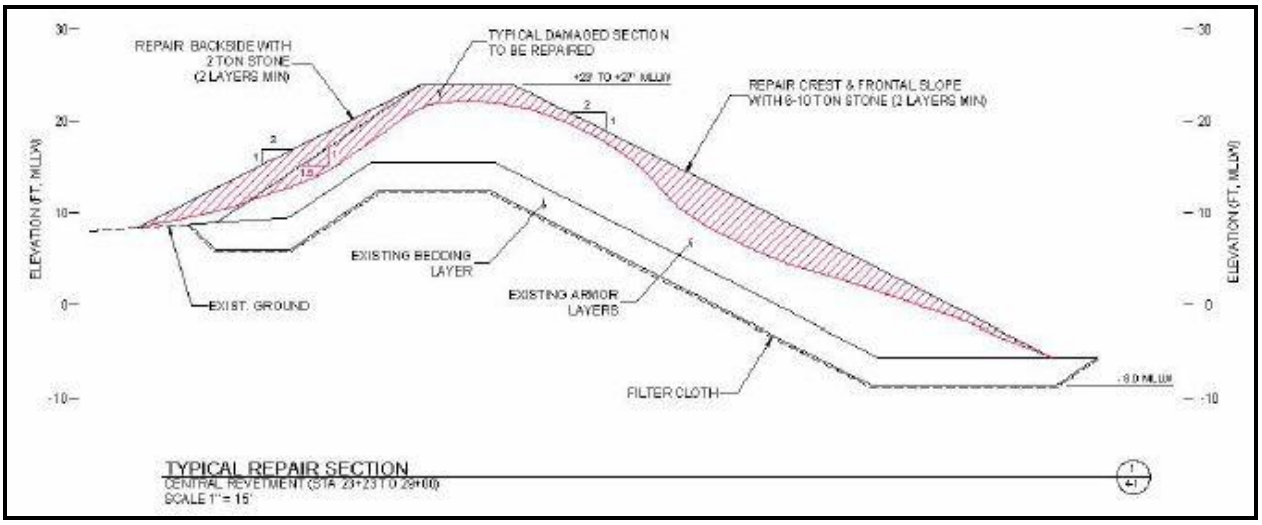

**Figure 2-2: Mugu Submarine Canyon Headwall in Proximity to the Central Revetment**

The close proximity of the retreating canyon headwall to the Central Revetment has increased the sand capture ratio of the canyon and reduced the sediment supply to beaches farther down the coast. The already narrow sandy spit between the Central Revetment and East Revetment will continue to experience shoreline retreat as the canyon's sand capture rate increases and the headwall retreats landward. Future headwall retreat could affect mission-critical infrastructure along the shoreline as well as wetland habitat in Mugu Lagoon.

A September 2011 site inspection of the Central Revetment near Building PM-761 documented the presence of stones from the revetment, with a wide range of sizes, scattered on the ground (Figure 2-3). This indicated that waves dislodged the stones while overtopping the revetment (i.e., exceeding the height of the revetment or breaking over the top of the revetment). Several locations on the revetment east of Building PM-761 were clearly damaged by wave action, as indicated by the narrowed crest and steep backside of the revetment following the high-water event (U.S. Department of the Navy 2012a). During wave events when waves overtop the revetment, greater damage can occur on the backside of the revetment, because downward hydrodynamic forces (from waves) and the force caused by gravity combine to increase damage and dislodge stones relative to the seaward side of the revetment.

**Figure 2-3: Damage to the Central Revetment**

Under Alternative 1, repairs and enhancements would include increasing the crest elevation of the Central Revetment from approximately 20 ft. up to 27 ft.; armoring the seaward slope; reinforcing the backside of the structure by adding larger, dense stone; and increasing the overall width of the revetment (Figure 2-4). The new stone would be nested properly during installation to ensure maximum stability and resistance to damage from storms. A significant percentage of stone on the Central Revetment is undersized. Furthermore, the revetment stones did not appear to be "nested" during construction, and instead appeared to be placed in more of a random pattern (referred to as "pell-mell" placement). As a result, individual stones are more easily dislodged, compromising the integrity and durability of the structure. The crest elevation of the revetment may have decreased over time due to this process. Furthermore, a significant volume of the stone appears broken and worn, indicating insufficient durability for future coastal shoreline protection.




Source: U.S. Department of the Navy 2012b

**Figure 2-4: Profile View of Proposed Repairs to the Central Revetment**

The proposed repair would restore approximately a 2:1 (horizontal: vertical) slope and increase crest elevation to between 23 and 27 ft. above mean lower low water (MLLW) along the existing revetment. The proposed repair would likely be constructed using six to eight-ton armor stone (or a similar material). Approximately 2,000 tons or more of armor stone would be required. The actual amount will be refined during the preliminary engineering phase as more detailed information becomes available. The existing revetment's footprint may be increased on its landward and seaward sides as a result of the repair work. The exact amount of footprint increase will be calculated once specific repairs have been identified. The final revetment will be designed, engineered, and constructed to accomplish the purpose of protecting the mission-critical infrastructure and assets located along the shoreline.

Three construction laydown areas have been identified adjacent to the revetment (Figure 2-5, Figure 2-6). The first and largest laydown area is immediately north of Building PM-7020 with direct access to the Central Revetment. However, part of the area would be unavailable, because it is used as a parking lot and is scheduled to be improved. The second laydown area is west of Building PM-761 and has direct access to the western end of the revetment. The third laydown area is located between Building PM-761 and Building PM-758 and provides access to the eastern end of the revetment. Additional laydown areas may be used as needed and would be located in previously disturbed areas or in areas where little to no impacts to environmental resources would be anticipated.

To the extent practicable, construction would be scheduled to avoid potential impacts to nesting western snowy plovers (*Charadrius nivosus nivosus*) and California least terns (*Sterna antillarum browni*). The schedule for revetment repair would also depend upon weather and wave conditions. Work would be scheduled to avoid periods of high swell to maintain protection of mission-critical infrastructure from the existing Central Revetment. If construction is scheduled during nesting season, construction activities can only occur if there are no western snowy plover or California least tern nests within 300 ft. of the area where construction is taking place.

**Figure 2-5: Potential Project Laydown Areas for Construction and Repair of the Central Revetment**

**Figure 2-6: Photograph of Potential Project Laydown Area**

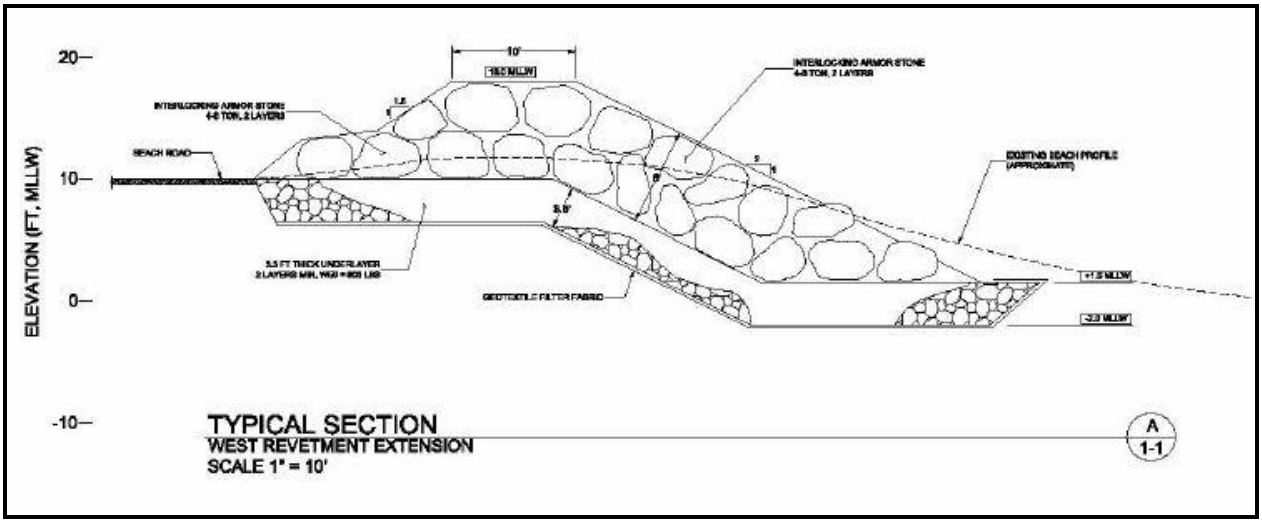
#### 2.3.2.3 West Revetment Repair, Expansion,and Extension with Sand Dune Replenishment

The West Revetment is located immediately down-coast of the groin field and extends to South M Avenue (Figure 2-7). Mission-critical infrastructure, including Beach Road, Building PM-812, and Runway 03-21, is protected by the West Revetment. Environmental resources in this area include the existing sand dune and beach located down the coast from the revetment, which provide nesting habitat for the western snowy plover and California least tern. The shoreline located just seaward of the West Revetment, as well as farther down the coast, has experienced the greatest landward recession of any segment of the NBVC Point Mugu shoreline (U.S. Department of the Navy 2012a). The recession rate at the eastern end of the West Revetment has accelerated since the mid-1990s, suggesting shoreline retreat farther down the coast from the revetment may continue at least for the near future.

**Figure 2-7 Beach Road, the West Revetment, Revetment Extension (125 ft.), and Dune Replenishment Area**

Under Alternative 1, the existing revetment would be repaired and extended approximately 125 ft. to protect Runway 03-21 and Beach Road from coastal flooding. The revetment extension would be constructed of 4–6 ton armored stone and would have a 2:1 (horizontal: vertical) seaward-facing slope (Figure 2-8). Approximately 2,600 tons of armor stone and 1,700 tons of under-layer stone would be required. The crest elevation of the extension would be approximately 18 ft. above MLLW and the width at the crest would be approximately 10 ft., matching the existing revetment. The toe of the revetment would be approximately 2 ft. below MLLW and covered with sand to match the existing beach profile. In addition, large, dense stones would be placed at the rear of the structure, and the overall width of the

revetment would be increased. All newly added stone would be nested properly during installation. The overall footprint of the extension is estimated at 0.18 ac., but the exact area will be calculated once detailed construction and engineering plans have been created. The final revetment will be designed, engineered, and constructed to accomplish the purpose of protecting the mission-critical infrastructure and assets located along the shoreline.




Source: U.S. Department of the Navy 2012b

**Figure 2-8: Profile View of West Revetment Extension**

The relatively short extension of the West Revetment is intended to move the localized erosion "hot spot" at the eastern end of the West Revetment to a location down-coast from Building PM-812. However, the shoreline at the extended end of the revetment would continue to erode beach and dune area down-coast caused by end-effect scour. Additional measures to reduce this effect include adding sand at the top of the beach or dune profile, which would assist with restoration of the dune and act as a sacrificial sand source to help reduce localized dune losses. Extending the existing sand fencing would also help to stabilize the dune.

Extending the revetment would also provide protection for Beach Road, which has been inundated during high-water events resulting in damage to the paved surface when substrate supporting the road is eroded. Beach Road has also been covered with sand following high-water events, making the road impassable until the sand is removed.

Construction laydown areas have been identified adjacent to the Central Revetment; however, areas may be needed closer to the West Revetment to accommodate equipment and materials. Additional laydown areas may be used as needed and would be located in previously disturbed areas or in areas where little to no impacts to environmental resources would be anticipated.

To the extent practicable, construction would be scheduled to avoid potential impacts to nesting western snowy plovers, California least terns, and light-footed Ridgway's rails. This may require construction to take place approximately between October 1 and February 15. If construction is scheduled during nesting season, construction activities can only occur if there are no western snowy plover or California least tern nests within 300 ft. of the area where construction is taking place. The revetment repair schedule would also depend upon weather and wave conditions. Work shall be

scheduled to avoid periods of high swell to maintain coastal protection to mission-critical infrastructure protected by the revetment.

#### 2.3.2.4 Sand Dune Replenishment

The eroded sand dunes located down-coast of the West Revetment would be partially restored with excavated material, or other beach-quality sand, to reduce the risk of waves overtopping the dunes and causing damage to Beach Road. The amount of sand needed is dependent on the condition of the beach at the time of construction. The dimensions of the sand dune and project footprint will be calculated based on the current need for sand retention and replenishment. The sand dune will be designed, engineered, and constructed to accomplish the purpose of protecting the mission-critical infrastructure and assets located along the shoreline. The existing sand fencing at the base of the dunes would be extended to reduce sand erosion and loss from wind transport. Revegetation of the dunes with native dune plants would be done to further protect the dunes from erosion.

Sand excavated to extend the West Revetment could be used to replenish the existing dunes and extend the beach profile. Sand could also be obtained from several other locations on NBVC Point Mugu, such as the magazine site, Family Beach parking lot, Donald Road stockpile site, and an area west of Cotar Road extending to the fence line (Figure 2-9). Calleguas Creek, which empties into the eastern end of Mugu Lagoon, is an off-base location that could be used for acquiring beach-quality sand. Sand from all sources would be filtered or sifted to remove debris before being used at the project site.

To the extent practicable, construction would be scheduled to avoid potential impacts to nesting western snowy plovers, California least terns and light-footed Ridgway's rails. This may require construction to take place approximately between October 1 and February 15. If construction is scheduled during nesting season, construction activities must be at least 300 ft. away from any western snowy plover, California least tern, and light-footed Ridgway's rail nests. The work schedule would also depend upon weather and wave conditions.

#### 2.3.2.5 Relocation of Airfield Lighting Equipment and Infrastructure

Building PM-812 is approximately 1,000 square feet (ft.$^2$) and contains the airfield lighting control equipment for NBVC Point Mugu. This facility is critical to flight operations, and its multi-million dollar contents are a valuable asset in supporting NBVC airfield operations. The building is located at the intersection of Beach Road and South M Avenue, near the eastern end of the West Revetment (Figure 2-10). Built in 1964, the single-story building is only in adequate condition despite being recently renovated. Because of its close proximity to the shoreline, Building PM-812 experiences periodic flooding when waves overtop the revetment and adjacent dune area (Figure 2-11), necessitating the relocation of the equipment. Accelerated shoreline retreat would increase the risk of damage to Building PM-812, Beach Road, and environmentally sensitive dune habitat down-coast of the revetment. In September 2011, a long period of an above-average swell out of the southwest resulted in damage to Building PM-812 from flooding. A large swell out of the south or northwest, which typically generates higher waves, could result in worse damage to the building. The airfield lighting equipment must be located close to Runway 03-21, and a key component of the two proposed relocation sites is their proximity to the runway.

Sand dunes exist along the beach down-coast of Building PM-812; however, a long gap in the dunes in front of the building and down-coast of the eastern end of the West Revetment has left the building vulnerable to high water events and damage from storms. Eddies occur at the end of the revetment when waves break and water rushes up and around the end (i.e., "end effects") causing scour (U.S.

Department of the Navy 2012a). The Shoreline Protection Study concludes that the area immediately seaward of Building PM-812 would benefit from enhanced shoreline protection through structural measures, such as extending the West Revetment and dune restoration (U.S. Department of the Navy 2012a). If the revetment is extended, additional measures would need to be taken to ensure end effects do not erode down-coast dunes. Extending the existing dune fencing or increasing vegetation on the dune may help reduce scour from end effects.

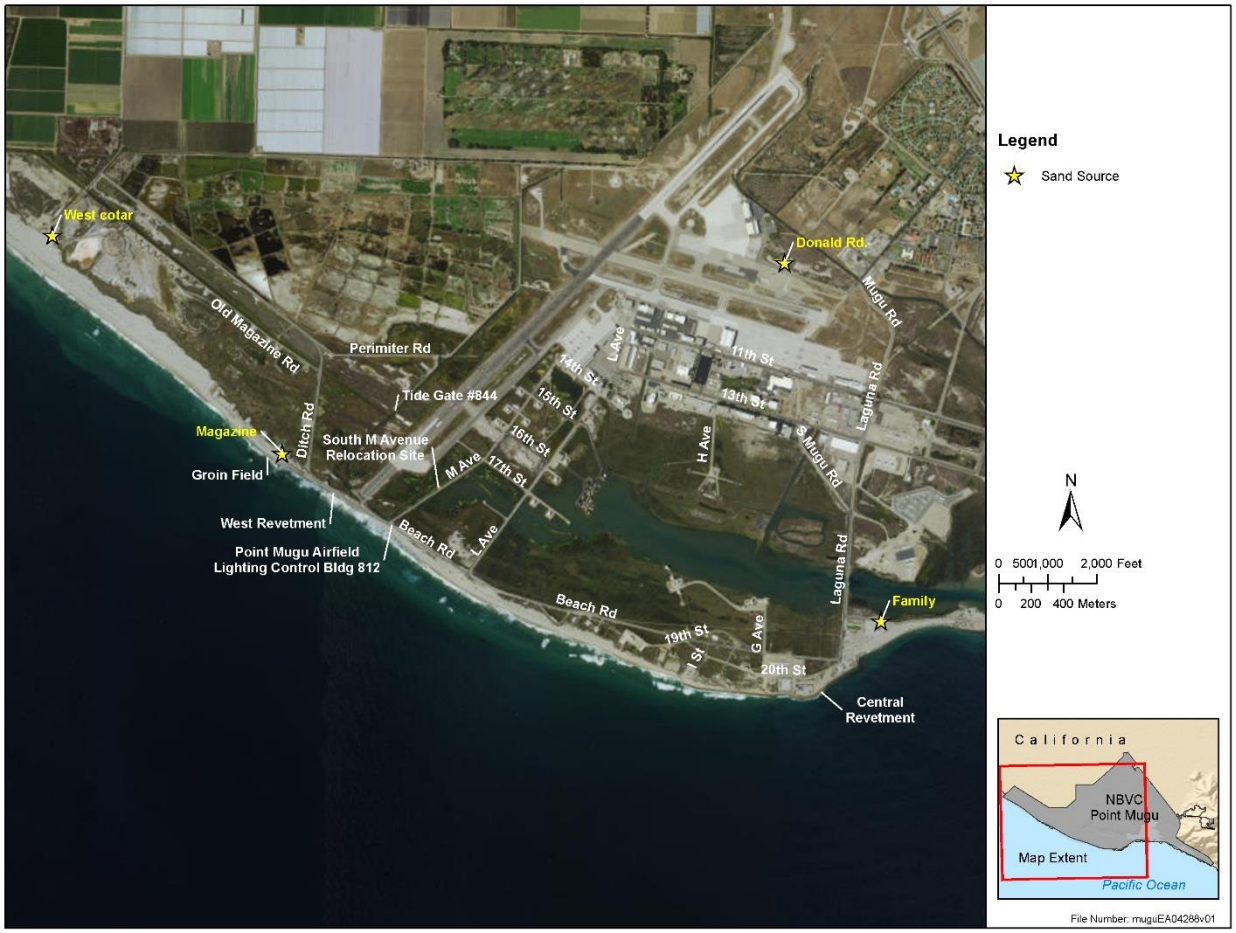



**Figure 2-9. Potential Sources of Sand for Dune Replenishment at NBVC Point Mugu**

Tide Gate #844 is accessed by using Marine Air Detachment (MAD) Road, an unpaved service road off Perimeter Road (Figure 2-13). If adequate onsite utilities are not available at the Tide Gate #844 site, utilities would be routed to the site via existing utility corridors (e.g., along roadways). The installation of new utilities, including a connection to the airfield (Runway 03-21), may require directional drilling beneath the wetland from the Tide Gate #844 site. Directional drilling to install utility cables is expected to have a negligible impact on wetlands, because the drilled corridor would be deep enough beneath the wetland to only penetrate silty clay sediments and not damage root systems of above-ground vegetation (Section 3.3.2.1.2, Environmental Consequences for Vegetation). Utilities may be above or below ground, and would be located to minimize impacts to environmental resources. The final footprint for utilities will be identified once the design and final engineering drawings for the relocation site are available.

**Figure 2-10: Building PM-812 Located at the Intersection of South M Avenue and Beach Road**

**Figure 2-11: Building PM-812 Flooded During an Above Average High-Water Event in September 2011**

Under Alternative 1, the airfield lighting equipment and infrastructure would be relocated into a new building, and Building PM-812 would be demolished. The preferred location for the airfield lighting equipment and a new building to house the equipment is the site at Tide Gate #844 (Figure 2-12 and Figure 2-13). The site is large enough to accommodate the required 5,500 ft.$^2$ (0.13 ac.) of building space and parking area. The footprint of Building PM-812 is approximately 1,000 ft.$^2$, and it is anticipated that a new building would have a comparable footprint. The site is a disturbed area elevated above the wetlands, allowing construction to take place with no permanent impacts anticipated to the surrounding wetlands. However, because the actual footprint of the new construction will not be available until preliminary engineering plans are available, it is assumed for the purposes of analysis that 5,500 ft.$^2$ (0.13 ac.) of wetland area would be permanently impacted.

#### 2.3.2.6 Repair and Protect Beach Road

Beach Road is a mission-critical stretch of road at NBVC Point Mugu. It extends northeast to southwest running nearly the entire length of coastline at NBVC Point Mugu. Beach Road is the base's main coastal road and serves as a major route of transportation for hazardous materials, including explosives. Clearing, repairing, and repaving Beach Road and maintaining access to this road is essential to operations at the base. To the extent practicable, construction would be scheduled to avoid potential impacts to nesting western snowy plovers, California least terns, and light-footed Ridgway's rails. This may require construction to take place approximately between October 1 and February 15. If construction is scheduled during nesting season, construction activities must be at least 300 ft. away from any snowy plover, least tern, and Ridgway's rail nests.

##### 2.3.2.6.1 Site Description

Beach Road is adjacent to the coastline and runs the entire length of NBVC Point Mugu. Beach Road provides access not only to beach areas including the groins up-coast of the West Revetment, but also serves as mission-critical transportation pathway by providing access to numerous buildings, ranges, ordnance storage, and the airfield.

Beach Road is often flooded when waves overtop the revetments and dunes adjacent to the road. At times, Beach Road is impassable when flooded or covered with sand and debris. Overall, Beach Road is in good condition, with the exception of a 300 ft. section near Building PM-812 at the intersection of South M Avenue, which has been reduced to one lane due to storm damage (Figure 2-14).

##### 2.3.2.6.2 Proposed Road Repairs

This 300 ft. span of Beach Road at the intersection of South M Avenue would be partially reconstructed, which would require milling the surface (i.e., removing some of the existing pavement to achieve a flat surface), repairing the base and sub-base of the road, and repaving with asphalt. For the next 5–10 years, the remainder of Beach Road, extending from Ditch Road to Laguna Road, would only require pothole repair and patching of cracks, as needed. Additional milling, deep patching, base and sub-base repairs, and repaving of Beach Road would occur every 10–15 years. Repairs will be needed for both road maintenance and occasional coastal flooding.

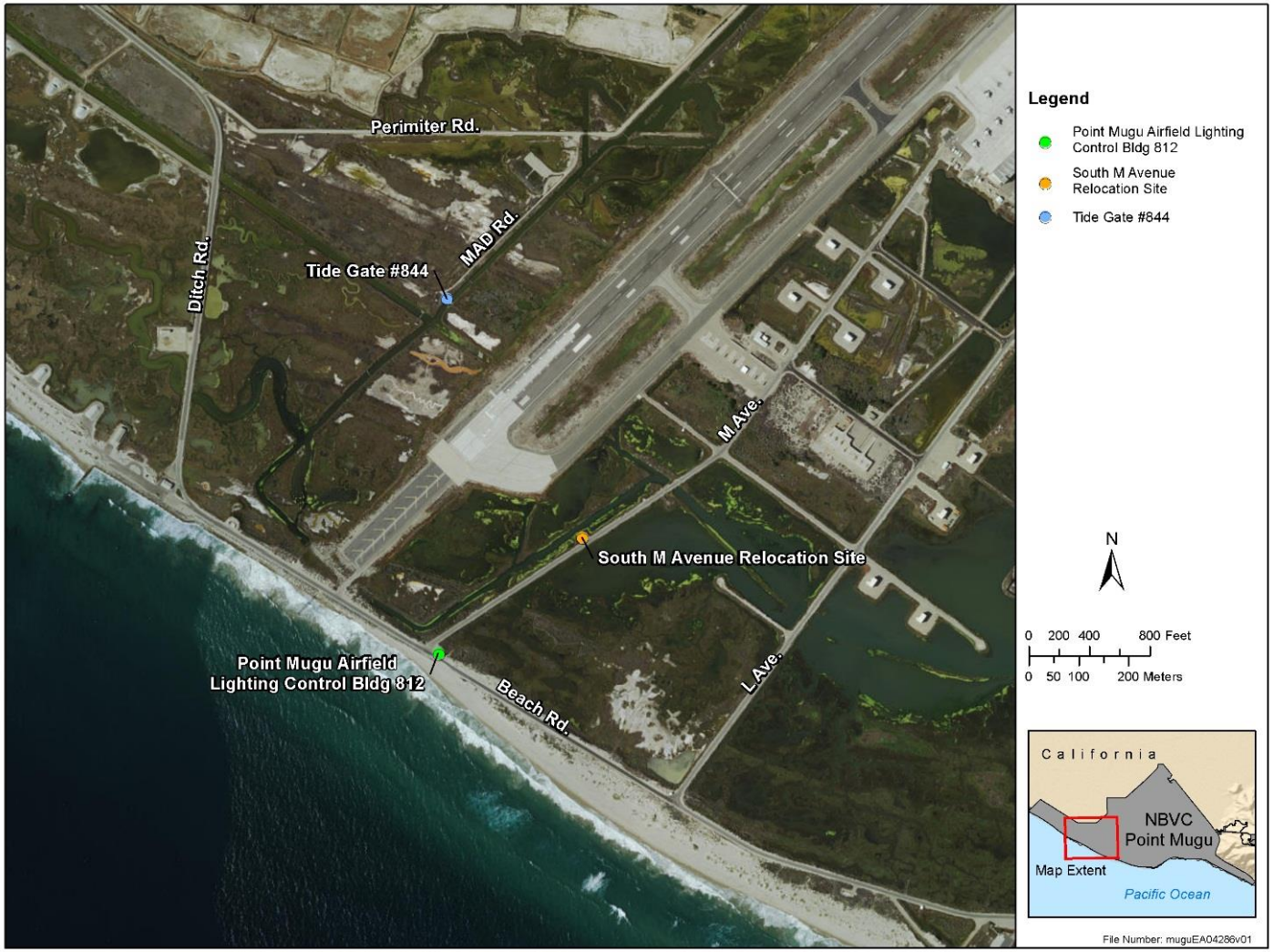



**Figure 2-12: Potential Relocation Sites for Airfield Lighting Equipment Housed in Building PM-812: Tide Gate #844 and South M Avenue**

**Figure 2-13: Tide Gate #844 Relocation Site, Northwest of Runway 03-21, and MAD Road, Accessible from Perimeter Road**

**Figure 2-14: A 300 ft. Section of Beach Road Near Building PM-812 at the Intersection of South M Avenue Has Been Reduced to One Lane Due to Storm Damage**

#### 2.3.2.7 Dune Recontouring at Ormond East Beach and Holiday Beach

Plants have stabilized the foredunes on Ormond East Beach and Holiday Beach, resulting in the accretion of sand and increasing the size of the foredunes over time. The overall result is a reduction of sand movement into the backdunes and the loss of open sand sheet habitat, which is the preferred nesting habitat for western snowy plovers and California least terns. To provide additional open beach area, which California least terns and western snowy plovers prefer for nesting habitat, the Navy would level an area of beach in which dunes and hummocks have developed and limited nesting. Dune recontouring would offset the loss of nesting habitat as a result of extending the West Revetment. The recontoured area would be at a 1:1 ratio (i.e., habitat lost to habitat restored) with the area of the revetment extension, equating to approximately 1 ac.

The preferred dune recontouring site is Ormond East Beach; however, recontouring may be performed on Holiday Beach either as an alternative to or in addition to recontouring at Ormond East Beach (Figure 2-15). This activity would be accomplished through the use of one or two bulldozers (Caterpillar D-8 or equivalent) over approximately 3 days. Environmental Protective Measures associated with this activity are described in Section 2.5.1 (Environmental Protection Plan).

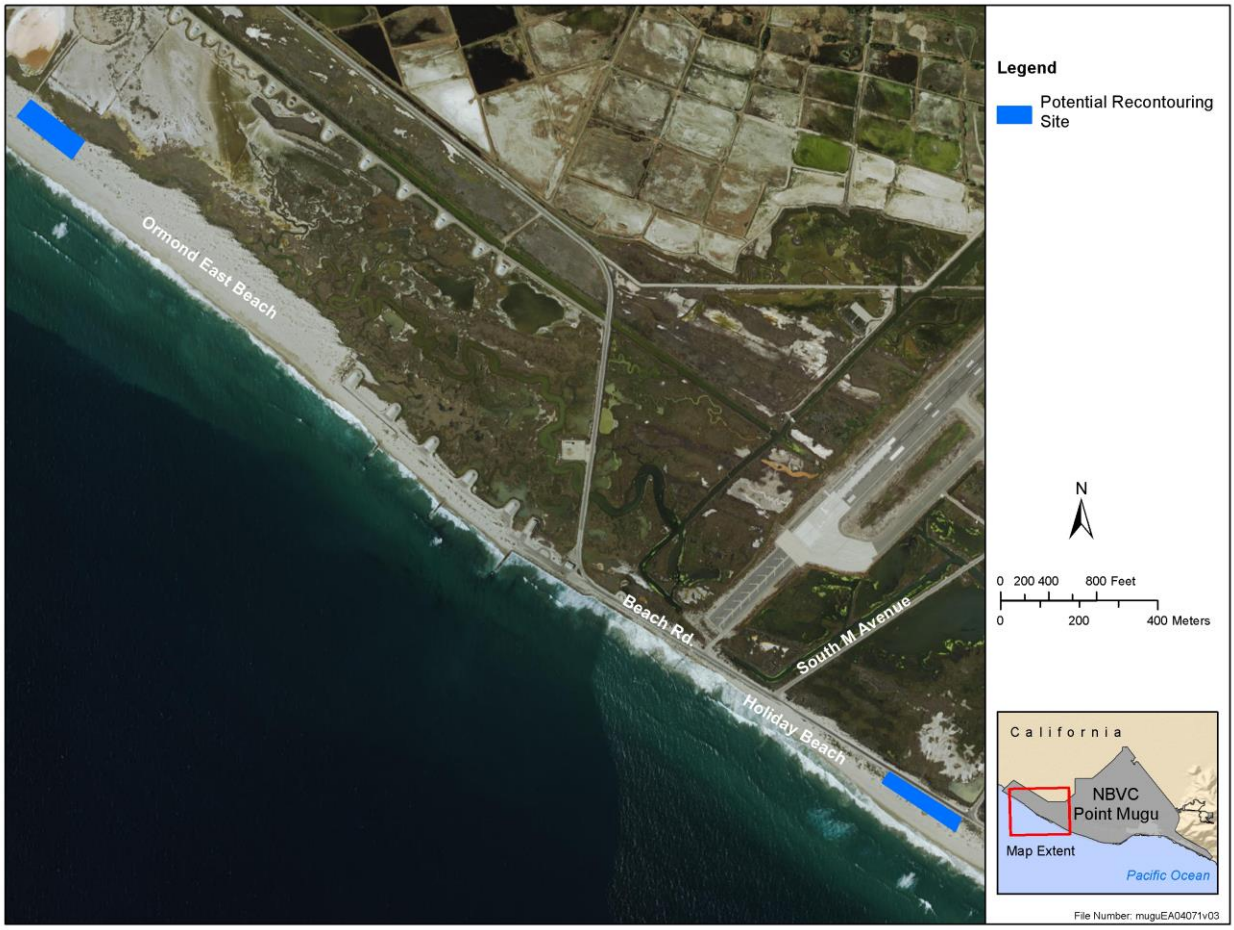



**Figure 2-15: Dune Recontouring Sites at Ormond East Beach (Up-coast) and Holiday Beach (Down-coast)**

### 2.3.3 ALTERNATIVE 2: SOUTH M AVENUE ALTERNATIVE

Alternative 2 includes all components of Alternative 1 with the only difference being the relocation site for Building PM-812. Instead of relocating the airfield light equipment from Building PM-812 to Tide Gate #844, the building would be relocated to the site on South M Avenue (Figure 2-12 and Figure 2-16). The building footprint and utility requirements at the South M Avenue site would be similar to those at Tide Gate Site #844. The structure at PM-81, which is currently located on the South M Avenue site, consists of a concrete pad with minimal infrastructure (Figure 2-17) and would need to be expanded to approximately 5,500 ft.$^2$ (0.13 ac.) or removed to accommodate construction of a new building. To the extent practicable, construction would be scheduled to avoid potential impacts to nesting western snowy plovers, California least terns, and light-footed Ridgway's rails. This may require construction to take place approximately between October 1 and February 15. If construction is scheduled during nesting season, construction activities must be at least 300 ft. away from any snowy plover, least tern, and Ridgway's rail nests.

The area of wetlands that would be disturbed as a result of the relocation of Building PM-812 to South M Avenue would be approximately 0.13 ac. Depending on the precise location of the building at each site, there may be a distinct difference in the area of wetlands that would be impacted. The availability of utilities at each site would also need to be considered in evaluating potential impacts. South M Avenue is a paved road located closer to facilities on the base.

**Figure 2-16: Relocation Area for Airfield Lighting Equipment on South M Avenue**

**Figure 2-17. Concrete pad and infrastructure at PM-81, the South M Avenue Relocation Site.**

### 2.3.4 ALTERNATIVE 3: BEACH SAND REPLENISHMENT (WITH REVETMENT REPAIR)

Under Alternative 3, the West Revetment would not be extended and the airfield lighting equipment housed in Building PM-812 would not be relocated. All other components of Alternative 1 would be implemented.

Instead of extending the eastern end of the West Revetment, as described under Alternative 1, sand dune replenishment would be undertaken as the only means of shoreline protection. Sand dune or beach replenishment is a proven method to stabilize or advance a shoreline against erosion and protect threatened upland areas and is often called the “soft solution” because it retains the environmental, recreational, and aesthetic aspects of the beach, without hard structures. Replenishing the existing dune would require significant amounts of sand from either an on-base or off-base location, as described under Alternative 1; however, no sand would be available from the excavation associated with extending the West Revetment. The area would still be subject to the existing high longshore sediment transport rate, likely requiring future replenishment of sand.

Beach replenishment is an effective shoreline protection measure if the beach remains in place and intact. However, significant erosion during storm events can occur, undermining the success of the project and protection of shoreline assets. Beach replenishment can also be a very economical solution if there is a readily available source of sand from an inland location or if there is a local offshore sand source.

In addition to replenishing the sand dune seaward of Building PM-812, flood protection measures would be implemented to further reduce the risk to assets located at the site. Flood-proofing the building would provide a secondary level of protection in addition to replenishing the sand dune. Elevating or relocating sensitive equipment within the building or constructing a flood barrier around the building

would reduce the risk of flood damage from high-water events. While these measures may be cost effective over the short-term, they would not be a long-term solution if the historical trend of shoreline erosion at the site continues, as anticipated (U.S. Department of the Navy 2012a).

### 2.3.5 SUMMARY OF ALTERNATIVES

The proposed activities associated with the alternatives considered for analysis in the EA are summarized in Table 2-2.

**Table 2-2: Alternatives Considered in this EA**

| Proposed Activity | Alternative 1 (Preferred) | Alternative 2 | Alternative 3 |
|---|---|---|---|
| Repair and Expand Central Revetment | X | X | X |
| Repair, Expand, and Extend West Revetment | X | X | |
| Repair and Expand West Revetment (No Extension) | | | X |
| Replenish Sand Dune at Eastern End of West Revetment | X | X | X |
| Relocate Equipment in Building PM-812 to Tide Gate #844 Location | X | | |
| Maintain and Repair Beach Road | X | X | X |
| Relocate Equipment in Building PM-812 to South M Avenue (PM-81 Location) | | X | |
| Recontour Dune at Ormond East Beach and Holiday Beach | X | X | X |

## 2.4 ALTERNATIVE CONSIDERED BUT NOT CARRIED FORWARD FOR DETAILED ANALYSIS

### 2.4.1 MANAGED RETREAT ALTERNATIVE

The Managed Retreat alternative is more pro-active than the No Action Alternative in that a plan would be put in place to regularly monitor the risk level to assets and infrastructure and to implement a procedure for abandonment, relocation, or protection for these properties. One example of a previously implemented managed retreat strategy was the removal of a large portion of the East Revetment and the relocation of buildings landward that would no longer be protected by the revetment. This approach was part of the Proposed Action in the 1996 EA supporting the repair of the East and Central revetments (U.S. Department of the Navy 1996). Following severe storm damage to the East Revetment and several buildings behind the revetment the Navy decided to remove the damaged, western end of the revetment and to demolish several buildings, some of which were completely destroyed and others damaged beyond repair. Two cabins remained but were relocated inland. A history of events occurring along the NBVC Point Mugu shoreline is presented in Chapter 1 (Purpose of and Need for the Proposed Action).

A managed retreat strategy does not always mean abandonment or relocation of infrastructure. It may be most practical to implement a monitoring plan to evaluate the condition of existing shoreline protective devices and the risk level to landward infrastructure. Along with thorough monitoring and inspection, an emergency plan would need to be in place that utilizes readily available materials and equipment. Regulatory approvals for action would also need to be in place to allow for rapid construction in an emergency.

The Managed Retreat Alternative alone would not meet the purpose and need for the Proposed Action. Alternatives 1 and 2 integrate a managed retreat strategy as part of Alternative 1 and Alternative 2 by proposing that airfield lighting equipment housed in Building PM-812 be relocated away from the shoreline; however, this is only part of the proposed strategy for protecting mission critical equipment and infrastructure, as described in Section 2.3 (Alternatives) above. Managed retreat is a multiphase, long-term adaptive strategy that requires considerable planning, time, and funding. As stated in the Shoreline Protection Study Report (U.S. Department of the Navy 2012a), a managed retreat would be a reasonable strategy for addressing the long-term rate of coastal erosion associated with the Mugu Submarine Canyon headwall retreat and the uncertain impacts of climate change; however, other near-term causes contributing to erosion and shoreline retreat would not be addressed and would leave infrastructure and assets vulnerable to damage from more frequent, short-term events, such as storms, putting operations at risk.

Monitoring sea level rise and the Mugu Submarine Canyon headwall retreat would be critical to a managed retreat strategy and would require a long-term commitment to regular surveys and analysis, which would be costly. Although this is a reasonable long-term strategy, it does not address the more immediate need to protect mission-critical infrastructure. Therefore, this alternative is not carried forward for analysis.

## 2.5 Environmental Protection Measures

Alternatives 1 through 3 would incorporate environmental protection measures to avoid or minimize impacts to environmental resources.

### 2.5.1 Environmental Protection Plan

The construction contractor(s) would submit an Environmental Protection Plan for approval by the Contracting Officer Representative prior to commencement of construction activities. The plan would discuss the measures the contractor would take to prevent or control the release of contaminants into the air, soil, and water during construction. It would also include, by appendix, the Storm Water Pollution Prevention Plan, Integrated Pest Management Plan to prevent the introduction of plant and animal pests, and if applicable, a restoration plan to ensure the project site is returned to existing or better conditions.

### 2.5.2 Biological Resources

#### 2.5.2.1.1 Birds

The following protective measures would be implemented to avoid significant impacts to Migratory Bird Treaty Act-protected birds and federally listed species that have been known to nest in the Project Area. Impacts to the three species listed under the Endangered Species Act (ESA): western snowy plovers, California least terns, and light-footed Ridgway's rails shall be minimized and avoided to comply with the Programmatic Biological Opinion (PBO).

- A Navy-approved biological monitor shall brief all project personnel prior to participating in construction or recontouring activities. At a minimum, the training would include a description of the listed species and sensitive biological resources occurring in the Project Area, the general and specific measures and restrictions to protect these resources during construction activities, the provisions of the ESA and the necessity of adhering to the provisions of the ESA, and the penalties associated with violations of the ESA.
- To the extent practicable, construction activities would take place between October 1 and February 15 to avoid the breeding season.
- If construction activities cannot feasibly avoid the breeding season, a Navy-approved qualified biologist, proficient at identifying special status species that may be found within or adjacent to the project area, would conduct weekly bird surveys, beginning 30 days prior to the start of construction, to detect evidence of nesting activity in the project footprint. The surveys would continue on a weekly basis with the last survey being conducted no more than 3 days prior to the initiation of work.
- Beach recontouring will only occur outside the nesting season for western snowy plovers and California least terns (October 1–February 28).
- If an active nest is documented within 300 ft. of the project site during pre-construction surveys, the project will be postponed until the nest has hatched and there is no new nesting activity within the 300 ft. buffer.
- Active nests between 300 and 500 ft. from a construction site will be monitored by Navy-approved biologists. If nesting birds are disturbed by construction activity, threatening nest loss, construction activity will be postponed until nesting at that location is complete (i.e., the birds have fledged).
- Biologists must be present when heavy equipment is on the beach or in the marsh to monitor for western snowy plover or light-footed Ridgway's rail presence in the Project Area. If western snowy plovers, California least terns, or light-footed Ridgway’s rails are observed within 100 ft. of heavy equipment in use, then construction activity will cease until the bird or birds move a safe distance from the equipment.

#### 2.5.2.1.2 Vegetation

Ground disturbance may create a potential for weed invasion. An invasive plant control plan must be prepared as part of the Integrated Pest Management Plan to prevent the introduction and movement of weedy species and control of weeds (i.e., unwanted plants competing with desirable vegetation) on site. The plan must be approved by the Navy before construction activities begin.

A Navy-approved Restoration Plan must be prepared for the project prior to the start of construction activities. The Restoration Plan shall be prepared by a Navy-approved biologist/botanist, and shall contain a list of approved native plant species and planting schemes. The restoration contractor shall also implement the plan on site during the rainy/planting season. Coordination with the Navy is essential to ensure restoration takes place in the correct locations, with approved plants, and at the appropriate time of year. The restoration contractor shall be held to the success criteria identified in the plan and approved by the Navy. The contractor shall restore all disturbed areas to pre-construction conditions or better.

### 2.5.2.2 Water Resources

Low Impact Development (LID) is a stormwater management strategy designed to maintain site hydrology and mitigate the adverse impacts of stormwater runoff and nonpoint source pollution. Low

Impact Development actively manages stormwater runoff by mimicking a project site's pre-development hydrology using design techniques that infiltrate, store, and evaporate runoff close to its source of origin. LID strategies provide decentralized hydrologic source control for stormwater runoff. In short, LID seeks to manage the rain, beginning at the point where it falls. This is done through a series of techniques that are referred to as LID Integrated Management Practices. The LID Integrated Management Practices are distributed small-scale controls that closely mimic hydrological behavior of the pre-project sites for a design storm event.

The criteria and design standards in this UFC 3-210-10 are required for all Department of Defense construction in the United States and United States Territories. Energy Independence and Security Act (EISA) Section 438 requirements apply to projects that construct facilities with a "footprint" greater than 5,000 gross ft.$^2$, or expand the footprint of existing facilities by more than 5,000 gross ft.$^2$. The project "footprint" consists of all horizontal hard surfaces and disturbed areas associated with the project development, including both building area and pavements (such as roads, parking, and sidewalks). These requirements do not apply to internal renovations, maintenance, or resurfacing of existing pavements. Where EISA Section 438 is not applicable (e.g., projects under 5,000 ft.$^2$), LID techniques apply to the extent practical.

The NBVC Point Mugu prepared a Wetland Restoration Plan to identify suitable areas at base for wetland restoration, wetland enhancement, and buffer enhancement (U.S. Department of the Navy 2014a). The purpose of the Wetland Restoration Program is to create, in advance of the need, economically efficient and flexible wetland mitigation opportunities for the Navy. The principal goal of the Wetland Restoration Program is to sustain no net loss of wetlands and maintain functional wetland habitat at NBVC Point Mugu while providing an efficient and flexible mitigation tracking system. Sites deemed by the U.S. Army Corps of Engineers (USACE) to be successfully restored or enhanced may be eligible for use by the Navy to offset wetland impacts that occur from Navy operations within the boundaries of NBVC Point Mugu. The Wetland Restoration Plan identified 102 potential restoration or enhancement projects and approximately 142 ac. of wetlands.

Because the project's construction phase would disturb more than 1 ac. (0.4 hectare), the project is required to obtain coverage under the National Pollution Discharge Elimination System General Permit for Discharges of Storm Water Associated with Construction Activity (General Permit), Water Quality Order 2009-009-DWQ. As part of the permit, a Storm Water Pollution Prevention Plan would be required.

The Navy would be required to obtain a Water Quality Certification (per Section 401 of the Clean Water Act [CWA]) and a wetland permit (per Section 404 of the CWA) prior to construction of the shoreline protection activities. Additional mitigation measures to minimize the potential for adverse impacts might be required, as set forth during the Section 401 and 404 of the CWA permitting process.

#### 2.5.2.2.1 Erosion Control

The contractor shall prepare a written Erosion Control Plan (ECP) that explains how they will prevent erosion on and off their project site as a result of their construction activities. The plan shall include Best Management Practices (BMPs), maps, monitoring plans, reports, restoration, revegetation, and weeding plans. The ECP shall be approved by the Navy prior to the start of construction activities. The ECP shall be implemented by the construction contractor and monitored by the Navy.

#### 2.5.2.2.2 Storm Water

Before demolition and construction activities, a Storm Water Pollution Prevention Plan (SWPPP) would be prepared, which would include the type, placement, and maintenance of erosion control features to be used during and following demolition and construction activities. The plan would include:

- Placement of Straw Wattle Buffers. Before the start of site demolition and construction activities, straw wattle buffers (certified weed free) would be placed within and around the project site to reduce surface water flow velocities, and retard soil erosion and off-site transport;
- Avoidance of Excavated Areas. Construction equipment would be directed to avoid places where pavement has been removed to prevent soil erosion; and
- Stockpiled Materials. Sites for temporary stockpiling and handling of recyclable wastes would be established on site. When appropriate, stockpiled materials would be covered with tarps or other suitable materials, and the piles would be enclosed with a sediment fence to prevent wind- or rain-induced runoff and dispersion. All contaminated materials would be disposed of in accordance with applicable federal, state, and local requirements.

As part of the SWPPP, BMPs would be implemented to prevent inadvertent runoff of contaminants, such as construction debris, petroleum products, and hazardous materials. Specifically, BMPs would include:

- Tarping of Washout Trap. If rain occurs, place a tarp or some other impermeable material for the concrete wash out traps to minimize inadvertent runoff with contaminants.
- Concrete Washout. If concrete is used, concrete trucks would be washed out in a designated area where the material cannot run off-site or percolate into the groundwater. This area would be specified on all applicable construction plans and be in place before any concrete is poured. All residual solids (e.g., concrete dust) would be cleaned up on a daily basis. In the event concrete/asphalt cutting is performed with a wet saw, all water would be contained and residual solids would be cleaned up.
- Vehicle and Work Area Maintenance. Upon entering the site and daily thereafter, equipment would be inspected and maintained prior to working on site. Any leaks or hoses/fittings in poor condition would be repaired before the equipment begins work. Construction equipment would be staged on site in designated staging areas. All vehicles leaving the site would be inspected to prevent dirt/debris from being transported off site. All material/waste storage areas would be inspected daily to ensure containers are in good condition. All storm drain inlets in the work area would be protected to prevent dust and/or debris from entering the drain(s).
- Storm drain catch basins in the construction area shall be covered so that sediment and debris do not enter the catch basins during construction.
- Sediment and debris from the work site shall be swept up and properly disposed, so that they will not be tracked off site and enter a storm drain or receiving water.
- For projects that occur during the rainy season (October through May), any soil, gravel, or debris stockpiles shall be covered/bermed to prevent rain from washing away the stockpiles.
- If metal cutting, grinding, or welding is part of the project (such as concrete reinforcing bars or metal fencing), measures shall be put in place to prevent those pollutants from entering the water or storm drain systems. Also, at a minimum, metal slag/residues/shavings must be swept up and properly disposed of at the end of each work day.

- Drip pans shall be placed under equipment to catch leaks. These drip pans shall be cleaned periodically. During rain events, these drip pans shall be moved so that the storm water runoff does not become contaminated from their contents.
- Wash water and residue from concrete and/or masonry work shall not be discharged into the storm drain or sanitary sewer systems. Wash water shall be contained in a concrete washout area and allowed to evaporate, with the remaining solids disposed of as solid waste. With written approval from the installation's environmental staff, smaller projects may have the option to discharge wash water onto a pervious soil surface and allow it to infiltrate into the soil. Any remaining residue shall be disposed of as solid waste.
- The project shall avoid the use of galvanized materials, or add an additional coating to the material to reduce the potential for zinc leaching into storm water runoff. Examples of items that may contain galvanized materials include fencing, flagpoles, corrugated roofing used in lean-to sheds, and sacrificial anodes.

If BMPs currently in place are found to be ineffective in controlling storm water pollution, they shall be amended as soon as possible to correct the problem.

#### 2.5.2.3 Hazardous Materials

A Hazardous Materials Plan would be prepared prior to operation of demolition and construction equipment. This plan would include, but not necessarily be limited to:

1. Specific bermed equipment maintenance and refueling areas.
2. Bermed and lined hazardous material storage areas on site that are covered during the rainy season.
3. Hazardous material spill cleanup equipment on site (e.g., sorbent pads, shovels, and bags to place contaminated soil in);
4. Workers trained in location and use of cleanup equipment;
5. Material Safety Data Sheets for all hazardous materials expected to be used. This includes paints, adhesives, and any other possible product that has a Material Safety Data Sheet with it; and
6. Hazardous Waste Generation information to include what materials are to go out as hazardous waste in what volume, who is transporting it, who shall sign the manifests for which type of wastes, and where the hazardous waste is going.
7. The use of Beach Road and South M Avenue as current and proposed ordnance transportation routes.

This is a list of minimum BMPs that should be implemented. Additional BMPs may be required depending on the specific project. Construction project managers would work with NBVC environmental representatives to ensure the Proposed Action meets both environmental compliance and project timelines.

#### 2.5.2.4 Air Quality and Climate Change

Dust control measures would be implemented to comply with the requirements of Ventura County Air Pollution Control District Rule 55, Fugitive Dust, during all proposed ground disturbance and building demolition activities.

Construction equipment control measures would be implemented during all proposed ground disturbance and building demolition activities, where feasible.

1. Maintain equipment according to manufacturer specifications.
2. Restrict idling of equipment and trucks to a maximum of five minutes at any location.
3. Use diesel oxidation catalysts and/or catalyzed diesel particulate traps.
4. Diesel fueled equipment must be registered with the California Air Resources Board (CARB) under the Portable Equipment Registration Program.
5. Use electricity from power poles rather than temporary diesel- or gasoline-powered generators.
6. Provide temporary traffic control, such as a flag person, during all phases of construction and/or demolition activities to maintain smooth traffic flow.
7. Keep construction/demolition equipment and equipment staging areas away from sensitive receptor areas.
8. Re-route construction trucks away from congested streets or sensitive receptor areas.
9. Use construction equipment with engines that meet U.S. Environmental Protection Agency (USEPA) Tier 3 and 4 non-road standards.
10. Use alternatively fueled construction equipment, such as compressed natural gas, liquefied natural gas, or electric.

#### 2.5.2.4.1 Noise

Construction/demolition equipment operation would be limited to between the hours of 7:00 AM and 5:00 PM weekdays and Saturdays, excluding holidays. No holiday or nighttime operation of construction equipment would be permitted.

#### 2.5.2.4.2 Public Health and Safety

Prior to the start of construction activities, a Health and Safety Plan would be prepared by the construction contractor, and all necessary permits and approvals would be obtained. Any required asbestos and lead abatement would be the responsibility of the construction contractor and would be conducted before demolition/construction activities begin. The Health and Safety Plan would describe the strategy for handling and disposing of all demolition debris. Part of this strategy would be to divert as much of the demolition waste from landfills as possible, using demolition deconstruction techniques to reduce, reuse, or recycle the various types of waste. If asbestos-containing materials and/or lead-based paint will be disturbed, take control measures as required by all local, state, federal regulations and Navy instructions.

#### 2.5.2.4.3 Transportation/Traffic

A Construction Traffic Management and Detour Plan would be developed and approved by the Navy, prior to the start of construction activities. The traffic management plan would specify necessary lane closures, detours, any signage/lighting, flaggers, and other traffic control measures needed to avoid accidents and provide access and continued traffic movement along these roads during construction.

#### 2.5.2.4.4 Cultural Resources

No cultural resources are expected to be found within the project footprint. However, if resources are discovered, construction activities would stop, and a qualified archaeologist would be notified and would monitor subsequent construction activities.

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# 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The Affected Environment and Environmental Consequences chapter describes the current state of physical, biological, and human-related resources in the Project Area. The resources described and analyzed in this chapter are Topography and sediments, water resources, biological resources (e.g., protected species, vegetation, birds, mammals, fish and Essential Fish Habitat (EFH), invertebrates, and reptiles and amphibians), air quality and greenhouse gases, noise, cultural resources, public health and safety, coastal zone resources, and transportation and traffic. The following additional resource areas were not analyzed in this EA because the potential for impacts were considered negligible or non-existent for land use and agricultural resources, airspace management, socioeconomics and environmental justice, visual quality, recreational resources, and utilities. These resources will not be described further in this EA (Section 1.6.1, Resources Not Carried Forward For Analysis).

## 3.1 TOPOGRAPHY AND SEDIMENTS

Coastal erosion and the effectiveness of shoreline protection measures to stabilize a shoreline and protect infrastructure are dependent, in part, on the topography and sediments of the shoreline.

### 3.1.1 AFFECTED ENVIRONMENT

#### 3.1.1.1 Beach Topography

The topography of the shoreline portion of the Project Area extends from Beach Road and developed areas on the landside of the dunes to the nearshore sub-tidal portion of the littoral zone. In the Project Area, the beach profile is dominated by the Central and West revetments (Figure 3-1). A shoreline protection plan (U.S. Department of the Navy 2012b) based on the results of the supporting 2012 study includes a typical cross-section view at the Central Revetment (Figure 3-2). The cross-section at the West Revetment is similar. Very little beach is exposed seaward of the revetments, which can exacerbate beach erosion, particularly when the toe of a revetment is exposed. No significant dunes remain on the landward side of the revetments.

The elevation of the Central Revetment is approximately 20 ft. above mean sea level (MSL) (23 ft. above MLLW). The toe of the Central revetment extends between 20 and 40 ft. seaward, and the seaward face of the revetment has a slope of approximately 2:1. The revetment is generally considered to be in good condition with the exception of erosion damage to the eastern end from high wave events (U.S. Department to the Navy 2012a). Between the mid-1960s and 2010, the shoreline at the Central Revetment has retreated approximately 200 ft. and is now located at the revetment (U.S. Department of the Navy 2012a).

The elevation of the West Revetment is approximately 14 ft. above MSL (16 ft. above MLLW). The toe of the revetment was extended in 1999, as described in U.S. Department of the Navy (2012a), but no information on the length of the toe or the slope of the seaward face of the West Revetment is provided in the report. The revetment is generally considered to be in good condition. Since 1938, the shoreline at the West Revetment has receded steadily and is now located approximately 400 ft. landward. Since the mid-2000s (through 2010), the rate of recession has accelerated at the eastern end of the revetment, indicating that shoreline retreat down-coast of the revetment, including seaward of Building PM-812 and Beach Road, is likely to continue (U.S. Department of the Navy 2012a).

**Figure 3-1: Topography of the Shoreline at the Central Revetment Facing West (up-coast)**

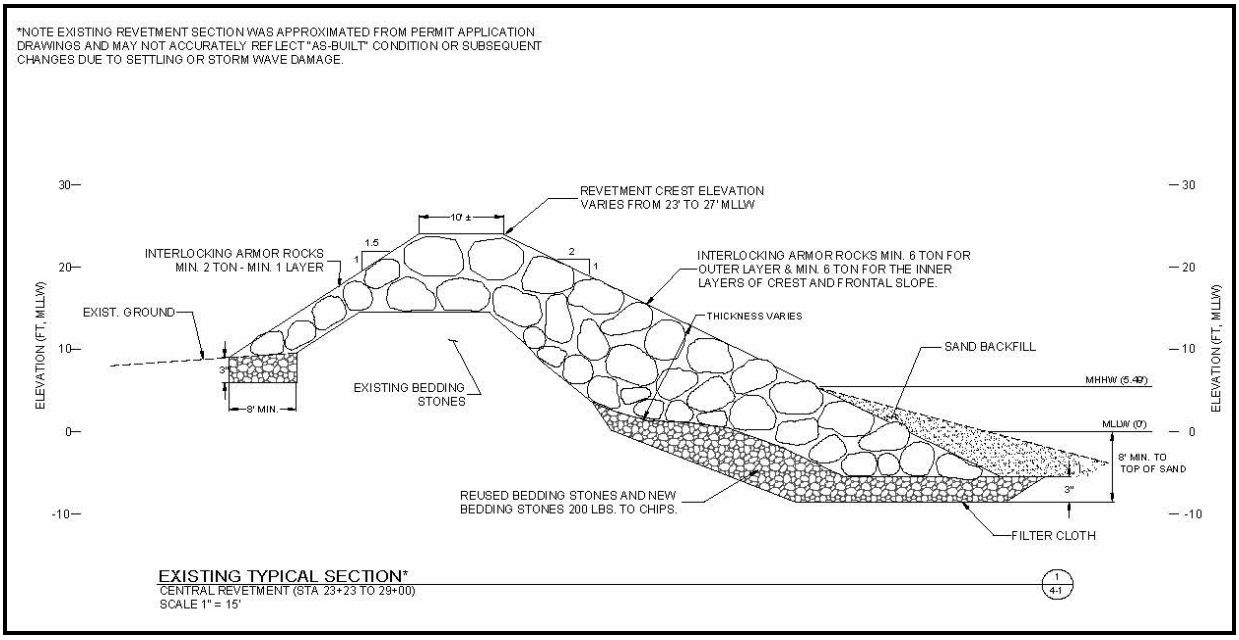


**Figure 3-2: Cross-Section at the Existing Central Revetment**

Up-coast (west) and down-coast (east) of the revetments, the beach widens and a vegetated sand dune is present along much of coast (Figure 3-3). The potential recontouring sites located on Ormond East Beach and Holiday Beach have a well-established foredune stabilized by vegetation. This results in a reduction of sand movement into backdune areas and loss of open sand sheet habitat, which is the preferred nesting habitat for western snowy plovers and California least terns. The width of the beach in the Project Area fluctuates daily with the tides as well as seasonally. Beaches along NBVC Point Mugu are generally wider in summer and narrower in winter and are influenced by the magnitude and incidence angle of waves, offshore storms, and tides.

**Figure 3-3: Beach profile looking up-coast (west) from the Central Revetment**

#### 3.1.1.2 Coastal Sediments

The coastline along NBVC Point Mugu is at the southeastern boundary of the Santa Barbara Littoral Cell, which extends from the Santa Maria River to the Mugu Submarine Canyon (Patsch and Griggs 2008; Patsch and Griggs 2007). A littoral cell is the coastal region within which longshore transport of sediments is contained (Patsch and Griggs 2006). The sediments entering the Santa Barbara Littoral Cell almost exclusively originate from the rivers and streams that empty into coastal areas adjacent to the cell, including the Santa Maria River, Santa Clara River, Ventura River, and Calleguas Creek (Patsch and Griggs 2008, Limber et al. 2008). Net longshore littoral transport of sands within the cell is predominantly down-coast, from the Santa Clara River to Point Mugu, terminating at the Mugu Submarine Canyon, where approximately 1,000,000 cubic yards ($yd^3$) of sediment is lost into the canyon per year (Figure 3-4). The beaches on NBVC Point Mugu rely on a consistent supply of littoral sediments from the Channel Islands Harbor sand bypassing program to counteract the effects of a retreating shoreline. The program is vital to sustain a sufficient beach width to function as a natural buffer against storm-related erosion and limit the risk of damage to mission-critical infrastructure (U.S. Department of the Navy 2012a).

Sediments on the beach and offshore within the littoral zone are composed of medium grain-size sands ranging in diameter from 0.25 millimeters (mm) to 0.5 mm (Mustain et al. 2007). The grain size of sediments on the seafloor within the littoral zone becomes increasingly smaller with distance from

shore (U.S. Army Corps of Engineers 1950). These fine-grained and very fine-grained sands (0.06–0.25 mm in diameter) and silts (0.004 mm–0.06 mm in diameter) that may initially originate from the beach are often carried offshore beyond the littoral zone, because they tend to remain suspended in the water column longer than the heavier medium-grained (and larger) sands (Limber et al. 2008; Mustain et al. 2007; Kennett 1982). Limber et al. (2008) demonstrate that grain size is an important factor when identifying sediments to be used for beach nourishment. Sediments traditionally classified as sands in the Wentworth scale (0.063 mm–2 mm in diameter) may not remain on the beach or in the littoral zone. Limber et al. recommend using sediments with a median grain size no smaller than 0.125 mm (the littoral cutoff diameter) in identifying sediments that would remain on beaches and within the littoral zone of the Santa Barbara Littoral Cell. A specific littoral cutoff diameter should be determined for a beach prior to selecting a sand source for beach nourishment, because littoral conditions (e.g., incident wave angle, wave energy) vary with a littoral cell (Mustain et al. 2007). Offshore of Point Mugu, digital images of sediments taken at 5, 10, and 20 meter (m) depths identified sediments predominantly comprised of clays, silts, and very fine-grain sands (Mustain et al. 2007).

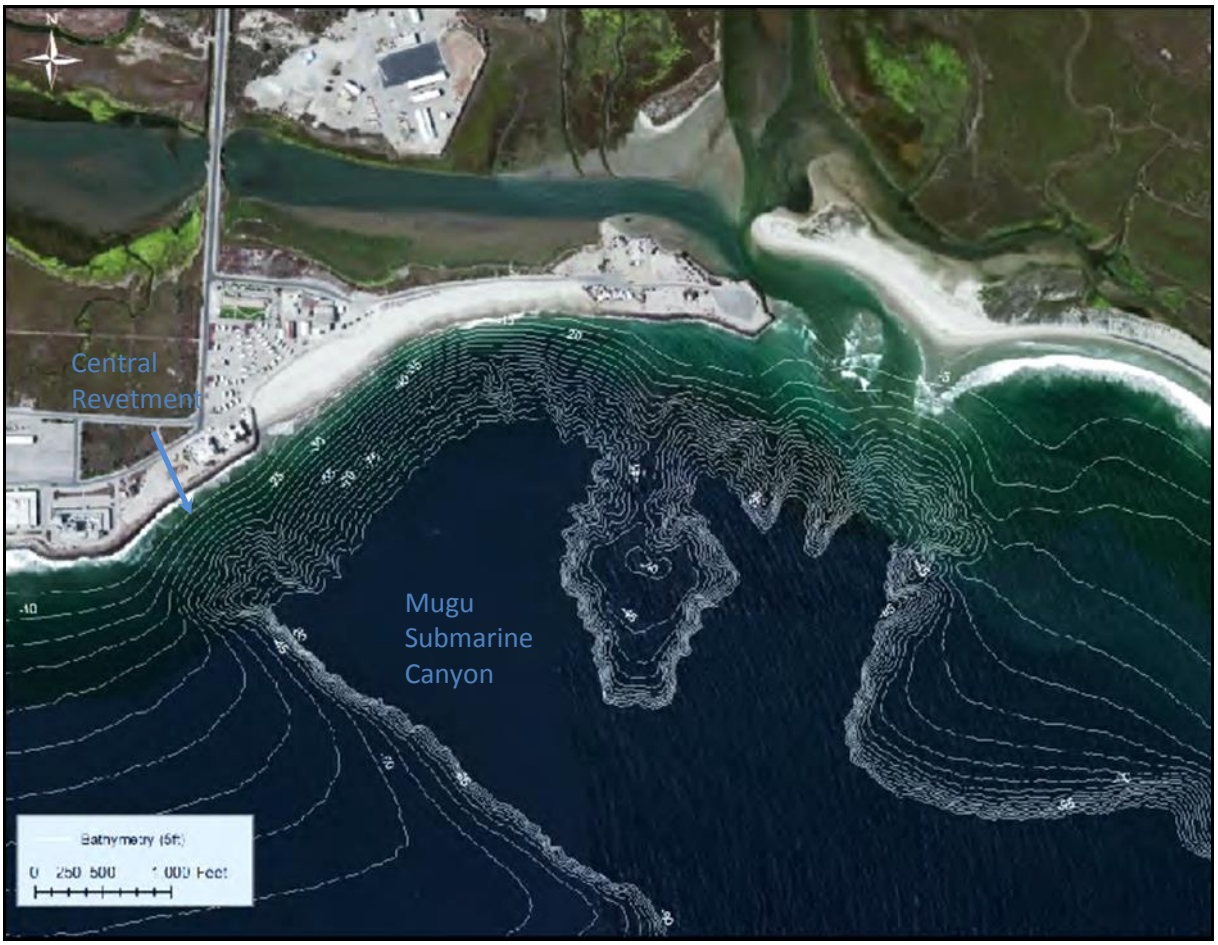


**Figure 3-4: Mugu Submarine Canyon in Proximity to the Central Revetment**

### 3.1.1.3 Mugu Submarine Canyon

The Mugu Submarine Canyon marks the eastern extent of the Santa Barbara Littoral Cell. Patsch and Griggs (2008) estimate that approximately 1,000,000 $yd^3$ per year of sediment transported down-coast in the Santa Monica Littoral Cell is lost into the Mugu Canyon. The headwall of the Mugu Submarine

Canyon extends as close as 100 ft. from the eastern end of the Central Revetment, if the canyon headwall continues to retreat landward at an estimated rate of 1–2 ft. per year, it may undermine the revetment in 50–100 years (U.S. Department of the Navy 2012a).

Sediments within the canyon consist primarily of unconsolidated very fine grain sands and silts (U.S. Army Corps of Engineers 1950). The steeper portions of the canyon headwall consist of 0.08 mm diameter very fine-grain sand. Core samples taken at greater depths in the canyon typically consisted of poorly sorted, fine-grain silts and clays occasionally overlaying coarser sands (U.S. Army Corps of Engineers 1950; Moffatt & Nichol 1995).

#### 3.1.1.4 Building Relocation Sites

Building PM-812 is currently located at the intersection of Beach Road and South M Avenue. Two potential sites for relocating the airfield lighting equipment housed in Building PM-812 are considered in this EA (Figure 2-12). Both sites are located within USACE designated jurisdictional wetlands, which encompass approximately 2,139 ac. of the 4,490 total ac. at NBVC Point Mugu (U.S. Army Corps of Engineers 2013, U.S. Department of the Navy 2013a). The area needed for the relocation sites is approximately 5,500 $ft.^2$ (0.13 ac.).

The site at Tide Gate #844 is adjacent to a drainage ditch running parallel to Runway 03-21 and is approximately 2,300 ft. north of the current site. The site at PM-81 is approximately 1,200 ft. northeast of the current site on South M Avenue. Vegetated wetlands surround both sites and are characterized by flat, level topography approximately 3 ft. above MSL. The 2013 NBVC Point Mugu Integrated Natural Resources Management Plan (INRMP) characterizes the soils at each site as deep, poorly drained silty clay characteristic of tidal flats (U.S. Department of the Navy 2013a).

### 3.1.2 Environmental Consequences to Topography and Sediments

The potential impacts to the topography and sediments in the Project Area from the Alternatives are discussed in this section. As described in Section 3.1.1 (Affected Environment), resources associated with the topography and sediments in the Project Area include beaches, sandy sediments, dune areas, the Central and West revetments, and saltmarsh sediments at the two relocation sites for airfield lighting equipment and infrastructure.

#### 3.1.2.1 Alternative 1: Shoreline Protection Alternative (Preferred Alternative)

Under Alternative 1, the Navy would repair and increase the width and height of the Central and West revetments, extend the eastern end of the West Revetment down-coast by approximately 125 ft. to protect Building PM-812 and Beach Road, replenish the sand dune down-coast of the eastern end of the West Revetment, replenish the dune at Ormond East and Holiday beaches, relocate equipment and infrastructure in Building PM-812 to the relocation site at Tide Gate #844, and repair and repave Beach Road near the intersection with South M Avenue.

##### 3.1.2.1.1 Beach Topography

As described in Section 3.1.1.1 (Beach Topography) the topography along the shoreline in the Project Area is dominated by the Central and West revetments. The repair and expansion of the revetments would alter the beach topography by increasing the height and width of the revetments and by extending the length of the West Revetment. The height of the Central Revetment would be increased from approximately 20 ft. above Mean Low Water (MLW) to between 23 ft. and 27 ft. above MLW. The seaward face of the Central Revetment would be restored to a 2:1 (horizontal to vertical) slope in areas where the revetment has been damaged by waves and high water (e.g., near the western end of the

revetment; Figure 2-3). With the increased crest elevation, the overall footprint of the revetment would be increased to maintain the desired 2:1 slope. Approximately 2,000 tons of 6–10 ton armor stone would be nested into the existing stone to repair and reinforce the Central Revetment.

The crest height of the West Revetment would be increased from between 12 and 14 ft. to approximately 18 ft. above MLW using an estimated 4,300 tons of armor and under-layer stone. As with the Central Revetment, the footprint of the West Revetment would increase to maintain a 2:1 seaward-facing slope. In addition, the eastern end of the West Revetment would be extended approximately 125 ft. down-coast. The extension would change the beach profile from a relatively flat, unvegetated, sandy area to an area similar to up-coast areas with a revetment. Beach erosion on the seaward side of the revetment extension would be consistent with up-coast beach areas immediately seaward of the revetment. Replenishing the dune down-coast of the extension may act as a sacrificial sand source to help reduce localized dune losses and beach erosion. Extending the existing sand fencing would help to stabilize the replenished dune. Sand needed for the construction and replenishment of the dune may be found from a source at NBVC Point Mugu or may be transported from off base. Any sand excavated to extend the West Revetment could also be used to build up the adjacent dune.

The erosion "hot spot" caused by end-effect scour at the down-coast end of the revetment would be moved down-coast to the end of the extension and farther from Building PM-812. The replenished dune down-coast of the revetment extension would further protect Beach Road from the effects of flooding, and sand eroded from the dune or blown off the dune may benefit down-coast beaches by adding to sand transported down-coast in the longshore current. However, no significant change to down-coast beaches or littoral transport is anticipated from the Proposed Action.

As described in Section 2.2.3.7 (Dune Recontouring at Ormond East Beach and Holiday Beach), the Navy plans to recontour a portion of the dune on Ormond Beach and on Holiday Beach to improve nesting habitat for western snowy plovers and California least terns (Figure 2-15). While the beach topography in these locations on the two beaches would be altered, the dune area and beach profile would remain consistent with the beach profile along the shoreline at NBVC Point Mugu.

Therefore, implementation of Alternative 1 would not result in significant impacts on the topography of the shoreline portion of the Project Area.

#### 3.1.2.1.2 Coastal Sediments

Sediments on the beach and dune consist predominantly of medium grain-sized sands (Section 3.1.1.2, Coastal Sediments). Sediments transported from a location on NBVC Point Mugu or from an off-site location to the area adjacent to the West Revetment for dune replenishment would consist of sand equivalent to the types of sand present on the beach at the West Revetment. Eroded sediments from Ormond Beach and other up-coast areas within the Santa Barbara Littoral Cell are currently transported down-coast and deposited on the beach adjacent to the West Revetment as part of natural littoral transport. The Proposed Action would not result in any change in the sediment type within the shoreline portion of the Project Area. The Proposed Action would not increase net littoral transport of sediments within the Santa Barbara Littoral Cell. Therefore, the Proposed Action, as described under Alternative 1, would have no significant impact on coastal sediments at the shoreline portion of the Project Area.

#### 3.1.2.1.3 Tide Gate #844 Relocation Site

As discussed in Section 3.1.1.4 (Building Relocation Sites), the proposed relocation site at Tide Gate #844 is surrounded by USACE jurisdictional wetlands with sediments consisting of deep, poorly drained silty clay characteristic of tidal flats (U.S. Department of the Navy 2013a). The area immediately surrounding Tide Gate #844 is elevated above the marsh to protect the existing tide gate facility and MAD Road,

which provides access to the tide gate, against flooding (Figure 2-10). Approximately 5,500 ft.$^2$ (0.13 ac.) are needed to accommodate a new building to house the airfield lighting equipment relocated from Building PM-812 and parking spaces at the site.

A developed area at the Tide Gate #844 site is elevated above the wetland to reduce the risk of flooding and is expected to be sufficient to accommodate the new building. This would limit disturbance to wetland areas to temporary impacts associated with construction. However, because the actual footprint of the new construction will not be available until preliminary engineering plans are available, it is assumed for the purposes of analysis that 5,500 ft.$^2$ (0.13 ac.) of wetland area would be permanently impacted. The installation of new utilities, including a connection to the airfield (Runway 3-21), may require directional drilling beneath the wetland from the Tide Gate #844 site. Directional drilling to install utility cables is expected to have a negligible impact on wetlands, because the drilled corridor would be deep enough beneath the wetland to only penetrate silty clay sediments and not damage root systems of above-ground vegetation (Section 3.3.2.1.2, Environmental Consequences for Vegetation). The final footprint for utilities will be identified as needed once the design and final engineering drawings are available. Therefore, implementation of Alternative 1 would not result in significant impacts on topography and sediments at the Tide Gate #844 site.

#### 3.1.2.2 Alternative 2: South M Avenue Alternative

The only difference between Alternative 2 (South M Avenue Alternative) and Alternative 1 (Preferred Alternative) is the relocation site for the equipment and infrastructure currently located in Building PM-812 on Beach Road. Instead of relocating the airfield lighting equipment in the building to the Tide Gate #844 site, the equipment would be relocated to a building on South M Avenue (the current site of Building PM-81) (Figure 2-12 and Figure 2-16). The building footprint and utility requirements at the South M Avenue site would be similar to those at the Tide Gate #844 site. The structure at PM-81, which is currently located on the South M Avenue site, would need to be expanded to approximately 5,500 ft.$^2$ (0.13 ac.) or removed to accommodate the new building.

##### 3.1.2.2.1 Beach Topography

Potential impacts to beach topography would be identical to impacts described under Alternative 1, because all proposed construction activities occurring along the shoreline are the same (Section 3.1.2.1.1, Beach Topography). Therefore, implementation of Alternative 2 would not result in significant impacts on beach topography in the Project Area.

##### 3.1.2.2.2 Coastal Sediments

Potential impacts to coastal sediments would be identical to impacts described under Alternative 1, because all proposed construction activities occurring along the shoreline are the same (Section 3.1.2.1.2, Coastal Sediments). Therefore, implementation of Alternative 2 would not result in significant impacts on coastal sediments in the Project Area.

##### 3.1.2.2.3 South M Avenue Relocation Site

As discussed in Section 3.1.1.4 (Building Relocation Sites), the proposed relocation site at South M Avenue is adjacent to USACE jurisdictional wetlands with sediments consisting of deep, poorly drained silty clay characteristic of tidal flats (U.S. Department of the Navy 2013a). Fill materials would be required to expand the existing foundation pad at the site to accommodate the larger footprint of the new building and spaces for parking. Up to 0.13 ac. of wetlands may be permanently impacted by expanding the pad, which equates to 0.007 percent of the approximately 2,139 ac. of wetlands at NBVC Point Mugu.

The installation of power cables and other utilities may be needed at the South M Avenue site. Utilities would be installed along existing utility corridors (e.g., along roadways). If utilities must be installed across wetland areas, then directional drilling would be used to route utility cables beneath wetland areas. A minimal impact to wetlands would be expected, because the drilled corridor would be deep enough beneath the wetland to only disturb silty clay sediments and not damage root systems of above-ground vegetation (Section 3.3.2.1.2, Environmental Consequences to Vegetation). The final footprint for utilities will be identified as needed once the design and final engineering drawings are available.

Relocating equipment and infrastructure to the South M Avenue site would result in the loss of less than one acre of wetland. The Navy has over 30 ac. of proactively restored wetlands that could be used to offset this loss. Furthermore, over 120 ac. of wetlands have been identified on NBVC Point Mugu as potential wetland restoration sites for projects such as the Proposed Action (U.S. Department of the Navy 2014a). An assessment of the restored sites would be conducted to determine appropriate type and acreage to be used for mitigation of the impacted wetlands from the project. Therefore, implementation of Alternative 2 would not result in significant impacts on topography and sediments at the South M Avenue relocation site.

#### 3.1.2.3 Alternative 3: Beach Sand Replenishment (With Revetment Repair)

Under Alternative 3, the West Revetment would not be extended and the equipment and infrastructure currently housed in Building PM-812 would not be relocated. The existing building would be maintained in its current location on Beach Road. All other components of Alternative 1 would be implemented. The Navy would repair and increase the width and height of the Central and West revetments, replenish the sand dune down-coast of the West Revetment to protect Building PM-812 and Beach Road, and repair and repave Beach Road near the intersection with South M Avenue.

##### 3.1.2.3.1 Beach Topography

Potential impacts to beach topography would be less than the potential impacts described under Alternative 1, because the West Revetment would not be extended down-coast. The crest height of the revetment would remain at approximately 14 ft. above MLW, and the footprint of the revetment would not be expanded seaward.

Beach sand would be added to the area seaward of Building PM-812 to build up the dune and protect the building and Beach Road from damaging waves and flooding. Dune replenishment would alter the beach profile in this location by increasing the height of the dune to approximately 18–20 ft. above MLW. The reconstructed dune would be similar in size and footprint to adjacent, down-coast dunes (U.S. Department of the Navy 2012b). The section of beach and the replenished dune would still be subject to end-effect scour and erosion as a result of its proximity to the end of the revetment. Augmenting the existing dune fencing and planting vegetation on the dune would slow the scouring effects, although they would continue to occur indefinitely. It is likely that dune replenishment would be needed in the future to maintain the protective capability of the dune. Although the topography of the dune replenishment area would be changed, the changes would be consistent with existing, down-coast dunes, and would have no negative impacts to the topography of the area. Therefore, implementation of Alternative 3 would not result in significant impacts on beach topography in the Project Area.

##### 3.1.2.3.2 Coastal Sediments

Potential impacts to coastal sediments would be identical to impacts described for dune replenishment under Alternative 1, because the proposed dune construction activities occurring along the shoreline are the same (Section 3.1.2.1.2, Coastal Sediments). Therefore, implementation of Alternative 3 would not result in significant impacts on coastal sediments in the Project Area.

#### 3.1.2.3.3 Airfield Lighting Equipment and Infrastructure Relocation Sites

Under Alternative 3, the equipment and infrastructure currently housed in Building PM-812 would remain in the building and would not be relocated to either of the proposed relocation sites. Therefore, implementation of Alternative 3 would not result in significant impacts on the topography and sediments at the relocation sites.

#### 3.1.2.4 No Action Alternative

Under the No Action Alternative, none of the proposed construction activities would be conducted. The West and Central revetments would not be repaired or expanded, the dune at the eastern end of the West Revetment would not be replenished, the equipment housed in Building PM-812 would not be relocated to either of the two proposed sites, the dunes at Ormond Beach and Holiday Beach would not be recontoured, and Beach Road would not be cleared and repaired near the intersection of South M Avenue. The historical trend of shoreline retreat is likely to continue into the foreseeable future (U.S. Department of the Navy 2012a), leaving assets and infrastructure located along the shoreline vulnerable to flooding and damage from high-water events. Therefore, implementation of the No Action Alternative would not result in significant impacts on topography and sediments in the Project Area.

## 3.2 WATER RESOURCES

### 3.2.1 REGULATORY SETTING

The Federal Water Pollution Control Act, as amended by the CWA, is intended to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. The CWA regulates the discharge of pollutants from point sources into waters of the United States. The CWA, as amended in 1987, requires each state to establish water quality standards for its surface waters derived from the amount of pollutants that can be assimilated by a body of water without deterioration of a designated use.

The CWA prohibits spills, leaks, or other discharges of oil or hazardous substances into the waters of the United States in quantities that could be harmful. The CWA limits any discharge of pollutants to a level sufficient to ensure compliance with the state water quality standards. Direct discharges of effluents are regulated under numerical limitations contained in National Pollutant Discharge Elimination System (NPDES) permits issued by the USEPA or under state NPDES programs approved by the USEPA.

The California State Water Resources Control Board (SWRCB) sets statewide water quality-based assessment thresholds and goals for maintaining and restoring the State's water quality (California State Water Resources Control Board 2014). Assessment thresholds are derived and used as metrics to protect the designated beneficial uses in a water body from contamination by chemical constituents. Water bodies assessed by the SWRCB include the State's groundwater, inland surface waters, bay and estuarine waters, and ocean waters. The SWRCB is responsible for setting policies and developing regulations that implement water quality standards mandated by state and federal regulations. Regional water quality control boards are responsible for implementing and prioritizing the statewide policies and goals as appropriate for the region's beneficial uses, water quality characteristics, and water quality issues. The NBVC Point Mugu is within the Los Angeles Region, which covers the coastal watershed of Los Angeles and Ventura counties.

### 3.2.2 STORM WATER RUNOFF

Under the Section 438 of the Energy Independence and Security Act of 2007, Federal agencies have new requirements to reduce storm water runoff from Federal development and redevelopment projects to protect water resources. Federal agencies can comply using a variety of storm water management

practices often referred to as "green infrastructure" or "low-impact development" practices (e.g., reducing impervious surfaces, or using vegetative practices, porous pavements, cisterns, and green roofs). Surface runoff at NBVC Point Mugu is transported to Calleguas Creek, Mugu Lagoon, or the Pacific Ocean via a system of drainage ditches and natural channels. NBVC Point Mugu currently operates under a state-issued general permit (Permit No. CA000001) for discharge of storm water from various industrial facilities on the installation. As part of the permit program, NBVC Point Mugu has prepared a Storm Water Pollution Prevention Plan to control storm water discharges from the installation that could impact the water quality in Calleguas Creek, Mugu Lagoon, and the Pacific Ocean. NBVC Point Mugu also reduces the amount of pollutants in storm water discharges by implementing BMPs at industrial facilities. BMPs can include structural modifications including skimmer dams, spill-control gates, oil/water separators, and roof and canopy structures over waste storage areas; or pollution prevention training for personnel.

### 3.2.3 AFFECTED ENVIRONMENT

Water resources in the Project Area include the intertidal zone along the shoreline at the West and Central revetments and the saltmarsh wetlands at the proposed relocation sites for the airfield lighting equipment. Water resources along the shoreline potentially affected by the Proposed Action are limited to these areas.

#### 3.2.3.1 Water Quality at NBVC Point Mugu

While quantitative water quality data are not known to be available for NBVC Point Mugu and surrounding areas, general qualitative assessments of local surface and groundwater quality conditions are provided in the Final INRMP (U.S. Department of the Navy 2013a). The INRMP identifies a number of issues related to water quality, including sea water intrusion and the discharge of urban and agricultural-related contaminants such as sediment, chemical pesticides and fertilizers, and metals. Past Navy practices are also cited as potential sources of water quality contamination. Based on these conditions, the INRMP generally identifies existing water quality in the Semi-Perched Groundwater Aquifer as poor, while the underlying Oxnard Aquifer is characterized as containing high-quality groundwater (except in areas where seawater intrusion has occurred).

While no characterization of surface water quality is provided in the INRMP, portions of the Calleguas Creek watershed (including segments of Calleguas Creek and Mugu Lagoon) are included on the most recent (2010) CWA 303(d) List of Water Quality Limited Segments Requiring Total Maximum Daily Loads (TMDLs) (California State Water Resource Control Board 2014). TMDLs establish the maximum amount of a substance or stressor that a water body can assimilate and still meet water quality standards. Existing TMDLs identified for various portions of the Calleguas Creek watershed within and upstream of NBVC include toxicity, nutrients, salts, trash, and metals. Based on the described conditions, local surface water quality at NBVC Point Mugu is generally considered to be moderate to poor.

#### 3.2.3.2 Intertidal Zone

The width of the intertidal zone along a shoreline is defined as the average distance between high tide and low tide. Tides in Southern California are mixed semidiurnal, with two different high tides and two different low tides each day. The average tidal range, that is, the difference in height between mean high water (MHW) and MLW, is 3.7 ft. The diurnal range, or difference in height between MHHW (the higher of the two high tides) and MLLW (the lower of the two low tides), is 5.4 ft. (U.S. Department of the Navy 2012a). The width of the intertidal zone fluctuates with the tidal range and can be estimated as

the product of the horizontal gradient (or slope) in the nearshore littoral zone and the tidal range (Boon 2004).

The nearshore slope at the West Revetment is 1:45 (i.e., for every 45 ft. in the horizontal direction, the elevation changes by 1 ft.). For a mean tidal range of 3.7 ft. and a 1:45 slope, the mean width of the intertidal zone would be approximately 167 ft. At the Central Revetment, the nearshore slope is 1:35, and the mean width of the intertidal zone is 130 ft. (U.S. Department of the Navy 2012a). The tidal range and the slope of the intertidal zone fluctuate seasonally as well as daily, resulting in variations in the width of the intertidal zone over different time scales.

#### 3.2.3.3 Waves

Waves are the primary driver of longshore sediment transport, which affects the availability of sand on the beaches at NBVC Point Mugu. Large waves created by storms or large offshore swells are the primary cause of damage to the revetments and infrastructure on the base. Understanding the wave climate at a beach is of particular importance to the design of shoreline protection devices (U.S. Department of the Navy 2012a). The NBVC Point Mugu coastline faces southwest, and this orientation combined with the proximity of the Channel Islands, provides some protection from large Pacific swells. Waves approaching the NBVC coastline from the northwest are the largest and carry the most energy, and are likely to do the most damage to the shoreline and infrastructure. Waves also approach the coast from the south, southwest, and southeast, but tend to be smaller and less energetic. (U.S. Department of the Navy 2012a). These southerly waves, however, are refracted (or bent) by the Mugu Submarine Canyon and focused on the NBVC Point Mugu shoreline resulting in greater wave heights than occur elsewhere along the coast.

Offshore storms have generated waves with heights between 12 and 19 ft. approaching NBVC Point Mugu from the northwest through the Santa Barbara Channel (U.S. Department of the Navy 2012a). The design of shoreline protection structures, like the West and Central revetments, must consider the maximum height of waves potentially impacting the structure. In addition to wave height, the storm-generated increase in the water level, sea-level rise, and the amount of scour occurring at the base of a structure factor into estimating the maximum wave height that a structure must be capable of withstanding (U.S. Army Corps of Engineers 2003). Based on estimates of these factors, the West Revetment must be capable of withstanding waves between 8.3 and 10.9 ft., and the Central Revetment must be able to withstand waves between 9.2 and 17.2 ft. (U.S. Department of the Navy 2012a).

#### 3.2.3.4 Longshore Current

The dominant surface current influencing the transport of sediments in the littoral zone is the longshore current (Patsch and Griggs 2008). A longshore current moves parallel to (or along) the shore, either up-coast of down-coast depending on the direction from which waves approach and break on the beach. Along the shoreline of NBVC Point Mugu, and generally along the entire California coastline, waves approach from the northwest which results in a down-coast (north to south) longshore current for most of the year. However, at NBVC Point Mugu, when a large southerly swell generates waves approaching from the south, the longshore current can reverse and flow up-coast (southeast to northwest) (Patsch and Griggs 2008). Longshore currents are instrumental in the transport of sediments within a littoral cell and determining where sediments accumulate and erode on beaches along the shoreline (see Section 3.1, Topography and Sediments).

Sea surface temperature and salinity in nearshore and offshore waters can be a factor influencing the occurrence of some marine species (Chavez et al. 2003). The sea surface temperature in waters off the

coast of NBVC Point Mugu varies seasonally from approximately 16 to 20 degrees Celsius (°C) (61 to 68 degrees Fahrenheit [°F]) in summer to 13 to 16°C (55 to 61°F) in winter (Surf-forecast.com 2015). Data from the Newport Beach/Balboa water quality station located down-coast from NBVC Point Mugu are representative of nearshore ocean data in the region. Average monthly salinity from 1925 through 2014 show that salinity varies seasonally ranging between 33.30 in February and 33.66 in June and July (Scripps Institute of Oceanography 2011, 2014). The greatest effect on salinity is the influx of freshwater from the Santa Ana River following regional precipitation, which lowers nearshore surface salinity values. Surface salinity increases during warmer, drier periods when surface evaporation is greatest (Pickard and Emery 1990).

#### 3.2.3.5 Wetlands

Wetland habitats are complex, varied, and constantly in flux and consist of interconnected physical and biological components that together define the wetland. This section is limited to a discussion of water quality at the two sites proposed for relocating the airfield lighting equipment housed in Building PM-812. Section 3.3.1.2 (Vegetation) discusses vegetation present at these sites, and Section 3.1 (Topography and Sediments) describes the substrate at the two sites.

Wetlands play a valuable role in the environment both ecologically and physically. Wetlands are ecologically important in that they provide food, spawning and nursing grounds, and habitat for many species. Physically, wetlands not only help absorb floodwater runoff, but also act as natural water treatment centers, filtering out large amounts of nutrients and waterborne pollutants and protecting the quality of the water in the area (Miller 1994). There are 2,139 ac. of wetlands on NBVC Point Mugu, 48 percent of its total area (4,490 ac.). The two proposed relocation sites at Tide Gate #844 and South M Avenue are both located adjacent to saltmarsh wetlands (U.S. Department of the Navy 2013a). Mugu Lagoon is the largest body of water on NBVC Point Mugu. Mixing and circulation rates in the eastern end of the Lagoon are greater than at the western end of the lagoon, because the eastern end is heavily influenced by the tidal fluctuations at the mouth of the lagoon and freshwater input from Calleguas Creek. Mixing and flushing rates at the western end of the lagoon far from the mouth of the lagoon and major sources of freshwater input are significantly lower. The Proposed Action Area does not overlay with Mugu Lagoon and is far enough upstream where no impacts to the lagoon would be expected. Mugu Lagoon is also part of the Laguna Point to Latigo Point Area of Special Biological Significance (ASBS), which is located along the coast and in offshore waters in both Los Angeles and Ventura counties. The Laguna Point to Latigo Point ASBS is the largest of the mainland ASBS in Southern California, with 24 mi. of coastline and 11,842 ac. of marine habitat. Water quality in California's ASBS are monitored and maintained by the State Water Resources Board. The NBVC Point Mugu and Mugu Lagoon are located at the northern boundary of the Laguna Point to Latigo Point ASBS. Pollution threatening the ASBS originates from hundreds of direct discharges including those from roads, landscapes, and businesses. No discharges of pollutants into coastal waters are expected during construction activities at the Central and West revetments; therefore, there would be no effects to the ASBS.

The saltmarsh wetlands on NBVC Point Mugu are subject to wide-ranging fluctuations in water level, salinity, and water temperature. At high tide, the saltmarsh is inundated with cooler, high-salinity water from offshore, and much of the substrate and vegetation may be submerged. When the tide recedes only a few hours later, the water level in the marsh drops and previously submerged areas are exposed to the sun and warmer, drier air in summer and possibly colder air in winter (Boon 2004). On a hot, sunny day, the water temperature can rise several degrees over a short period of time, which may result in excess evaporation. Freshwater input from upland streams or creeks can dramatically lower the

salinity in the marsh, particularly following heavy precipitation. The plants and animals that have adapted live in this dynamic environment are also vulnerable to dramatic changes in the daily, seasonal, and annual cycles of the wetland (see Section 3.3, Biological Resources).

#### 3.2.3.6 Flooding

The generally level topography and typically saturated soil conditions over much of NBVC Point Mugu are contributing factors to the serious flooding and drainage problems on the installation. About half of the installation is located within the 100-year flood zone for Calleguas Creek (U.S. Department of the Navy 2013a). Historically, flooding has caused drainage problems and damage to infrastructure on the base, necessitating the construction of shoreline protection structures like revetments and the groin field on Ormond Beach (U.S. Department of the Navy (2012a).

### 3.2.4 Environmental Consequences to Water Resources

The potential impacts to the water resources in the Project Area from the Proposed Action are discussed in this section. As described in Section 3.2.1 (Affected Environment), water resources in the Project Area include nearshore, intertidal marine waters, and brackish waters in saltmarsh wetlands at the two relocation sites for the airfield lighting equipment housed in Building PM-812.

#### 3.2.4.1 Alternative 1: Shoreline Protection Alternative (Preferred Alternative)

Under Alternative 1, the Navy would repair and increase the width and height of the Central and West revetments, extend the eastern end of the West Revetment down-coast by approximately 125 ft. to protect Building PM-812 and Beach Road, replenish the sand dune down-coast of the eastern end of the West Revetment, relocate equipment and infrastructure in Building PM-812 to the relocation site at Tide Gate #844, recontour the dunes at Ormond Beach and Holiday Beach, and repair and repave Beach Road near the intersection with South M Avenue.

##### 3.2.4.1.1 Intertidal Zone

As described in Section 3.2.3.2 (Intertidal Zone), marine waters between MHW and MLW seaward of the West and Central revetments may be affected by the Proposed Action. Construction vehicles and equipment, such as dump trucks and cranes, would transport and install armor stone at the revetments, including within the intertidal zone. The activity would likely loosen and introduce additional sandy sediments into the water column of intertidal and nearshore waters. Additional suspended sediments would result in an increase in turbidity, reducing water quality and potentially affecting biological resources that may be present in nearshore waters.

Although increases in turbidity may occur, any impacts would be localized and temporary, lasting only as long as equipment and materials are being used on site. After construction activity is complete, sedimentation and turbidity levels would quickly return to pre-construction levels as less turbid, up-coast waters are transported into the local intertidal zone. Sediments entrained in the water column would be transported down-coast and deposited on beaches or be transported offshore as part of natural longshore transport within the littoral cell (Section 3.1, Topography and Sediments). The seaward face of the revetments would be constructed or repaired to establish a 2:1 (horizontal to vertical) slope, which is similar to existing conditions at the intact sections of the revetments. After construction activities at the revetments are complete, sedimentation in intertidal waters would be no different than before construction began.

Stone, sand, and other materials (e.g., filter cloth) used to repair and expand the West and Central revetments would be free from chemical contaminants that have the potential to impact water quality

in nearshore waters. A Hazardous Materials Plan would be prepared that outlines procedures for the use and clean-up of hazardous materials (e.g., fuel) should an accidental spill occur (see Section 2.5.2.3, Hazardous Materials).

Replenishing the sand dune down-coast of the West Revetment would require depositing a significant amount of sand onto the beach. The exact quantity would be determined once engineering plans are finalized. Wind and waves can rapidly erode unprotected or unstabilized sand dunes, particularly during storms or other high wind, high water events. Under these conditions, sand eroded from the dune would become entrained in waters of the intertidal zone, resulting in a greater rate of deposition on down-coast beaches (e.g., Holiday Beach). Introducing greater amounts of suspended sand into the water column of the intertidal zone would increase turbidity; however, intertidal waters are already highly turbid due to the dynamic, high-energy nature of the intertidal zone, so no measurable change is anticipated. The replenished dune would be stabilized using sand dune fencing and by planting native vegetation, which would help to maintain the dune and minimize erosion from wind and waves. Therefore, implementation of Alternative 1 would not result in significant impacts on intertidal and nearshore waters in the Project Area.

#### 3.2.4.1.2 Waves

As described in Section 3.2.3.3 (Waves), the intensity and direction of approaching waves along the coastline at NBVC Point Mugu is the primary driver of the longshore current and littoral transport within the Santa Barbara Littoral Cell (U.S. Department of the Navy 2012a; Patsch and Griggs 2008). Unlike other shoreline structures, such as an offshore breakwater, a revetment does not alter the intensity or direction of approaching waves. A revetment absorbs and reflects wave energy as waves break against the revetment, protecting structures on the landward side of the revetment. The deposition and entrainment of sand at the revetments by breaking waves would be the same as it is under existing conditions. Reducing the slope of the seaward face of the revetments to 2:1 in areas where the face is steeper and repairs are needed would reduce the rate of scour from backwash at the toe of the revetments. However, beach directly seaward of the revetments may eventually have a steeper slope than adjacent beaches where a revetment is not installed. The proposed repairs and enhancements made to the West and Central revetments and the expansion of the West Revetment would not affect the direction or energy of waves approaching the shoreline and would not significantly alter littoral transport in the Santa Barbara Littoral Cell. The wave climate at beaches adjacent to the revetments would not be affected. No effect on the wave climate would occur from sand dune replenishment. Therefore, implementation of Alternative 1 would not result in significant impacts on the wave climate along the shoreline of the Project Area.

#### 3.2.4.1.3 Longshore Current

As described in Section 3.2.3.4 (Longshore Current), the longshore current transports water, nutrients, and sediments down-coast within the Santa Barbara Littoral Cell, which extends from the Santa Maria River to the Mugu Submarine Canyon. Slight changes to the beach topography by extending the West Revetment and repairing and reinforcing the West and Central revetments would not significantly change littoral transport of beach sand along the NBVC Point Mugu coastline. No effect on the longshore current would occur from the repair and expansion of the revetments or from sand dune replenishment at the eastern end of the West Revetment. The Proposed Action would not significantly increase nor decrease net littoral transport of sediments within the Santa Barbara Littoral Cell. Therefore, implementation of Alternative 1 would not result in significant impacts on the longshore current or longshore transport in the Project Area.

#### 3.2.4.1.4 Wetlands

As described in Section 3.2.3.5 (Wetlands), wetlands cover nearly half of the total area of NBVC Point Mugu. Under Alternative 1, the airfield lighting equipment and infrastructure currently housed in Building PM-812 would be relocated to a new 5,500 $ft.^2$ (0.13 ac.) site located adjacent to Tide Gate #844. While USACE jurisdictional saltmarsh wetlands surround the tide gate site, the site and MAD Road, which provides access to the site, are elevated above the flood plain on disturbed substrate that is more consistent with upland habitat. It is anticipated that no wetlands would need to be filled to accommodate the new structure and parking spaces. However, because the actual footprint of the new construction will not be available until preliminary engineering plans are available, it is assumed for the purposes of analysis that 5,500 $ft.^2$ (0.13 ac.) of wetland area would be permanently impacted. There is the potential for runoff of sediments and debris entering adjacent wetland areas from the construction site; however, any impacts resulting from sedimentation due to runoff would be temporary. To minimize the potential for impacts (e.g., an increase in turbidity), sediment fences would be installed during construction activities.

If adequate onsite utilities are not available at the Tide Gate #844 site, utilities would be routed to the site via existing utility corridors (e.g., along roadways). The installation of new utilities, including a connection to the airfield (Runway 03-21), may require directional drilling beneath the wetland from the Tide Gate #844 site. Directional drilling to install utility cables is expected to have a negligible impact on wetlands, because the drilled corridor would be beneath the wetland and only penetrate silty clay sediments and not damage root systems of above-ground vegetation (Section 3.3.2.1.2, Environmental Consequences for Vegetation). Utilities may be above or below ground, and would be located to minimize impacts to environmental resources. The final footprint for utilities will be identified once the design and final engineering drawings for the relocation site are available.

Potential, long-term impacts to water quality at the site from contaminants (e.g., engine oil) associated with parked vehicles may occur. To minimize this impact, the final design of the site would include LID strategies as described in Section 2.5.2.2 (Water Resources). Any impacts to wetlands would be offset through the Wetlands Restoration Program at NBVC Point Mugu as described in Section 2.5.2.2 (Water Resources). Therefore, implementation of Alternative 1 would not result in significant impacts on the water quality of wetlands at the Tide Gate #844 relocation site.

### 3.2.4.2 Alternative 2: South M Street Alternative

The only difference between Alternative 2 (South M Avenue Alternative) and Alternative 1 (Preferred Alternative) is the relocation site for the equipment and infrastructure currently located in Building PM-812 on Beach Road. Instead of relocating the airfield lighting equipment in the building to the Tide Gate #844 site, the equipment would be relocated to a building on South M Avenue (the current site of Building PM-81) (Figure 2-12 and Figure 2-16). The building footprint and utility requirements at the South M Avenue site would be similar to those at the Tide Gate #844 site. The structure at the PM-81 site, which is currently located on the South M Avenue site, would need to be expanded to approximately 5,500 $ft.^2$ (0.13 ac.) or removed to accommodate the new building.

#### 3.2.4.2.1 Intertidal Zone

Potential impacts to water quality in the intertidal zone would be identical to impacts described under Alternative 1, because all proposed construction activities occurring along the shoreline are the same (Section 3.2.4.1.1, Intertidal Zone). Therefore, implementation of Alternative 2 would not result in significant impacts on intertidal and nearshore waters in the Project Area.

#### 3.2.4.2.2 Waves

Potential impacts to the wave climate would be identical to impacts described under Alternative 1, because all proposed construction activities occurring along the shoreline are the same (Section 3.2.4.1.2, Waves). Therefore, implementation of Alternative 2 would not result in significant impacts on the wave climate at the shoreline portion of the Project Area.

#### 3.2.4.2.3 Longshore Current

Potential impacts to the longshore current would be identical to impacts described under Alternative 1, because all proposed construction activities occurring along the shoreline are the same (Section 3.2.4.1.3, Longshore Current). Therefore, implementation of Alternative 2 would not result in significant impacts on the longshore current or longshore transport in the Project Area.

#### 3.2.4.2.4 Wetlands

Fill materials would be required to expand the existing foundation pad at the South M Avenue site to accommodate the larger footprint of the new building and spaces for parking. Up to 5,500 $ft.^2$ (0.13 ac.) of wetlands may be permanently impacted by expanding the pad, which equates to 0.007 percent of the approximately 2,139 ac. of wetlands at NBVC Point Mugu. Impacts to water quality, including an increase in turbidity, in the immediate area of the pad would occur. However, the semidiurnal tidal cycle would provide regular flushing of turbid waters, which would limit any impacts to water quality. In addition, sediment fences would be installed to limit runoff from construction activities. Only temporary impacts from construction activities would be expected.

Potential, long-term impacts to water quality at the site from contaminants (e.g., engine oil) associated with parked vehicles may occur. To minimize this impact, the final design of the site would include LID strategies as described in Section 2.5.2.2 (Water Resources).

The installation of power cables and other utilities may be needed at the South M Avenue site. Directional drilling to install utility cables is expected to have a negligible impact on wetlands, because the drilled corridor would be deep enough beneath the wetland to only penetrate silty clay sediments and not damage root systems of above-ground vegetation (Section 3.3.2.1.2, Environmental Consequences for Vegetation). No impacts to water quality from the installation of subterranean utility cables is anticipated. The final footprint for utilities will be identified as needed once the design and final engineering drawings for the site are available.

Relocating equipment and infrastructure to the South M Avenue site would result in the loss of less than one acre of wetland. The Navy has over 30 ac. of proactively restored wetlands that could be used to offset this loss. Furthermore, over 120 ac. of wetlands have been identified on NBVC Point Mugu as potential wetland restoration sites for projects such as the Proposed Action (U.S. Department of the Navy 2014c). An assessment of the restored sites would be conducted to determine appropriate type and acreage to be used for mitigation of the impacted acre. Therefore, implementation of Alternative 2 would not result in significant impacts on the water quality of wetlands at the South M Avenue relocation site.

### 3.2.4.3 Alternative 3: Beach Sand Replenishment (With Revetment Repair)

Under Alternative 3, the West Revetment would not be extended and the equipment and infrastructure currently housed in Building PM-812 would not be relocated. The existing building would be maintained in its current location on Beach Road. All other components of Alternative 1 would be implemented. The Navy would repair and increase the width and height of the Central and West revetments, replenish the sand dune down-coast of the eastern end of the West Revetment to protect Building PM-812 and Beach Road, and repair and repave Beach Road near the intersection with South M Avenue.

#### 3.2.4.3.1 Intertidal Zone

The types of potential impacts to water quality in the intertidal zone would be identical to impacts described under Alternative 1; however, the probability of impacts would be lower, because the West Revetment would not be expanded down-coast (Section 3.2.4.1.1, Intertidal Zone). Therefore, implementation of Alternative 3 would not result in significant impacts on intertidal and nearshore waters in the Project Area.

#### 3.2.4.3.2 Waves

The types of potential impacts to the wave climate would be identical to impacts described under Alternative 1; however, the probability of impacts would be lower, because the West Revetment would not be expanded down-coast (Section 3.2.4.1.2, Waves). Therefore, implementation of Alternative 3 would not result in significant impacts on the wave climate at the shoreline portion of the Project Area.

#### 3.2.4.3.3 Longshore Current

The types of potential impacts to the longshore current would be identical to impacts described under Alternative 1, because all proposed construction activities occurring along the shoreline are the same (Section 3.2.4.1.3, Longshore Current). Therefore, implementation of Alternative 3 would not result in significant impacts on the longshore current or longshore transport in the Project Area.

#### 3.2.4.3.4 Wetlands

Under Alternative 3, the equipment and infrastructure currently house in Building PM-812 would not be relocated to either of the proposed relocation sites. Therefore, implementation of Alternative 3 would not result in significant impacts on water resources at the relocation sites.

### 3.2.4.4 No Action Alternative

Under the No Action Alternative, none of the proposed construction activities would be conducted. The West and Central revetments would not be repaired or expanded, the dune at the eastern end of the West Revetment would not be replenished, the equipment housed in Building PM-812 would not be relocated to either of the two proposed sites, the dunes at Ormond Beach and Holiday Beach would not be recontoured, and Beach Road would not be cleared and repaired near the intersection of South M Avenue. Therefore, implementation of the No Action Alternative would not result in significant impacts on water resources in the Project Area.

## 3.3 BIOLOGICAL RESOURCES

### 3.3.1 AFFECTED ENVIRONMENT

#### 3.3.1.1 Protected Species

Protected and special status species include the following:

- Species listed and proposed for listing as threatened or endangered under the ESA;
- Species listed or proposed for listing as threatened or endangered under the California ESA;
- California Fully Protected Species;
- California Species of Special Concern;
- Plant species listed as sensitive by the California Native Plant Society;
- Marine mammals protected under the Marine Mammal Protection Act (MMPA);
- Nesting birds protected by the Migratory Bird Treaty Act (MBTA);
- Golden eagles and bald eagles protected under the Bald and Golden Eagle Protection Act; and
- Birds considered Federal Birds of Conservation Concern.

Table 3-1 lists federal and state listed wildlife and plant species and other special status species that occur or have the potential to occur within the Project Area and its vicinity. Potential occurrence was determined based on past documentation of special status species within the vicinity of the Project Area (U.S. Department of the Navy 2013a) and on suitability of habitat and occurrence within the region of a particular species. Several species were excluded from potential occurrence because they either do not occur at the site during the time construction activities would occur (October 1 to February 15), they do not breed within the Project Area and their special status affords them protection during their breeding period, they do not occur in a manner that affords them special status protection (i.e., rookeries or nesting colonies), or past occurrence is based on observations of isolated individuals outside of their established range (e.g., vagrant birds).

**Table 3-1: Protected Species Potentially Occurring at NBVC Point Mugu and within the Project Area of the Proposed Action**

| Species | Status | | Base Presence[1] | Presence within Project Area[1] |
|---|---|---|---|---|
| | Federal | State | | |
| **Plants** | | | | |
| Salt Marsh Bird's-Beak (*Chloropyron maritimum* ssp. *maritimum*) | FE | SE | Present | Not Present |
| **Fishes** | | | | |
| Tidewater Goby (*Eucyclogobius newberryi*) | FE | SSC | Present | Not Present |
| **Reptiles** | | | | |
| Two-striped Gartersnake (*Thamnophis hammondii*) | | SSC | Uncommon | Not Present |
| Pacific Pond Turtle (*Actinemys marmorata pallida*) | | SSC | Common | Not Present |
| **Birds** | | | | |
| California brown pelican (*Pelecanus occidentalis californicus*) | DL | DL, FP | Common | Common |
| Brant (wintering and staging) (*Branta bernicula*) | | SSC | Common | Not Present |
| Merlin (wintering) (Falco columbarius) | | WL | Common | Common |
| Peregrine falcon (*Falco peregrines*) | DL, BCC | DL | Common | Common |
| Golden eagle (*Aquila chrysaetos*) | BGEPA | FP | Rare | Not Present |
| Ferruginous hawk (wintering) (*Buteo regalis*) | BCC | - | Uncommon | Not Present |
| Northern harrier (nesting) (*Circus cyaneus*) | - | SSC | Common | Uncommon |
| Light-footed Ridgeway's rail (*Rallus obsoletus levipes*) | FE | SE | Common | Common |
| Western snowy plover (*Charadrius nivosus nivosus*) | FT | SSC | Common | Common |
| Black oystercatcher (*Haematopus bachmani*) | BCC | - | Uncommon | Uncommon |

**Table 3-1: Protected Species Potentially Occurring at NBVC Point Mugu and within the Project Area of the Proposed Action (continued)**

| Species | Status | | Base Presence[1] | Presence within Project Area[1] |
|---|---|---|---|---|
| | Federal | State | | |
| Red knot (*Calidris canutus*) | BCC | - | Common | Not Present |
| Short-billed dowitcher (*Limnodromus griseus*) | BCC | - | Common | Uncommon |
| Marbled godwit (*Limosa fedoa*) | BCC | - | Common | Common |
| Long-billed curlew (*Numenius americanus*) | BCC | - | Common | Common |
| California least tern (*Sterna antillarum browni*) | FE | SE | Common | Common |
| Burrowing owl (*Athene cunicularia*) | BCC | SSC | Common | Uncommon |
| Allen's hummingbird (*Selasphorus sasin*) | BCC | - | Common | Not Present |
| Loggerhead Shrike (*Lanius ludovicianus*) | BCC | SSC | Common | Common |
| Least Bell's Vireo (*Vireo bellii pusillus*) | FE | SE | Rare | Not Present |
| Belding's savannah sparrow (*Passerculus sandwhichensis beldingi*) | - | SE | Common | Common |
| Tri-colored blackbird (*Agelaius tricolor*) | BCC | SE, SSC | Uncommon | Not Present |
| **Mammals** | | | | |
| California saltmarsh shrew (*Sorex ornatus salicornicus*) | - | SSC | Uncommon | Uncommon |
| California sea lion (*Zalophus californianus*) | MMPA | - | Uncommon | Uncommon |
| Northern Elephant seal (*Mirounga angustirostris*) | MMPA | - | Uncommon | Uncommon |
| Pacific harbor seal (*Phoca vitulina*) | MMPA | - | Common | Uncommon |
| Pallid bat (*Antrozous pallidus*) | | SSC | Uncommon | Not Present |
| Western mastiff bat (*Eumops perotis californicus*) | | SSC | Uncommon | Not Present |
| Pocketed free-tailed bat (*Nyctinomops femorosaccus*) | | SSC | Uncommon | Not Present |
| Western red bat (*Lasiurus blossevillii*) | | SSC | Uncommon | Not Present |
| Big free-tailed bat (*Nyctinomops macrotis*) | | SSC | Uncommon | Not Present |
| South coast marsh vole (*Microtus californicus stephensi*) | - | SSC | Uncommon | Uncommon |

[1] Base presence assigned per the INRMP for NBVC Point Mugu
Notes: FE = Federal Endangered, FT = Federal Threatened, SE = State Endangered, ST = State Threatened, BCC = Federal Bird Species of Conservation Concern, SSC = California Species of Special Concern, DL = Delisted, FP = Fully Protected, MMPA = Marine Mammal Protection Act, BGEPA = Bald and Golden Eagle Protection Act, USFWS = United States Fish and Wildlife Service, CDFW = California Department of Fish and Wildlife
Source: U.S. Department of the Navy 2013a

The following three federally listed species, salt marsh bird's-beak, tidewater goby, and least Bell's vireo, are found or have been found on NBVC Point Mugu, but not within the Project Area. As a result, they are not carried forward for analyses of impacts in this EA.

***Salt marsh bird's-beak.*** At NBVC Point Mugu, this species is primarily distributed west of Runway 3/21 (U.S. Department of the Navy 2013a). In 2015, the extent of potential habitat and past localities were mapped at NBVC Point Mugu (U.S. Department of the Navy 2015a). None of the Project Areas associated with the Proposed Action have suitable habitat for salt marsh bird's beak.

***Tidewater goby.*** This species had been thought to be extirpated from NBVC Point Mugu but was rediscovered in Calleguas Creek, at the northeastern edge of the installation in 2011 (Bonterra Consulting 2011). Downstream of this locality, water salinity increases significantly and, because of the lack of freshwater influence, it is unlikely that tidewater gobies would be found in other parts of the estuary except as transitory individuals during runoff events (U.S. Department of the Navy 2013a).

***Least Bell's Vireo.*** There have been sporadic records of this species in various willow patches at NBVC Point Mugu since 2009 (U.S. Department of the Navy 2013a). These observations have been of one or two individuals on rare occasions (U.S. Department of the Navy 2011, 2013a). The Project Area does not include suitable habitat for least Bell's vireo.

The three federally listed species that have the potential to occur within or near the Project Area are described below.

#### 3.3.1.1.1 Light-Footed Ridgway's Rail

The U.S. Fish and Wildlife Service (USFWS) listed the light-footed clapper rail (*Rallus longirostris levipes*) as endangered in 1970 (35 Federal Register [FR] 16047–16048). In 2014, rail taxonomy was re-organized and west coast clapper rails were moved to species *R. obsoletus*. The accepted common name was changed to Ridgway's rail; thus, this subspecies is now recognized as the light-footed Ridgeway's rail (*Rallus obsoletus levipes*; Chesser et al. 2014). The USFWS has not designated critical habitat for this subspecies. Light-footed Ridgway's rails are present on NBVC Point Mugu throughout the year and forage along mudbanks bordering shallow tidal creeks and within marsh vegetation. Light-footed Ridgway's rails inhabiting NBVC Point Mugu nest in spiny rush (*Juncus acutus* spp. *leopoldii*), which grows at the upper marsh/lower marsh fringe, from mid-March to July. During winter high flow events, rails will move into to dry upland vegetated habitat adjacent the marsh (U.S. Department of the Navy 2013a). Twenty-two nesting pairs were been documented on NBVC Point Mugu in 2012 and 23 nesting pairs were documented in 2013 (U.S. Department of the Navy 2013a, U.S. Department of the Navy 2015a). Within the Project Area, light-footed Ridgway's rail habitat is found at the relocation site at South M Avenue, adjacent to Building PM-812, and at the eastern end of the West Revetment where the proposed extension would be located (Figure 2-6).

#### 3.3.1.1.2 Western Snowy Plover

The USFWS listed the Pacific coast population of the western snowy plover as federally threatened in 1993 (58 FR 12864–12874). The USFWS designated critical habitat for this species in 1999 and revised this designation on September 29, 2005 (70 FR 56969-57119). NBVC Point Mugu was exempted from critical habitat designation under section 4(a)(3)(B)(i) of the ESA and in accordance with the Sikes Improvement Act (16 U.S.C. § 670a–670o) with the implementation of the installation's INRMP. Western snowy plovers nest on sandy beaches, dry salt flats, barrier beaches, and dune-backed beaches with loose substrate (Wilson 1980; Page and Stenzel 1981; Powell et al. 1997). On NBVC Point Mugu, western

snowy plovers are present throughout the year on the beaches and salt pannes (U.S. Department of the Navy 2013a). Nesting occurs between March 1 and September 15, primarily on open sandy flat areas along the shoreline (U.S. Department of the Navy 2013a). Nesting occasionally occurs on the airfield, developed concrete and asphalt pads, and salt pannes far from beach habitats (U.S. Department of the Navy 2013a). Western snowy plover habitat is found throughout the Project Area from the western end of the Central Revetment past the eastern end of the West Revetment (Figure 1-4).

#### 3.3.1.1.3 California Least Tern

The USFWS listed the California least tern as federally endangered in 1970 (35 FR 16047–16048). Critical habitat for this species has not been designated. The California least tern is the smallest of the North American terns and is found along the Pacific Coast of California, from San Francisco southward to Baja California. The California populations are localized and increasingly fragmented, due to coastal development resulting in habitat loss. California least terns are migratory and winter along the Pacific coast of southern Mexico and the Gulf of California. Least terns arrive at breeding grounds around the last week of April and typically return to wintering grounds in August. California least terns nest in colonies on relatively open beaches that are free of vegetation as a result of tidal or wind action. Nesting on NBVC Point Mugu primarily occurs in two locations: Ormond East Beach, and Holiday Beach (U.S. Department of the Navy 2013a). Ormond East Beach is located northwest (or up-coast) of the West Revetment and extends beyond the groin field; Holiday Beach is located down-coast of the West Revetment. The nesting population at Ormond East Beach has increased significantly, from 266 nests in 1998 to 844 nests in 2012 (U.S. Department of the Navy 2013a). In addition, Mugu Lagoon provides important foraging habitat. Within the Project Area, nesting habitat is found on Holiday Beach, located between the Central and West revetments.

### 3.3.1.2 Vegetation

NBVC Point Mugu consists of a developed area, dominated by non-native vegetation, and a large salt marsh estuary and beach that supports a variety of native plants and wildlife, including special status species. The Project Area is primarily located along a south to southwest facing beach encompassing developed areas, including the areas around Buildings PM-7020, PM-761, PM-759, and PM-812, and the degraded beach and coastal dune system west of Building PM-7020 (Figure 2-1) extending to the end of the West Revetment (Figure 1-2). These areas are largely devoid of vegetation, due to anthropogenic impacts or sand movement, and are heavily impacted by nonnative species. The potential project laydown areas (Figure 2-5) are heavily impacted by vehicle parking and traffic and only support sparse, mainly non-native vegetation, including lollypop tree (*Myoporum laetum*), iceplant (*Carpobrotus* spp.), and telegraph weed (*Heterotheca grandiflora*). The coastal dunes and upper beach support native vegetation, including red sand verbena (*Abronia maritima*), beach-bur (*Ambrosia chamissonis*), dune saltbush (*Atriplex leucophylla*), beach morning glory (*Calystegia soldanella*), beach evening primrose (*Camissoniopsis cheranthifolia*), saltgrass (*Distichlis spicata*), and seaside heliotrope (*Heliotropium curassavicum*). Relatively large patches of nonnative European beachgrass (*Ammophila arenaria*) and iceplant (*Carpobrotus* spp. and *Mesembryanthemum* spp.) also occur in this area, along with sea rocket (*Cakile maritima*).

The preferred relocation site for the airfield lighting equipment housed in Building PM-812 is the site at Tide Gate #844 (Figure 2-13). The area surrounding the site is within USACE Jurisdictional Wetlands and salt marsh habitat. The alternative relocation site at South M Avenue Site #81 (Figure 2-12) is also within USACE Jurisdictional Wetlands and includes salt marsh and mudflat habitat. Within the Project Area, salt marsh habitat supports native species, including perennial pickleweed (*Salicornia pacifica*), jaumea

(*Jaumea carnosa*), alkali heath (*Frankenia salina*), sea lavender (*Limonium californicum*), saltgrass (*Distichlis spicata*), and glasswort species (*Salicornia bigelovii* and *S. depressa*). Nonnative plants found in this area include iceplant, mustards (*Brassica* spp.), and weedy grasses (*Bromus* spp. and *Avena* spp.).

#### 3.3.1.3 Birds

Sandy beach, coastal fore dune, coastal salt marsh, and disturbed habitats within the Project Area on NBVC Point Mugu provide habitat for multiple special status bird species. Special status bird species that may occur within or adjacent to the Project Area include: light-footed Ridgway's rail, California least tern, and western snowy plover, which are listed on the Federal Endangered Species Act of 1973; their biology and potential occurrence within the Project Area is detailed in Section 3.3.1.1 (Protected Species). In addition to federally listed bird species, the Project Area provides habitat for California state-listed species, species listed on the California Special Animals List, and species protected under the MBTA.

The California state endangered Belding's savannah sparrow may nest and forage in salt marsh and beach habitat within the Project Area (U.S. Department of the Navy 2013a). This species is common on NBVC Point Mugu (U.S. Department of the Navy 2013a), making utilization of the Project Area by these species possible.

Some birds that are expected to commonly occur within the Project Area also have special status. The California brown pelican has been delisted from both the federal and state endangered species lists, but is still designated by California as a Fully Protected Species. Brown pelicans are unlikely to, but may, utilize beach and revetment habitats within the Project Area for roosting and resting. The loggerhead shrike (*Lanius ludovicianus*), a USFWS bird of conservation concern and California state species of concern, is another common species on NBVC Point Mugu. Shrikes would be expected to utilize all portions of the Project Area for foraging. For a complete list of protected bird species that may occur within the Project Area, see Table 3-1.

Most native bird species are protected under the MBTA, which provides protection to adults, young, and eggs. This would include common species such as the black phoebe (*Sayornis nigricans*) and barn swallow (*Hirundo rustica*), which may forage and construct mud nests on structures within the Project Area. House finches (*Haemorhous mexicanus*), which may use shrubs and structures within the Project Area for nesting, are also protected under the MBTA.

#### 3.3.1.4 Mammals

Information on mammals that may occur within or near the Project Area is taken mainly from the *Final Integrated Natural Resources Management Plan (INRMP) Naval Base Ventura County Point Mugu and Special Areas, California* (U.S. Department of the Navy 2013a). A complete list of mammals known to occur on or in the vicinity of NBVC Point Mugu is in Appendix G of the INRMP. This section focuses on terrestrial and marine mammals that are or may be present in the Project Area.

Five mammals with Federal or state protected status that may be present in the vicinity of the Project Area are California saltmarsh shrew (*Sorex ornatus salicornicus*), south coast marsh vole (*Microtus californicus stephensi*), California sea lion (*Zalophus californianus*), northern elephant seal (*Mirounga angustirostris*), and harbor seal (*Phoca vitulina*). The California saltmarsh shrew and the south coast marsh vole are terrestrial species found in coastal saltmarsh habitats and are listed by the California Department of Fish and Wildlife as California Species of Special Concern. The California sea lion, northern elephant seal, and harbor seal are all protected under the MMPA. Protected mammals may be

found in the vicinity of the Project Area, but no mammals listed under the ESA or the MMPA are expected to occur in the Project Area. Additional information on protected species and their status is provided in Section 3.3.1.1 (Protected Species).

#### 3.3.1.4.1 Marine Mammals

Four main groups of marine mammals are generally recognized: cetaceans (whales, dolphins, and porpoises), pinnipeds (seals, sea lions, and walruses; walruses do not occur in the Project Area), sirenians (manatees, dugongs, and sea cows; none of which occur in the Project Area), and several species of marine carnivores (sea otters and polar bears; polar bears do not occur in the Project Area) (Jefferson et al. 2008; Rice 1998).

Cetaceans typically occur in deep, offshore marine waters and are not expected to occur close to shore where repair and enhancements to the revetments would take place. During studies conducted for the Point Mugu Sea Range Final Environmental Impact Statement, five species of cetaceans, one species of pinniped, and the sea otter were recorded within 3 nm of NBVC Point Mugu (U.S. Department of the Navy 2002). Pinnipeds hunt and feed exclusively in the water, but unlike cetaceans, pinnipeds come onto land (i.e., haul out) to rest, mate, bear young, and even to avoid predators. Because pinnipeds spend a significant portion of time on land, it is possible that they may occur in or near to the Project Area. Sea otters also have the ability to come onto land, but they rarely come ashore and spend most of their life in nearshore marine waters where they regularly swim, feed, and rest (Tinker et al. 2006).

Only California sea lion, northern elephant seal, and harbor seal would be expected to occur in the vicinity of the Project Area (U.S. Department of the Navy 2013a). The only pinniped commonly seen in large numbers on NBVC Point Mugu is the harbor seal, which regularly hauls-out at the mouth of Mugu Lagoon and at several other locations within the lagoon (U.S. Department of the Navy 2013a). Small numbers of California sea lions have been observed feeding in waters offshore of NBVC Point Mugu and on occasion individual sea lions have been observed hauling out on beaches at the base. Northern elephant seal pups, post-dispersal from breeding rookeries, are occasionally found hauled out and resting on NBVC Point Mugu, with more encounters documented since 2009 (U.S. Department of the Navy 2013a).

**California Sea Lion**

The current population estimate of California sea lions in the U.S. stock is 296,750 (Carretta et al. 2014). During the summer, California sea lions breed on islands from the Gulf of California to the Channel Islands and seldom travel more than about 31 mi. (50 km) from the islands. The primary rookeries are located on the California Channel Islands of San Miguel, San Nicolas, Santa Barbara, and San Clemente (Edgell and Demarchi 2012). In the non-breeding season, adult and subadult males migrate northward along the coast to central and northern California and farther north. They are occasionally sighted hundreds of miles offshore, and return south the following spring.

Most adult females with pups remain in waters near their breeding rookeries off the coast of California and Mexico (Lowry and Forney 2005; Melin and DeLong 2000; Thomas et al. 2010). They may also enter bays, harbors, and river mouths and often haul out on man-made structures such as piers, jetties, offshore buoys, and oil platforms.

There is no documented record of California sea lions hauling-out on the sandy beaches at NBVC Point Mugu to pup. Seagars et al. (1985) concluded that no California sea lions have pupped or mated on the mainland coast of southern California and that occupation of mainland haul-out sites appears to be

sporadic along the coastline. Only occasional sightings have been made of individual California sea lions hauling-out on sandy beaches to rest, and on most occasions they are individuals in poor health or with injuries (U.S. Department of the Navy 2013a).

**Northern Elephant Seal**

The northern elephant seal occurs almost exclusively in the eastern and central North Pacific (Robinson et al. 2012). Breeding and molting habitats are characterized by sandy beaches, mostly on offshore islands, but also in some mainland locations along the coast (Stewart and DeLong 1994). Rookeries are located from central Baja California, Mexico, to northern California (Stewart and Huber 1993). In California, rookeries are located at the Channel Islands, Piedras Blancas, Cape San Martin, Año Nuevo Island and Peninsula, the Farallon Islands, and Point Reyes (Stewart and DeLong 1994; Carretta et al. 2014). Rookeries and haulouts are also scattered along the coast north of the Channel Islands. In 2005, the California stock of northern elephant seals was estimated to be approximately 124,000 individuals (Carretta et al. 2014).

There is no documented record of northern elephant seals hauling out on the sandy beaches at NBVC Point Mugu to pup. Only occasional sightings have been made of individual young northern elephant seals hauling out on sandy beaches to rest (U.S. Department of the Navy 2013a).

**Harbor Seal**

The harbor seal is widely distributed from Alaska to Baja California. The harbor seal population in California is estimated at 30,196 seals (Carretta et al. 2014). Harbor seals favor nearshore coastal waters and haul-out sites on sandy beaches, mudflats, intertidal and subtidal rock outcrops, offshore rocks, sandbars, and manmade structures such as docks and recreational floats. In general, the species seems to prefer protected haul-out areas (e.g., bays and lagoons) over areas directly exposed to the ocean (Baird 2001). Characteristics of preferred haul-out sites include adequate protection from land predators, direct access to deep water, proximity to food sources, and protection from strong wind and waves.

Harbor seals are present at NBVC Point Mugu year-round, and regularly use several locations within Mugu Lagoon to haul out. Although beaches on NBVC Point Mugu may also be used as haul-out sites for resting seals, this would be a very uncommon occurrence (U.S. Department of the Navy 2013a). Annual observations of harbor seals in Mugu Lagoon indicates that the population has been increasing, with an average of 53 pups born per year from 2008 to 2013. There is no documented record of harbor seals hauling out on the sandy beaches at NBVC Point Mugu to pup (U.S. Department of the Navy 2013a).

#### 3.3.1.4.2 Terrestrial Mammals

The majority of terrestrial mammals identified at NBVC Point Mugu are found in transitional and upland habitats located inland of the Project Area and would not be impacted by the Proposed Action. Terrestrial mammals at NBVC Point Mugu are not expected to be present along the beaches and shoreline of the Project Area. An occasional visitor to the shoreline area may include highly mobile species, such as coyotes (*Canis latrans*), opossums (*Didelphis virginiana*), and rodents.

The two potential relocation sites for the airfield lighting equipment housed in Building PM-812, at Tide Gate #844 and off of South M Avenue, are both surrounded, at least partially, by salt marsh habitat, including a wide variety of native and non-native vegetation (Section 3.3.1.2, Vegetation). The habitat is suitable for the California saltmarsh shrew and the south coast marsh vole, which are both known to occur in salt marshes at Point Mugu.

**California Saltmarsh Shrew**

Occurrences of the California saltmarsh shrew have been documented at Point Mugu since the 1930s (Collins 1998). Surveys in the 1980s and 1990s reconfirmed the occurrence of the shrew in salt marshes at Point Mugu and reported the presence of a small population.

The California saltmarsh shrew prefers salt marshes dominated by glasswort species (i.e., Salicornia spp.) (Collins 1998). Habitat preferences may be similar to other shrew species that also inhabit salt marshes, which is characterized by dense vegetative ground cover, protected nesting sites above mean high tide that are free from inundation, and moist surroundings (Collins 1998; Goldstein 2006). In salt marshes near NBVC Point Mugu, the occurrence of the California saltmarsh shrew is associated with dense willow (Salix spp.) and bulrush (Scirpus sp.) thickets, which are known to occur along tidal drainage ditches on NBVC Point Mugu (U.S. Department of the Navy 2013a). The preferred relocation site for the airfield lighting equipment housed in Building PM-812 is the site at Tide Gate #844, which is adjacent to a drainage ditch (see Chapter 2, Description of Proposed Action and Alternatives). The vegetation at the site is highly dependent on the salinity range of water flowing through the drainage ditch. Willow and bulrush species are more common where low salinity conditions dominate and are unlikely to be present where salinities are predominantly high (U.S. Department of the Navy 2013a). The California saltmarsh shrew is likely uncommon in the area.

**South Coast Marsh Vole**

The south coast marsh vole, also known as Stephen's California vole or simply the California vole, occurs in middle and upper intertidal zones of salt marsh and brackish marsh habitat (Guntenspergen and Nordby 2006). The vole has adapted to feed on Salicornia spp. from which it may derive freshwater where water in the marsh is too saline for consumption (Goldstein 2006). The south coast marsh vole is likely uncommon in the area.

#### 3.3.1.4.3 Other Terrestrial Mammals

U.S. Department of the Navy (2013a) reports that two species of small mammals are known to occur in the transition habitat type at NBVC Point Mugu: the western harvest mouse (*Reithrodontomys megalotis*) and deer mouse (*Peromyscus maniculatus*). Other mammals that have been recorded in upland habitats include two carnivores, the coyote and the long-tailed weasel (*Mustela frenata*). The black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audobonii*), opossum, and California ground squirrel (*Otospermophilus beecheyi*) are commonly observed. Species, such as coyotes, opossums, raccoons, mice and other rodents may be intermittently present in the Project Area, including in developed areas on the base.

Bat surveys on NBVC Point Mugu have commonly recorded the Mexican free-tailed bat (*Tadarida brasiliensis mexicana*), a year-round resident that inhabits buildings and residential homes on the base. Yuma myotis (*Myotis yumanensis*) has also been documented roosting on base. Bats are long-lived mammals with few predators, low reproductive rates, and slow population growth. Bats are more likely to occur in wetland habitats in search of insect prey (e.g., mosquitos), which they capture in flight, than on beach habitat (Bat Conservation International 2014). Bats are protected by California Department of Fish and Wildlife code.

### 3.3.1.5 Fish

This section addresses marine and estuarine fish that inhabit or are known to occur within the marine and estuarine areas surrounding NBVC Point Mugu. Species of fish that are currently listed as either

endangered or threatened under the ESA of 1973 (16 U.S.C. §1531) are specifically addressed in Section 3.3.1.1 (Protected Species).

The marine and estuarine habitats surrounding NBVC Point Mugu include coastal waters and Mugu Lagoon. Past investigations on the fish habitat and species present in Mugu Lagoon have reported that fish were less abundant in the western arm than in the central basin and eastern arm (Onuf 1987), which was attributed to the restriction of tidal exchange in the western part of the lagoon. Fish samples were collected in the eastern arm of Mugu Lagoon between 1977 and 1982. Onuf (1987) reported that 39 species of fish were identified in Mugu Lagoon, with the four small species being the most common: arrow gobies (*Clevelandia ios*), topsmelt (*Atherinops affinis*), Pacific staghorn sculpin (*Leptocottus armatus*), and shiner surfperch (*Cymatogaster aggregate*). The only larger fishes commonly identified included sharks, rays, and the shovelnose guitarfish (*Rhinobatos productus*) (Onuf 1987). A more recent survey of fish in 2008 resulted in a total of 2,453 fish (representing 15 families and 17 species) collected at NBVC Point Mugu between August and November 2008. In general, more species were collected at stations with the greatest tidal exchange, such as in the lagoon habitat. The other habitat types consisted of drainage channels and exhibited low species diversity. Species assemblages in the areas with less tidal action were dominated by topsmelt, longjaw mudsucker (*Gillichthys mirabilis*), and Pacific staghorn sculpin.

The nearshore coastal habitat of NBVC Point Mugu is located within the Southern California Bight, which has a great diversity of fish. Grunion (*Leuresthes tenuis*) are known to spawn on the beaches of Point Mugu during spring and summer (U.S. Department of the Navy 2002, 2013a). This species supports a minor recreational fishery along sandy beaches in Southern California. Offshore, in areas of soft substrate within the inner shelf, the following species have been recorded at depths up to 60 feet: turbot (*Pleuronichthys* spp.), northern anchovy (*Engraulis mordax*), queenfish (*Seriphus politus*), round stingray (*Urobatis halleri*), shovelnose guitarfish (*Rhinobatos productus*), shiner surfperch, walleye (*Hyperprosopon argentteum*), white surfperch (*Phanerdon furcatus*), California halibut (*Paralichthys californicus*), speckled sanddab (*Citharichthys stigmaeus*), and white croaker (*Genyonemus lineatus*). Fishes of the outer shelf include calico (*Sebastes dalli*) and stripetail (S. saxicola) rockfish, California scorpionfish (*Scorpaena guttanta*), bigmouth sole (*Hippoglossina stomata*), California lizardfish (*Synodus lucioceps*), California tonguefish (*Sympharus atricauda*), curlfin turbot (*Pleuronichthys decurrens*), English sole (*Pleuronectes vetulus*), northern anchovy, and Pacific (*Citharichthys sordidus*) and speckled sanddab (Cross and Allen 1993, U.S. Department of the Navy 2013a). Table 3-2 includes a listing of surveyed and observed fish species found in Mugu Lagoon and the nearshore coastal waters off NBVC Point Mugu. The tidewater goby (*Eucyclogobius newberryi*) is the only species listed under the ESA known to occur on NBVC Point Mugu, and is found only at the northern boundary of NBVC. Additional information on the tidewater goby is provided in Section 3.3.1.1 (Protected Species). Arroyo chub (*Gila orcutti*), which is listed by the State as "imperiled," has only been found in Calleguas Creek at the northern boundary of NBVC Point Mugu.

**Table 3-2: Fish Species Likely to Occur in and around NBVC Point Mugu**

| Scientific Name | Common Name | Conservation Status |
|---|---|---|
| *Acanthogobius flavimanus* | Yellowfin goby | |
| *Ameiurus nebulosus* | Brown bullhead | |
| *Amphistichus argenteus* | Barred surfperch | |
| *Anchoa compressa* | Deepbody anchovy | |

**Table 3-2: Fish Species Likely to Occur in and around NBVC Point Mugu (continued)**

| Scientific Name | Common Name | Conservation Status |
|---|---|---|
| *Atherinops affinis* | Topsmelt | |
| *Carassius carpio* | Goldfish | |
| *Citharichthys stigmaeus* | Speckled sanddab | |
| *Clevelandia ios* | Arrow goby | |
| *Clupea pallasii* | Pacific herring | |
| *Cymatogaster aggregate* | Shiner surfperch | |
| *Cyprinus carpio* | Common carp | |
| *Dorosoma petenense* | Threadfin shad | |
| *Embiotoca jacksoni* | Black surfperch | |
| *Eucyclogobius newberryi* | Tidewater goby | Federally Endangered |
| *Fundulus parvipinnis* | California killifish | |
| *Gambusia affinis* | Western mosquitofish | |
| *Genyonemus lineatus* | White croaker | |
| *Gila orcutti* | Arroyo chub | State Imperiled |
| *Gillichthys mirabilis* | Longjaw mudsucker | |
| *Girella nigricans* | Opaleye | |
| *Heterostichus rostratus* | Giant kelpfish | |
| *Hypsoblennius gentilis* | Bay/red-throated blenny | |
| *Hypsoblennius gilbert* | Rockpool/tidepool blenny | |
| *Hypsopsetta guttulata* | Diamond turbot | |
| *Ilypnus gilbert* | Cheekspot goby | |
| *Leuresthes tenuis* | California grunion | |
| *Menticirrhus undulates* | California corbina | |
| *Mugil cephalus* | Striped mullet | |
| *Mustelus californicus* | Grey smoothhound shark | |
| *Myliobatis californica* | Bat ray | |
| *Paralabrax clathratus* | Kelp bass | |
| *Paralabrax nebulifer* | Barred sand bass | |
| *Paralichthys californicus* | California halibut | |
| *Phanerodon furcatus* | White seaperch | |
| *Platichthys stellatus* | Starry flounder | |
| *Pleuronichthys ritteri* | Spotted turbot | |
| *Porichthys notatus* | Specklefin midshipman | |
| *Prionace glauca* | Blue shark | |
| *Quietula y-cauda* | Shadow goby | |
| *Rhacochilus vacca* | Pile surfperch | |
| *Rhinobatos productus* | Shovelnose guitarfish | |
| *Roncador stearnsii* | Spotfin croaker | |
| *Sardinops sagax* | Pacific sardine | |
| *Scorpaenichthys marmoratus* | Cabezon | |

**Table 3-2: Fish Species Likely to Occur in and around NBVC Point Mugu (continued)**

| Scientific Name | Common Name | Conservation Status |
|---|---|---|
| *Sebastes atrovirens* | Kelp rockfish | |
| *Sebastes auriculatus* | Brown rockfish | |
| *Sebastes rastrelliger* | Grass rockfish | |
| *Sebastes serranoides* | Olive rockfish | |
| *Seriphus politus* | Queenfish | |
| *Symphurus atricaudus* | California tonguefish | |
| *Syngnathus californiensis* | Kelp pipefish | |
| *Syngnathus leptorhynchus* | Bay pipefish | |
| *Triakis semifasciata* | Leopard shark | |
| *Umbrina roncador* | Yellowfin croaker | |
| *Urolophus halleri* | Round stingray | |

Sources: Bonterra Consulting 2011, MacDonald 1976, Onuf 1987, Saiki 1997, and Tetra Tech 2008

#### 3.3.1.5.1 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §1801-1882, as amended) requires the delineation and description of EFH by regional fishery management councils, in conjunction with the National Marine Fisheries Service (NMFS), in fishery management plans for all federally managed fish species. Essential Fish Habitat is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Actions that occur outside of EFH and might affect the habitat must also be taken into account. In addition to EFH designations, areas called Habitat Areas of Particular Concern (HAPCs) are also designated by the regional fishery management councils. Designated HAPCs are discrete subsets of EFH that provide extremely important ecological functions or are especially vulnerable to degradation (50 C.F.R. §§600.805–600.815). Regional fishery management councils may designate a specific habitat area as an HAPC based on one or more of the following reasons (National Marine Fisheries Service 2002):

1. 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
4. Rarity of the habitat type

NBVC Point Mugu is within the jurisdiction of the Pacific Fishery Management Council (PFMC). The PFMC has designated EFH and HAPC for Pacific Coast Groundfish (Pacific Fishery Management Council 2011a), Pacific Coast Salmon (Pacific Fishery Management Council 2012), Coastal Pelagic Species (Pacific Fishery Management Council 2011b), and Highly Migratory Species (Pacific Fishery Management Council 2011c). Only EFH and HAPC for Pacific Coast Groundfish and Coastal Pelagic Species are located in the nearshore marine and estuarine habitats at NBVC Point Mugu (Pacific Fishery Management Council 2011a, Pacific Fishery Management Council 2011b).

Groundfish species include rockfish (*Scorpaenidae*), sablefish (*Anoplopoma fimbria*), flatfish (*Pleuronectiformes*), and Pacific whiting (*Merluccius productus*) that are often (but not exclusively) found on or near the ocean floor or other structures. The EFH for Pacific Groundfish species includes all waters and substrates in areas less than or equal to 3,500 m in depth extending to the mean higher high water level or the upriver extent of saltwater intrusion. Habitat Areas of Particular Concern designated for

groundfish include all waters, substrates, and associated biological communities falling within estuaries, canopy kelp, seagrasses, rocky reefs, and other habitat areas of interest (Pacific Fishery Management Council 2011a). As such, Mugu Lagoon is a designated HAPC for groundfish.

Coastal Pelagic Species include finfish such as Pacific sardine (*Sardinops sagax*), Pacific chub mackerel (*Scomber japonicus*), northern anchovy (*Engraulis mordax*), jack mackerel (*Trachurus symmetricus*), and market squid. The EFH for Coastal Pelagic Species includes all marine and estuary waters from the coasts of California, Oregon, and Washington to the limits of the exclusive economic zone (i.e., 200 nm from shore) and above the thermocline, where sea surface temperatures seasonally range between 50° and 79°F(10° and 26°C) (Pacific Fishery Management Council 2011b). A thermocline is an area in the water column where water temperatures change rapidly with depth. Water temperature is typically colder below the thermocline and warmer above the thermocline. The southern boundary of EFH for Coastal Pelagic Species is the United States and Mexico maritime boundary. The northern boundary of EFH for Coastal Pelagic Species is more changeable and defined as the position of the 50°F (10°C) isotherm, which varies seasonally and annually. Based on sea surface temperature ranges for waters off of NBVC Point Mugu, which can range up to 68°F in summer, coastal pelagic species may occur in waters offshore of NBVC Point Mugu. There are no HAPC designated for the Coastal Pelagic Species EFH (Pacific Fishery Management Council 2011b).

#### 3.3.1.6 Invertebrates

The Project Area encompasses sandy beach, coastal foredune, coastal salt marsh, and disturbed habitats that are known to support a variety of terrestrial arthropod species. In 1982, the Los Angeles Museum of Natural History conducted insect surveys on NBVC Point Mugu during which 528 species were identified (ChaduxTt 2009). Wetland restoration and monitoring studies conducted from 2001 to 2005 also included insect surveys. In 2008, a second insect survey was conducted from July to September with the goal of documenting additional taxa and identifying any occurrences of special status insect species (ChaduxTt 2009). To date, no federally listed or California state listed species have been documented on NBVC Point Mugu. However, multiple species included on the California Special Animals List (California Department of Fish and Wildlife 2015b), as well undescribed species and species with limited distributions, have been documented on NBVC Point Mugu (California Department of Fish and Wildlife 2015a, ChaduxTt 2009, Pierce 1975, Ramirez 1995).

Insect taxa on the California Special Animals list that have been documented on NBVC Point Mugu include three species of tiger beetle: Gabb's tiger beetle *(Cicindela gabbi*), Frost's tiger beetle (*Cicindela senilis frosti*), and the sandy beach tiger beetle (*Cicindela hirticollis gravida*). Gabb's tiger beetle and Frost's tiger beetle have been documented on areas of open ground in marsh and lagoon habitat (ChaduxTt 2009). The sandy beach tiger beetle has been documented on coastal sandy beach habitats (ChaduxTt 2009). A tenebrionid beetle, the globose dune beetle (*Coelus globosus*), has also been documented in sandy beach habitat (ChaduxTt 2009).

Two Lepidopterans (moths and butterflies) on the California Special Animals list also occur on NBVC Point Mugu. The wandering skipper (*Panoquina errans*) occurs in association with its salt grass (*Distichlis spicata*) host plant, which grows in barrier beach and marsh habitats (ChaduxTt 2009). The monarch butterfly (*Danaus plexippus*), which was petitioned for listing under the federal Endangered Species Act in 2014 due to dramatic population declines in recent years, has been documented on NBVC Point Mugu, but breeding has not been documented. The monarch's milkweed host plant, narrowleaf milkweed (*Ascelpias fascicularis*), also occurs on the base (U.S. Department of the Navy 2013a) along Pacific Coast Highway near the Santa Monica Mountains. Migrant monarchs were noted as abundant

during 1982 surveys, but were not detected during 2008 surveys (ChaduxTt 2009). Narrowleaf milkweed is not known to occur within the Project Area, making the Project Area unsuitable habitat for breeding individuals.

Additional narrowly distributed and undescribed insect taxa are known to occur in sandy habitats on NBVC Point Mugu. These include an undescribed species of *Lutica*, a burrowing spider restricted to sandy habitats along the immediate coast from Santa Barbara and Ventura counties (Ramirez 1995); an undescribed moth species in the genus *Arenoscythris* associated with beach bur (*Ambrosia chamossonis*), a species of ragweed found in sandy habitats (ChaduxTt 2009); and the Point Mugu dune weevil (*Trigonoscuta muguensis*), known only from sandy beach habitat in the vicinity of Point Mugu and Port Hueneme (Pierce 1975).

In addition to arthropods, there is one gastropod species on the California Special Animals list documented to occur on Point Mugu. The California brackish water snail (*Tryonia imitator*) may occur in marsh habitats within the Project Area (California Department of Fish and Wildlife 2015a). Although not documented on NBVC Point Mugu, beach-front habitat, including the revetments slated for removal, are within the documented habitat range of the federally endangered black abalone (*Haliotis cracherodii*). The rock break wall, however, occupies the upper intertidal zone. Black abalone occupy the low intertidal zone and do not occur above the mean high tide line (Ault 1985). Because the profile of the revetment does not extend below the upper intertidal zone, it does not comprise potential habitat for black abalone. The revetment is also subtended by sand, which is not suitable habitat for black abalone. Therefore, if rocks from the revetment were to shift or fall during the repair process, they would not present a crush hazard to black abalone.

#### 3.3.1.7 Reptiles and Amphibians

Sandy beach, coastal foredune, coast salt marsh, and disturbed habitats within the Project Area provide habitat for several reptile and amphibian species. To date, the only special status reptiles documented on NBVC Point Mugu are the two-striped gartersnake (*Thamnophis hammondii*) and the western pond turtle (*Actinemys marmorata*) (U.S. Department of the Navy 2013a). Both species are California species of special concern and have potential to be found in northern reaches of the base, but not in the Project Area. A third reptile, the silvery legless lizard (*Anniella pulchra pulchra*), another California species of special concern, is considered to have a high potential for occurrence on the NBVC Point Mugu, although it is not yet documented on the base. The nearest documented occurrences of silvery legless lizards are 10 miles up-coast from NBVC Point Mugu (California Department of Fish and Wildlife 2015a). However, the secretive fossorial nature of this species makes detection difficult and results in underreporting of occurrence. If legless lizards are present, they would be likely to inhabit fore dune habitat (i.e., the peak or ridge of the dune parallel to the shoreline) within the Project Area.

Common reptile species such as the western fence lizard (*Sceloporus occidentalis*), common side-blotched lizard (*Uta stansburiana*), and the southern Pacific rattlesnake (*Crotalus oreganus helleri*), may be found within the Project Area (U.S. Department of the Navy 2013a). These species are expected to use upland areas of the Project Area that are not subjected to regular tidal influx. No amphibian species are expected to occur in or adjacent to the Project Area.

### 3.3.2 Environmental Consequences to Biological Resources

The potential impacts to biological resources located at NBVC Point Mugu from the Proposed Action are discussed in this section. As described in Section 3.3.1 (Affected Environment), biological resources that are known to occur or may occur in the Project Area include various types of vegetation, birds,

mammals, fishes, invertebrates, reptiles, and amphibians. Certain species within these groups have protected status; potential impacts to protected species are given additional consideration in the analysis.

Several factors were considered in determining whether the Proposed Action would result in significant impacts on biological resources. These include the extent or degree to which implementation of an alternative would result in

- unmitigable loss of important quantities of declining vegetation communities (including wetlands) that are considered rare;
- impacts to endangered, threatened, or protected species; and
- alteration of regionally and locally important wildlife corridors that would severely and permanently limit their use.

#### 3.3.2.1 Alternative 1: Shoreline Protection Alternative (Preferred Alternative)

Under Alternative 1, the Navy would repair and increase the width and height of the Central and West revetments, extend the eastern end of the West Revetment by approximately 125 ft. to protect Building PM-812 and Beach Road, replenish the sand dune down-coast of the eastern end of the West Revetment, recontour the dunes at Ormond Beach and Holiday Beach, relocate equipment and infrastructure in Building PM-812 to the relocation site at Tide Gate #844, and repair and repave Beach Road near the intersection with South M Avenue.

##### 3.3.2.1.1 Environmental Consequences for Protected Species

Under Section 7 of the ESA of 1973, as amended (16 U.S.C. 1531 et seq.), federal agencies are required to assess the effect of any project on federally listed threatened and endangered species. Section 7 consultations with the USFWS or NMFS are required for federal projects if such actions have the potential to directly or indirectly affect listed species or destroy or adversely modify critical habitat. It is also Navy policy to consider species listed by state agencies, and other federal special status species when evaluating the impacts of a project. Impacts to protect species would occur if special status species or their habitats, as designated by federal and state agencies, would be affected directly or indirectly by project-related activities. These impacts can be short- or long-term impacts, for example, short-term or temporary impacts from noise and dust during construction and demolition, and long-term impacts from the loss of habitat to support wildlife populations.

NBVC Point Mugu was issued a PBO (PBO 1-8-99-F-24) in 2015 from the USFWS that addresses potential adverse impacts to federally listed wildlife species as a result of repairing and maintaining infrastructure, such as roads, facilities, culverts, seawalls, and utilities. Therefore, no additional Section 7 compliance is required, unless the Proposed Action cannot fulfill PBO requirements.

The potential impacts to the three federally listed bird species—light-footed Ridgway's rail, western snowy plover, and California least tern—with potential to occur in the project area are analyzed in this section. Potential impacts to marine mammals protected under the MMPA are analyzed in Section 3.3.2.1.4 (Environmental Consequences for Mammals).

**Light-Footed Ridgway's Rail**

Light-footed Ridgway's rails are present throughout the year along the mud banks of tidal creeks and marsh vegetation, and dry upland adjacent to the marsh (U.S. Department of the Navy 2013a). Suitable habitat is found adjacent to Building PM-812 and at the eastern end of the West Revetment where the proposed extension would be located (Figure 2-6). As a result, Ridgway's rails may be disturbed by noise and visual stimuli during the repair and extension of the revetments, repairs to Beach Road,

replenishment and recontour of sand dunes, and the relocation of the airfield lighting equipment housed in Building PM-812 to the site at Tide Gate #844 and the demolition of Building PM-812. Individuals would be expected to move away from the Project Area and therefore would not be exposed to noise levels that would cause hearing damage or loss or suffer risk of injury due to equipment strikes. However, the visual and noise disturbances could cause disruption of foraging behaviors and nest loss as a result of abandonment or increased predation.

These potential impacts would be minimized by the implementation of the Environmental Protective Measures (EPMs) described in Section 2.5.2.1.1 (Birds) and the measures required within the PBO. To the extent practicable, construction activities would be scheduled to avoid potential impacts to nesting light-footed Ridgway's rails and would therefore occur approximately between 1 October and 15 February. If construction cannot avoid the light-footed Ridgway's rail nesting season, a Navy-approved qualified biologist would conduct weekly surveys for nesting Ridgway's rails within and adjacent to the Project Area. If construction is scheduled during nesting season, construction activities can only occur if there are no western snowy plover, light-footed Ridgway's rails, or California least tern nests within 300 ft. of the area where construction is taking place. Construction cones or temporary fencing would be used to mark a 300 ft. buffer zone around the nest to ensure no activity occurs within the buffer zone. If an active nest is found between 300 and 500 ft., a Navy-approved biologist would monitor the nest through the completion of nesting. If the biologist determines that the nesting birds are disturbed and there is a risk of nest loss, the construction activity would be postponed until nesting is complete.

Effects from construction and demolition activities under Alternative 1 on light-footed Ridgway's rails are addressed under the NBVC Point Mugu PBO. No critical habitat has been designated for this species; therefore, implementation of Alternative 1 would have no adverse effect on critical habitat in the Project Area.

**Western Snowy Plover**

Western snowy plovers are present on the beaches and salt pannes at NBVC Point Mugu throughout the year (U.S. Department of the Navy 2013a). This species primarily nests on open sandy flat areas along the shoreline and occasionally on the airfield, developed concrete and asphalt pads, and salt pannes far from beach habitats (U.S. Department of the Navy 2013a). Western snowy plover habitat is found throughout the Project Area from the western end of the Central Revetment past the eastern end of the West Revetment (Figure 1-4). As a result, western snowy plovers may be disturbed by noise and visual stimuli during the repair and extension of the revetments, repairs to Beach Road, replenishment and recontour of sand dunes, and demolition of Building PM-812. Plovers would be expected to move away from the Project Area and therefore would not be exposed to noise levels that would cause hearing damage or loss or suffer risk of injury due to equipment strikes. However, the visual and noise disturbances could cause disruption of foraging behaviors, crushing of eggs by equipment or foot traffic, and nest loss through abandonment or increased predation.

These potential impacts would be minimized by the implementation of the EPMs described in Section 2.5.2.1.1 (Birds) and the measures required within the PBO. To the extent practicable, construction activities would be scheduled to avoid potential impacts to nesting western snowy plovers and would therefore occur approximately between 1 October and 15 February. If construction cannot avoid the western snowy plover nesting season, a Navy-approved qualified biologist would conduct weekly surveys for western snowy plover nests within the project area with a survey conducted no more than 3 days prior to the start of construction activities. If construction is scheduled during nesting season, construction activities can only occur if there are no western snowy plover nests within 300 ft. of the area where construction is taking place. Construction cones or temporary fencing would be used to

mark a 300 ft. buffer zone around the nest to ensure no activity occurs within the buffer zone. If an active nest is found between 300 and 500 ft., a Navy-approved biologist would monitor the nest through the completion of nesting. If the biologist determines that the nesting birds are disturbed and there is a risk of nest loss, the construction activity would be postponed until nesting is complete.

Effects from construction and demolition activities under Alternative 1 on western snowy plovers are addressed under the NBVC Point Mugu Programmatic Biological Opinion. Implementation of Alternative 1 would have no adverse effect on critical habitat for this species, because critical habitat does not occur within the Project Area.

**California Least Tern**

California least terns are present at NBVC Point Mugu during nesting season, typically between April and August, primarily in two locations: Ormond East Beach, and Holiday Beach (U.S. Department of the Navy 2013a). Holiday Beach is located between the Central and West revetments. California least terns also use Mugu Lagoon for foraging. If project activities occur when California least terns are present, this species may be disrupted by noise and visual stimuli during the repair and extension of the revetments, repairs to Beach Road, replenishment and recontour of sand dunes, relocation of airfield lighting equipment, and demolition of Building PM-812. Terns would be expected to move away from the Project Area and therefore would not be exposed to noise levels that would cause hearing damage or loss or suffer risk of injury due to equipment strikes. However, the visual and noise disturbances could cause disruption of foraging behaviors, crushing of eggs by equipment or foot traffic, and nest loss through abandonment or increased predation.

These potential impacts would be minimized by the implementation of the EPMs described in Section 2.5.2.1.1 (Birds) and the measures required within the PBO. To the extent practicable, construction activities would be scheduled to avoid potential impacts to nesting California least terns and would therefore occur approximately between 1 October and 15 February. If construction cannot avoid the California least tern nesting season, a Navy-approved qualified biologist would conduct weekly surveys for California least tern nests within the Project Area. If construction is scheduled during nesting season, construction activities can only occur if there are no California least tern nests within 300 ft. of the area where construction is taking place. Construction cones or temporary fencing would be used to mark a 300 ft. buffer zone around the nest to ensure no activity occurs within the buffer zone. If an active nest is found between 300 and 500 ft., a Navy-approved biologist would monitor the nest through the completion of nesting. If the biologist determines that the nesting birds are disturbed and there is a risk of nest loss, the construction activity would be postponed until nesting is complete.

Effects from construction and demolition activities under Alternative 1 on California least terns are addressed under the NBVC Point Mugu PBO. No critical habitat has been designated for this species; therefore, implementation of Alternative 1 would have no adverse effect on critical habitat in the Project Area.

#### 3.3.2.1.2 Environmental Consequences for Vegetation

The portions of the Project Area surrounding the Central Revetment, including the laydown areas, are primarily developed areas or degraded beach, which are either unvegetated or heavily dominated by non-native vegetation. As a result, repairs to the Central Revetment would have no significant impact on native vegetation communities.

The extension of the West Revetment would result in the loss of approximately 0.18 ac. of sparsely vegetated upper beach and dune habitat. This area is largely devoid of vegetation and characterized by a mixture of native and non-native dune species (Section 3.3.1.2, Vegetation). These impacts would be offset by the restoration and revegetation of dunes down-coast from the West Revetment (Section

2.3.2.4, Sand Dune Replenishment). The sand dune replenishment area would be partially restored and planted with native dune vegetation (Figure 2-9). Non-native vegetation would be removed in the process. As a result, the repairs and extension of the West Revetment and sand dune replenishment activities would have no significant negative impact on native vegetation communities.

Repairs to Beach Road would impact approximately 300 ft. x 15 ft. of sparsely vegetated upper beach and roadside habitat (Figure 2-6). The constant sand movement and occasional tidal influence at this area has kept the repair site largely devoid of vegetation. As a result, very little vegetation would be impacted, and the overall impacts to vegetation communities as a result of the Beach Road repairs would not be significant.

Relocating equipment and infrastructure currently housed in Building PM-812 to the Tide Gate #844 site may impact up to 5,500 $ft^2$ (0.13 ac.) of salt marsh vegetation, depending on the size of available developed upland areas that would be used for the building needed to house the relocated airfield lighting equipment. This would be a relatively small impact compared to the overall amount of salt marsh at NBVC Point Mugu. The Navy has over 30 ac. of proactively restored wetlands that could be used to offset this loss. Furthermore, over 120 ac. of wetlands have been identified on NBVC Point Mugu as potential wetland restoration sites for projects such as the Proposed Action as described in the Wetland Restoration Plan (U.S. Department of the Navy 2014a). An assessment of the restored sites would be conducted to determine appropriate type and acreage to be used for mitigation of the impacted acre.

Therefore, implementation of Alternative 1 would not result in significant impacts on vegetation in the Project Area.

#### 3.3.2.1.3 Environmental Consequences for Birds

The Project Area includes sandy beach, coastal fore dune, coastal salt marsh, and anthropogenic habitats, all of which provide habitat for multiple species of birds, including California state-listed species, species listed on the California Special Animals List, and species protected under the MBTA. Federally listed species protected under the ESA are analyzed in Section 3.3.2.1.1 (Environmental Consequences for Protect Species). Activities associated with the repair and expansion of the West and Central revetments, sand dune replenishment, repairs to Beach Road, and the relocation of airfield lighting equipment currently housed in Building PM-812 to the site at Tide Gate #844 could disrupt behaviors and breeding activity. Potential Impacts could include nest loss as a result of abandonment, increased predation, and loss of habitat.

Individual birds would be expected to move away from the Project Area, and therefore would not be at risk of injury due to equipment strikes or impact to hearing as a result of construction noise. To the extent practicable, project activities would occur between 1 October and 15 February, outside of bird nesting season, thus avoiding impact to nesting birds. If construction during nesting season cannot be avoided, a Navy-approved biologist would conduct weekly surveys for nesting birds within and adjacent to the Project Area. If nesting migratory birds are found within the Project Area, a buffer of adequate size to prevent disturbance from project-related activities (to be determined by the biological monitor) would be marked to avoid disturbance. The nest would be monitored to ensure no potential nest loss due to project activity.

Therefore, implementation of Alternative 1 would not result in significant impacts on birds in the Project Area.

#### 3.3.2.1.4 Environmental Consequences for Mammals

**Marine Mammals**

Marine mammals with the potential to occur in the Project Area are described in Section 3.3.1.4.1 (Marine Mammals). While numerous species of cetaceans are known to occur in the waters off of NBVC Point Mugu, these animals would not be expected in shallow intertidal or sub-tidal waters adjacent to the revetments where construction and repair activities would take place. Only two marine mammals, both pinnipeds (California sea lion and northern elephant seal), have an extremely minimal chance to occur on the sandy beaches adjacent to the revetments. If the pinnipeds use the beaches as haul-out sites, it would be to rest; there are no known pupping sites on the coastal beaches at NBVC Point Mugu. No marine mammals would be expected to occur in other parts of the Project Area (e.g., wetlands, lay down areas, dune, or Beach Road).

Construction activities at the West and Central revetments are the only components of the Proposed Action that have the potential to impact the three pinniped species. During revetment repair and expansion, large, 6–8 ton stone would be transported to the shoreline and placed ("nested") into the existing stone to build-up and reinforce the revetments. The seaward face of the revetments would be reinforced and extended farther seaward into the sub-tidal zone, increasing the overall footprint of each revetment. Heavy equipment, such as cranes and large trucks, would need to access the beach area during construction.

Potential stressors associated with construction activities at the revetments could include airborne noise from construction equipment and the placement of large stones on the revetments, and loss of haul-out habitat on sandy beaches seaward of the revetments and, temporarily, adjacent to the revetments when construction equipment is present.

Harbor seals are the most abundant of the three pinnipeds at NBVC Point Mugu. While harbor seals are known to use sandy beaches and manmade structures as haul-out sites (Baird 2001, London et al. 2012), the seals at NBVC Point Mugu are only found in the more protected habitat within Mugu Lagoon and not on beach habitat, which is directly exposed to waves and wind from the Pacific Ocean (U.S. Department of the Navy 2013a). Harbor seals are year-round residents at NBVC Point Mugu and use Mugu Lagoon as habitat for resting, breeding, pupping, and raising young. There are no documented reports of harbor seals using the sandy beaches along the coastline as pupping sites or haul-out sites. While harbor seals could potentially haul-out on beaches within or adjacent to the Project Area to rest (or for other reasons), harbor seals have never been documented to haul-out on beaches at NBVC Point Mugu. If a seal was present, it would most likely be a seal in distress. The vast majority of beach areas along the NBVC Point Mugu shoreline, including sandy beach areas on Holiday Beach and Ormond East Beach would remain undisturbed and available to the seals as would their preferred habitat in Mugu Lagoon. Construction activity is expected to occur over several months. Once complete, approximately the same amount of beach area would be available to the seals as potential haul-out habitat.

Airborne noise from construction activities at the two revetments may deter seals from hauling-out on beaches within or adjacent to the Project Area or may cause the seals on the beach to flee into the water if they are startled or feel threatened (Wilson 2014). However, such a disturbance is highly unlikely because harbor seals have never been observed hauling-out on beaches near the Project Area. The harbor seals at NBVC Point Mugu have acclimated to human activities on the base, as is evident by the thriving, year-round population residing primarily in Mugu Lagoon (U.S. Department of the Navy 2013a). Because the seals have adapted to the presence of human activity, any effects are anticipated to be negligible with no long-term consequences to the individual or the population of harbor seals at NBVC Point Mugu.

Northern elephant seals and California sea lions have also been observed using the beaches at NBVC Point Mugu as haul-out sites (U.S. Department of the Navy 2013a). While these two pinniped species are more likely to use the sandy coastal beaches than the harbor seals, northern elephant seals and California sea lions are less abundant with only occasional sightings of individual young northern elephant seals and California sea lions hauling-out on the beaches to rest (U.S. Department of the Navy 2013a). Rookeries for both species are located on offshore islands along the California coastline where the elephant seals and sea lions are more abundant (Edgell and Demarchi 2012, Carretta et al. 2014). There is no record of either species using the beaches at NBVC Point Mugu as pupping sites (U.S. Department of the Navy 2013a).

The potential effects from construction activity at the revetments on northern elephant seals and California sea lions would be the same as those described for harbor seals. While temporary loss of haul-out habitat in the Project Area would occur, the vast majority of beach areas along the NBVC Point Mugu shoreline would remain undisturbed and available to the two pinniped species. Once construction is complete, there would be no appreciable loss of potential haul-out habitat. If a behavioral response to construction noise were to occur, the effect on the animal would be temporary and minimal (e.g., an alert response), with no long-term consequences to the individual or population of northern elephant seals or California sea lions in the region.

Therefore, implementation of Alternative 1 would not result in significant impacts on marine mammals in the Project Area.

**Terrestrial Mammals**

Terrestrial mammals with the potential to occur in the Project area are described in Section 3.3.1.4.2 (Terrestrial Mammals). The coastal, sandy beach habitat where the repair and expansion of the revetments would occur is not primary habitat for terrestrial mammals at NBVC Point Mugu. Highly mobile species, such as invasive feral cats, opossums, and rodents, may occasionally visit shoreline areas to search for food, but these species are highly adapted to a wide variety of habitats on the base, including developed areas, and are not likely to be impacted by construction activities along the shoreline. Additionally, these species pose a serious risk to avian and reptile species that rely on the dunes and sandy beach habitat adjacent to the revetments.

Construction activities at Tide Gate #844 to accommodate the equipment and infrastructure currently located at Building PM-812 have the potential to affect marsh habitat that may be suitable for the California saltmarsh shrew and the south coast marsh vole, which are both known to occur in small numbers in salt marshes at NBVC Point Mugu (U.S. Department of the Navy 2013a). No significant impacts to saltmarsh habitat are anticipated from implementing the Proposed Action (Section 3.3.2.1.2, Environmental Consequences for Vegetation). However, because the actual footprint of the new construction will not be available until preliminary engineering plans are available, it is assumed for the purposes of analysis that 5,500 $ft.^2$ (0.13 ac.) of wetland area would be permanently impacted. However, over 120 ac. of wetlands have been identified on NBVC Point Mugu as potential wetland restoration sites for projects such as the Proposed Action, as described in the Wetland Restoration Plan (U.S. Department of the Navy 2014a). An assessment of the restored sites would be conducted to determine appropriate type and acreage to be used for mitigation of the impacted area. Therefore, there would be no net loss of potential habitat for the shrew or the vole as a result of construction at Tide Gate #844. Furthermore, most of the area immediately surrounding Tide Gate #844 is elevated above the marsh to protect the existing tide gate facility and MAD Road, which provides access to the tide gate (Figure 2-13), against flooding. The habitat characteristics of the elevated areas are more consistent with upland habitat and not with marsh habitat.

An increase in noise and overall activity associated with construction at the site may result in some terrestrial species, including the California saltmarsh shrew, south coast marsh vole, and bat species avoiding the immediate area around the construction site. These behavioral responses, if they were to occur, are expected to be minor and temporary, occurring sporadically over approximately several weeks during which construction is expected to take place. Several acres of undisturbed saltmarsh would remain available as suitable habitat for species that utilize the saltmarsh (U.S. Department of the Navy 2013a).

Therefore, implementation of Alternative 1 would not result in significant impacts on terrestrial mammals in the Project Area.

#### 3.3.2.1.5 Environmental Consequences for Fish

Fish with the potential to occur in the Project Area are described in Section 3.3.1.5 (Fish). Numerous species of fish are known to occur in marine waters off of NBVC Point Mugu; these animals would be expected in shallow intertidal or sub-tidal waters adjacent to the revetments where construction and repair activities would take place. Only one species, grunion (*Leuresthes tenuis*), may occur on the sandy beaches adjacent to the revetments during spawning events (U.S. Department of the Navy, 2002, 2013a).

Construction activities at the West and Central revetments have the potential to directly impact fish species. During revetment repair and expansion, large, 6–8 ton stones would be transported to the shoreline and placed ("nested") into the existing stone to build-up and reinforce the revetments. The seaward face of the revetments would be reinforced and extended farther seaward into the sub-tidal zone, increasing the overall footprint of each revetment. Sand from the West Revetment expansion would be used, along with sand from additional sources, to replenish the sand dunes down-coast of the West Revetment. Heavy equipment, such as cranes and large trucks, would need to access the beach area during construction.

Potential stressors associated with construction activities at the revetments could include the placement of large stones on the revetments, and loss of habitat on sandy beaches seaward of the revetments and, temporarily, adjacent to the revetments when construction equipment is present. Construction activity is expected to occur over several months. Once complete, approximately the same amount of beach area would be available as habitat. Construction would take place approximately between October 1 and February 15, which is outside of the spawning season for grunion.

Construction activities at Tide Gate #844 to accommodate the equipment and infrastructure currently located at Building PM-812 have the potential to affect marsh habitat at NBVC Point Mugu. No significant impacts to saltmarsh habitat are anticipated from implementing the Proposed Action (Section 3.3.2.1.2, Environmental Consequences for Vegetation); therefore, there would be no loss of habitat or indirect impacts for fish species.

Therefore, implementation of Alternative 1 would not result in significant impacts on fish in the Project Area.

**Essential Fish Habitat**

Essential Fish Habitat within Project Area is described in Section 3.3.1.5.1 (Essential Fish Habitat). The Pacific Coast Groundfish EFH extends from the MHHW line to a depth of 3,500 m and includes the upper river extent of salt water intrusion, including Mugu Lagoon, which is classified as a Habitat Area of Particular Concern. The Coastal Pelagic EFH extends from the coast to the exclusive economic zone (200 nm offshore), including all waters above the thermocline. Only construction activities at the West and Central revetments have the potential to directly impact EFH.

Potential stressors associated with construction activities at the revetments would include the placement of large stones on the revetments causing loss of habitat on sandy beaches seaward of the revetments and, temporarily, adjacent to the revetments when construction equipment is present; increased turbidity from excess sand displaced from construction activities and equipment; and additional sand introduced into the littoral zone from sand dune replenishment. Sand delivery into the littoral zone at NBVC Point Mugu is heavily impacted by existing anthropogenic structures both at NBVC Point Mugu and up-coast of the base (Section 3.1, Topography and Sediments; and Section 3.1.2.1, Alternative 1: Shoreline Protection Alternative [Preferred Alternative]). The introduction of additional sand into the littoral system from the Proposed Action is not expected to exceed naturally occurring sedimentation levels, with any effects to EFH being minimal and temporary, or to negatively accelerate erosion rates.

Construction activities at Tide Gate #844 to accommodate the equipment and infrastructure currently located at Building PM-812 have the potential to affect marsh habitat at NBVC Point Mugu. No significant impacts to saltmarsh habitat are anticipated from implementing the Proposed Action (Section 3.3.2.1.2, Environmental Consequences for Vegetation); therefore, there would be no loss of EFH. No significant impacts to water resources are anticipated from implementing the Proposed Action Section 3.2.4 (Environmental Consequences to Water Resources); therefore, there would be no impact on EFH from run off.

Therefore, implementation of Alternative 1 would not result in significant impacts on fish species and EFH in the Project Area.

#### 3.3.2.1.6 Environmental Consequences for Invertebrates

No federally listed or California state listed invertebrate species have been documented on NBVC Point Mugu. However, insects on the California Special Animal list, including three species of tiger beetle, are found on NBVC Point Mugu. These species of tiger beetles would not be affected by the Proposed Action; however, other invertebrate species may be impacted by the repair and expansion of the Central and West Revetments, dune replenishment, relocation of airfield lighting equipment, the demolition of Building PM-812, and repairs to Beach Road. Dune replenishment would include the removal of invasive plants and revegetation with native dune plant species and would result in an overall benefit to invertebrate species. The California brackish water snail may occur in salt marsh habitat and thus may be affected by the relocation of equipment and infrastructure in Building PM-812 to the Tide Gate #844 site. The Navy has over 30 ac. of proactively restored wetlands that could be used to offset this loss. Furthermore, over 120 ac. of wetlands have been identified on NBVC Point Mugu as potential wetland restoration sites for projects such as the Proposed Action. An assessment of the restored sites would be conducted to determine appropriate type and acreage to be used for mitigation of the impacted acre. Therefore, implementation of Alternative 1 would not result in significant impacts on invertebrates in the Project Area.

#### 3.3.2.1.7 Environmental Consequences for Reptiles and Amphibians

As described in Section 3.3.1.7 (Reptiles and Amphibians), the only special status species that has the potential to occur within the Project Area is the silvery legless lizard. Shoreline habitat within the Project Area is consistent with habitat for this species; however, there are no records of silvery legless lizards occurring on NBVC Point Mugu. No other special status reptile or amphibian species is known to occur within the Project Area. A Navy-approved biologist would monitor project activities and would capture and relocate any legless lizards encountered within the Project Area and in harm's way. In addition, the proposed replenishment of dune habitat would benefit this species. Therefore, implementation of Alternative 1 would not result in significant impacts on reptiles and amphibians in the Project Area.

#### 3.3.2.2 Alternative 2: South M Avenue Alternative

Under Alternative 2, the Navy would repair and increase the width and height of the Central and West revetments, extend the eastern end of the West Revetment by approximately 125 ft. to protect Building PM-812 and Beach Road, replenish the sand dune down-coast of the eastern end of the West Revetment, relocate equipment and infrastructure in Building PM-812 to the relocation site at South M Avenue, and repair and repave Beach Road near the intersection with South M Avenue.

The only difference between Alternative 2 (South M Avenue Alternative) and Alternative 1 (Preferred Alternative) is the relocation site for the equipment and infrastructure currently located in Building PM-812 on Beach Road. Instead of relocating the equipment in the building to the Tide Gate #844 site, the equipment would be relocated to a building on South M Avenue (the current site of Building PM-81) (Figure 2-13 and Figure 2-15). The building footprint and utility requirements at the South M Avenue site would be similar to those at the Tide Gate #844 site. The structure at the PM-81 site, which is currently located on the South M Avenue site, would need to be expanded to approximately 5,500 ft.$^2$ (0.13 ac.) or removed to accommodate the new building.

##### 3.3.2.2.1 Environmental Consequences for Protected Species

Under Alternative 2, repairs and extensions of the Central and West Revetments, repairs to Beach Road, replenishing and recontouring of sand dunes, and demolition Building PM-812 would still occur. However, airfield lighting equipment currently in Building PM-812 would be relocated to the South M Avenue site. The potential impacts to protected species, discussed in Section 3.3.2.1.1 (Environmental Consequences for Protected Species) under Alternative 1, would be the same. However, the creation of an approximately 0.13 ac. pad in wetland habitat at this relocation site would result in loss of potential habitat for the light-footed Ridgway's rail.

##### 3.3.2.2.2 Environmental Consequences for Vegetation

The impacts to vegetation under Alternative 1, described above, would be the same for Alternative 2, except that the relocation site at South M Avenue Site (Figure 2-7) includes salt marsh and mudflat habitat. The creation of the pad at this site would result in the loss of a combined total of approximately 0.13 ac. of salt marsh and mudflat habitat. This would be a relatively small impact compared to the overall amount of these habitats at NBVC Point Mugu. The Navy has over 30 ac. of proactively restored wetlands that could be used to offset this loss. Furthermore, over 120 ac. of wetlands have been identified on NBVC Point Mugu as potential wetland restoration sites for projects such as the Proposed Action (U.S. Department of the Navy 2014a). An assessment of the restored sites would be conducted to determine appropriate type and acreage to be used for mitigation of the impacted area.

Therefore, implementation of Alternative 2 would not result in significant impacts on native vegetation in the Project Area.

##### 3.3.2.2.3 Environmental Consequences for Birds

The impacts to birds under Alternative 2 would be the same as described in Section 3.3.2.1.3 (Environmental Consequences for Birds) under Alternative 1. Construction activities would be conducted outside of nesting season, to the extent practicable, or a Navy-approved biologist would monitor construction activities and survey for nesting birds within and adjacent to the Project Area. If nesting birds are found, the biologist would establish a sufficient buffer around the nests until nesting is complete. Individual birds would be expected to move away from construction activities; thus, equipment strikes and hearing damage from construction noise would be unlikely. Therefore, implementation of Alternative 2 would not result in significant impacts on birds in the Project Area.

#### 3.3.2.2.4 Environmental Consequences for Mammals

**Marine Mammals**

Potential impacts to marine mammals would be identical to impacts described under Alternative 1, because all proposed construction activities occurring along the shoreline are the same (Section 3.3.2.1.4, Environmental Consequences for Mammals).

Therefore, implementation of Alternative 2 would not result in significant impacts on marine mammals in the Project Area.

**Terrestrial Mammals**

Terrestrial mammals with the potential to occur in the Project area are described in Section 3.3.1.4.2 (Terrestrial Mammals). As described in Section 3.3.2.1.4 (Environmental Consequences for Mammals), no terrestrial mammals are expected to be impacted by construction activities occurring along the shoreline.

Construction activities at the South M Avenue relocation site to accommodate the equipment and infrastructure currently located at Building PM-812 have the potential to affect saltmarsh habitat suitable for the California saltmarsh shrew and the south coast marsh vole, which are both known to occur in salt marshes at NBVC Point Mugu (U.S. Department of the Navy 2013a). The existing building at the South M Avenue site (Building PM-81) is not large enough to accommodate the equipment and infrastructure currently housed in Building PM-812 (Figure 2-16). The structure at the PM-81 site would be expanded or demolished, and a new building would be constructed to house the equipment from Building PM-812. However, the South M Avenue site is not large enough to accommodate the estimated 5,500 $ft.^2$ (0.13 ac.) required to house the equipment without impacting adjacent saltmarsh habitat (see Section 3.3.2.1.2, Environmental Consequences for Vegetation; and Section 3.2.2, Environmental Consequences to Water Resources for details).

The saltmarsh habitat that would be permanently lost is a small fraction of the available saltmarsh habitat on NBVC Point Mugu. Given its close proximity to South M Avenue, a paved and frequently traveled road, the habitat is probably not preferred by the California saltmarsh shrew or the south coast marsh vole. Furthermore, no significant impacts to saltmarsh habitat are anticipated from implementing the Proposed Action (Section 3.3.2.1.2, Environmental Consequences for Vegetation; and Section 3.2.4, Environmental Consequences to Water Resources; therefore, there would be no significant loss of habitat for the shrew or the vole as a result of construction at the South M Avenue site (Figure 2-12 and Figure 2-16).

An increase in noise and overall activity associated with construction at the site may result in some terrestrial species, including the shrew, the vole, and bat species, avoiding the immediate area around the construction site. These behavioral responses, if they were to occur, are expected to be minor and temporary, occurring sporadically over approximately several weeks during which construction is expected to take place. The South M Avenue site is located immediately adjacent to South M Avenue, which is a paved road that is used throughout the day by a variety of vehicles, including larger trucks transporting equipment (and occasionally ordnance). Animals at the site may have become accustomed to experiencing a certain level of disturbance, and the addition of construction activity may not result in any type of behavioral response. Furthermore, several acres of undisturbed saltmarsh would remain available as suitable habitat for species that utilize the saltmarsh (U.S. Department of the Navy 2013a).

Therefore, implementation of Alternative 2 would not result in significant impacts on terrestrial mammals in the Project Area.

#### 3.3.2.2.5 Environmental Consequences for Fish

Potential impacts to fish species located along the shoreline and wetland areas of the Project Area would be the same as described in Section 3.3.2.1.5 (Environmental Consequences for Fish) under Alternative 1. Construction activities at the South M Avenue site to accommodate the equipment and infrastructure currently located in Building PM-812 have the potential to affect marsh habitat at NBVC Point Mugu. Although approximately 0.13 ac. of wetland habitat would be filled in, no significant impacts to saltmarsh habitat are anticipated from implementing the Proposed Action under Alternative 2 (Section 3.3.2.1.2, Environmental Consequences for Vegetation; and Section 3.2.2, Environmental Consequences to Water Resources); therefore, implementation of Alternative 2 would not result in significant impacts on fish species.

**Essential Fish Habitat**

Potential impacts to EFH located along the shoreline and wetland areas of the Project Area would be the same as described in Section 3.3.2.1.5 (Environmental Consequences for Fish) under Alternative 1. Saltmarsh habitat adjacent to the South M Avenue relocation site is classified as a Habitat Area of Particular Concern under the Pacific Coast Groundfish EFH. Approximately 0.13 ac. of wetlands would be filled in to allow for the construction of a new facility to house the relocated equipment and space for parking at the site. The EFH that would be permanently lost is a small fraction of available saltmarsh habitat on NBVC Point Mugu, and a very small portion of HAPC designated along the California coastline, which are defined as all waters, substrates, and associated biological communities falling within estuaries, canopy kelp, seagrasses, rocky reefs, and other habitat areas of interest, including Mugu Lagoon. Therefore, the construction activities at the South M Avenue relocation site would affect EFH, but the effects are expected to be negligible.

Therefore, implementation of Alternative 2 would not result in significant impacts on EFH in the Project Area.

#### 3.3.2.2.6 Environmental Consequences for Invertebrates

Potential impacts to invertebrate species located along the shoreline, wetland, and dune areas of the Project Area would be the same as described in Section 3.3.2.1.6 (Environmental Consequences for Invertebrates) under Alternative 1. The California brackish water snail may occur in salt marsh habitat and thus may be affected by the relocation of equipment and infrastructure in Building PM-812 to the South M Avenue site. The Navy has over 30 ac. of proactively restored wetlands that could be used to offset this loss. Furthermore, over 120 ac. of wetlands have been identified on NBVC Point Mugu as potential wetland restoration sites for projects such as the Proposed Action. An assessment of the restored sites would be conducted to determine appropriate type and acreage to be used for mitigation of the impacted acre. Therefore, implementation of Alternative 2 would not result in significant impacts on invertebrate species.

#### 3.3.2.2.7 Environmental Consequences for Reptiles and Amphibians

The impacts to reptiles and amphibians under Alternative 2 would be the same as described in Section 3.3.2.1.7 (Environmental Consequences for Reptiles and Amphibians) under Alternative 1. The relocation site for the airfield lighting equipment housed in Building PM-812 on South M Avenue is not suitable habitat for legless lizards or other special status reptile species. Therefore, implementation of Alternative 2 would not result in significant impacts on reptile or amphibian species in the Project Area.

### 3.3.2.3 Alternative 3: Beach Sand Replenishment (With Revetment Repair)

Under Alternative 3, the West Revetment would not be extended and the equipment and infrastructure currently housed in Building PM-812 would not be relocated. The existing building would be maintained

in its current location on Beach Road. All other components of Alternative 1 would be implemented. The Navy would repair and increase the width and height of the Central and West revetments, replenish the sand dune down-coast of the eastern end of the West Revetment to protect Building PM-812 and Beach Road, and repair and repave Beach Road near the intersection with South M Avenue.

#### 3.3.2.3.1 Environmental Consequences for Protected Species

The potential impacts to protected species discussed in Section 3.3.2.1.1 (Environmental Consequences for Protected Species) under Alternative 1 would be the same; however, construction activities would have no effect on light-footed Ridgway's rail, because no activities would occur in wetland areas. Therefore, implementation of Alternative 3 would not result in significant impacts on protected species.

#### 3.3.2.3.2 Environmental Consequences for Vegetation

The potential impacts to vegetation discussed in Section 3.3.2.1.2 (Environmental Consequences for Vegetation) under Alternative 1, would be the same; however, construction activities would not impact salt marsh vegetation and wetlands, because no activities would occur at either of the two relocation sites for the airfield lighting equipment housed in Building PM-812. Therefore, implementation of Alternative 3 would not result in significant impacts on vegetation.

#### 3.3.2.3.3 Environmental Consequences for Birds

The potential impacts to birds discussed in Section 3.3.2.1.3 (Environmental Consequences for Birds) under Alternative 1 would be the same. Construction activities would be conducted outside of nesting season, to the extent practicable, or a Navy-approved biologist would monitor construction activities and survey for nesting birds within and adjacent to the Project Area. If nesting birds are found, the biologist would establish a sufficient buffer around the nests until nesting is completed. Individual birds would be expected to move away from construction activities; thus, equipment strikes and hearing damage from construction noise would be unlikely. Therefore, implementation of Alternative 3 would not result in significant impacts on birds.

#### 3.3.2.3.4 Environmental Consequences for Mammals

**Marine Mammals**

Marine mammals with the potential to occur in the Project Area are described in Section 3.3.1.4.1 (Marine Mammals). Only three pinnipeds—California sea lion, northern elephant seal, and harbor seal—may but are not likely to occur on the sandy beaches at NBVC Point Mugu. If the pinnipeds use the beaches as haul-out sites, it would be to rest; there are no known pupping sites on the coastal beaches at NBVC Point Mugu. No marine mammals would be expected to occur in other parts of the Project Area (e.g., wetlands, lay down areas, dune, or Beach Road).

As described in 3.3.2.1.4 (Environmental Consequences for Mammals) under Alternative 1, the construction activities at the West and Central revetments are the only components of the Proposed Action that have the potential to impact the three pinniped species. Potential impacts on marine mammals from the Proposed Action as described under Alternative 3 would be no greater than impacts described under Alternative 1. Expansion of the West Revetment, as described under Alternative 1 (Section 2.3.2.3, West Revetment Repair, Expansion, and Extension with Sand Dune Replenishment) would not occur under Alternative 3.

The reduction in construction activity at the West Revetment would reduce the potential for impacts to marine mammals. Without the expansion, the amount of time construction vehicles would be on-site is reduced, resulting in less airborne noise over the duration of the project. Less noise would lower the probability of causing a behavioral response from a hauled-out pinniped. Because revetments can contribute to beach erosion on the seaward side of the revetment, not extending the revetment 125 ft.

down-coast would maintain the existing conditions along that section of beach, which could be used as a haul-out site. However, the possible reduction of sandy beach at the site would be negligible when compared to the 6 mi. of shoreline available to pinnipeds at NBVC Point Mugu as haul-out sites (U.S. Department of the Navy 2012a).

Therefore, implementation of Alternative 3 would not result in significant impacts on marine mammals in the Project Area.

**Terrestrial Mammals**

Terrestrial mammals with the potential to occur in the Project area are described in Section 3.3.1.4.2 (Terrestrial Mammals). The coastal, sandy beach habitat where the repair and expansion of the revetments and the dune replenishment would occur is not primary habitat for terrestrial mammals at NBVC Point Mugu. Highly mobile species, such as invasive feral cats, opossums, and rodents, may occasionally visit shoreline areas to search for food, but these species are highly adapted to a wide variety of habitats on the base, including developed areas, and are not likely to be impacted by construction activities along the shoreline. Additionally, these species pose a serious risk to avian and reptile species that rely on the dunes and sandy beach habitat adjacent to the revetments. No impacts to terrestrial mammals inhabiting saltmarsh wetlands would occur, because the equipment housed in Building PM-812 would not be relocated to the site at Tide Gate #844.

Therefore, implementation of Alternative 3 would not result in significant impacts on terrestrial mammals in the Project Area.

#### 3.3.2.3.5 Environmental Consequences for Fish

The potential impacts to fish species discussed in Section 3.3.2.1.5 (Environmental Consequences for Fish) under Alternative 1 would be the same under Alternative 3; however, there would be no impacts on species in wetland habitats, because no activities would occur in wetland areas. Therefore, implementation of Alternative 3 would not result in significant impacts on fish species.

**Essential Fish Habitat**

The potential impacts to EFH discussed in Section 3.3.2.1.5 (Environmental Consequences for Fish) under Alternative 1 would be the same under Alternative 3; however, no construction activities would occur at either of the two relocation sites for the airfield lighting equipment housed in Building PM-812, and, therefore, there would be no impacts on salt marsh vegetation and wetlands. Therefore, implementation of Alternative 3 would not result in significant impacts on EFH.

#### 3.3.2.3.6 Environmental Consequences for Invertebrates

Potential impacts to invertebrate species located along the shoreline and dune areas of the Project Area would be the same as described in Section 3.3.2.1.6 (Environmental Consequences for Invertebrates) under Alternative 1; however, the California brackish water snail would not be impacted, because no activities would occur at either of the two relocation sites for the airfield lighting equipment housed in Building PM-812.

Therefore, implementation of Alternative 3 would not result in significant impacts on invertebrates in the Project Area.

#### 3.3.2.3.7 Environmental Consequences for Reptiles and Amphibians

Potential impacts to reptile species located along the shoreline and dune areas of the Project Area would be the same as described in Section 3.3.2.1.7 (Environmental Consequences for Reptiles and Amphibians) under Alternative 1. No amphibians are known to occur in or adjacent to the Project Area.

Therefore, implementation of Alternative 3 would not result in significant impacts on reptiles or amphibians in the Project Area.

#### 3.3.2.4 No Action Alternative

Under the No Action Alternative, none of the proposed construction activities would be conducted. The West and Central revetments would not be repaired or expanded, the dune at the eastern end of the West Revetment would not be replenished, the equipment housed in Building PM-812 would not be relocated to either of the two proposed sites, the dunes at Ormond Beach and Holiday Beach would not be recontoured, and Beach Road would not be cleared and repaired near the intersection of South M Avenue. No new ground disturbing activities would occur. Therefore, implementation of the No Action Alternative would not result in significant impacts on biological resources in the Project Area.

## 3.4 AIR QUALITY AND CLIMATE CHANGE

The impact analysis for air quality considers possible changes in ambient air quality that could result from the Proposed Action. Such changes could arise from air pollutant emissions associated with increases in shoreline development activities (e.g., from construction vehicles). Factors used in determining if impacts to air quality would be significant include whether emissions from the proposed activities under each alternative would be expected to change the California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS) attainment status in the Ventura County Air Pollution Control District (VCAPCD).

Section 3.4.3 (Environmental Consequences to Air Quality and Contributions to Climate Change) presents the analysis of potential impacts on air quality in relation to three air quality stressors:

- Criteria air pollutants
- Hazardous air pollutants
- Fugitive dust

### 3.4.1 AIR POLLUTANTS

California is divided into 15 distinct air basins for monitoring and management purposes. The project site is within the South Central Coast Air Basin, which consists of San Luis Obispo County, Santa Barbara County, and Ventura County. California consists of 35 air quality control districts, NBVC Point Mugu being within the VCAPCD. This district is further divided into two zones, the North Zone and the South Zone, of which the dividing line is the southern boundary of the Los Padres National Forest.

Air pollutants are classified as either primary or secondary pollutants. Primary air pollutants are those emitted directly into the atmosphere, such as carbon monoxide (CO), sulfur dioxide ($SO_2$), suspended particulate matter (PM), and lead (Pb). Secondary air pollutants, such as ozone ($O_3$), are those formed through atmospheric chemical reactions. Such reactions usually involve primary air pollutants and normal constituents of the atmosphere. Sunlight and meteorological conditions, such as temperature and humidity, can also affect atmospheric chemistry. Air pollutants such as organic gases and particulate matter are a combination of primary and secondary pollutants. Suspended particulate matter less than or equal to 10 micrometers in diameter ($PM_{10}$) and suspended particulate matter less than or equal to 2.5 micrometers in diameter ($PM_{2.5}$) are generated as primary pollutants by various mechanical processes (e.g., abrasion, erosion, mixing, or atomization) or combustion processes. However, $PM_{10}$ and $PM_{2.5}$ also can be formed as secondary pollutants, through chemical reactions or by the condensation of gaseous pollutants into fine aerosols.

Compounds that react to form secondary air pollutants, such as $O_3$, are called pollutant precursors. Precursors for $O_3$ fall into two broad groups of chemicals: nitrogen oxides ($NO_X$) and organic compounds. $NO_X$ consists of nitric oxide and nitrogen dioxide ($NO_2$). Organic compound precursors of $O_3$ are routinely described by various terms, including volatile organic compounds, reactive organic compounds, and reactive organic gases. In this document, the term "reactive organic gases" refers to organic compound precursors of $O_3$.

Air quality at a given location is defined by the concentrations of various pollutants in the atmosphere. Pollutants are defined as two general types: (1) criteria pollutants and (2) toxic compounds. Criteria pollutants have national and/or state ambient air quality standards. Criteria pollutants are $O_3$, CO, $NO_2$, $SO_2$, $PM_{10}$, $PM_{2.5}$, and Pb.

Non-criteria air pollutants (which are the entire range of contaminants other than the criteria pollutants, including other toxic and hazardous pollutants) that can affect human health are categorized as hazardous air pollutants under Section 112 of the Clean Air Act (CAA). The USEPA has identified 189 hazardous air pollutants, such as benzene, perchloroethylene, and methylene chloride. Hazardous air pollutants emitted from mobile sources are called mobile source air toxics. Mobile source air toxics are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects. On March 29, 2001, the USEPA published the first mobile source air toxics rule, which identified 21 compounds as hazardous air pollutants that required regulation (66 FR 17229). A subset of six of these mobile source air toxics compounds were identified as having the greatest influence on health: benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. The USEPA published a second mobile source air toxics rule on February 26, 2007, which generally supported the findings in the first rule and provided additional recommendations of compounds having the greatest impact on health (72 FR 37 Monday 26, February). The rule also identified several engine emission certification standards that must be implemented.

Unlike the criteria pollutants, there are no national ambient air quality standards for benzene and other hazardous air pollutants. The primary control methods for these pollutants for mobile sources involves reducing their content in fuel and altering the engine operating characteristics to reduce the volume of pollutant generated during combustion.

Mobile source air toxics would be the primary hazardous air pollutants emitted by mobile sources (e.g., construction equipment) during activities associated with the Proposed Action. For these reasons, hazardous air pollutants are evaluated qualitatively in this EA.

#### 3.4.1.1 Measuring Air Pollutants

The quantity of air pollutant emissions are measured by the weight or volume of one or more specific compounds emitted into the atmosphere by a source. Most air pollutant emissions are expressed as a rate (e.g., pounds per hour, pounds per day, or tons per year). Typical measurement units for emission rates on a source activity basis include pounds per thousand gallons of fuel burned, pounds per ton of material processed, and grams per vehicle-mile of travel.

Ambient air quality is determined by the atmospheric concentrations of specific air pollutants at a particular time and location. The ambient air pollutant concentrations measured at a particular location are determined by the pollutant emissions rate, local meteorology, and atmospheric chemistry. Wind speed and direction and precipitation patterns affect the dispersal, dilution, and removal of air pollutant

emissions. Ambient air quality data are generally reported as a mass per unit volume (e.g., micrograms per cubic meter [$\mu g/m^3$] of air) or as a volume fraction (e.g., parts per million by volume).

The following section provides the regulatory framework for air quality and contains general information and definitions of terms commonly used in this section.

#### 3.4.1.2 General Conformity

The USEPA established the NAAQS, while the CARB established the state standards, known as the CAAQS. The USEPA designates all areas of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. A nonattainment designation generally means that a primary NAAQS has been exceeded more than once per year in a given area; however, an area will be in nonattainment with respect to an annual standard if that standard is exceeded on even one occasion during a year. The CARB also designates areas of the state as either in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if its CAAQS has been exceeded more than once in 3 years. The NAAQS and CAAQS are shown in Table 3-3. Toxic air contaminants generally have no established ambient standards, but have been determined to cause short-term (acute) and/or long-term (chronic non-carcinogenic or carcinogenic) adverse health effects. Units of concentration for these pollutants are generally expressed in parts per million (ppm) or $\mu g/m^3$.

##### 3.4.1.2.1 Regulatory Framework and Management Practices

The USEPA is responsible for enforcing the CAA of 1970 and its 1977 and 1990 amendments (42 U.S.C. §7401, et seq.). The CAA's purposes are to classify air basins as to their attainment status under the NAAQS (40 C.F.R. §50) (Table 3-3), develop schedules and strategies to meet the NAAQS, and regulate emissions of criteria pollutants and air toxics to protect the public health and welfare. Short-term standards (1-, 3-, 8- and 24-hour periods) are established for pollutants contributing to acute health effects, while long-term standards (quarterly and annual averages) are established for pollutants contributing to chronic health effects.

States may also establish their own ambient air quality standards that are more stringent than those set by Federal law. The CARB establishes ambient air quality standards for California. These standards include the NAAQS as well as CAAQS, which are used to consider whether to issue a permit for a stationary source by ensuring that the stationary source will not cause the CAAQS to be exceeded in areas where the general public has access. Many CAAQS are more stringent than the equivalent NAAQS criteria.

The Western Regional Air Partnership Dust Emissions Joint Forum adopted a definition of fugitive dust on October 21, 2004 (Western Governors' Association 2006). Fugitive dust was defined as dust that could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening. Fugitive dust can be generated from agricultural tilling, construction, materials handling, paved travel surfaces, unpaved travel surfaces, minerals products industry, abrasive blasting, livestock husbandry, and wind erosion of exposed areas. Fugitive dust can become a contributor to nonattainment of the NAAQS for $PM_{10}$ or $PM_{2.5}$.

**Table 3-3: Ambient Air Quality Standards**

| Pollutant | Averaging Time | NAAQS Primary | NAAQS Secondary | CAAQS |
|---|---|---|---|---|
| $O_3$ | 1 hour | - | - | 0.09 ppm |
| | 8 hour | 0.075 ppm | Same as primary | 0.070 ppm |
| CO | 1 hour | 35 ppm | - | 20 ppm |
| | 8 hour | 9 ppm | - | 9 ppm |
| | 8 hour (Lake Tahoe) | - | - | 6 ppm |
| $NO_2$ | 1 hour | 100 ppb | - | 0.18 ppm |
| | Annual arithmetic average | 0.053 ppm | Same as primary | 0.030 ppm |
| $SO_2$ | 1 hour | 75 ppb | - | 0.25 ppm |
| | 3 hour | - | 0.5 ppm | - |
| | 24 hour | 0.14 ppm | | 0.04 ppm |
| | Annual arithmetic average | 0.030 ppm | | - |
| $PM_{10}$ | 24 hour | 150 µg/m$^3$ | Same as primary | 50 µg/m$^3$ |
| | Annual arithmetic mean | - | - | 20 µg/m$^3$ |
| $PM_{2.5}$ | 24 hour | 35 µg/m$^3$ | Same as primary | - |
| | Annual arithmetic average | 12 µg/m$^3$ | 15 µg/m$^3$ | 12 µg/m$^3$ |
| Pb | 30 day average | - | - | 0.15 µg/m$^3$ |
| | Calendar Quarter | 1.5 µg/m$^3$ | Same as primary | - |
| | Rolling 3-month average | 0.15 µg/m$^3$ | Same as primary | - |

Notes: CO = carbon monoxide, ft. = feet, NAAQS = national ambient air quality standards, CAAQS = California Ambient Air Quality Standards, $NO_2$ = nitrogen dioxide, $O_3$ = ozone, $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter, $PM_{10}$ = suspended particulate matter less than or equal to 10 micrometers in diameter, Pb = lead, ppb = parts per billion, ppm = parts per million, µg/m$^3$ = micrograms per cubic meter
Sources: California Air Resources Board 2013

#### 3.4.1.2.2 Federal Regulations

Section 176(c) of the CAA, as articulated in the USEPA General Conformity Rule, states that a Federal agency cannot issue a permit or support an activity unless the agency determines that it will conform to the most recent USEPA-approved State Implementation Plan. This means that projects using Federal funds or requiring Federal approval in nonattainment or maintenance areas must not (1) cause or contribute to any new violation of a NAAQS; (2) increase the frequency or severity of any existing violation; or (3) delay timely attainment of any standard, interim emission reduction, or other milestone. The General Conformity Rule applies to Federal actions affecting areas that are in nonattainment of a NAAQS and to designated maintenance areas (attainment areas that have been reclassified from a previous nonattainment status and which are required to prepare an Air Quality Maintenance Plan); the federally enforceable applicable state implementation plan for California is compiled in 40 C.F.R. Part 52 Subpart F. A conformity review must be completed for every Federal action that generates air emissions in nonattainment or maintenance (former nonattainment) areas.

Conformity determinations are required when the annual direct and indirect emissions from a Federal action exceed an applicable *de minimis* threshold. The conformity *de minimis* thresholds vary by pollutant and the severity of nonattainment conditions in the region where the Proposed Action would occur. VCAPCD Rule 220 implements the USEPA General Conformity Rule.

#### 3.4.1.2.3 State Regulations

The CARB is responsible for the coordination and administration of both Federal and state air pollution control programs within California, and implementation of the California CAA. The California CAA requires the CARB to establish the CAAQS (Table 3-3). In general, the CAAQS are at least as stringent as the NAAQS. The California CAA requires local air districts in the state to achieve and maintain the CAAQS by the earliest practical date. The California CAA specifies that local air districts should focus particular attention on reducing emissions from transportation and area-wide emission sources, and it gives districts the authority to regulate indirect sources of emissions.

### 3.4.2 AFFECTED ENVIRONMENT

The Project Area is located in Ventura County, which is within the VCAPCD. Presently, the VCAPCD attains all NAAQS except the ozone standard. Ventura County is classified as a serious ozone nonattainment area (U.S. Environmental Protection Agency 2013). The CARB also designates areas of the state that are in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if its CAAQS has been exceeded more than once in 3 years. Presently, the VCAPCD is in attainment of the CAAQS for all air pollutants except ozone.

The VCAPCD is responsible for regulating stationary sources of air emissions within Ventura County and has prepared numerous air quality planning documents to meet state and Federal clean air mandates. The most important of these are the air quality management plans (AQMPs). These documents outline the VCAPCD's long-range strategy for providing clean, healthful air to the citizens and businesses of Ventura County. The AQMPs are not one-time documents, but periodically get updated and revised in accordance with changes in governing law and air pollution control science and technology. Moreover, each successive AQMP builds on its predecessor. The last major Ventura County AQMP was the 2007 AQMP (Ventura County Air Pollution Control District 2007). It was prepared to satisfy requirements of the CAA for the 1997 Federal 8-hour ozone standard.

Central to Ventura County's AQMPs are stationary source control measures. Stationary source control measures are techniques and equipment for reducing ozone precursor emissions, reactive organic compounds (ROCs), and $NO_X$ from stationary sources in the county. Examples of stationary source control measures include gasoline station vapor recovery systems, landfill gas recovery systems, and catalytic emission control systems on engines and various other combustion devices. Control measures for stationary sources proposed in the air quality plans and adopted by the VCAPCD are incorporated into the Rules and Regulations of the VCAPCD (Ventura County Air Pollution Control District 2014).

#### 3.4.2.1 Regional and Local Air Quality

As mentioned in Section 3.4.1 (Air Pollutants), California is divided into 15 distinct air basins for monitoring and management purposes. The Project Area is within the South Central Coast Air Basin, which consists of the San Luis Obispo County, Santa Barbara County, and VCAPCD.

The California Air Resources Board's air quality monitoring program collects accurate real-time measurements of ambient level pollutants at over 40 sites located throughout the state. The data generated are used to define the nature and severity of pollution in California, determine which areas of California are in attainment or non-attainment, identify pollution trends in the state, support agricultural burn forecasting, and develop air models and emission inventories.

Ventura County (VCAPCD) is an attainment area for all ambient air quality standards shown in Table 3-3, with the exception of ozone. The air quality in the VCAPCD (excluding the Channel Islands of Anacapa and San Nicolas Island) have been characterized by the USEPA as a serious nonattainment area for 8-hour ozone ($NO_X$ and volatile organic compounds [VOCs]). A nonattainment designation generally means that a primary NAAQS has been exceeded more than once per year in a given area; however, an area will be in nonattainment with respect to an annual standard if that standard is exceeded on even one occasion during a year. Table 3-4 lists the number of exceedances within the VCAPCD for the last 5 years, ending in 2014.

**Table 3-4: Ozone Exceedances for VCAPCD**

| Year | Number of Exceedance Days | | | Maximum Concentration | |
|---|---|---|---|---|---|
| | State | | National | | |
| | 1-hour | 8-hour | 8-hour | 1-hour | 8-hour |
| 2014 | 1 | 16 | 7 | 0.112 | 0.085 |
| 2013 | 3 | 12 | 4 | 0.104 | 0.0894 |
| 2012 | 4 | 32 | 16 | 0.106 | 0.0879 |
| 2011 | 4 | 17 | 8 | 0.108 | 0.0864 |
| 2010 | 6 | 22 | 13 | 0.104 | 0.0906 |
| 2009 | 13 | 42 | 25 | 0.116 | 0.0954 |

Source: California Air Resources Board 2015

The most recent annual air emissions inventory data available for California (2011) are shown in Table 3-5.

**Table 3-5: Annual Baseline (2011) Criterial and Precursor Air Pollutant Emissions for South Central Coast Air Basin and Ventura County**

| Geographic Area | Criteria and Precursor Air Pollutant Emissions in Tons/Year | | | | | |
|---|---|---|---|---|---|---|
| | CO | $NO_x$ | VOC | $SO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| South Central Coast Air Basin | 147,567 | 29,897 | 145,933 | 948 | 12,389 | 2,114 |
| Ventura County (VCAPCD) | 61,220 | 12,006 | 44,428 | 235 | 4,102 | 761 |

Notes: CO = carbon monoxide, $NO_x$ = nitrogen oxides, VOC = volatile organic compounds, $SO_x$ = sulfur oxides, $PM_{10}$ = suspended particulate matter less than or equal to 10 micrometers in diameter, and $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter.

Source: U.S. Environmental Protection Agency 2015a

#### 3.4.2.2 Greenhouse Gases and Climate Change Effects

In addition to criteria pollutants, which are hazardous to human health, natural processes and human activities produce greenhouse gases (GHGs), which absorb and emit thermal infrared radiation and trap heat in the atmosphere. The most common GHGs emitted from natural processes and human activities include carbon dioxide ($CO_2$), nitrous oxide ($N_2O$), methane ($CH_4$).

The Revised Draft Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews, issued by the CEQ on 18 December 2014, recommends incorporating impacts associated with climate change as part of the standard cumulative impact analysis of all NEPA documents. The draft guidance encourages agencies to determine which climate change impacts warrant consideration in their analyses based on both the Proposed Action's potential impact to climate

changes and the potential impact a changing climate may have on implementation of the Proposed Action.

The USEPA developed a "State of Knowledge" website following the 2007 Intergovernmental Panel on Climate Change report. The USEPA affirms that, while the contribution is uncertain, human activities are substantially increasing GHG emissions, which, in turn, are contributing to a global warming trend (U.S. Environmental Protection Agency 2015b). The U.S. Global Change Research Program (USGCRP) is a working group coordinating the efforts of 13 different federal agencies, including the U.S. Department of Agriculture, the Department of the Interior, the Department of Defense, and the Department of Energy. The USGCRP releases regular reports presenting the most current scientific consensus of predicted changes associated with global climate change. The 2014 National Climate Assessment report is the most recent complete report (Melillo et al. 2014). This report summarizes the science of climate change and the impacts of climate change on the United States, now and in the future, and is recommended by the CEQ 2014 draft guidance as the primary source for framing climate change discussions. Therefore, the impact of proposed greenhouse gas emissions to climate change is discussed in the context of cumulative impacts in Chapter 4 (Cumulative Impacts).

### 3.4.3 Environmental Consequences to Air Quality and Contributions to Climate Change

The potential impacts to Air Quality in the Project Area from the Proposed Action are discussed in this section. Emissions thresholds associated with federal Clean Air Act conformity requirements are the primary means of assessing significance of potential air quality impacts associated with implementation of the Proposed Action. 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. Potential impacts are evaluated based on estimated direct or indirect emissions associated with implementation of the No Action Alternative and Proposed Action. Air quality impacts would occur if implementation of the Proposed Action would directly or indirectly:

- produce emissions that would be the primary cause of or significantly contribute to a violation of state or federal ambient air quality standards;
- establish land uses that would expose people to localized (or opposed to regional) air pollutant concentrations that violate state or federal ambient air quality standards;
- cause a net increase in pollutant or pollutant precursor emissions that exceed relevant emission significance thresholds (such as Clean Air Act conformity *de minimis* levels or the numerical values of major source thresholds for nonattainment pollutants);
- conflict with adopted air quality management plan policies or programs; or
- foster or accommodate development in excess of levels assumed by the applicable air quality management plan.

#### 3.4.3.1 Alternative 1: Shoreline Protection Alternative (Preferred Alternative)

Under Alternative 1, the Navy would repair and increase the width and height of the Central and West revetments, extend the eastern end of the West Revetment down-coast by approximately 125 ft. to protect Building PM-812 and Beach Road, replenish the sand dune down-coast of the eastern end of the West Revetment, recontour the dunes at Ormond Beach and Holiday Beach, relocate equipment and infrastructure in Building PM-812 to the relocation site at Tide Gate #844, and repair and repave Beach Road near the intersection with South M Avenue.

### Criteria Pollutants

Total emissions were estimated from proposed construction activities. Emissions associated with ground vehicles were estimated based on emission factors for specific equipment, or for ground vehicles, from the CARB's Emission Factors (EMFAC) model, which provides emission factors for on-road vehicles, or the OFFROAD model. Table 3-6 lists estimated annual criteria and precursor air pollutant emissions under Alternative 1 and Alternative 2.

A CAA Record of Non-Applicability (RONA) has been prepared pursuant to Section 176 (c) of the Clean Air Act, the General Conformity Rule at 40 C.F.R. Parts 51 and 93, and the Chief of Naval Operations (CNO) Interim Guidance on Compliance with the Clean Air Act Conformity Rule (Appendix B). The Navy determined that the potential actions and managements practices outlined in the EA are exempt from conformity requirements in accordance with sections 40 C.F.R. 93.153 (c)(2)(ii), (iv), (vi), (vii), (viii), (ix), (x), and (xiii). Federal actions may be exempt from conformity determinations if they do not exceed designated de minimis levels for criteria pollutants (40 C.F.R. Part 51.853[b]).

The increases in construction/demolition activities would result in a corresponding increase in criteria and precursor pollutant emissions. All would increase under Alternative 1 compared to the No Action Alternative. However, effects of Alternative 1 on air quality would be negligible and local because emissions would be intermittent, the emissions would be limited to a few small sources, and pollutants would be rapidly dispersed by prevailing winds. Air pollutant emissions under Alternative 1 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality. As shown in Table 3-6, estimated emissions would not be considered regionally significant as they would range from less than 1 percent of the regional emissions for $SO_x$ and $PM_{10}$ up to 13.52 percent for $NO_x$. The calculations of potential emissions of criteria pollutants are provided in Appendix B (Clear Air Act Record of Non-Applicability).

### Hazardous Air Pollutants

The U.S. Environmental Protection Agency has listed 188 hazardous air pollutants regulated under Title III (Hazardous Air Pollutants), Section 112(g) of the Clean Air Act. Hazardous air pollutants are emitted by processes associated with Alternative 1, including fuel combustion. Trace amounts of hazardous air pollutants are emitted by combustion sources participating in construction/demolition activities. The amounts of hazardous air pollutants emitted are small compared to the emissions of criteria pollutants; emission factors for most hazardous air pollutants from combustion sources are roughly three or more orders of magnitude lower than emission factors for criteria pollutants (California Air Resources Board 2007). Hazardous air pollutant emissions estimates were not calculated because of the small amounts that would be emitted.

Under Alternative 1, hazardous pollutant emissions would increase, and the increases would be roughly proportional to the increases observed for the criteria air pollutants emitted (see Table 3-6). Hazardous air pollutants emissions would be intermittent and distributed over the Project Area. Their concentrations would be further reduced by atmospheric mixing and other dispersion processes. After initial mixing, it is possible that hazardous pollutants would be measurable, but they would temporarily be in very low concentrations and would not affect the air quality in the air quality control regions.

**Table 3-6: Annual Criteria and Precursor Air Pollutant Emissions under Alternative 1 and Alternative 2***

| Activity | Criteria and Precursor Air Pollutant Emissions in Tons/Year | | | | |
|---|---|---|---|---|---|
| | CO | $NO_x$ | ROG | $SO_x$ | $PM_{10}$ |
| **Alternative 1 and Alternative 2** | | | | | |
| Central Revetment Repair and Expansion | 1.0613 | 1.7852 | 0.2513 | 0.0032 | 0.0820 |
| West Revetment Repair, Expansion, and Extension | 1.8827 | 3.4755 | 0.4708 | 0.0058 | 0.1547 |
| Relocation of Airfield Lighting Equipment and Infrastructure | 0.6195 | 1.1233 | 0.1458 | 0.0020 | 0.0462 |
| Beach Road Repair | 0.2185 | 0.3692 | 0.0504 | 0.0007 | 0.0173 |
| Dune Recontouring | 0.0075 | 0.0118 | 0.0017 | 0.0000 | 0.0007 |
| **Alternative 1 and Alternative 2 Totals** | **3.79** | **6.76** | **0.92** | **0.012** | **0.30** |
| **Summary and Comparison** | | | | | |
| *De minimis* levels | 100 | 50 | 50 | 100 | 100 |
| Alternative 1 and 2 emissions as a percentage of the South Central Coast Air Basin baseline | **3.79%** | **13.52%** | **1.84%** | **0.01%** | **0.30%** |

*The only distinction between Alternative 1 and Alternative 2 is the location of the site for relocating the airfield lighting equipment (Tide Gate #844 under Alternative 1 and South M Avenue under Alternative 2). All other components of the Proposed Action are the same. Emissions associated with the construction of a new building and the relocation of the equipment would not be dependent on the site. Therefore, emissions under Alternative 1 and Alternative 2 would be approximately equivalent.

Notes: CO = carbon monoxide, $NO_x$ = nitrogen oxides, ROG = reactive organic gas, $SO_x$ = sulfur oxides, $PM_{10}$ = suspended particulate matter less than or equal to 10 micrometers in diameter

**Fugitive Dust**

The potential for fugitive dust to be generated under Alternative 1 would increase in comparison to the No Action Alternative. As presented in Section 2.5.2.4 (Air Quality/Climate Change), dust control measures would be implemented to comply with the requirements of Ventura County Air Pollution Control District Rule 55, Fugitive Dust, during all proposed ground disturbance and building demolition activities. Under Rule 55, construction, demolition, and/or earthmoving activities are prohibited from causing discharge of visible dust outside the property line, and must utilize standard BMPs to minimize dust from truck hauling, track-out/carry-out from active construction sites, and demolition activities. Following standard operating procedures and, where warranted, implementing best management practices would ensure that fugitive dust does not result in significant impacts on air quality.

Therefore, implementation of Alternative 1 would not result in significant impacts on air quality in the Project Area.

#### 3.4.3.2 Alternative 2: South M Avenue Alternative

Alternative 2 includes all components of Alternative 1, with the only difference being the relocation site for the airfield lighting equipment housed in Building PM-812. Instead of relocating the airfield lighting equipment housed in Building PM-812 to Tide Gate Site #844, the equipment would be relocated to the site on South M Avenue.

**Criteria Pollutants**

The construction and demolition activities are essentially the same under Alternative 2 as they are in Alternative 1 and would result in a corresponding increase in criteria and precursor pollutant emissions. However, effects of Alternative 2 on air quality would be negligible and local because emissions would

be intermittent, the emissions would be limited to a few small sources, and pollutants would be rapidly dispersed by prevailing winds. Air pollutant emissions under Alternative 2 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality. As with Alternative 1, estimated emissions would not be considered regionally significant as they would range from less than 1 percent of the regional emissions for $SO_x$ and $PM_{10}$ up to 13.52 percent for $NO_x$ (Table 3-6). The calculations of potential emissions of criteria pollutants are provide in Appendix A: Air Quality Calculations.

**Hazardous Air Pollutants**

Under Alternative 2, hazardous pollutant emissions would increase, and the increases would be roughly proportional to the increases observed for the criteria air pollutants emitted (see Table 3-6), similar to Alternative 1. Hazardous air pollutants emissions would be intermittent and distributed over the Study Area. Their concentrations would be further reduced by atmospheric mixing and other dispersion processes. After initial mixing, it is possible that hazardous pollutants would be measurable, but they would be in very low concentrations and would not affect the air quality in the air quality control regions.

**Fugitive Dust**

The potential for fugitive dust to be generated under Alternative 2 would increase in comparison to the No Action Alternative, and be the same as Alternative 1. Following standard operating procedures and, where warranted, implementing best management practices would ensure that fugitive dust does not result in significant impacts on air quality.

Therefore, implementation of Alternative 2 would not result in significant impacts on air quality in the Project Area.

#### 3.4.3.3 Alternative 3: Beach Sand Replenishment (With Revetment Repair)

Under Alternative 3, the West Revetment would not be extended and the airfield lighting equipment housed in Building PM-812 would not be relocated. All other components of Alternative 1 would be implemented.

**Criteria Pollutants**

Total emissions were estimated from proposed construction activities associated with the fixed and mobile emitters. Table 3-9 lists estimated annual criteria and precursor air pollutant emissions under Alternative 3.

All criteria and precursor pollutant emissions would increase under Alternative 3 compared to the No Action Alternative, though not as much as under Alternative 1, and would result in a corresponding increase in criteria and precursor pollutant emissions. However, effects of Alternative 3 on air quality would be negligible and local because emissions would be intermittent, the emissions would be limited to a few small sources, and pollutants would be rapidly dispersed by prevailing winds. Air pollutant emissions under Alternative 3 would not result in violations of state or federal air quality standards because they would not have a measurable impact on air quality. As shown in Table 3-9, estimated emissions would not be considered regionally significant, as they would range from less than 1 percent to approximately 8 percent of the regional emissions.

**Table 3-7: Annual Criteria and Precursor Air Pollutant Emissions under Alternative 3**

| Emissions Source | Criteria and Precursor Air Pollutant Emissions in Tons/Year | | | | |
|---|---|---|---|---|---|
| | CO | $NO_x$ | ROG | $SO_x$ | $PM_{10}$ |
| **Alternative 3** | | | | | |
| Central Revetment Repair and Expansion | 1.0613 | 1.7852 | 0.2513 | 0.0032 | 0.0820 |
| West Revetment Repair and Expansion[1] | 1.0613 | 1.7852 | 0.2513 | 0.0032 | 0.0820 |
| Beach Road Repair | 0.2185 | 0.3692 | 0.0504 | 0.0007 | 0.0173 |
| Dune Recontouring | 0.0075 | 0.0118 | 0.0017 | 0.0000 | 0.0007 |
| **Alternative 3 Total** | 2.3486 | 3.9514 | 0.5547 | 0.0071 | 0.182 |
| **Summary and Comparison** | | | | | |
| *De minimis* levels | 100 | 50 | 50 | 100 | 100 |
| Alternative 3 emissions as a percentage of the South Central Coast Air Basin baseline | **2.35%** | **7.90%** | **1.11%** | **0.01%** | **0.18%** |

Notes: CO = carbon monoxide, $NO_x$ = nitrogen oxides, ROG = reactive organic gas, $SO_x$ = sulfur oxides, $PM_{10}$ = suspended particulate matter less than or equal to 10 micrometers in diameter

[1] Assumes criteria pollutants emissions for repairs and expansion of the West Revetment will be equivalent to emissions for repairs and expansion of the Central Revetment.

**Hazardous Air Pollutants**

Under Alternative 3, hazardous pollutant emissions would increase, and the increases would be roughly proportional to the increases observed for the criteria air pollutants emitted (see Table 3-9). Hazardous air pollutants emissions would be intermittent and distributed over the Study Area. Their concentrations would be further reduced by atmospheric mixing and other dispersion processes. After initial mixing, it is possible that hazardous pollutants would be measurable, but they would be in very low concentrations and would not affect the air quality in the air quality control regions.

**Fugitive Dust**

The potential for fugitive dust to be generated under Alternative 3 would increase in comparison to the No Action Alternative, but would be less than Alternative 1. Following standard operating procedures and, where warranted, implementing best management practices would ensure that fugitive dust does not result in significant impacts on air quality.

Therefore, implementation of Alternative 3 would not result in significant impacts on air quality in the Project Area.

#### 3.4.3.4 No Action Alternative

The No Action Alternative is based on the “Do-Nothing” alternative described in the 2012 shoreline study (U.S. Department of the Navy 2012a) and represents the short-and long-term vulnerabilities of the coastal infrastructure at NBVC Point Mugu. Under the No Action Alternative, the existing shoreline protection devices and the infrastructure along the NBVC Point Mugu coastline would remain in their present location and condition. The Navy would not repair or expand the Central or West revetments, extend the West Revetment, replenish sand along the shoreline at the eastern end of the West Revetment to refortify the dunes, recontour dune areas at Ormond or Holiday beaches, relocate the airfield lighting equipment housed in Building PM-812, or repair and repave Beach Road near the intersection of South M Avenue.

**Criteria Pollutants**

Under the No Action Alternative, there would be no increase or decrease in criteria and precursor pollutant emissions.

**Hazardous Air Pollutants**

Under the No Action Alternative, there would be no increase or decrease in hazardous air pollutant emissions.

**Fugitive Dust**

Construction and demolition activities would not occur under the No Action Alternative, and generation of fugitive dust would be negligible. Existing conditions have not led to any known violations of state or federal ambient air quality standards.

Therefore, implementation of the No Action Alternative would not result in significant impacts on air quality in the Project Area.

## 3.5 NOISE

### 3.5.1 CHARACTERISTICS OF SOUND

Noise is often defined as unwanted sound. Sound is present at all times in our environment, but is perceived as noise when it interferes with communication or other behavior. Sound can be described as a vibration traveling through a medium (e.g., air or water) in the form of a wave. The focus of this EA is sound as changes in air pressure (caused by the vibrations) that the human ear can detect. A sound can be characterized by the physical properties of frequency, perceived by humans as pitch, and its amplitude, a relative measure of a sound's loudness.

The number of pressure oscillations or waves per second defines the frequency of the sound and is represented by the unit Hertz (Hz). A healthy human ear can hear a range of sound frequencies, from about 20 Hz at the lower end of the frequency spectrum, to 20,000 Hz at the higher end (Halliday and Resnick 1988; Berglund and Lindvall 1995). The amplitude or intensity of a sound is a measure of the amount of acoustic energy carried by the sound wave and is usually described as sound pressure. As the acoustic energy emitted by the source increases, the intensity, expressed in terms of sound pressure level or sound exposure level, also increases. Pitch and loudness are subjective measures of sound. Higher-frequency sounds are perceived as having a higher pitch than lower-frequency sounds, and higher-intensity sounds are perceived as louder than lower-intensity sounds. Higher-frequency sounds are also perceived as louder to humans than lower-frequency sounds having the same amount of energy (Berglund and Lindvall 1995; U.S. Department of the Navy 2013a).

The decibel (dB) is the most widely used unit of measure for quantifying the relative intensity, or sound level, of a sound. Decibels are calculated on a logarithmic scale, such that an increase of 10 dB represents a 10-fold increase in sound level, 20 dB is 100 times more intense, and 30 dB is 1,000 times more intense. On the decibel scale, 0 dB is defined as the lowest sound level that a healthy, unimpaired human ear can detect under ideal conditions (i.e., very quiet). Normal speech has a sound level of approximately 60 dB, and a garbage disposal has a sound level of about 80 dB. Sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 and 140 dB are felt as pain (Table 3-8, Halliday and Resnick 1988, Berglund and Lindvall 1995, National Academy of Engineers 2010).

The most common way to characterize the sensitivity of human hearing to in-air sounds is with the A-weighted scale (units of decibels, A-weighted [dBA]). The A-weighted scale is defined by the

frequencies of sound to which the human ear is most sensitive. The A-weighted scale is closely correlated to annoyance caused by sources of noise such as traffic and construction activities (National Academy of Engineers 2010, U.S. Department of the Navy 2013a).

**Table 3-8: Typical Noise Levels in the Environment**

| Sound Source | Sound Level (dBA) |
|---|---|
| Threshold of human hearing | 0 |
| Whisper (at 1 m) | 20 |
| Normal conversation (at 1 m) | 60 |
| Noisy restaurant | 70 |
| Garbage disposal | 80 |
| Jackhammer (at 1 m) | 90 |
| Threshold of pain | 120 |
| Jet engine (at 50 m) | 130 |

Adapted from Halliday and Resnick (1988); National Academy of Engineers (2010)

A change in sound pressure level of 3 dBA is widely accepted as the smallest change perceptible to humans, while a change of 5 dBA is readily perceptible. An increase in sound pressure level of 10 dBA is perceived as twice as loud, and a decrease of 10 dBA is perceived as half as loud. Because each 10 dB increase in the source level is a 10-fold increase in sound pressure level but only a doubling of perceived loudness to the human ear, sound pressure levels from different sound sources cannot simply be summed. For example, if two sounds with the same pressure level are detected by the same receptor, the sum is a sound pressure level that is only 3 dB higher than the sound pressure level of the individual sources (e.g., 70 dB + 70 dB = 73 dB, not 140 dB).

Sound levels can vary over short periods of time. Because of this inconsistency, a method for describing either the average character of the sound or the statistical behavior of the variations over time is often used to better represent perceived noise in a community. The most commonly used metric is the energy averaged sound level (Equivalent sound level [$L_{eq}$]). The $L_{eq}$ is the constant sound level that contains the same amount of energy as the time-varying sound level over the same time period. For example, if a sound varies continuously from 60 dB to 80 dB to 85 dB and then back down to 60 dB over the course of several minutes, then the $L_{eq}$ metric might be 76 dB, representing the time-averaged noise level over that time period.

$L_{eq}$ can describe any series of noise events of arbitrary duration; however, a common averaging period is hourly. Another metric, the Day/Night average sound level ($L_{dn}$), is also used to characterize community noise levels, taking into account increased sensitivity to noise at night and in the evening. Noise occurring from 7:00 PM to 10:00 PM is weighted by +5 dB, and noise occurring between 10:00 p.m. and 7:00 a.m. is weighted by +10 dB. Another noise metric is the Community Noise Equivalent Level (CNEL), which takes into account the overall average noise in the environment. Over a 24-hour period, both the $L_{dn}$ and CNEL metrics result in a weighted average sound level that is approximately 5 dB higher than actual measured noise levels (National Academy of Engineers 2010, Goelzer et al. 2001).

### 3.5.2 Human Health and Response to Noise

Some studies have linked increases in noise with human health effects. Some effects include hearing impairment, sleep disturbance, cardiovascular effects, psychophysiological effects, and potential impacts to fetal development (Van Kempen et al. 2002, National Academy of Engineers 2010). Both short- and long-term exposure to very loud noises and long-term exposure to lower levels of sound (chronic exposure) have the potential to affect health. Mechanical damage to hair cells of the cochlea (the auditory portion of the inner ear) and hearing impairment can be caused by acute exposure to sounds greater than 120 dB (Goelzer et al. 2001, Babisch 2005).

### 3.5.3 Propagation of Sound in the Environment

In an ideal setting in which sound propagates away from a point source without any outside influence (e.g., a barrier reflecting or attenuating the sound), sound energy radiates uniformly outward in all directions from the source in a pattern referred to a spherical spreading. As sound energy propagates away from the sound source, both the sound level and frequency change. For each doubling of distance from the source, the sound level attenuates (or drops off) at a rate of 6 dBA.

When a sound is not from a single point source but is instead from multiple sources along a line, like the noise made by the continuous movement of vehicles on a highway, the source of the sound appears to emanate from a linear source rather than from a point source. The sound level from a linear source decreases by approximately 3 to 4 dBA with a doubling of the distance from the source (Goelzer et al. 2001).

When the sound propagation path between the source and the receiver is very close to the ground, noise attenuation from ground absorption and reflection will cancel or sum the amplitude of the reflected waves. This type of propagation from the source is referred to as cylindrical spreading and can also be caused by an atmospheric boundary layer that reflects and absorbs sound.

### 3.5.4 Sound Attenuation Effects in the Environment

In a real-world setting, a number of factors can influence how sound propagates in the environment; the ideal case of spherical spreading is at best only an approximation of attenuation with distance. Wind has been shown to be the single most important meteorological factor within approximately 500 ft. of the sound source, while vertical air temperature gradients are more important in sound propagation over longer distances. Other atmospheric conditions such as air temperature, humidity, and turbulence also can have a major effect on received sound levels.

Whether natural or man-made, a large object or barrier in the path between a sound source and a receptor can attenuate sound levels substantially. The impact of this shielding depends on the size and material of the object as well as the frequency content of the sound source. Natural terrain, buildings, and walls can serve as noise barriers in which attenuation of 5–10 dB is often not noticeable.

Directionality of the sound and the orientation of the receptor are also important factors affecting the received sound level. Most sound sources do not radiate sound energy equally in all directions, but project sound in a more focused, narrower direction. Consider a person speaking; a receptor immediately in front of the speaker will receive a higher sound level than a receptor behind the speaker. Similarly, the orientation of the receptor with respect to the sound source affects the perceived sound level.

### 3.5.5 GUIDANCE ON NOISE ENVIRONMENT

#### 3.5.5.1 NAVFAC Planning in the Noise Environment (Publication P-970)

This document provides a discussion of allowable noise levels, as well as guidance for selecting a site for new facilities within the noise environment of military installations. The document also discusses noise reduction techniques to render marginally acceptable locations suitable for use (Naval Facilities Engineering Command 1978).

#### 3.5.5.2 Federal Interagency Committee on Urban Noise

The federal government has established suggested land use compatibility criteria for different noise zones. However, land use compatibility with differing noise levels is regulated at the local level (Federal Interagency Committee on Urban Noise 1980). Residential areas and schools are considered compatible where the $L_{dn}$ is less than or equal to 65 dBA, and outdoor recreational activities are compatible with noise levels less than or equal to 70 dBA. Furthermore, parks are compatible with noise levels less than or equal to 75 dBA based on Land Use Guidelines contained in the Federal Interagency Committee on Urban Noise (1980).

#### 3.5.5.3 U.S. Environmental Protection Agency Noise Standards

The level of environmental noise at which no measureable hearing loss would be expected to occur over a lifetime, as identified by the USEPA, is a 24-hour exposure level of 70 dB (U.S. Environmental Protection Agency 1974). This exposure level is also the threshold for all areas in terms of hearing loss avoidance.

#### 3.5.5.4 Federal Highway Administration Noise Standards

Noise standards, regulations, and policies related to highway traffic noise have been adopted by the Federal Highway Administration. As defined in 23 C.F.R. Part 772 the federal regulations addressing highway noise standards are not directly applicable to the Proposed Action because it is not a Type 1 federally funded highway improvement project. However, included in its guidance is a useful methodology to evaluate construction noise impacts. Included in the Federal Highway Administration's Roadway Construction Noise Model User's Guide, this methodology has been incorporated into this analysis to evaluate potential construction (including demolition) noise impacts (Federal Highway Administration 2006).

### 3.5.6 AFFECTED ENVIRONMENT

#### 3.5.6.1 Existing Noise Environment

At NBVC Point Mugu, the dominant source of noise is from aircraft. Depending on the aircraft and meteorological conditions, the height at which the noise becomes indistinguishable from the ambient environment varies.

The 1992 Air Installation Compatible Use Zone (AICUZ) Study for NBVC Point Mugu (Naval Base Ventura County 1992) is an update to the original AICUZ Study, which was developed in 1977. The purpose of the Navy AICUZ program is to protect the public's health, safety, and welfare and to prevent encroachment, while allowing the military to fulfill its mission of maintaining national security. The 1992 AICUZ Study addresses aircraft noise, aircraft safety, and land use compatibility in the vicinity of NBVC Point Mugu, and addresses safe land use planning through demarcation of clear zones and Accident Potential Zones (APZs). For land use planning purposes, the noise exposure from aircraft operations at NBVC Point Mugu is divided into the following three noise zones:

- Noise Exposure Zone 1 (less than 65 dBA CNEL) is the area of minimal impact, where sound attenuation or noise level reduction is not suggested in most cases.
- Noise Exposure Zone 2 (65 to 75 dBA CNEL) is an area of moderate impact, where some land use controls are needed. California state law does not allow most types of residential development in this zone. Most other land uses are acceptable, although sound attenuation is often required.
- Noise Exposure Zone 3 (more than 75 dBA CNEL) is the most severely impacted area and the area that requires the greatest degree of land use compatibility. Residential uses are unacceptable in this zone, and most other land uses are incompatible or require sound attenuation measures to reduce the noise level by at least 30 dBA.

The Navy is in the process of updating the AICUZ report for NBVC Point Mugu; if available, updated noise contours will be incorporated into the analysis for this EA.

Noise sources in the Action Area include current traffic on Beach Road, MAD road, and South M Avenue., as well as airborne noise associated with flights (particularly takeoffs and landings on Runway 03-21). At NBVC Point Mugu, the dominant source of noise is from aircraft. Flight operations noise levels exceeding ambient background noise only typically occur beneath main approach and departure corridors and in the places that are immediately adjacent to parking ramps and aircraft staging areas. The contribution of aircraft to the noise environment at ground level diminishes to levels that are indistinguishable from the ambient background as aircraft gain altitude. Depending on the aircraft and meteorological conditions, the height at which the noise becomes indistinguishable from the ambient environment varies.

The 2013 EA, *West Coast Home Basing of the MQ-4C Triton Unmanned Aircraft System at Naval Base Ventura County Point Mugu, California* (Triton EA) evaluated noise impacts from aircraft at NBVC Point Mugu (U.S. Department of the Navy 2013a). The Triton EA concluded that while other sources of noise, such as general vehicle traffic; existing operational, industrial, and developed area activities; and other maintenance and landscaping activities, are a common, on-going occurrence on NBVC Point Mugu, these sources are relatively minor compared to the dominant aircraft-generated noise at and adjacent to the installation (U.S. Department of the Navy 2013a). Flight operations noise levels exceeding ambient background noise only typically occur beneath main approach and departure corridors and in the places that are immediately adjacent to parking ramps and aircraft staging areas. The contribution of aircraft to the noise environment at ground level diminishes to levels that are indistinguishable from the ambient background as aircraft gain altitude. Noise levels, expressed using the sound exposure level (SEL) metric, is another time-averaged measure of sound level similar to $L_{eq}$, and can exceed 100 dB SEL at takeoff, which is typically when the loudest noise emissions occur (Table 3-9).

**Table 3-9: Representative SEL at Departure for Commonly Flown Aircraft at NBVC Point Mugu**

| Aircraft Type | Representative SEL |
|---|---|
| FA-18 E/F | 116 |
| FA-18 A/D | 117 |
| E-2/C-2 | 94 |
| Triton UAS | 87 |

Source: U.S. Department of the Navy (2013a)

#### 3.5.6.2 Noise Sensitive Receptors near the Project Area

Noise sensitive receptors in the vicinity of the Project Area at NBVC Point Mugu include mobile home park residents and visitors (about 2 mi. [3.2 km] east of Building PM-812), users of the Ventura County Game Preserve, and visitors in the camping and recreational beach areas on NBVC Point Mugu adjacent

to Beach Road and the Project Area (Figure 3-7). The nearest schools to the Project Area are the University of La Verne and Embry-Riddle Aeronautical University, both of which are located approximately 2 mi. (3.2 km) northeast of the Project Area. The nearest high school, Hueneme High School, is approximately 4.5 mi. (7.2 km) away. The closest middle school is Oceanview Junior High School, which is on East Hueneme Road and approximately 3 mi. (4.8 km) from the Project Area. The nearest elementary schools are about 7 mi. (11.3 km) from the Project Area and off base. The closest churches to the Project Area are about 4 mi. (6.4 km) away and located in Oxnard.

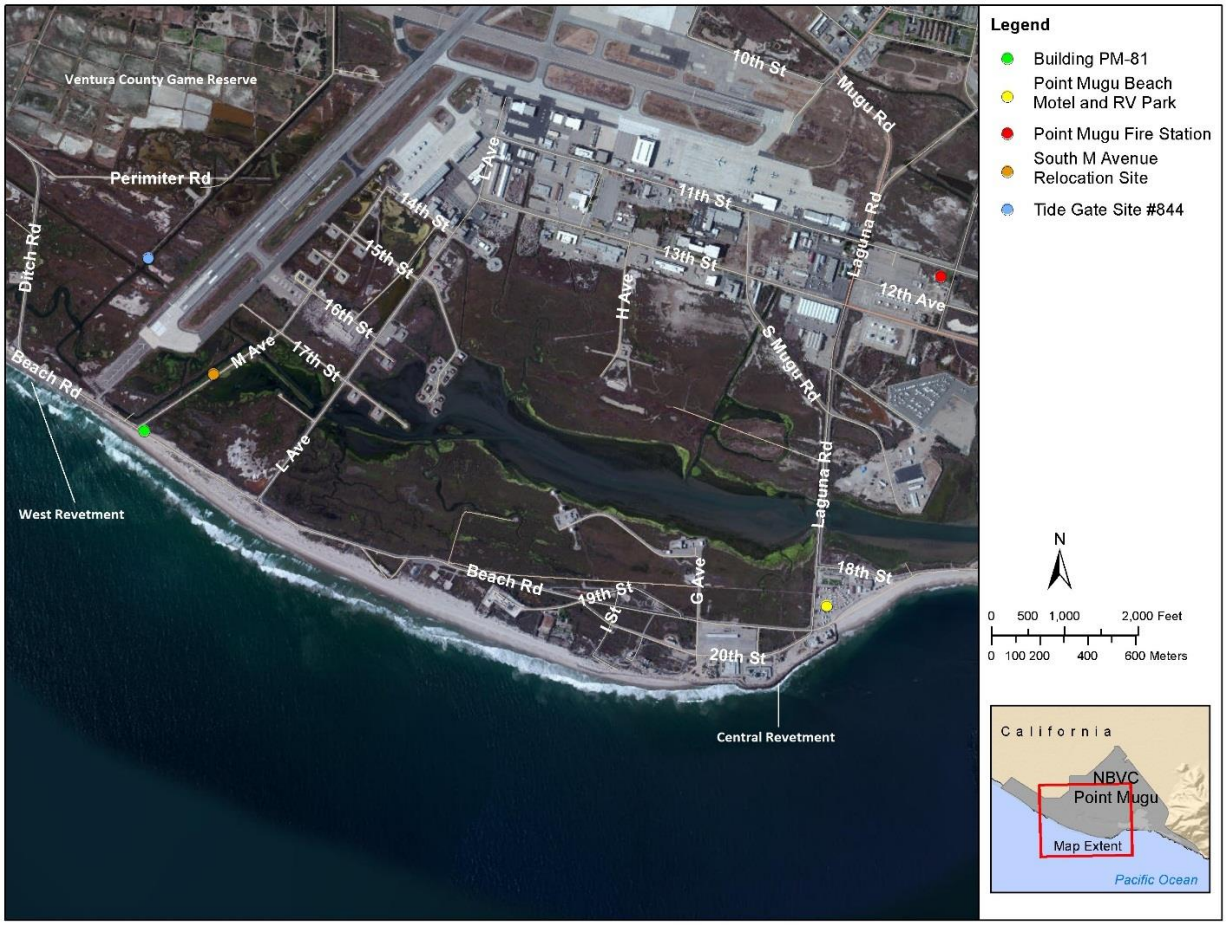


**Figure 3-5: Noise-sensitive receptors in the vicinity of the Project Area at NBVC Point Mugu**

### 3.5.6.3 Construction Equipment

Construction equipment is broken into two different categories: stationary, which consists of equipment that generates noise from one general area; and mobile, which consists of equipment such as dozers, scrapers, and graders that travel within and beyond the Project Area and may operate in a cyclical fashion where a period of full power is followed by a period of reduced power. Non-impact stationary equipment includes items such as pumps, generators, and compressors, which operate at a constant noise level under normal operation. Impact-type stationary equipment includes pile drivers, jackhammers, pavement breakers, and blasting operations, which produce variable sporadic noise levels. Generally, impact equipment is defined as equipment that generates impulsive noise, where impulsive noise is defined as noise of short duration (generally less than 1 second), high intensity, abrupt onset, rapid decay, and often rapidly changing spectral composition (U.S. Department of Transportation 2006).

Noise levels typically associated with some types of construction equipment that may be used during construction are listed in Table 3-10. Construction equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment, and up to 30 to 34 dBA in a quiet suburban area.

**Table 3-10: Predicted Noise Levels for Construction Equipment**

| Construction Category and Equipment | Predicted Noise Level at 50 feet (dBA) |
|---|---|
| **Clearing and Grading** | |
| Bulldozer | 80 |
| Grader | 80–93 |
| Truck | 83–94 |
| Roller | 73–75 |
| **Excavation** | |
| Backhoe | 72–93 |
| Jackhammer | 81–98 |
| **Building Construction** | |
| Concrete mixer | 74–88 |
| Welding generator | 71–82 |
| Pile driver | 91–105 |
| Crane | 75–87 |
| Paver | 86–88 |

Source: U.S. Environmental Protection Agency 1971

## 3.5.7 Environmental Consequences to the Existing Noise Environment

### 3.5.7.1 Alternative 1: Shoreline Protection Alternative (Preferred Alternative)

Alternative 1 (the Preferred Alternative) includes repairing and expanding existing shoreline protection revetments (Central and West), replenishing beach sand at the eastern end of the West Revetment, recontouring the dunes at Ormond Beach and Holiday Beach, relocating equipment from Building PM-812 to the Tide Gate #844 Site, demolishing Building PM-812, and repairing and repaving Beach Road near the intersection of South M Avenue.

The addition of noise due to construction, demolition, and movement of vehicles on the roads on NBVC Point Mugu would be minor relative to the overall noise environment on base. Additional noise from the Proposed Action would not impact the overall noise environment, because other sources of noise, such as general vehicle traffic; on-going operational, industrial, and developed area activities; and maintenance and landscaping activities, are a common occurrence on NBVC Point Mugu. Noise from construction activities occurring in the vicinity of Runway 03-21 would be negligible compared to the dominant aircraft-generated noise adjacent to the Project Area. Therefore, implementation of Alternative 1 would not result in significant impacts on the existing noise environment.

### 3.5.7.2 Alternative 2: South M Avenue Alternative

Alternative 2 includes all components of Alternative 1, with the only difference being the relocation site for the airfield lighting equipment housed in Building PM-812. Instead of relocating the airfield lighting

equipment to the Tide Gate #844 Site, the equipment would be relocated to the site on South M Avenue (see Figure 2-12 and Figure 2-16) referred to as PM-81. Alternative 2 would result in additional noise on NBVC Point Mugu from construction equipment accessing the shoreline protection revetments and the relocation site on South M Avenue, as well as from construction at the South M Avenue, and demolition of Building PM-812. The structure at PM-81, which is currently located on the South M Avenue site, would need to be expanded to approximately 5,500 $ft^2$ (0.13 ac.) to accommodate the new building.

Noise generated by construction activities under Alternative 2 would be the same as those described under Alternative 1. Noise-generating activities associated with the relocation of airfield lighting equipment would increase along South M Avenue but would not occur at the Tide Gate #844 site or along MAD Road. For the reasons described under Alternative 1, implementation of Alternative 2 would not result in significant impacts on the existing noise environment.

#### 3.5.7.3 Alternative 3: Beach Sand Replenishment (With Revetment Repair)

Under Alternative 3 the West Revetment would not be extended and equipment from Building PM-812 would not be relocated. All other components of Alternative 1 would be implemented. Instead of extending the West Revetment, as described under Alternative 1, sand dune replenishment would be undertaken as the only means of shoreline and infrastructure protection down-coast of the West Revetment. Under Alternative 3, there would be fewer trucks hauling sand and stone to and from Beach Road and the laydown areas, decreasing noise introduced into the environment. Beach sand may be available offshore, which would reduce road traffic, further reducing noise additions to the Project Area. The project would also take less time as only repairs to the revetments would be completed. Alternative 3 would include clearing and repairing Beach Road; however, Beach Road may be subject to future closures if sand from the replenished but unprotected dune is blown or washed onto the road during future storms or other high water events (U.S. Department of the Navy 2012).

Noise generated by construction activities under Alternative 3 would be less than noise generated by activities under Alternative 1. Noise-generating activities associated with the relocation of airfield lighting equipment would not occur. Noise generated by activities at the revetments would be less than under Alternatives 1 or 2, because only necessary repairs would be made—the West Revetment would not be extended. For the reasons described under Alternative 1, implementation of Alternative 3 would not result in significant impacts on the existing noise environment.

#### 3.5.7.4 No Action Alternative

Under the No Action Alternative, the existing shoreline protection devices and the infrastructure along the NBVC Point Mugu coastline would remain in their present location and condition; therefore, implementation of the No Action Alternative would not result in significant impacts on the existing noise environment.

## 3.6 CULTURAL RESOURCES

### 3.6.1 AFFECTED ENVIRONMENT

Cultural resources include prehistoric resources, traditional cultural properties, and historic resources. Prehistoric resources are physical properties associated with human activities that predate written records and are generally identified as archaeological sites. Prehistoric resources can include village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burials. Traditional cultural properties can include archaeological resources, buildings, neighborhoods, prominent topographic features, habitats, plants, animals, and minerals that Native Americans or other groups consider essential for the continuance of traditional cultures. Historic resources include resources that postdate the advent of written records in a region. Significant cultural resources are defined as those resources that meet one or more criteria for eligibility for nomination of the resource to the National Register of Historic Places (NRHP).

Cultural resources are protected primarily through the National Historic Preservation Act (NHPA) of 1966, the Archaeological and Historic Preservation Act of 1974, the Archaeological Resources Protection Act of 1979, and implementing regulations for Protection of Historic Properties (36 C.F.R. 800). Section 106 of NHPA and its implementing regulations require federal agencies to consider the effects of their actions on properties listed, or eligible for listing, in the NRHP. NBVC Point Mugu does not have a Programmatic Agreement with the State Historic Preservation Office (SHPO); therefore, NBVC Point Mugu is required to consult with the SHPO under Section 106 of the NHPA for EAs.

#### 3.6.1.1 Area of Potential Effects

The area of potential effects (APE) for the Proposed Action includes the Central Revetment along the coastline seaward of Buildings PM-761 and PM-7020, the laydown areas for construction and repair, the West Revetment and the extension area down-coast of the revetment, Building PM-812, portions of Beach Road, the relocation sites at Tide Gate #844 and at South M Avenue, and the beach recontouring sites on Ormond East Beach and Holiday Beach**.**

#### 3.6.1.2 Archaeological Resources

There are few areas at NBVC Point Mugu that are considered archaeologically sensitive because of the use of fill soils on the base. Culturally sensitive areas at NBVC Point Mugu include: areas situated adjacent to known archaeological sites located along the base perimeter, areas that are now covered by fill or submerged, and areas where an examination of historic maps and aerial photos indicates the potential for historic resources. These culturally sensitive areas are identified in the NBVC Point Mugu Integrated Cultural Resources Management Plan (ICRMP) (Naval Facilities Engineering Command Southwest 2010). One of these areas is the Mugu Fish Camp (CA-VEN-1239) located east of the Central Revetment area outside of the APE. The Mugu Fish Camp was a recreational resort established in 1910. Based on the ICRMP, there are no known archaeological resources within the vicinity of the APE. The APE was surveyed on foot for this project, and no cultural resources were identified.

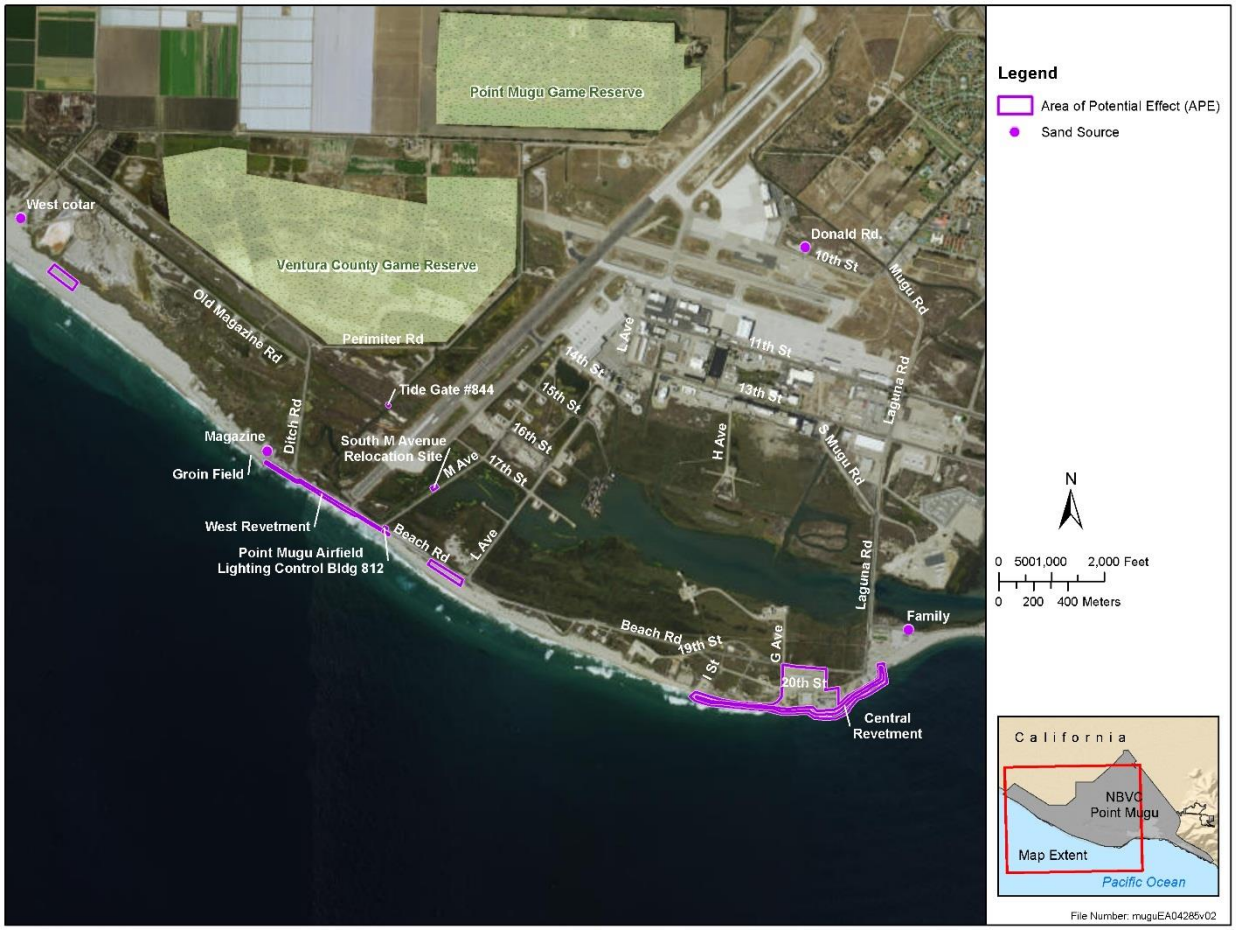


**Figure 3-6: Area of Potential Effect for Cultural Resources at NBVC Point Mugu**

### 3.6.1.3 Historic Resources

Among 536 properties evaluated at NBVC Point Mugu, 11 were found to be eligible for the NRHP for their association with the development, testing, and tracking of early naval guided missile systems that were developed at NBVC Point Mugu during the Cold War era (Naval Facilities Engineering Command Southwest 2010). According to the ICRMP, there are no historic structures within the APE.

## 3.6.2 Environmental Consequences to Cultural Resources

Factors considered when determining the potential for impacts to cultural resources include the extent or degree to which the Proposed Action would diminish the integrity of the location, design, setting, materials, workmanship, feeling, or association of an archaeological or historic site. Cultural resources are subject to review under both federal and state laws and regulations. Section 106 of the NHPA (as amended) empowers the Advisory Council on Historic Preservation to comment on federally initiated, licensed, or permitted projects affecting cultural sites listed or eligible for inclusion in the National Register. Once cultural resources have been identified, they are evaluated to determine if they meet one or more of the four criteria for significance as defined by 36 C.F.R. 60.4. Only cultural resources determined to be significant (i.e., eligible to the National Register) are protected under NHPA.

The Proposed Action represents an undertaking as defined by the NHPA of 1966 (as amended). Accordingly, Section 106 consultation with the SHPO is being conducted. The SHPO consultation letter will be included in the Final EA.

#### 3.6.2.1 Alternative 1: Shoreline Protection Alternative (Preferred Alternative)

Under Alternative 1, the Navy would repair and increase the width and height of the Central and West revetments, extend the eastern end of the West Revetment down-coast by approximately 125 ft. to protect Building PM-812 and Beach Road, replenish the sand dune down-coast of the eastern end of the West Revetment, recontour the dunes at Ormond Beach and Holiday Beach, relocate equipment and infrastructure in Building PM-812 to the relocation site at Tide Gate #844, and repair and repave Beach Road near the intersection with South M Avenue.

No archaeological resources or traditional cultural properties are known to exist within the area associated with Alternative 1. In addition, no facilities within the APE are listed or eligible for listing on the NRHP. If sensitive cultural resources are encountered during revetment repair and expansion and Beach Road repair, construction would be suspended until an archaeologist could determine the significance of the encountered resource(s). Therefore, implementation of Alternative 1 would not result in significant impacts on known cultural resources in the Project Area.

#### 3.6.2.2 Alternative 2: South M Avenue Alternative

No archaeological resources or traditional cultural properties are known to exist within the area associated with Alternative 2. In addition, no facilities within the area are listed or eligible for listing on the NRHP. If sensitive cultural resources are encountered during revetment repair and expansion and Beach Road repair, construction would be suspended until an archaeologist could determine the significance of the encountered resource(s). Therefore, implementation of Alternative 2 would not result in significant impacts on known cultural resources in the Project Area.

#### 3.6.2.3 Alternative 3: Beach Sand Replenishment (With Revetment Repair)

No archaeological resources or traditional cultural properties are known to exist within the area associated with Alternative 3. In addition, no facilities within the area are listed or eligible for listing on the NRHP. Therefore, implementation of Alternative 3 would not result in significant impacts on known cultural resources in the Project Area.

#### 3.6.2.4 No Action Alternative

Under the No Action Alternative, revetment repair and expansion, relocation of the airfield lighting equipment housed in Building PM-812, and Beach Road repair would not occur. No new ground disturbing activities would occur; therefore, implementation of the No Action Alternative would not result in significant impacts on known cultural resources in the Project Area.

## 3.7 PUBLIC HEALTH AND SAFETY

### 3.7.1 AFFECTED ENVIRONMENT

This section describes issues that could potentially affect public health and safety. Specifically these issues are associated with APZs, Beach Access, and an Explosive Safety Ordnance Route on Beach Road. The AICUZ Program delineates APZs, which are areas in the immediate vicinity of an airfield with the greatest potential for an aircraft mishap. APZs are not predictors of accidents; rather, they are tools to help developers, local governments, and the public better understand safety issues near airfields and plan appropriately. The Federal Aviation Administration (FAA) is responsible for ensuring safe and efficient use of Federal airspace by military and civilian aircraft. To fulfill these requirements, the FAA has established safety regulations, airspace management guidelines, a civil/military common system, and cooperative activities with the Department of Defense. While the chances of an accident are remote, the military also defines areas of accident potential for land use planning purposes (U.S. Department of the Navy 2013a). The APZs that are identified for Runway 03-21 encompass mainly agricultural land; however, they also encompass the Naval Air Mobile Home Park and overlaps with the Project Area.

The *Protection of Children from Environmental Health Risks and Safety Risks*, EO 13045, was created because children may be disproportionately affected by environmental health and safety risks. It helps to ensure that federal agencies' policies, programs, activities, and standards address environmental health and safety risks to children. Within the vicinity of the Project Area, children may be present at the mobile home park, Ventura County Game Preserve, or in the camping and recreational beach areas near Beach Road (Figure 3-5). However, there are no schools near the Project Area.

#### 3.7.1.1 Existing Conditions

##### 3.7.1.1.1 Accident Potential Zones

The clear zone is immediately beyond the end of a runway and outward along the extended runway centerline for 3,000 ft. and is fan-shaped in pattern ranging from 1,500 ft. to 2,300 ft. at its widest point. APZ-I is the rectangular area beyond the clear zone and is normally provided under flight paths that experience 5,000 or more annual operations. The zone is typically 3,000 ft. wide by 5,000 ft. long and may be curved to conform to the shape of flight paths. APZ-II is the area beyond APZ-I that has measureable potential for accidents. Normally they are provided under a flight path whenever an APZ-I is required, and the dimensions of APZ-II zones are usually 3,000 ft. wide by 7,000 ft. long (AICUZ Study; Naval Base Ventura County 1992).

Flight operations would be conducted in existing controlled airspace at NBVC Point Mugu; therefore, there would be no change in the existing accident potential zones. The Central and West Revetments, as well as the relocation sites and the existing Building PM-812 fall under the APZ-I and APZ-II for Runway 03-21 (Figure 3-7). The Ventura County Game Preserve is adjacent to the Tide Gate #844 relocation site for the airfield lighting equipment housed in Building PM-812 and within the APZ-II and clear zone, which poses potential safety conflicts for recreational users at the preserve.

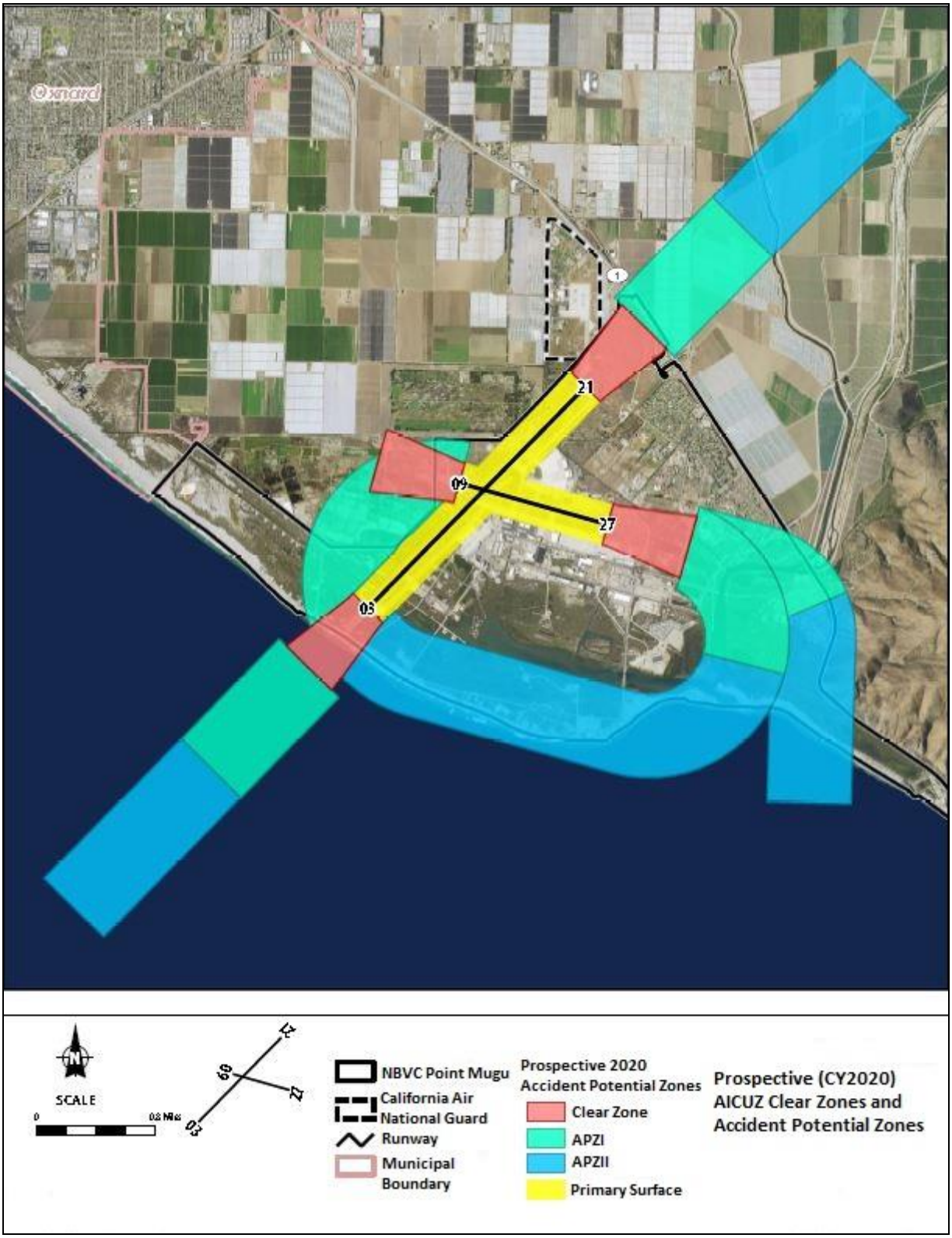


**Figure 3-7: Accident Potential Zones in the Project Area**

#### 3.7.1.1.2 Beach Access

Access to the beach in the Project Area is restricted, because of mission activities and sensitive natural resources. Areas open to base personnel for recreation include Family Beach, picnic and campground areas, and waterfowl hunting areas. Beach closures are posted for safety and mission requirements and to conserve sensitive habitat areas. The majority of the western arm of the base is enclosed within a Weapons Safety Arc for missile and operational activities. Only personnel with proper authorization or who obtain authorization from the Weapons Safety Officer can drive roads and work at facilities in the closed areas.

Outdoor recreation activities occur at other locations on NBVC Point Mugu and include hunting, fishing, wildlife viewing, camping, picnicking, and limited recreational use of beaches. The most heavily used recreation area is Family Beach, adjacent to the mouth of Mugu Lagoon (Figure 3-8). Shoreline fishing is a popular activity at Family Beach and along the existing West and Central revetments (U.S. Department of the Navy 2013b).

**Figure 3-8: Family Beach**

#### 3.7.1.1.3 Explosive Safety Ordnance Route

Beach Road is an Explosive Safety Ordnance Route. However, damage from storms and other high water events has left debris and sand covering portions of Beach Road. Between L St. and South M Avenue, Beach Road is limited to one lane, and it is sometimes necessary to alter the route of the commercial vehicles transporting explosive ordnance from Beach Road onto L St., across 17th St. to South M

Avenue, and then back onto Beach Road (Figure 3-9) (McLeod 2015). Improvements to Beach Road would include expanding the road back to two lanes so that the explosives can be safely transported without being diverted onto a less direct, alternate route.

The explosive ordnance disposal program has since been relocated to San Diego, and most unexploded ordnance is transported to San Diego. On rare occasion, for safety reasons, ordnance cannot be transported to San Diego and must be disposed of at NBVC Point Mugu (U.S. Department of the Navy 2013a). On these occasions, Beach Road would need to be utilized as an Explosive Safety Ordnance Route.

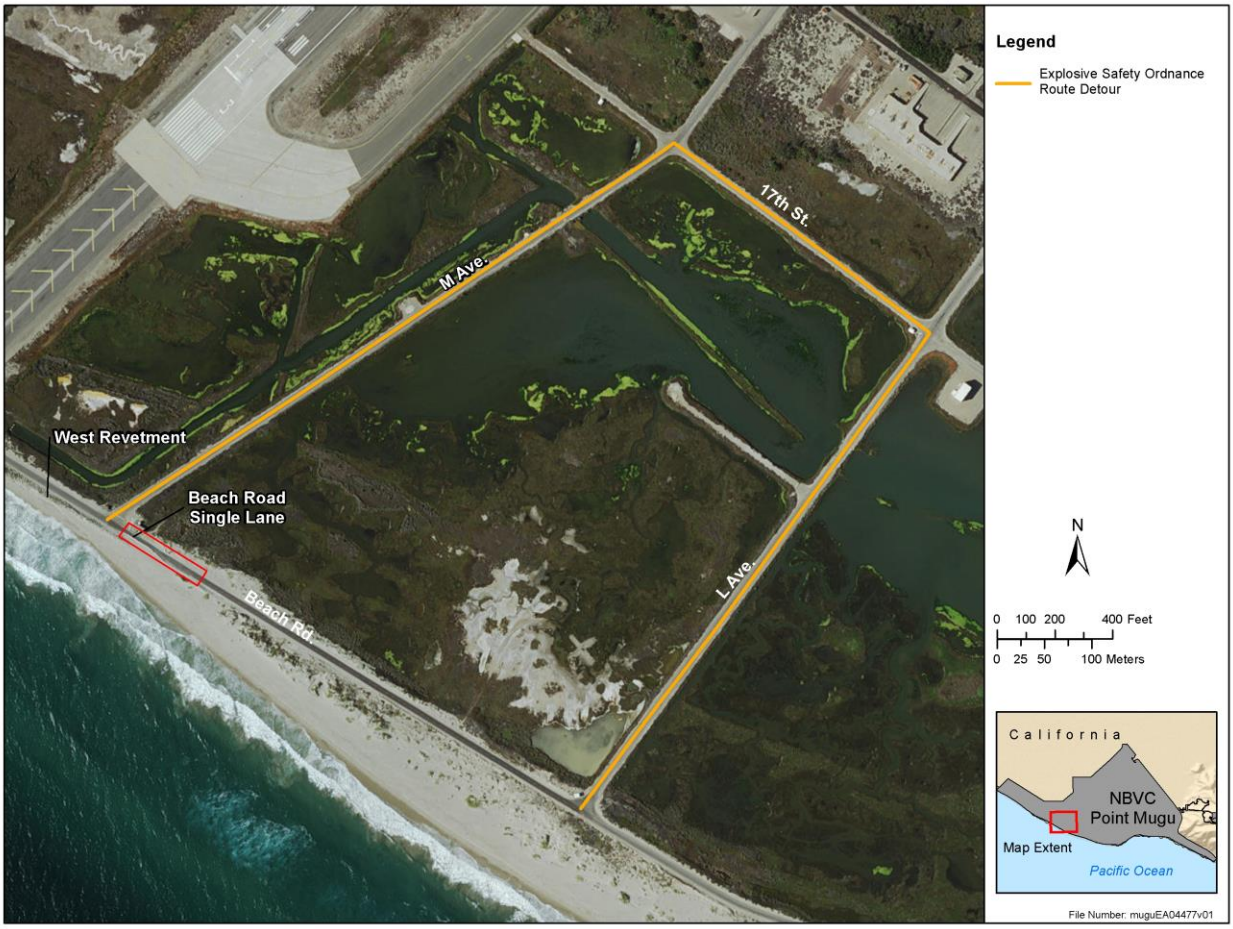


**Figure 3-9: Explosive Safety Ordnance Alternate Route**

#### 3.7.1.1.4 Installation Remediation and Unexploded Ordnance Sites

The Project Area is located adjacent to two installation remediation (IR) sites and one explosive ordnance disposal (EOD) site, where unexploded ordnance (UXO) may be present (Figure 3-10). In 2015, the Navy conducted a feasibility study of IR Site 11, identified as Mugu Lagoon and drainage ditches, to establish remediation goals, evaluate alternatives for meeting those goals, and recommend a course of action (U.S. Department of the Navy 2015b). Chromium contained in sediments has been identified as the chemical of concern at the site and poses a health risk to humans through the ingestion of fish and shellfish potentially contaminated with elevated levels of chromium. NBVC Point Mugu will continue to post signs warning about the hazards of consuming fish and shellfish at the site until consumption is

deemed safe. No additional remedial actions are recommended in the feasibility study. The second IR site located adjacent to the Project Area is IR Site 38, which consists of an area affected by release of diesel fuel from an aboveground storage tank that was located on the seaward side of Building 7020—between the building and the Central Revetment. The Navy has performed several clean-up actions at the site, including soil removal in 2002 and 2007 and liquid phase hydrocarbon recovery in 2002 and 2009. Soil samples collected during site investigations, most recently in 2013, continue to show elevated levels of petroleum hydrocarbons extending several feet below ground at the site. Monitoring and treatment at the site will continue (U.S. Department of the Navy 2015c).

From 1964 to 1987, two sites on Ormond Beach were used as EOD sites. A work plan for an extended site investigation was completed in December 2014 (U.S. Department of the Navy 2014b). The purpose of the planned site investigation is to determine if munitions constituents and munitions and explosives of concern were introduced into in soils and groundwater at the site as a result of ordnance detonations. Results from the investigation are not yet available; however, the Navy has surveyed the site and detected the presence of subsurface metal. Further investigation is need to confirm that the metal detections are either UXO or indicate the presence of other objects.

### 3.7.2 Environmental Consequences to Public Health and Safety

#### 3.7.2.1 Alternative 1: Shoreline Protection Alternative (Preferred Alternative)

Alternative 1 includes repairing and expanding existing shoreline protection revetments (Central and West), extending the eastern end of the West Revetment, replenishing beach sand at the eastern end of the West Revetment, recontouring of the dune at Ormond and Holiday beaches, relocating equipment from Building PM-812 to the Tide Gate #844 Site, and repairing and repaving of Beach Road near the intersection of South M Avenue.

The Central and West Revetments—as well as the relocation sites for the existing Building PM-812—fall under the APZ-I and APZ-II for Runway 03-21. Flight operations would be conducted in existing controlled airspace at NBVC Point Mugu; therefore, there would be no change in the existing APZs. The two IR sites and the EOD site described in Section 3.7.1.1.4 (Installation Remediation and Unexploded Ordnance Sites) pose a potential public health and safety risk. The proposed relocation site for equipment and infrastructure currently housed in Building PM-812 is within the boundaries of IR Site 11; however, ground-disturbing activities associated with construction of a new building to house the equipment would not contribute to chromium levels in drainage ditches or Mugu Lagoon. Proposed construction activities at the Central Revetment may require access from land at or near IR Site 38. The final engineering plans for enhancements and repairs to the revetment will take into consideration the location of the site and any restrictions regarding access to the site. To the extent practicable, the site will be avoided; however, if access to the revetment from the site is required, then proper procedures would be followed to limit ground-disturbing activities (i.e., positioning equipment at or near the site to access the revetment). Dune recontouring at the Ormond Beach site, which overlaps with the EOD site, would not take place until after it is confirmed that UXO are not present on the site. Construction activities at the West Revetment and dune replenishment area would be coordinated with the Point Mugu Sea Range to ensure the safety of personnel at the construction site during target launch operations and to minimize impacts to Naval Air Systems Command testing.

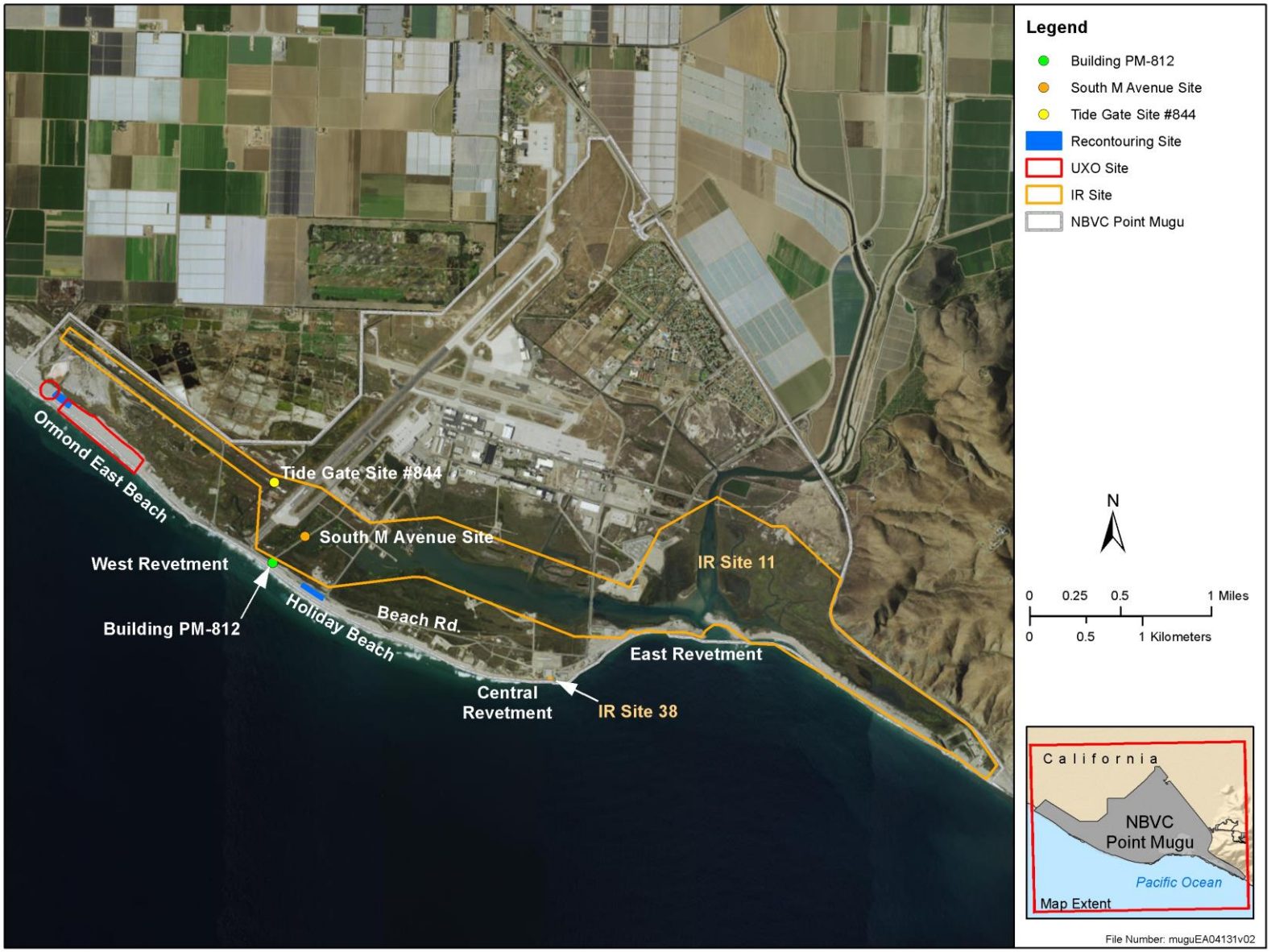


**Figure 3-10: Installation Remediation (IR) Sites (IR 11 and IR 38) and the EOD site on Ormond Beach**

As described in Section 3.9 (Transportation and Traffic), only minor, short-term, and intermittent traffic increases would occur, which would not significantly increase the risk of traffic incidents. The transportation of explosive ordnance is currently diverted from the preferred route along Beach Road to an alternate route, because the road is partially blocked with sand and debris (Figure 3-9). After Beach Road is repaired and cleared, the more direct route along Beach Road would become available for the transport of explosive ordnance resulting in reduced transit times and reduced risk to public health and safety.

Prior to construction and demolition activities, a Health and Safety Plan for handling and disposing of demolition debris and conducting activities in the vicinity of the two IR sites and EOD site on Ormond Beach would be prepared. Therefore, implementation of Alternative 1 would not result in significant impacts on public health and safety in the Project Area.

#### 3.7.2.2 Alternative 2: South M Avenue Alternative

Alternative 2 includes all components of Alternative 1, with the only difference being the relocation site for the airfield lighting equipment housed in Building PM-812. Instead of relocating the equipment from Building PM-812 to Tide Gate #844, the equipment would be relocated to the site on South M Avenue. The potential impacts from implementing Alternative 2 would be the same as the impacts described under Alternative 1, with the exception of an increase in traffic on South M Avenue associated with the construction of infrastructure to house the airfield lighting equipment. All other potential impacts to public health and safety from the implementation of Alternative 2 would be the same as those described under Alternative 1.

Prior to construction and demolition activities, a Health and Safety Plan for handling and disposing of demolition debris and conducting activities in the vicinity of the two IR sites and EOD site on Ormond Beach would be prepared. Therefore, implementation of Alternative 2 would not result in significant impacts on public health and safety in the Project Area.

#### 3.7.2.3 Alternative 3: Beach Sand Replenishment (With Revetment Repair)

Under Alternative 3, the West Revetment would not be extended and equipment from Building PM-812 would not be relocated. All other components of Alternative 1 would be implemented. Instead of extending the West Revetment, as described under Alternative 1, sand dune replenishment would be undertaken as the only means of shoreline and infrastructure protection. Under Alternative 3, there would be fewer trucks hauling sand and stone to and from Beach Road and the laydown areas. Alternative 3 would include clearing and repairing Beach Road; however, Beach Road may be subject to future closures if sand from the replenished dune is blown or washed onto the road during future storms or other high water events.

The sand dunes that would be replenished are under the APZ-I and APZ-II for Runway 03-21. Flight operations would be conducted in existing controlled airspace at NBVC Point Mugu; therefore, there would be no change in the existing APZs.

All other potential impacts to public health and safety from the implementation of Alternative 3 would be the same as those described under Alternative 1.

Prior to construction and demolition activities, a Health and Safety Plan for handling and disposing of demolition debris and conducting activities in the vicinity of the two IR sites and EOD site on Ormond Beach would be prepared. Therefore, implementation of Alternative 3 would not result in significant impacts on public health and safety in the Project Area.

#### 3.7.2.4 No Action Alternative

Under the No Action Alternative, the existing shoreline protection devices and the infrastructure along the NBVC Point Mugu coastline would remain in their present location and condition. Beach Road would remain unsuitable for transportation of explosive ordnance, which would require the use of the longer, alternate route along South M Avenue, 17th Street, and L Avenue. Building PM-812 would be subject to flooding during future high-water events. Despite these and other risks from continued shoreline erosion, there would be no immediate, significant impacts on existing public health and safety in the Project Area from implementation of the No Action Alternative.

## 3.8 COASTAL USES AND RESOURCES

### 3.8.1 THE COASTAL ZONE MANAGEMENT ACT

The Coastal Zone Management Act of 1972 (16 U.S.C. Section 1451–1464) encourages coastal states to be proactive in managing coastal zone uses and resources. The Act established a voluntary coastal planning program in which participating states submit a Coastal Management Plan to the National Oceanic and Atmospheric Administration (NOAA) for approval. Under the Coastal Zone Management Act, federal agency actions within or outside the coastal zone that affect any land or water use or natural resource of the coastal zone shall be carried out in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved state management programs. Each state defines its coastal zone in accordance with the Coastal Zone Management Act. Excluded from any coastal zone are lands the use of which by law is subject solely to the discretion of the federal government or which is held in trust by the Federal government (16 U.S.C. 1453) (U.S. Department of the Navy 2013b).

Accordingly, although NBVC Point Mugu land is federal government property and therefore excluded from the coastal zone, the Navy conducts an effects test, evaluates potential impacts to the state's coastal zone resources, and submits to the state a determination document requesting concurrence with the Navy's determination of effects. The effects test supports the Navy's determination that an action (even if conducted entirely within a federal enclave) would or would not affect any coastal use or resource (U.S. Department of the Navy 2013a). The Navy will consult with the California Coastal Commission based on the findings presented in this EA to the extent necessary and appropriate under the Coastal Zone Management Act.

### 3.8.2 CALIFORNIA COASTAL COMMISSION POLICIES

The Coastal Zone Management Act defines the coastal zone as extending "to the outer limit of State title and ownership under the Submerged Lands Act." For the State of California, the seaward extent of the coastal zone is 3 nm from shore. The state of California has a Coastal Management Plan, which has been approved by NOAA and is administered by the California Coastal Commission. The California Coastal Act of 1976 (California Public Resources Code, §30000 et seq.) implements California's Coastal Management Program and outlines federally approved and enforceable policies identifying California's coastal zone resources.

The California Coastal Act policies are grouped into seven articles:

- Article 1: General
- Article 2: Public Access
- Article 3: Recreation
- Article 4: Marine Environment
- Article 5: Land Resources
- Article 6: Development
- Article 7: Industrial Development

Individual policies are defined under each article and include policies intended to protect and expand public access to shorelines for water-oriented activities such as recreation, and to protect, enhance, and restore environmentally sensitive habitats, including intertidal and nearshore waters, wetlands, bays and estuaries, riparian habitat, certain woods and grasslands, streams, lakes, and habitat for rare and endangered plants and animals. Other policies address development of existing developed areas; scenic and visual qualities; maintenance and enhancement of public areas; location and expansion of industrial development such as the use of tanker facilities, liquefied natural gas terminals, oil and gas development, refineries or petrochemical facilities, thermal electric generating plants; and coordination of activities concerning offshore oil transport and refining.

Under the Coastal Zone Management Act, the California Coastal Commission must provide an opportunity for public comment and involvement in the federal coastal consistency determination process. Given the location of the Project Area along the shoreline of NBVC Point Mugu, the Navy will consult with the California Coastal Commission on potential impacts to coastal zone uses and resources and request concurrence with the Navy's consistency (or negative) determination.

### 3.8.3 SEA LEVEL RISE AND CLIMATE CHANGE

While the California coast regularly experiences erosion, flooding, and significant storm events, sea level rise associated with climate change will exacerbate these natural forces, leading to significant social, environmental, and economic impacts. Along the California coast, sea level has risen an average of 7 inches (17.8 centimeters) from 1900 to 2005; this rate is predicted to accelerate in coming years (U.S. Global Change Research Program 2014). The State of California provides recommended sea level rise ranges for planning analysis, derived from published work by the National Research Council. The State recommends a range of 0.39 to 2.0 ft. (0.11 to 0.6 m) rise for the period from 2000 through 2050, and 1.38 to 5.48 ft. (0.42 to 1.67 m) rise for the period from 2000–2100 (State of California 2014).

Although the Proposed Action is intended to ensure protection of infrastructure and resources from the effects of coastal flooding and storm surge, sea level rise still has the potential to impact the shoreline protection enhancements and structures proposed under the alternatives, as well as have detrimental impacts to existing facilities on NBVC Point Mugu. Sea level rise would increase the impact of storms and storm surge on the coastline and could result in an increase in beach erosion and the need for maintenance on coastal roads (e.g., Beach Road) and infrastructure. Inundation associated with sea level rise could result in damage to the existing revetments that are intended to protect installation buildings, infrastructure, and natural resources. If water levels were to rise in the wetland areas adjacent to the proposed relocation sites, then the relocated airfield lighting equipment may become susceptible to coastal flooding. The design of the proposed new building would need to take into account sea level rise estimates to ensure the equipment in the building is protected over the long term.

To minimize risk from current and potential future sea level rise, adaptation strategies include (1) sea level rise estimates would be incorporated into the engineering plans for expanding the height and

width of the revetments to avoid impacts to coastal resources and facilities/infrastructure, and (2) sea level rise estimates would be incorporated into the planning for the relocation of existing facilities and the siting of new proposed facilities.

### 3.8.4 Environmental Consequences to Coastal Uses and Resources

The Navy's consistency (or negative) determination was sent to the California Coastal Commission in October 2015 and is provided in Appendix C (Agency Correspondence).

#### 3.8.4.1 Alternative 1: Shoreline Protection Alternative (Preferred Alternative)

Alternative 1 (the Preferred Alternative) includes repairing and expanding existing shoreline protection revetments (Central and West), extending the eastern end of the West Revetment, replenishing beach sand at the eastern end of the West Revetment, recontouring the dune at Ormond and Holiday Beaches, relocating equipment from Building PM-812 to the Tide Gate #844 site, and repairing and repaving of Beach Road near the intersection of South M Avenue.

Alternative 1 would result in a temporary disruption to accessibility of adjacent beaches where replenishment of beach sand is necessary, as well as where the construction and expansion of the revetments would occur. The work schedule would depend upon weather and wave conditions that may affect construction activities at the revetments. All beaches potentially affected by the project are on NBVC Point Mugu and are not open to the public. Holiday Beach and Family Beach, located adjacent to the Central and West revetments, are used by base personnel for recreation. While some portions of these beach areas may be temporarily unavailable during construction and sand dune recontouring, construction activities at the revetment are not taking place on these beaches and the majority of the beach area would be available for recreational use by base personnel. One of the dune recontouring sites is located on Holiday Beach. Any disruption to beach access would be unlikely, because other avenues for accessing the beach would remain open, and recontouring the dune would be a short-term activity. Therefore, access to beaches on NBVC Point Mugu would not be significantly impacted by the Proposed Action as implemented under Alternative 1.

The movement of equipment from Building PM-812 to the Tide Gate #844 relocation site, demolition of Building PM-812, replenishment of beach sand, recontouring of dunes, and repair and expansion of existing shoreline protection revetments, may impact marine and terrestrial resources in the Project Area. Potential impacts to these resources are discussed in Section 3.1 (Topography and Sediments), Section 3.2 (Water Resources), and Section 3.3 (Biological Resources). Potential impacts to down-coast areas from construction at the revetments are discussed briefly in Section 3.1.2.1.1 (Beach Topography). The Proposed Action would not impact residential, commercial, or industrial development, because the Project Area is located entirely within property owned by the Department of Defense and is not opened to development. Therefore, implementation of Alternative 1 would not result in significant impacts on coastal uses and resources in the Project Area.

#### 3.8.4.2 Alternative 2: South M Avenue Alternative

Alternative 2 includes all components of Alternative 1, with the only difference being the relocation site for equipment from Building PM-812. Instead of relocating the equipment from Building PM-812 to Tide Gate #844, the equipment would be relocated to the site on South M Avenue referred to as PM-81. Alternative 2 would result in increased traffic on NBVC Point Mugu from construction equipment accessing the shoreline protection revetments and the relocation site on South M Avenue. The structure at PM-81, which is currently located on the South M Avenue site, would need to be expanded to approximately 5,500 ft.$^2$ (0.13 ac.) to accommodate equipment and infrastructure transferred from Building PM-812.

As in Alternative 1, Alternative 2 would result in temporary limitations on beach access where replenishment of beach sand is necessary, where the recontouring of dunes would occur, and where construction on the revetments would occur. The work schedule would be the same as described under Alternative 1. These areas are generally not open to the public as they are on NBVC Point Mugu, and near Runway 03-21. Therefore, access to beaches on NBVC Point Mugu would not be significantly impacted by the Proposed Action as implemented under Alternative 2.

The construction, demolition, and replenishment of beach sand, recontouring of dunes, and repair and expansion of existing shoreline protection revetments, may impact the marine environment and land resources. This impact is discussed in Section 3.1 (Topography and Sediments), Section 3.2 (Water Resources), and Section 3.3 (Biological Resources). As the Proposed Action is on Department of Defense land, it will not significantly impact development, either residentially, commercially, or industrially. Therefore, implementation of Alternative 2 would not result in significant impacts on coastal uses and resources in the Project Area.

#### 3.8.4.3 Alternative 3: Beach Sand Replenishment (With Revetment Repair)

Under Alternative 3 the West Revetment would not be extended and equipment and infrastructure from Building PM-812 would not be relocated and would remain in its current location. All other components of Alternative 1 would be implemented. Instead of extending the West Revetment, as described under Alternative 1, sand dune replenishment would be undertaken as the only means of shoreline and infrastructure protection. Under Alternative 3, there would be fewer trucks hauling sand and stone to and from Beach Road and the laydown areas. The project would take less time as only needed repairs would be made to the revetments, and the West Revetment would not be extended, reducing the limitations on public access to the area. Alternative 3 would include clearing and repairing Beach Road; however, Beach Road may be subject to future closures if sand from the replenished dune is blown or washed onto the road during future storms or other high water events (U.S. Department of the Navy 2012a).

The work schedule described under Alternative 3 would be the same as described under Alternative 1, with the schedule remaining dependent on weather conditions. Less time would be required as only work at the Central Revetment would need to be completed. As the Proposed Action is on Department of Defense land, it will not impact development, either residentially, commercially, or industrially. Therefore, implementation of Alternative 3 would not result in significant impacts on coastal uses and resources in the Project Area.

#### 3.8.4.4 No Action Alternative

Under the No Action Alternative, the existing shoreline protection devices and the infrastructure along the NBVC Point Mugu coastline would remain in their present location and condition. The historical trend of shoreline retreat is likely to continue into the foreseeable future (U.S. Department of the Navy 2012a), leaving assets and infrastructure located along the shoreline vulnerable to flooding and damage from high-water events. However, there would be no immediate, significant impacts on existing coastal uses and resources from implementation of the No Action Alternative.

## 3.9 TRANSPORTATION AND TRAFFIC

### 3.9.1 AFFECTED ENVIRONMENT

Transportation and traffic refers to the movement of vehicles on roadways inside and in the vicinity of NBVC Point Mugu. The potential impacts of the Proposed Action on transportation and traffic at NBVC Point Mugu were analyzed by considering any changes to transportation and traffic at and in the vicinity of the Central and West revetments, the relocation sites of the airfield lighting equipment housed in

Building PM-812, and repair and repaving sites on Beach Road. This analysis examines how the Proposed Action would impact the existing road network and traffic levels at these sites and throughout NBVC Point Mugu.

#### 3.9.1.1 Existing Conditions

##### 3.9.1.1.1 Regional and Local

NBVC Point Mugu is located approximately 9 mi. (15 km) southeast of the city of Oxnard, California. The primary major roadway in the area is State Route 1 (SR-1) (Pacific Coast Highway [PCH]) which passes north of NBVC Point Mugu and continues along the coast as the only state route through Malibu, running southeast for about 57 mi. (92 km) to Santa Monica. The PCH is a four-lane state highway traveling in an east-west direction along the Pacific Coast.

The PCH is part of the coastal highway that provides access to the Santa Monica Mountains, canyons, and beaches along the California coastline. It is the most direct route between Ventura/Oxnard and the coastal cities west of Los Angeles, and is often used as an alternate to the Ventura (SR-101) and San Diego Freeways (I-405). During weekday peak hours, approximately 35,000 commuters utilize the 21 mi. (34 km) stretch of the PCH extending through the City of Malibu. During summer, the PCH serves as an access route to local beaches, causing commuter levels to rise to 100,000 vehicles during weekday peak hours. The most frequent Primary Collisions Factors for traffic accidents on the PCH from 2008 to 2010 were unsafe speed (38 percent), unsafe lane change (15 percent), right of way violation (11 percent) and improper turning (9 percent) (Malibu/Lost Hills Station 2011). The PCH borders the northeastern boundary of NBVC Point Mugu and is the primary route used to access the base.

##### 3.9.1.1.2 Installation

In addition to the PCH, other access roads to NBVC Point Mugu include Hueneme Road, Wood Road, and Las Posas Road (Figure 3-11). There are three gates providing access to NBVC Point Mugu: Gate 1 (Main Road Gate), Gate 2 (North Mugu Road Gate), and Gate 3 (Las Posas Gate) (U.S. Department of the Navy 2013a). Laguna Road, Beach Road, and Perimeter Road located on NBVC Point Mugu provide access to the beaches and the southernmost parts of the base (U.S. Department of the Navy 2013a).

Over the past decade, NBVC Point Mugu has experienced a drawdown in installation personnel and operations. Subsequently, there is excess capacity for transportation and vehicles at the installation, because the existing transportation system was originally designed to support a larger population (U.S. Department of the Navy 2013a). Varying work schedules, deployment schedules, ridesharing, and other traffic management initiatives are employed at NBVC Point Mugu and further reduce traffic.

**Figure 3-11: Major Roads Leading to NBVC Point Mugu**

Transportation operations at NBVC Point Mugu consist of maintaining 69 mi. of paved roads and the airport runways (U.S. Department of the Navy 2013a). The primary roadways at NBVC Point Mugu include 13th Street, Main Road, and Ronald Reagan Boulevard. Beach Road is adjacent to the coastline and extends along the entire southwestern boundary of NBVC Point Mugu. Beach Road provides access not only to the beach, but also serves as mission-critical infrastructure by providing access to numerous buildings, ranges, ordnance storage, and the airfield. Beach Road is also utilized as an Explosive Safety Ordnance Route. Ocean debris and sand left behind from storms have restricted Beach Road to a single lane between L St. and South M Avenue. Because of this limitation, it is sometimes necessary to divert commercial vehicles transporting explosive ordnance from the direct route along Beach Road onto L St., across 17th St. and onto South M Avenue before returning to Beach Road (McLeod 2015; Figure 3-9). Proposed improvements to Beach Road would include expanding the road to two lanes so that explosives and other materials can be transported without being diverted.

**Figure 3-12: Beach Road narrowing at the intersection with South M Avenue**

### 3.9.2 Environmental Consequences to Transportation and Traffic

A Construction Traffic Management and Detour Plan would be developed and approved by the Navy prior to the start of construction activities on Beach Road, the Central and West revetments, and the Tide Gate Site #844 or South M Avenue relocation sites. The traffic management plan would specify necessary lane closures, detours, any signage or lighting, flaggers, and other traffic control measures needed to avoid accidents and provide access and continued traffic movement along these roads during construction.

#### 3.9.2.1 Alternative 1: Shoreline Protection Alternative (Preferred Alternative)

Alternative 1 includes repairing and expanding Central and West shoreline protection revetments, extending the eastern end of the West Revetment, replenishing beach sand at the eastern end of the West Revetment, dune recontouring at Ormond Beach and Holiday Beach, relocating the airfield lighting equipment housed in Building PM-812 to the Tide Gate Site #844, and repaving and repairing to Beach Road.

Alternative 1 would result in a temporary increase in traffic on NBVC Point Mugu from construction equipment accessing the shoreline protection revetments and Tide Gate Site #844. Only minor, short-term, and intermittent traffic increases would occur due to equipment and material movement to and from the construction laydown areas (Figure 2-5), and potentially from off the base, depending on the location of the source of beach sand needed for dune replenishment. The current volume of traffic on NBVC Point Mugu is low relative to the capacity of base infrastructure to accommodate traffic. Under Alternative 1, Beach Road would be protected for continued use by the extension of the West Revetment and stabilization of the replenished dune. Therefore, implementation of Alternative 1 would not result in significant impacts on transportation and traffic in the Project Area.

#### 3.9.2.2 Alternative 2: South M Avenue Alternative

Alternative 2 includes all components of Alternative 1, with the only difference being the relocation site for the airfield lighting equipment housed in Building PM-812. Instead of relocating the equipment to the site at Tide Gate #844, the building would be relocated to the site on South M Avenue (see Figure 2-9 and Figure 2-11). Alternative 2 would result in increased traffic on NBVC Point Mugu from construction equipment accessing the shoreline protection revetments and the relocation site on South M Avenue. The structure at PM-81, which is currently located on the South M Avenue site, would need to be expanded to approximately 5,500 $ft.^2$ (0.13 ac.) to accommodate the new building.

Proposed construction activities described under Alternative 1 would be the same under Alternative 2. Only minor, short-term, and intermittent traffic increases would occur due to equipment and material movement to and from the construction laydown areas (Figure 2-5), and potentially from off the base, depending on the location of the source of beach sand needed for dune replenishment. Traffic on South M Avenue would increase due to the use of the South M Avenue relocation site for the airfield lighting equipment. However, there would be no increase in traffic on MAD Road, because the site at Tide Gate #844 would not be used. The current volume of traffic on NBVC Point Mugu is low relative to the capacity of base infrastructure to accommodate traffic. Under Alternative 2, Beach Road would be protected for continued use by the extension of the West Revetment and stabilization of the replenished dune. Therefore, implementation of Alternative 2 would not result in significant impacts on transportation and traffic in the Project Area.

#### 3.9.2.3 Alternative 3: Beach Sand Replenishment (With Revetment Repair)

Under Alternative 3 the West Revetment would not be extended and the airfield lighting equipment housed in Building PM-812 would not be relocated. All other components of Alternative 1 would be implemented. Instead of extending the West Revetment, as described under Alternative 1, sand dune replenishment would be undertaken as the only means of shoreline and infrastructure protection. Under Alternative 3, there would be fewer trucks hauling sand, and no trucks hauling stone, to and from Beach Road and the laydown areas. Beach sand may be available offshore, which would reduce road traffic even further. The project would take less time as only needed repairs to the revetments would be made, and the West Revetment would not be extended. Alternative 3 would include clearing and repairing Beach Road; however, Beach Road may be subject to future closures if sand from the

replenished dune is blown or washed onto the road during future storms or other high water events (U.S. Department of the Navy 2012a).

Proposed construction activities described under Alternative 3 would be similar to the schedule described under Alternative 1, with activities taking place approximately between October 1 and February 15 and dependent on weather conditions. Less time would be required to complete work at the West Revetment. Only minor, short-term, and intermittent traffic increases would occur due to equipment and material movement to and from the construction laydown areas (Figure 2-5), and potentially from off the base, depending on the location of the source of beach sand needed for dune replenishment. The current volume of traffic on NBVC Point Mugu is low relative to the capacity of base infrastructure to accommodate traffic. Therefore, implementation of Alternative 3 would not result in significant impacts on transportation and traffic in the Project Area.

#### 3.9.2.4 No Action Alternative

Under the No Action Alternative, existing shoreline protection and infrastructure along the NBVC Point Mugu coastline would remain in their present location and condition. Therefore, implementation of the No Action Alternative would not result in immediate, significant impacts on transportation and traffic in the Project Area. However, Beach Road would continue to be impassible when flooded or covered with sand and debris and would continue to be reduced to one lane near Building PM-812 due to storm damage. If predicted trends in sea level rise and shoreline retreat continue, then significant and long-term impacts to transportation near the coastline (e.g., on Beach Road) may develop.

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# 4 CUMULATIVE IMPACTS ANALYSIS

## 4.1 INTRODUCTION

The assessment of cumulative impacts (or cumulative effects[1]) in the Study Area follows the objectives of the NEPA of 1969, CEQ regulations, and CEQ guidance. CEQ regulations (40 C.F.R. Parts 1500-1508) provide the implementing procedures for NEPA as

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

While a single project may have minor impacts, overall impacts may be collectively significant when the project is considered together with other projects on a regional scale[2]. The CEQ provides guidance on cumulative impacts analysis in *Considering Cumulative Effects Under the National Environmental Policy Act* (Council on Environmental Quality 1997) and identifies cumulative effects as those environmental effects resulting "from spatial and temporal crowding of environmental perturbations."

The cumulative impacts analysis in this EA focuses on impacts that are "truly meaningful," in accordance with CEQ guidance (Council on Environmental Quality 1997). The level of analysis for each resource was commensurate with the intensity of the impacts. Variable geographic boundaries were used for analyses of cumulative impacts, depending on the resource being evaluated. The current impacts of past and present actions and the potential impacts of reasonably foreseeable future actions were analyzed, to the extent they may be additive to impacts of the Proposed Action.

## 4.2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Various types of reasonably foreseeable future actions relevant to the Proposed Action have the potential to affect the resources identified in Chapter 3 (Affected Environment and Environmental Consequences). Descriptions of the other actions (Table 4-1) and environmental considerations carried forward for analysis are provided in the following sections.

**Table 4-1: Past, Present, and Reasonably Foreseeable Future Actions Project List**

| Project Title | Project Description |
|---|---|
| NBVC Point Mugu Sea Range Countermeasures Testing and Training | The Navy (Naval Air Systems Command) prepared an EA for Point Mugu Sea Range Countermeasures (Navy 2012a) for conducting additional types of countermeasures testing on the Sea Range at NBVC Point Mugu and San Nicolas Island. A Finding of No Significant Impact (FONSI) was signed in July 2014. |

[1] CEQ regulations consider the terms "cumulative impacts" and "cumulative effects" as synonymous (40 C.F.R. § 1508.8[b]); the terms are used interchangeably.
[2] A cumulative impact is the additive effect of all projects in the geographic area.

**Table 4-1: Past, Present, and Reasonably Foreseeable Future Actions Project List (continued)**

| Project Title | Project Description |
|---|---|
| EIS/OEIS NAVAIR Point Mugu Sea Test Range EIS | The EIS/OEIS analyzed potential impacts associated with Theater Missile Defense test and training activities and an increase in the level of both Fleet training exercises and special warfare training. In addition, the EIS/OEIS analyzed the modernization of facilities at Point Mugu and San Nicolas Island to increase the Sea Range's capability to support existing and future operations. The EIS/OEIS and ROD were completed in 2003. |
| Point Mugu Sea Range Expansion of Unmanned Systems Operations | The Navy has developed an Environmental Assessment (EA)/Overseas Environmental Assessment (OEA) for the proposed expansion of unmanned systems testing and training on the Point Mugu Sea Range, which includes land areas at NBVC Point Mugu, NBVC Port Hueneme, and San Nicolas Island (U.S. Department of the Navy 2014).<br><br>Under the Proposed Action, an increase of approximately 15 personnel would be required for the launch and recovery of the vehicles, command and control of the vehicles, and maintenance of the systems and associated equipment. No modifications to existing facilities (temporary lodging, meals, recreation, sanitation, etc.) are needed to accommodate the Proposed Action and associated personnel. A FONSI/Finding of No Significant Harm (FONSH) was signed February 2015. |
| EA for the West Coast Home Basing of the MQ-4C Triton UAS at Naval Base Ventura County Point Mugu | In 2013, the Navy prepared an EA that evaluated the potential effects associated with home basing the MC-4C Triton UAS at NBVC Point Mugu (U.S. Department of the Navy 2013b). Under the Proposed Action, the Navy would home-base four Triton UASs; establish a hub for the Triton UAS, supporting up to four additional Triton UASs that would be undergoing maintenance actions at any one time; conduct an average of five Triton UAS flight operations per day (1,825 annually); construct, demolish, and renovate facilities and infrastructure at NBVC Point Mugu; and station up to 700 personnel, plus their family members, while supporting rotational developments to and from outside the continental United States. The FONSI was signed in April 2013, and construction activities started in 2015 for the maintenance hangar and facilities. Triton flight operations will begin in fiscal year (FY) 2016. |
| EA/OEA JSF F-35 Developmental Test Program | In 2013, the Navy prepared an EA/OEA for JSF F-35 developmental test program, which includes flight operations and testing activities at NBVC Point Mugu and the Point Mugu Sea Range. The FONSI/FONSH was signed in August 2013. |

**Table 4-1: Past, Present, and Reasonably Foreseeable Future Actions Project List (continued)**

| Project Title | Project Description |
|---|---|
| EA/OEA MQ-4C Triton (BAMS) UAS Developmental Test Program | In 2013, the Navy prepared an EA/OEA that evaluated the potential effects associated with the MQ-4C Triton Developmental Test (DT) Program. The DT program would be completed in 2 years and approximately 2,270 flight hours are planned for the entire DT program, of which an average of 2 flights per week would be conducted at the NBVC Point Mugu, NGC Palmdale or NAS Patuxent River locations. The FONSI/FONSH was signed in 2013 and DT flight operations are anticipated to begin in FY15. |
| EA Point Mugu PPV Housing Transfer | In 2014, the Navy prepared an EA for the privatization of 226 military family housing units at NBVC Point Mugu. The FONSI was signed in September 2014. |
| Damage Assessment and Restoration Plan EA for Omega 707 Air Tanker Crash in Mugu Lagoon | An EA is being prepared for the Natural Resources Damage Assessment and Restoration Plans for the 2011 Omega 707 Air Tanker Crash at NBVC Point Mugu. The EA is expected to be final in December 2015. |
| Transition to E-2D Advanced Hawkeye | In 2009, the Navy prepared the *Final Environmental Assessment for the Transition of the E-2D Advanced Hawkeye, Naval Station Norfolk, VA, Naval Base Ventura County Point Mugu, CA*; a FONSI was signed February 9, 2009 (U.S. Department of the Navy 2009a, U.S. Department of the Navy 2009b). The Navy proposed to provide facilities and functions to support the replacement of 44 E-2C aircraft with 57 E-2D Advanced Hawkeye aircraft at established Airborne Early Warning home bases (i.e., Naval Station Norfolk and NBVC Point Mugu). For purposes of this analysis, only the actions proposed at NVBC Point Mugu are assessed. |
| Implementing the Bird/Wildlife-Aircraft Strike Hazard Management Plan | The Navy prepared an EA for the implementation of the Bird/Wildlife-Aircraft Strike Hazard (BASH) Management Plan at NBVC Point Mugu in 2009 (NAVFAC 2009). The EA analyzed the environmental impacts of the BASH program, with a finding of no significant impact (FONSI). A Biological Assessment (BA) was also prepared to analyze the impacts to federally listed species from the BASH Program, with a Biological Opinion received from the U.S. Fish and Wildlife Service concurring that the BASH Plan will not jeopardize listed species. The EA identified that 4.9 acres (1.9 hectares [ha]) of wetlands would be filled, 28.3 acres (11 ha) of brackish and freshwater marsh and 360.4 acres (146 ha) of transition disturbed habitat would be subject to mowing and vegetation removal, and wildlife abundance near the runways would be permanently reduced. The Navy has over 30 acres of proactively restored wetlands that could be used to offset this loss. In addition, over 120 acres have been identified on NBVC Point Mugu as potential wetland restoration sites for projects such as this. |

**Table 4-1: Past, Present, and Reasonably Foreseeable Future Actions Project List (continued)**

| Project Title | Project Description |
|---|---|
| NBVC Point Mugu Integrated Natural Resources Management Plan and Environmental Assessment | The Integrated Natural Resources Management Plan (INRMP) for NBVC Point Mugu is the Navy's long-term planning document to guide the installation commander in the management of natural resources to support the installation mission, while protecting and enhancing installation resources for multiple use, sustainable yield, and biological integrity (U.S. Department of the Navy 2013a). The INRMP addresses terrestrial and aquatic natural resources at NBVC Point Mugu and Special Areas. The INRMP establishes planning and management strategies; identifies natural resources constraints and opportunities; supports the resolution of land use conflicts, provides baseline descriptions of natural resources necessary for development of conservation strategies and environmental assessments; serves as the principal information source for the preparation of future environmental documents for proposed actions at NBVC Point Mugu and Special Areas; and provides guidance for annual natural resources management reviews, internal compliance audits, and annual budget submittals. The FONSI was completed in December 2013. |
| Ventura County General Plan | In 2011, Ventura County updated its General Plan to extend the planning horizon from 2010 to 2020. The updates included updating population, dwelling unit, and employment forecasts; updating transportation and circulation impacts and noise impacts based on updated traffic forecasts; updating appendices based on the updated population, dwelling unit, and employment forecasts; and incorporating specific amendments as directed by the County Board of Supervisors (Ventura County Board of Supervisors 2013). The General Plan identified impacts on air quality, biological resources, agricultural resources, scenic resources, paleontological resources, cultural resources, coastal beaches and sand dunes, fire protection services, hazardous materials and waste and public health, noise and vibration, transportation circulation, airports and airport hazards, water resources and water supply, utilities and energy resources, education facilities, recreational facilities, community character, and housing as a result of direct and induced growth and road projects. |

**Table 4-1: Past, Present, and Reasonably Foreseeable Future Actions Project List (continued)**

| Project Title | Project Description |
|---|---|
| Ormond Beach Specific Plan Environmental Impact Report | The *Ormond Beach Specific Plan Final Environmental Impact Report (EIR)* was developed in 2009 (Oxnard Development Services 2009). This EIR addressed the 916.8-acre (371 ha) Ormond Beach Specific Plan Study Area on the Oxnard Plain in unincorporated Ventura County immediately outside the southeastern city limits of the City of Oxnard. The Study Area is currently almost exclusively used for agricultural activities. The Study Area is adjacent to the perimeter of NBVC Point Mugu and is divided into subareas by Hueneme Road: the 322.9-acre (131-ha) Northern Subarea and the 594.8-acre (241-ha) Southern Subarea. |
| Port Hueneme Sand Bypass Program | After the construction of Port Hueneme in the early 1940s, littoral transport of sand to down-coast beaches, including beaches at NBVC Point Mugu, was dramatically reduced. The Channel Islands Harbor was completed in 1960 and included the construction of an offshore jetty, which served as a sand trap, capturing sand from down-coast littoral transport. Dredged sand is transported around the Port Hueneme harbor entrance to down-coast beaches, resulting in the replenishment of sand on the beaches. Recent reductions in funding to support the bypass program have resulted in a decrease in sand transported to down-coast beaches and necessitated the adoption of shoreline protection measures, such as the construction of revetments. |

## 4.3 RESOURCE-SPECIFIC CUMULATIVE IMPACTS

This section provides an analysis of potential cumulative effects to each resource area analyzed in this EA. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. In some cases, specific information on some projects listed in Table 4-1 is not available so cumulative impacts can't be quantified. Therefore, this section presents a qualitative analysis of the cumulative impacts based on activities anticipated for each project (e.g., ground disturbing activities).

### 4.3.1 TOPOGRAPHY AND SEDIMENTS

Implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, or the No Action Alternative in conjunction with the identified cumulative actions would result in temporary re-suspension of sediments in the water column, temporarily disturbing sediments. However, disturbed sediments would quickly settle back to the bottom. In addition, no significant cumulative effect would occur given that design and construction measures would be used to limit erosion and there would be geographic separation from the areas affected by other projects. While shoreline revetments may contribute to erosion of the beach immediately seaward of the revetment, littoral processes would not be significantly different from existing conditions. Furthermore, construction of a dune at the eastern end of the West Revetment using sand transported to the site may ultimately contribute to the amount of sand transported down-coast. Therefore, no cumulative impacts would occur. Implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, or the No Action Alternative in

conjunction with other past, present or reasonably foreseeable projects would not result in significant cumulative impacts on topography and sediment.

### 4.3.2 WATER RESOURCES

Implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, or the No Action Alternative in conjunction with the identified cumulative actions would result in temporary increases in runoff and associated total suspended particulate matter in nearby surface water. However, impacts would be minimized with implementation of best management practices (BMPs). Impacts to wetlands (less than one acre) would be offset by consideration of the installation's 30 ac. of proactively restored wetlands, as described in the Wetland Restoration Plan (U.S. Department of the Navy 2014a).

The project area is located within the 100-year floodplain; therefore, implementation of any of the alternatives could result in impacts on the floodplain. However, potential impacts would be reduced with implementation of BMPs. Construction and development within the 100-year floodplain would be consistent with regulations outlined in EO 11988. Flood proofing and other flood-protection measures would be applied to constructed facilities. Therefore, implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, or the No Action Alternative in conjunction with other past, present or reasonably foreseeable projects would not result in significant cumulative impacts on water resources.

### 4.3.3 BIOLOGICAL RESOURCES

Implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, or the No Action Alternative would not result in significant impacts on biological resources because construction related activities would occur primarily in highly disturbed and developed portions of NBVC Point Mugu. Cumulative impacts on plants, reptiles, birds, and mammals could occur from revetment construction, dune replenishment, building demolition and construction to relocate airfield lighting equipment, dune recontouring, and road repair activities; however, these impacts would not be significant, because projects in the vicinity would impact relatively small areas, and the impacts in most respects would be temporary, occurring primarily during construction. In addition, some aspects of the alternatives (e.g., dune recontouring) would confer long-term benefits to biological resources through restoration of native habitat. The overall abundance and quality of terrestrial and marine resources (including Essential Fish Habitat) in the project area would not be appreciably reduced by the combined effects of cumulative projects. As required by the ESA, NBVC Point Mugu has consulted with the USFWS and NMFS to address project effects on ESA-listed species as described in Section 3.3 Biological Resources, and no cumulative impacts on biological resources are anticipated to occur. Therefore, implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, or the No Action Alternative in conjunction with other past, present or reasonably foreseeable projects would not result in significant cumulative impacts on biological resources.

### 4.3.4 AIR QUALITY AND CLIMATE CHANGE

#### 4.3.4.1 Greenhouse Gasses and Climate Change Cumulative Effects

The U.S. Global Change Research Program (USGCRP) looks to two potential future conditions as part of its predictive modeling process. Under conditions of lower Greenhouse Gas (GHG) emissions, the average temperature in southwestern California may increase as much as 2.5°F by 2050, 3.5°F by 2070, and 4.5°F by 2099. Under conditions of higher continuous GHG emissions, the potential increase is greater in the long term, and may be as much as 7.5°F by 2099. Projected changes in long-term climate predict more frequent extreme events such as heat waves and droughts (U.S. Global Change Research Program 2014).

Current simulations predict decreasing precipitation, snowpack, runoff, and soil moisture for the region into the future. Specifically, winter and spring precipitation may decrease between 0 and 30 percent from currently observed levels, with the biggest reduction predicted under the higher emissions scenario. While total precipitation is projected to decrease, the frequency of extreme rain events with the high potential for flooding is projected to increase. At the same time, extreme heat events are also expected to increase in frequency and magnitude. The temperatures observed during extreme events are projected to increase by 3–9°F, depending on the emissions scenario used for predictive modeling (U.S. Global Change Research Program 2014). This change in precipitation and heat would likely alter agricultural and ecosystem conditions.

As temperatures increase in the current century, optimal zones for growing crops will shift. Pests that were historically unable to survive in cooler areas may spread northward. Milder winters and earlier springs also may encourage greater numbers of pest species. Rising $CO_2$ levels in the atmosphere may increase growth of both crop and weed species. In some areas, water scarcity may reduce or even eliminate certain types of agricultural production. Similarly, changes in temperature and precipitation affect the composition and diversity of native animals and plants through altering their breeding patterns, water and food supply, and habitat availability. In a changing climate, populations of some pests such as red fire ants and rodents, better adapted to a warmer climate, are projected to increase (U.S. Global Change Research Program 2014). The existence of the greenhouse effect is not disputed. The issues and interrelationship between these issues that are not clearly defined include how the strength of the greenhouse effect changes with different concentrations of greenhouse gases, the relationships among natural sources and sinks of greenhouse gases, human sources of greenhouse gases, and atmospheric concentrations of greenhouse gases. Climate processes are understood at a general level, and more research is needed before impacts may be clearly defined (International Panel of Climate Change 2014).

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with goals set by EO 13423 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 military installations include thermal and photovoltaic solar energy systems, geothermal power plants, and wind energy generators.

Emissions of GHGs are considered to have a potential cumulative impact on global climate. The emissions associated with construction and demolition would incrementally increase regional emissions of $CO_2$ and other GHGs. Scientists are in general agreement that the earth's climate is gradually changing, and that change is due, at least in part, to emissions of $CO_2$ and other GHG from manmade sources. The anticipated magnitude of global climate change is such that a significant cumulative impact on global climate exists.

On the issue of global climate change, however, there are no adopted federal plans, policies, regulations, or laws mandating reductions in the GHG emissions that cause global climate change. The climate change research community has not yet developed tools specifically intended to evaluate or quantify end-point impacts attributable to the emissions of GHGs from a single source. In particular, because of the uncertainties involving the assessment of such emissions regionally and locally, the very minor incremental contribution of the Proposed Action to climate change cannot be determined given the current state of the science and assessment methodology.

On 8 December 2014, the CEQ released revised draft guidance on addressing climate change in NEPA documents. The draft guidance, which has been issued for public review and comment, recommends quantification of GHG emissions, and proposes a threshold of 25,000 metric tons of carbon dioxide equivalent ($CO_2e$) emissions. The CEQ indicates that use of 25,000 metric tons of $CO_2e$ emissions as a

reference point would provide federal agencies with a useful indicator, rather than an absolute standard of significance, for agencies to provide action-specific evaluation of GHG emissions and disclosure of potential impacts. In the absence of formally-adopted thresholds of significance, this EA compares GHG emissions that would occur from the Proposed Action with the 25,000 metric ton level.

The *Revised Draft Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews* (CEQ Draft Guidance) issued by the CEQ (79 FR 247, Wednesday 24 December 2014), recommends incorporating impacts associated with climate change as part of the standard cumulative impact analysis of all NEPA documents. The draft guidance encourages agencies to determine which climate change impacts warrant consideration in their analyses based on both the Proposed Action's potential impact to climate changes and the potential impact a changing climate may have on implementation of the Proposed Action. The Department of Defense 2014 Climate Change Roadmap provides guidelines to identify and assess the effects of climate change on the Department, integrate climate change considerations across the Department, manage associated risks, and collaborate with internal and external stakeholders on climate change challenges.

The USEPA developed a "State of Knowledge" website following the 2007 Intergovernmental Panel on Climate Change report. The USEPA affirms that while the contribution is uncertain, human activities are substantially increasing GHG emissions, which, in turn, are contributing to a global warming trend (U.S. Environmental Protection Agency 2015b). The USGCRP is a working group coordinating the efforts of 13 different federal agencies, including the U.S. Department of Agriculture, the Department of the Interior, the Department of Defense, and the Department of Energy. The USGCRP releases regular reports presenting the most current scientific consensus of predicted changes associated with global climate change. The 2014 National Climate Assessment report is the most recent complete report (Melillo et al. 2014). This report summarizes the science of climate change and the impacts of climate change on the United States, now and in the future, and is recommended by the CEQ 2014 draft guidance as the primary source for framing climate change discussions.

#### 4.3.4.1.1 Greenhouse Gas Emissions for Alternative 1

The Proposed Action's emissions have been compared with the proposed federal threshold of 25,000 metric tons of $CO_2e$ emissions. Table 4-1 summarizes the annual GHG emissions associated with construction and demolition activities of all alternatives. These data show that the annual $CO_2e$ emissions estimated for the Preferred Alternative would be less than the proposed significance threshold of 25,000 metric tons of $CO_2e$. Net emissions change would not significantly affect regional air quality. Potentially cumulative projects in the vicinity of Action Area (Table 4-1) could also release a nominal amount of GHGs from construction and operation activities when compared to the total annual $CO_2e$ emissions in the United States, California, and NBVC Point Mugu. Also, in response to DoD directives such as EO 13221, *Energy Efficient Standby Power Devices*, and EO 13423, *Strengthening Federal Environment, Energy, and Transportation Management*, the Navy has taken a number of steps to reduce GHG emissions from their activities. These actions include developing energy efficient technologies and weapons systems, improving military and civilian vehicles fuel efficiency, utilizing alternative fuel vehicles and electric vehicles, improving energy efficiency at Navy facilities, and installing solar and other renewable energy sources at Navy facilities. Therefore, when GHG impacts from Alternative 1 are added to the GHG impacts from the cumulative projects, there would not be significant GHG cumulative impacts to global climate change from implementation of Alternative 1.

**Table 4-2: Annual Greenhouse Gas Emissions for Alternatives 1, 2, and 3**

| Activity | GHG Emissions in Tons/Year[1] | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| **Alternative 1 and Alternative 2*** | | | | |
| Central Revetment Repair and Expansion | 287.37 | 0.02 | 0.01 | 292.15 |
| West Revetment Repair, Expansion, and Extension | 527.64 | 0.05 | 0.02 | 535.93 |
| PM-812 Relocation | 188.23 | 0.01 | 0.01 | 191.39 |
| Beach Road Repaving | 57.94 | 0.00 | 0.00 | 59.10 |
| Dune Recontouring | 1.17 | 0.00 | 0.00 | 1.19 |
| **Alternative 1 and 2 Total =** | **1,062.35** | **0.08** | **0.04** | **1,079.76** |
| **U.S. 2013 Net Emissions (metric tons)[2]** | | | | **6,673,000,000** |
| **Alternative 1 and 2 Emissions as a percent of U.S. Emissions** | | | | **0.000016%** |
| **Alternative 3** | | | | |
| Central Revetment Repair and Expansion | 287.37 | 0.02 | 0.01 | 292.15 |
| West Revetment Repair and Expansion[3] | 287.37 | 0.02 | 0.01 | 292.15 |
| Beach Road Repaving | 57.94 | 0.00 | 0.00 | 59.10 |
| Dune Recontouring | 1.17 | 0.007 | 0.007 | 1.19 |
| **Alternative 3 Total =** | **633.85** | **0.05** | **0.03** | **644.59** |
| **U.S. 2013 Net Emissions (metric tons)[2]** | | | | **6,673,000,000** |
| **Alternative 3 Emissions as a percent of U.S. Emissions** | | | | **0.00000.97%** |

Notes: $CO_2$ = carbon dioxide, $CH_4$ = methane, $N_2O$ = nitrogen dioxide, $CO_2e$ = carbon dioxide equivalent

[1] $CO_2e = (CO_2 * 1) + (CH_4 * 21) + (N_2O * 298)$.

[2] U.S. Environmental Protection Agency 2015a (Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2013)

[3] Assumes greenhouse gas emissions for repairs and expansion of the West Revetment will be equivalent to emissions for repairs and expansion of the Central Revetment.

*The only distinction between Alternative 1 and Alternative 2 is the location of the site for relocating the airfield lighting equipment (Tide Gate #844 under Alternative 1 and South M Avenue under Alternative 2). All other components of the Proposed Action are the same. Emissions associated with the construction of a new building and the relocation of the equipment would not be dependent on the site. Therefore, emissions under Alternative 1 and Alternative 2 would be approximately equivalent.

#### 4.3.4.1.2 Greenhouse Gas Emissions for Alternative 2

The Proposed Action's emissions have been compared with the proposed federal threshold of 25,000 metric tons of $CO_2e$ emissions. Table 4-2 summarizes the annual GHG emissions associated with construction and demolition activities of Alternative 2, which are the same as those under Alternative 1. These data show that the annual $CO_2e$ emissions estimated for the Preferred Alternative would be less than the proposed significance threshold of 25,000 metric tons of $CO_2e$. Net emissions change would not

significantly affect regional air quality. Therefore, there would not be significant GHG cumulative impacts to global climate change from Alternative 2.

#### 4.3.4.1.3 Greenhouse Gas Emissions for Alternative 3

The Proposed Action's emissions have been compared with the proposed federal threshold of 25,000 metric tons of $CO_2e$ emissions. Table 4-2 summarizes the annual GHG emissions associated with construction and demolition activities under Alternative 3. These data show that the annual $CO_2e$ emissions estimated for the Preferred Alternative would be less than the proposed significance threshold of 25,000 metric tons of $CO_2e$. Net emissions change would not significantly affect regional air quality. Therefore, there would not be significant GHG cumulative impacts to global climate change from Alternative 3.

#### 4.3.4.1.4 Greenhouse Gas Emissions for the No Action Alternative

Under the No Action Alternative, there would be no increase or decrease in greenhouse gas emissions, therefore, there would be no significant impacts to air quality and there would be no GHG impacts to global climate change.

### 4.3.5 NOISE

Implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, and the No Action Alternative would not result in significant noise impacts because revetment construction, dune replenishment, equipment relocation, and road maintenance activities would not occur near any sensitive noise receptors. In addition, noise generated as a result of these construction activities would be short-term and intermittent and would be similar in magnitude to noises commonly heard in the area. Therefore, no cumulative noise impacts would occur. Therefore, implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, or the No Action Alternative in conjunction with other past, present or reasonably foreseeable projects would not result in significant cumulative impacts on the existing noise environment.

### 4.3.6 CULTURAL RESOURCES

Implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, and the No Action Alternative would not result in significant impacts on cultural resources because there are no known cultural resources eligible or included on the National Register of Historic Places that exist within the Project Area. Proposed revetment repair and expansion, dune replenishment, equipment relocation, building construction and demolition, dune recontouring, and road maintenance activities do not intersect with any known cultural resource site within the Project Area. No cumulative impacts on cultural resources would occur. Therefore, implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, or the No Action Alternative in conjunction with other past, present or reasonably foreseeable projects would not result in significant cumulative impacts on known cultural resources.

### 4.3.7 PUBLIC HEALTH AND SAFETY

Implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, and the No Action Alternative would not result in significant impacts on public health and safety because revetment repair and expansion, dune replenishment, equipment relocation, building construction and demolition, dune recontouring, and road maintenance activities would occur within the installation boundaries with limited public access. In addition, access to the areas where these activities would occur would be restricted and construction activities would comply with applicable Department of Defense and federal safety regulations and requirements. In addition, proposed activities would not occur in areas where there is a permanent population of children. Therefore, implementation of the Preferred Alternative

(Alternative 1), Alternative 2, Alternative 3, and the No Action Alternative in conjunction with other past, present, or reasonably foreseeable projects would not result in significant cumulative impacts on public health and safety.

### 4.3.8 COASTAL USES AND RESOURCES

Implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, and the No Action Alternative would not result in significant impacts on coastal uses and resources, because construction related activities associated with the Proposed Action would occur primarily in highly disturbed and developed portions of NBVC Point Mugu. Cumulative impacts on coastal resources, including biological resources, coastal sediments, water resources, and accessibility to beaches could occur from revetment construction, dune replenishment, building demolition and construction to relocate airfield lighting equipment, and road repair activities could occur. However, these impacts would not significantly contribute to cumulative effects, because this and other projects in the vicinity have the potential to impact relatively small areas, and the impacts in most respects would be temporary, occurring primarily during construction. In addition, some aspects of the Proposed Action (e.g., dune recontouring) would confer long-term benefits to biological resources through restoration of native habitat. Nearly all projects listed in Table 4-1 and occurring at NBVC Point Mugu or in the offshore Sea Range have been analyzed in Navy EAs under NEPA and resulted in a FONSI or Finding of No Significant Harm. The Proposed Action would not significantly contribute to impacts on resources identified in the Ventura County General Plan, because of the short-term nature of the project and less than significant impacts on resources identified in the plan, many of which are analyzed in this EA. The Proposed Action Alternatives would not impact agricultural resources associated with Ormond Beach, which is the focus of the Ormond Beach Specific Plan Environmental Impact Report.

The Port Hueneme Sand Bypass Program is the dominant activity affecting the amount of sand available to beaches at NBVC Point Mugu. The program has been underfunded in recent years, which has resulted in less sand transported around Port Hueneme to down-coast beaches at NBVC Point Mugu. Sand continues to be transported off beaches at NBVC Point Mugu as part of natural littoral transport; however, sand from up-coast is not transported onto NBVC Point Mugu beaches to maintain the integrity of the beaches and the shoreline. The deficit in sand has contributed to shoreline retreat and necessitated the construction of shoreline protection structures (e.g., revetments) to protect infrastructure along the coastline. While some shoreline protection structures are designed to trap sand in an effort to prevent beach erosion, revetments are designed to protect infrastructure and can contribute to erosion of beach areas immediate seaward of the revetment. Beach areas down-coast of revetments may benefit from this process; however, additional sand may also be transported offshore and into Mugu Submarine Canyon as a result. While the Proposed Action Alternatives may contribute to erosion on NBVC Point Mugu beaches, the alternatives would have a negligible contribution to the overall sand deficit attributed to the underfunded sand bypass program.

Impacts from the Proposed Action are discussed in Section 3.1 (Topography and Sediments), Section 3.2 (Water Resources), and Section 3.3 (Biological Resources). As the Proposed Action is on Department of Defense land, it would not impact development, either residentially, commercially, or industrially. Therefore, implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, or the No Action Alternative in conjunction with other past, present, or reasonably foreseeable projects would not result in significant cumulative impacts on coastal uses and resources.

### 4.3.9 TRANSPORTATION AND TRAFFIC

Implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, and the No Action Alternative would not result in significant impacts on transportation on NBVC Point Mugu.

Implementation of any of the alternatives would not represent a significant permanent increase in daily average transportation volumes on the roadways within the installation. Increased traffic on NBVC Point Mugu roadways may result due to equipment and material movement to and from the construction laydown areas, but these increases would be minor, short-term, and intermittent. Roadways and other infrastructure on NBVC Point Mugu would be sufficient to support the temporary traffic associated with construction activities as well as anticipated increases in traffic associated with the addition of personnel described in several of the projects listed above (Table 4-1). Therefore, implementation of the Preferred Alternative (Alternative 1), Alternative 2, Alternative 3, and the No Action Alternative in conjunction with other past, present or reasonably foreseeable projects would not result in significant cumulative impacts on transportation and traffic resources.

# 5 OTHER NEPA CONSIDERATIONS

## 5.1 POSSIBLE CONFLICTS BETWEEN THE PROPOSED ACTION AND THE OBJECTIVES OF FEDERAL ACTS, EXECUTIVE ORDERS, POLICIES, AND PLANS

Based on evaluation with respect to consistency and statutory obligations, the Navy's Proposed Action for the NBVC Point Mugu does not conflict with the objectives or requirements of Federal, State, Local, and Regional land use plans, policies, and controls. Table 5-1 summarizes environmental compliance requirements that were considered in preparing this EA.

**Table 5-1: Summary of Environmental Compliance for the Proposed Action**

| Plans, Policies, and Controls | Responsible Agency | Status of Compliance |
|---|---|---|
| Clean Air Act (CAA) (42 United States Code [U.S.C.] §§7401 et seq.)<br>CAA General Conformity Rule (40 Code of Federal Regulations [C.F.R.] §93[B])<br>State Implementation Plan (SIP) | United States Environmental Protection Agency (USEPA) | The CAA is the comprehensive federal law that regulates air emissions from stationary and mobile sources. The Proposed Action would not conflict with attainment and maintenance goals established in SIPs. A CAA conformity determination will not be required because emissions attributable to the alternatives would be below *de minimis* thresholds. |
| Clean Water Act (CWA) (33 U.S.C. 1251 et seq.) | USEPA | The CWA is an act to provide for water-pollution control activities in the Public Health Service of the Federal Security Agency and in the Federal Works Agency, and for other purposes. The Act's objective is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.<br>Section 401 of the CWA: a permit would be obtained from the California Regional Water Quality Control Board to comply with Section 401 of the CWA. This permit would ensure that water quality standards are met.<br>Section 404 of the CWA: a permit would be obtained from USACE for regulating the discharge of dredged or fill materials into waters of the United States, including wetlands. |
| NEPA of 1969 (42 U.S.C. §§4321, et seq.)<br>Council on Environmental Quality Regulations for Implementing the Procedural Provisions of National Environmental Policy Act [NEPA] (40 C.F.R. §§1500–1508)<br>Navy Procedures for Implementing NEPA (32 C.F.R. §775) | Navy | This Environmental Assessment (EA) has been prepared in accordance with NEPA, Council on Environmental Quality regulations, and the Navy's NEPA procedures. The Proposed Action would not result in significant impacts, and thus an Environmental Impact Statement is not required. |
| Endangered Species Act (ESA) (16 U.S.C. §§1531 et seq.) | U.S. Fish and Wildlife Service (USFWS) | The ESA established protection over and conservation of threatened and endangered species and the ecosystems upon which they depend. The Proposed Action would have no adverse effects on endangered species or their habitat. |

**Table 5-1: Summary of Environmental Compliance for the Proposed Action (continued)**

| Plans, Policies, and Controls | Responsible Agency | Status of Compliance |
|---|---|---|
| Marine Mammal Protection Act (MMPA) (16 U.S.C. §§1361–1407) | National Marine Fisheries Service (NMFS) | The MMPA governs activities with the potential to harm, disturb, or otherwise "harass" marine mammals. The Proposed Action is not expected to result in injury or harassment of any marine mammal as defined by the MMPA. |
| Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§703–712) | USFWS | The Migratory Bird Treaty Act prohibits the taking, killing, or possessing of migratory birds or the parts, nests, or eggs of such birds, unless permitted by regulation. The 2003 National Defense Authorization Act provides that the Armed Forces may take migratory birds incidental to military readiness activities provided that, for those ongoing or proposed activities that the Armed Forces determine may result in a significant adverse effect on a population of a migratory bird species, the Armed Forces confer and cooperate with the Service to develop and implement appropriate conservation measures to minimize or mitigate such significant adverse effects. Implementation of the Proposed Action would cause no significant adverse effect on a population of migratory bird species. The Proposed Action would not have a significant impact on migratory birds and would comply with applicable requirements of the MBTA. |
| National Historic Preservation Act (36 C.F.R. §800) | Navy/State Historic Preservation Office | The Proposed Action would not result in any negative impacts, change, or alter cultural resources of surrounding areas. |
| Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §§1801–1891) | NMFS | The Proposed Action would have no adverse effect on Essential Fish Habitat (EFH). Therefore, per the 2011 U.S. Navy EFH Policy, EFH consultation with the NMFS is not required. |
| Coastal Zone Management Act (CZMA) (16 U.S.C. 1456, 15 C.F.R. part 930) | NOAA | A federal action is subject to CZMA federal consistency requirements if the action will have any reasonably foreseeable direct or indirect effect on any coastal use or resource. The Navy conducted an effects test for purposes of federal consistency review. Due to past similar activities and minimal effects to coastal uses and resources, the Navy determined that a Coastal Consistency Negative Determination is appropriate and is seeking California Coastal Commission concurrence on this determination. |
| EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (58 Federal Register 7269 [16 February 1994]) | Navy | The Proposed Action would not result in any disproportionately high and adverse human health or environmental effects on minority or low-income populations. |

## 5.2 Energy Requirements and Conservation Potential of Alternatives Including the Proposed Action and All Conservation Measures Being Considered

The Proposed Action includes the repair and extension of the Central and West revetments, extension of the eastern end of the West Revetment, replenishment of the sand dunes, relocation of airfield equipment and infrastructure, recontouring of the dune at Ormond and Holiday Beach, and repair and repaving of Beach Road. These activities would not result in an overall permanent increase in energy usage.

## 5.3 Irreversible or Irretrievable Commitment of Natural or Depletable Resources

The NEPA requires that environmental analysis include identification of "any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented." (NEPA Sec. 102 (2)(C)(v), 42 U.S.C. §4332). Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy or minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., the disturbance of a cultural site). For the Proposed Action, most resource commitments are neither irreversible nor irretrievable. Most impacts are short term and temporary or, if long lasting, are negligible.

## 5.4 Relationship Between Short-Term Uses of the Environment and Long-Term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and of the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development option reduces future flexibility in pursuing other options, or that giving over a parcel of land or other resource to a certain use eliminates the possibility of other uses being performed at the site. The Proposed Action would occur on government-owned lands operated by the Navy. The nature of activities for the Proposed Action would not differ from current uses of these areas. Therefore, implementation of the Proposed Action would not result in significant impacts on sensitive resources. As a result, it is not anticipated that the Proposed Action would result in any environmental impacts that would permanently narrow the range of beneficial uses of the environment or pose long-term risks to health, safety, or the general welfare of the public.

## 5.5 Any Probable Adverse Environmental Effects that Cannot be Avoided and are not Amenable to Mitigation

This EA has determined that the Proposed Action would not result in any significant unmitigable impacts; therefore, there are no probable adverse environmental effects that cannot be avoided or are not amenable to mitigation.

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**Chapter 5 – Other NEPA Considerations**

There are no references in this Chapter.

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# 7 LIST OF AGENCIES AND PERSONS CONSULTED

**Antl Szijj**
Project Manager, Army Corps Los Angeles District, Ventura Field Office

**Stephen Henry**
Field Supervisor, United States Fish and Wildlife Service, Ventura Office

**Mark Delaplaine**
Federal Consistency Manager, California Coastal Commission

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# 8 LIST OF PREPARERS

Members of the Navy staff responsible for the preparation of this EA are:

**Michelle Cox**
Natural Resources Specialist
Naval Facilities Engineering Command Southwest

**Catherine Girod**
Cultural Resources Program Manager
Naval Base Ventura County

**Rebecca Martinez**
Environmental Planner
Environmental Division, Naval Base Ventura County

**Rebecca Loomis**
Environmental Planner
Naval Facilities Engineering Command Southwest, Naval Base San Diego

**Chad Lousen**
Physical Scientist
Environmental Division, Naval Base Ventura County

**Martin Ruane**
Natural Resources Manager
Environmental Division, Naval Base Ventura County

**Valerie Vartanian**
Natural Resources Manager
Environmental Division, Naval Base Ventura County

Members of the ManTech SRS Technologies staff responsible for the preparation of this EA are:

**Alice Abela**, Wildlife Biologist
*B.S., Biology, California Polytechnic State University, San Luis Obispo, California*

**John LaBonte**, Wildlife Biologist, Project Manager
*Ph.D. Biology, University of California, Santa Barbara*
*B.S., Ecology, Behavior, and Evolution, University of California, San Diego*

**Karyn Palma**, Technical Editor
*B.A., Environmental Studies, University of California, Santa Barbara*

**Marya Samuelson**, Environmental Scientist, Associate
*B.A., Environmental Studies: Biology/Ecology, Washington University in St. Louis*

**Heather Turner**, Marine Biologist
*M.A.S., Marine Biodiversity and Conservation, Scripps Institution of Oceanography, University of California, San Diego*
*B.S., Environmental Science, University of California, Berkeley*

**Karen Waller**, Vice President/Quality Assurance
*B.S., Public Affairs, Indiana University*

**Lawrence Wolski**, Marine Scientist
*M.S., Marine Sciences, University of San Diego*
*B.S., Biology, Loyola Marymount University*

**Mike Zickel**, Environmental Scientist
*M.S., Marine Estuarine Environmental Sciences, University of Maryland-College Park, Chesapeake Biological Lab*
*B.S., Physics, College of William and Mary*

# APPENDIX A: AIR QUALITY CALCULATIONS

The data, assumptions, and formulas used to estimate emissions of criteria pollutants and greenhouse gasses from implementation of the Proposed Action are presented in this section. An analysis of potential effects to air quality is presented in Section 3.4.3 (Environmental Consequences to Air Quality and Contributions to Climate Change).

Emissions factors for criteria pollutants and greenhouse gasses used in the calculations are presented in Table A-1.

**Table A-1: Emissions Factors for Criteria Pollutants and Greenhouse Gasses**

| Equipment (HP) | Emissions Factors (lb./hr) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CO | NOx | ROG | SOx | PM10 | $CO_2$ | $CH_4$ | $N_2O$ |
| Hydraulic Crane (139) | 0.3533 | 0.4476 | 0.0744 | 0.0006 | 0.0378 | 50.15 | 0.01 | 0.01 |
| Hydraulic Crane (360) | 0.2634 | 0.7534 | 0.0875 | 0.0013 | 0.0259 | 112.16 | 0.01 | 0.01 |
| Bulldozer (207) | 0.8280 | 1.3073 | 0.1852 | 0.0015 | 0.0740 | 129 | 0.0167 | 0.01 |
| Front-End Loader (230) | 0.6242 | 0.7295 | 0.1022 | 0.0012 | 0.0402 | 129 | 0.0167 | 0.01 |
| Dump truck – Onsite (481) | 0.3651 | 0.8678 | 0.1179 | 0.0019 | 0.0290 | 167 | 0.0106 | 0.01 |
| Dump truck – Transport (up to 475) | 0.3651 | 0.8678 | 0.1179 | 0.0019 | 0.0290 | 167 | 0.0106 | 0.01 |
| Excavator (239) | 0.6648 | 0.6563 | 0.0972 | 0.0013 | 0.0355 | 112 | 0.0088 | 0.01 |
| Bulldozer (207) | 0.8280 | 1.3073 | 0.1852 | 0.0015 | 0.0740 | 129 | 0.0167 | 0.01 |
| Scraper (407) | 0.5689 | 1.6086 | 0.1911 | 0.0024 | 0.0607 | 209 | 0.0172 | 0.01 |

Notes: HP = horsepower, lb./hr = pound(s) per hour, CO = carbon monoxide, $NO_x$ = nitrogen oxides, ROG = reactive organic gas, $SO_x$ = sulfur oxides, $PM_{10}$ = suspended particulate matter less than or equal to 10 micrometers in diameter, $CO_2$ = carbon dioxide, $CH_4$ = methane, $N_2O$ = nitrous oxide

Emissions (E) of criteria pollutants and greenhouse gasses are calculated for each type of equipment by multiplying the number of each type that would be used (N), the number of days in use (d), the number of hours per day (h), and the emissions factor (F) from Table A-1 for each pollutant.

$$E = N \times d \times h \times F$$

The total (E) is converted from pounds (lb.) to metric tons by dividing by 2,000.

## Central Revetment Repair and Expansion

Emissions of criteria pollutants and greenhouse gasses for the proposed repair and expansion of the Central Revetment are presented in Table A-2 and Table A-3.

**Table A-2: Emissions for Five Criteria Pollutants from the Proposed Repair and Expansion of the Central Revetment**

| Equipment | Horsepower | Number | Days in Use | Hours per Day | Emissions (metric tons) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CO | $NO_x$ | ROG | $SO_x$ | $PM_{10}$ |
| Hydraulic Crane | 139 | 1 | 90 | 6 | 0.10 | 0.12 | 0.02 | 0.000 | 0.01 |
| Bulldozer | 207 | 1 | 90 | 6 | 0.22 | 0.35 | 0.05 | 0.000 | 0.02 |
| Front-End Loader | 230 | 1 | 90 | 6 | 0.17 | 0.20 | 0.03 | 0.000 | 0.01 |
| Dump truck - Onsite | 481 | 2 | 90 | 6 | 0.20 | 0.47 | 0.06 | 0.001 | 0.02 |
| Dump truck - Transport | 365-475 | 2 | 90 | 6 | 0.20 | 0.47 | 0.06 | 0.000 | 0.02 |
| Excavator | 239 | 1 | 90 | 6 | 0.18 | 0.18 | 0.03 | 0.000 | 0.01 |
| | | | | **Total** | **1.06** | **1.79** | **0.25** | **0.003** | **0.08** |

Notes: CO = carbon monoxide, $NO_x$ = nitrogen oxides, ROG = reactive organic gas, $SO_x$ = sulfur oxides, $PM_{10}$ = suspended particulate matter less than or equal to 10 micrometers in diameter

**Table A-3: Greenhouse Gas Emissions from the Proposed Repair and Expansion of the Central Revetment**

| Equipment | Horsepower | Number | Days in Use | Hours per Day | Emissions (metric tons) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Hydraulic Crane | 139 | 1 | 90 | 6 | 13.54 | 0.00 | 0.00 | 14.12 |
| Bulldozer | 207 | 1 | 90 | 6 | 34.96 | 0.00 | 0.00 | 35.59 |
| Front-End Loader | 230 | 1 | 90 | 6 | 28.71 | 0.00 | 0.00 | 29.29 |
| Dump truck - Onsite | 481 | 2 | 90 | 6 | 89.93 | 0.01 | 0.00 | 91.13 |
| Dump truck - Transport | 365-475 | 2 | 90 | 6 | 89.93 | 0.01 | 0.00 | 91.13 |
| Excavator | 239 | 1 | 90 | 6 | 30.30 | 0.00 | 0.00 | 30.89 |
| | | | | **Total** | **287.37** | **0.02** | **0.01** | **292.15** |

Notes: $CO_2$ = carbon dioxide, $CH_4$ = methane, $N_2O$ = nitrous oxide, $CO_2e$ = carbon dioxide equivalent

[1] $CO_2e = (CO_2 * 1) + (CH_4 * 21) + (N_2O * 298)$

## West Revetment Repair, Expansion, Extension, and Sand Dune Replenishment

Emissions from equipment usage needed for the proposed repair, expansion, and extension of the West Revetment and replenishment of the dune down-coast of the West Revetment are provided in Table A-4 and Table A-5.

**Table A-4. Emissions for Five Criteria Pollutants from the Proposed Repair and Extension of the West Revetment and Sand Dune Replenishment**

| Equipment | Horse Power | Number | Days in Use | Hours per Day | Emissions (metric tons) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CO | $NO_x$ | ROG | $SO_x$ | $PM_{10}$ |
| Hydraulic Crane | 139 | 1 | 90 | 6 | 0.10 | 0.12 | 0.02 | 0.000 | 0.01 |
| Hydraulic Crane | 360 | 1 | 90 | 6 | 0.07 | 0.20 | 0.02 | 0.000 | 0.01 |
| Bulldozer | 207 | 1 | 90 | 6 | 0.22 | 0.35 | 0.05 | 0.000 | 0.02 |
| Front-End Loader | 230 | 1 | 90 | 8 | 0.22 | 0.26 | 0.04 | 0.000 | 0.01 |
| Dump truck - Onsite | 481 | 2 | 90 | 8 | 0.26 | 0.62 | 0.08 | 0.001 | 0.02 |
| Dump truck - Transport | 365-475 | 2 | 90 | 8 | 0.26 | 0.62 | 0.08 | 0.001 | 0.02 |
| Excavator | 239 | 1 | 90 | 8 | 0.24 | 0.24 | 0.03 | 0.000 | 0.01 |
| Bulldozer | 207 | 1 | 90 | 8 | 0.30 | 0.47 | 0.07 | 0.001 | 0.03 |
| Scraper | 407 | 1 | 90 | 8 | 0.20 | 0.58 | 0.07 | 0.001 | 0.02 |
| **Total** | | | | | **1.88** | **3.48** | **0.47** | **0.006** | **0.15** |

Notes: CO = carbon monoxide, $NO_x$ = nitrogen oxides, ROG = reactive organic gas, $SO_x$ = sulfur oxides, $PM_{10}$ = suspended particulate matter less than or equal to 10 micrometers in diameter

**Table A-5: Greenhouse Gas Emissions from the Proposed Repair and Extension of the West Revetment and Sand Dune Replenishment**

| Equipment | Horsepower | Number | Days in Use | Hours per Day | Emissions (metric tons) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Hydraulic Crane | 139 | 1 | 90 | 6 | 13.54 | 0.00 | 0.00 | 14.12 |
| Hydraulic Crane | 360 | 1 | 90 | 6 | 30.28 | 0.00 | 0.00 | 30.87 |
| Bulldozer | 207 | 1 | 90 | 6 | 34.96 | 0.00 | 0.00 | 35.59 |
| Front-End Loader | 230 | 1 | 90 | 6 | 46.61 | 0.01 | 0.00 | 47.45 |
| Dump truck - Onsite | 481 | 2 | 90 | 6 | 119.91 | 0.01 | 0.00 | 121.51 |
| Dump truck - Transport | 365-475 | 2 | 90 | 6 | 119.91 | 0.01 | 0.00 | 121.51 |
| Excavator | 239 | 1 | 90 | 6 | 40.40 | 0.00 | 0.00 | 41.18 |
| Bulldozer | 207 | 1 | 90 | 8 | 46.61 | 0.01 | 0.00 | 47.45 |
| Scraper | 407 | 1 | 90 | 8 | 75.41 | 0.01 | 0.00 | 76.26 |
| | | | | **Total** | **527.64** | **0.05** | **0.02** | **535.93** |

Notes: $CO_2$ = carbon dioxide, $CH_4$ = methane, $N_2O$ = nitrous oxide, $CO_2e$ = carbon dioxide equivalent

[1] $CO_2e = (CO_2 * 1) + (CH_4 * 21) + (N_2O * 298)$

## Relocation of Airfield Lighting Equipment from Building PM-812

Emissions from equipment usage needed for the proposed relocation of airfield lighting equipment housed in Building PM-812 to either the site at Tide Gate #844 or the South M Avenue site are provided in Table A-6 and Table A-7.

**Table A-6: Emissions for Five Criteria Pollutants from the Proposed Relocation of Equipment in Building PM-812**

| Equipment | Horse Power | Number | Days in Use | Hours per Day | Emissions (metric tons) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CO | $NO_x$ | ROG | $SO_x$ | $PM_{10}$ |
| Excavator (Large) | 239 | 1 | 60 | 6 | 0.12 | 0.12 | 0.02 | 0.000 | 0.01 |
| Excavator (small) | 113 | 1 | 60 | 6 | 0.05 | 0.04 | 0.01 | 0.000 | 0.00 |
| Dump truck - Onsite | 481 | 1 | 60 | 6 | 0.07 | 0.16 | 0.02 | 0.000 | 0.01 |
| Dump truck - Transport | 365-475 | 1 | 60 | 6 | 0.07 | 0.16 | 0.02 | 0.000 | 0.01 |
| Front End Loader | 230 | 1 | 60 | 6 | 0.11 | 0.13 | 0.02 | 0.000 | 0.01 |
| Scraper | 407 | 1 | 60 | 6 | 0.10 | 0.29 | 0.03 | 0.000 | 0.01 |
| Soil Compactor | 405 | 1 | 60 | 6 | 0.06 | 0.18 | 0.02 | 0.000 | 0.01 |
| Concrete Mixing Truck | | 1 | 60 | 6 | 0.04 | 0.05 | 0.00 | 0.000 | 0.00 |
| | | | | **Total** | **0.62** | **1.12** | **0.15** | **0.002** | **0.05** |

Notes: CO = carbon monoxide, $NO_x$ = nitrogen oxides, ROG = reactive organic gas, $SO_x$ = sulfur oxides, $PM_{10}$ = suspended particulate matter less than or equal to 10 micrometers in diameter

**Table A-7: Greenhouse Gas Emissions from the Proposed Relocation of Equipment in Building PM-812**

| Equipment | Horsepower | Number | Days in Use | Hours per Day | Emissions (metric tons) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Excavator (Large) | 239 | 1 | 60 | 6 | 20.20 | 0.00 | 0.00 | 20.59 |
| Excavator (small) | 113 | 1 | 60 | 6 | 4.50 | 0.00 | 0.00 | 4.90 |
| Dump truck - Onsite | 481 | 1 | 60 | 6 | 29.98 | 0.00 | 0.00 | 30.38 |
| Dump truck - Transport | 365-475 | 1 | 60 | 6 | 29.98 | 0.00 | 0.00 | 30.38 |
| Front End Loader | 230 | 1 | 60 | 6 | 19.14 | 0.00 | 0.00 | 19.53 |
| Scraper | 407 | 1 | 60 | 6 | 37.70 | 0.00 | 0.00 | 38.13 |
| Soil Compactor | 405 | 1 | 60 | 6 | 27.56 | 0.00 | 0.00 | 27.95 |
| Concrete Mixing Truck | | 1 | 60 | 6 | 19.17 | 0.00 | 0.00 | 19.54 |
| | | | | **Total** | **188.23** | **0.01** | **0.01** | **191.39** |

Notes: $CO_2$ = carbon dioxide, $CH_4$ = methane, $N_2O$ = nitrous oxide, $CO_2e$ = carbon dioxide equivalent

[1] $CO_2e = (CO_2 * 1) + (CH_4 * 21) + (N_2O * 298)$

## Beach Road Repair

Emissions from equipment usage needed for the proposed repairs to Beach Road are provided Table A-8 and Table A-9.

**Table A-8: Emissions for Five Criteria Pollutants from the Proposed Repairs to Beach Road**

| Equipment | Horse Power | Number | Days in Use | Hours per Day | Emissions (metric tons) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CO | $NO_x$ | ROG | $SO_x$ | $PM_{10}$ |
| Soil Compactor (Front Roller) | 405 | 1 | 25 | 6 | 0.03 | 0.07 | 0.01 | 0.000 | 0.00 |
| Asphalt Paver | 174 | 1 | 25 | 6 | 0.04 | 0.05 | 0.01 | 0.000 | 0.00 |
| Asphalt Roller | 48.8 | 1 | 25 | 6 | 0.00 | 0.01 | 0.00 | 0.000 | 0.00 |
| Dump truck - Onsite | 481 | 1 | 25 | 6 | 0.03 | 0.07 | 0.01 | 0.000 | 0.00 |
| Dump truck - Transport | 365-475 | 1 | 25 | 6 | 0.03 | 0.07 | 0.01 | 0.000 | 0.00 |
| Excavator | 239 | 1 | 25 | 6 | 0.05 | 0.05 | 0.01 | 0.000 | 0.00 |
| Front end Loader | 230 | 1 | 25 | 6 | 0.05 | 0.05 | 0.01 | 0.000 | 0.00 |
| **Total** | | | | | **0.22** | **0.37** | **0.05** | **0.001** | **0.02** |

Notes: CO = carbon monoxide, $NO_x$ = nitrogen oxides, ROG = reactive organic gas, $SO_x$ = sulfur oxides, $PM_{10}$ = suspended particulate matter less than or equal to 10 micrometers in diameter

**Table A-9: Greenhouse Gas Emissions from the Proposed Repairs to Beach Road**

| Equipment | Horsepower | Number | Days in Use | Hours per Day | Emissions (metric tons) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Soil Compactor (Front Roller) | 405 | 1 | 25 | 6 | 11.48 | 0.001 | 0.001 | 11.65 |
| Asphalt Paver | 174 | 1 | 25 | 6 | 4.09 | 0.001 | 0.001 | 4.25 |
| Asphalt Roller | 48.8 | 1 | 25 | 6 | 1.00 | 0.000 | 0.001 | 1.17 |
| Dump truck - Onsite | 481 | 1 | 25 | 6 | 12.49 | 0.001 | 0.001 | 12.66 |
| Dump truck - Transport | 365-475 | 1 | 25 | 6 | 12.49 | 0.001 | 0.001 | 12.66 |
| Excavator | 239 | 1 | 25 | 6 | 8.42 | 0.001 | 0.001 | 8.58 |
| Front end Loader | 230 | 1 | 25 | 6 | 7.97 | 0.001 | 0.001 | 8.14 |
| | | | | **Total** | **57.94** | **0.004** | **0.004** | **59.10** |

Notes: $CO_2$ = carbon dioxide, $CH_4$ = methane, $N_2O$ = nitrous oxide, $CO_2e$ = carbon dioxide equivalent

[1] $CO_2e = (CO_2 * 1) + (CH_4 * 21) + (N_2O * 298)$

## Beach Recontouring

Emissions from equipment usage needed for the proposed recontouring of dunes at Ormond Beach and Holiday Beach are provided in Table A-10 and Table A-11.

**Table A-10: Emissions for Five Criteria Pollutants from the Proposed Recontouring of Dunes at Ormond Beach and Holiday Beach**

| Equipment | Horse power | Number | Days in Use | Hours per Day | Emissions (metric tons) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CO | $NO_x$ | ROG | $SO_x$ | $PM_{10}$ |
| Bulldozer | 207 | 1 | 3 | 6 | 0.0075 | 0.0118 | 0.0017 | 0.0000 | 0.0007 |

Notes: CO = carbon monoxide, $NO_x$ = nitrogen oxides, ROG = reactive organic gas, $SO_x$ = sulfur oxides, $PM_{10}$ = suspended particulate matter less than or equal to 10 micrometers in diameter

**Table A-11: Greenhouse Gas Emissions from the Proposed Recontouring of Dunes at Ormond Beach and Holiday Beach**

| Equipment | Horsepower | Number | Days in Use | Hours per Day | Emissions (metric tons) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Bulldozer | 207 | 1 | 3 | 6 | 1.1653 | 0.0002 | 0.0001 | 1.1864 |

Notes: $CO_2$ = carbon dioxide, $CH_4$ = methane, $N_2O$ = nitrous oxide, $CO_2e$ = carbon dioxide equivalent

[1] $CO_2e = (CO_2 * 1) + (CH_4 * 21) + (N_2O * 298)$

# APPENDIX B: CLEAN AIR ACT RECORD OF NON-APPLICABILITY (RONA)

AIR EMISSIONS CALCULATIONS

Total emissions were estimated from proposed construction activities. Emissions associated with ground vehicles were estimated based on emission factors for specific equipment, or for ground vehicles, from the California Air Resources Board's Emission Factors (EMFAC) model, which provides emission factors for on-road vehicles, or the OFFROAD model (Table 2).

Table 2. Annual Criteria and Precursor Air Pollutant Emissions under the Proposed Action

| Emissions Source | Criteria and Precursor Air Pollutant Emissions in Tons/Year | | |
|---|---|---|---|
| | CO | $NO_x$ | ROG |
| **Alternative 1** | | | |
| Central Revetment | 1.0613 | 1.7852 | 0.2513 |
| West Revetment | 1.8827 | 3.4755 | 0.4708 |
| Building PM-812 Relocation | 0.6195 | 1.1233 | 0.1458 |
| Beach Road Repair | 0.2185 | 0.3692 | 0.0504 |
| Dune Recontouring | 0.0075 | 0.0118 | 0.0017 |
| **Total =** | **3.79** | **6.76** | **0.92** |
| **Summary and Comparison** | | | |
| *De minimis* levels | 100 | 50 | 50 |
| Proposed Action emissions as a percentage of the South Central Coast Air Basin baseline | 3.79% | 13.52% | 1.84% |

Notes: CO = carbon monoxide, $NO_x$ = nitrogen oxides, ROG = reactive organic gas

CONCLUSION

As indicated in Table 2, implementation of the Proposed Action is expected to result in emissions increases that would be de minimis. Consequently, the proposed action is exempt from the conformity determination requirements of the Environmental Protection Agency's conformity rule, and that further formal Conformity Determination procedures are not required, resulting in this Record of Non-Applicability.

RONA APPROVAL

To the best of my knowledge, the information presented in this Record of Non-Applicability is correct and accurate and I concur in the finding that the Proposed Action is not subject to the General Conformity Rule.

APPROVED: Daniel T. Shude DATE: 8/21/15

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# APPENDIX C: AGENCY CORRESPONDENCE

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

IN REPLY REFER TO:
5090
Ser N0000CV/1043
October, 14 2015

Mr. Mark Delaplaine
Federal Consistency Supervisor
California Coastal Commission
45 Fremont Street, Suites 1900 & 2000
San Francisco, CA 94105-2219

Dear Mr. Delaplaine:

SUBJECT: NEGATIVE DETERMINATION FOR SHORELINE PROTECTION REPAIRS AND ENHANCEMENTS AT NAVAL BASE VENTURA COUNTY, POINT MUGU, CA

The Navy is submitting a Coastal Consistency Negative Determination (CCND) for Shoreline Protection Repair and Enhancements at Naval Base Ventura County at Point Mugu, California. The proposed project involves repairing and extending revetments, replenishing sand dunes, and relocating critical shore infrastructure to reduce or eliminate effects of coastal flooding and erosion.

This submittal is in compliance with Section 930.35 (d) of the National Oceanic and Atmospheric Administration (NOAA) Federal Consistency Regulations (15 CFR 930). The Navy has determined that the proposed action would have no effect to coastal resources for the reasons enclosed.

The Navy requests your concurrence on this proposed project. When completed, email a letter of concurrence to Ms. Deb McKay, Region NEPA Coordinator, at deborah.mckay@navy.mil. If you have any questions or need further information, please contact Ms. Deb McKay at (619) 532-2284.

Sincerely,

C. D. JANKE
Captain, U.S. Navy
Commanding Officer

Enclosure: 1. Coastal Consistency Negative Determination

**Coastal Consistency Negative Determination**

In accordance with the Federal Coastal Zone Management Act (CZMA) of 1972 as amended, Section 307c(1), the United States Department of the Navy (Navy) has determined that the proposed action, Shoreline Protection Repair and Enhancements, would not affect the resources or uses of the coastal zone. Therefore, the Navy has concluded that a Coastal Consistency Determination is not required and is requesting your concurrence with this Coastal Consistency Negative Determination (CCND) in compliance with the Ocean and Coastal Resource Management regulations (15 CFR 930.35).

The Navy is completing an Environmental Assessment (EA) for the proposed project. Public input on the proposed project will be solicited and the Draft EA made available on the Navy Region Southwest website and in regional libraries for 30 days. The project is similar in purpose and proximity to previous consistency determinations: CD-90-98, Repairs to Damaged Portion of the Central and Western Seawalls; CD-91-95, Repair and Partial Removal of Existing Seawall; and ND-062-07, Holiday Beach restoration project. These projects were located at Naval Air Station at Point Mugu, CA, which was the previous name for Naval Base Ventura County (NBVC) Point Mugu.

## PROJECT DESCRIPTION

NBVC Point Mugu is located between the City of Oxnard to the north and Point Mugu State Park to the south. The installation occupies 4,490 acres and contains approximately 6 miles of coastline exposed to the Pacific Ocean. (See Figure 1 for site location map.) NBVC Point Mugu operates an airfield with two runways and a 36,000-square-mile sea test range extending more than 180 nautical miles seaward from shore. Its proximity to the Sea Range is inherently important to provide aircraft access as well as radar and tracking capabilities for the aircraft, weapon and missile testing completed on the range. The installation has mission-critical infrastructure threatened by the long history of erosion and shoreline retreat in the area. Over the years, shoreline protection structures such as groins and revetments have been constructed to protect the buildings and roads. Storms and other high water events continue to damage these revetments necessitating their repair and/or enhancement periodically. (See Figure 2 for map showing shore protection structures.)

Construction of shore protection structures along NBVC Point Mugu began in the late 1960s and consisted of a groin field and four revetments, typically constructed as an emergency response measure to protect infrastructure from the effects of long-term shoreline retreat, storm related erosion and flood damage. Loss of longshore sand transport after the development of Port Hueneme jetty and Channel Islands harbor has exacerbated the erosion challenges at Point Mugu. A Shoreline Protection Study Report (Department of Navy, 2012) was recently prepared to assess the short and long term vulnerabilities of installation and ecological assets and to develop a strategy to reduce or eliminate those vulnerabilities. Recommendations from that

report form the basis of the proposed project. (See Figure 3 for short history of shoreline protection in the area.)

There are several components to the proposed shoreline repair and enhancement project. The first of which is the repair and expansion of the Central revetment. Built 1966-1968, the Central revetment is the highest and longest such structure on NBVC Point Mugu and protects Buildings PM-761 and PM-7020. Its elevation is approximately 20 feet (ft) above mean sea level (MSL) or 23 ft above mean lower low water (MLLW). The toe of the Central revetment extends between 20 and 40 ft seaward and the seaward face has a slope of approximately 2:1 (horizontal to vertical). Since its construction, the shoreline at the Central revetment has retreated approximately 200 ft. The coastline protected by this revetment is most vulnerable to concentrated wave energy refracted by the Mugu Submarine Canyon. The revetment protects the west shoulder of the embayment created by the recession of the Mugu Submarine Canyon. Review of the Central revetment indicates a significant percentage of stone is undersized and placed in a more random pattern resulting in stones being easily dislodged, compromising the integrity and durability of the structure. In addition, a significant volume of stones appear broken and worn, indicating insufficient durability for future coastal protection. Also, strong storms during 2014 resulted in minor flooding and damages to adjacent infrastructure and buildings from waves over topping the revetment. Therefore, proposed repairs and enhancements to the Central revetment would include increasing the crest elevation from its current height of approximately 20 ft to between 23 and 27 ft. high; armoring the seaward slope; reinforcing the backside of the structure by adding larger, dense stone; and increasing the overall width of the revetment. The new stone would be nested properly during installation to ensure maximum stability and resistance to damage from storms. The repair would restore an approximate 2:1 slope and increase crest elevations above mean lower low water (MLLW) along the existing revetment. This repair would likely use 6-8 ton (in size) armor stone and would require approximately 2,000 tons of more armor. (See Figure 4)

The next component of the project is the repair and expansion of West revetment and sand dune replenishment. West revetment protects Runway 3-21, Beach Road, and Building PM-812 as well as an existing sand dune and beach down coast that provides nesting habitat for western snowy plover and California least terns. The elevation of the West revetment is approximately 14 ft. above MSL (16 ft. above MLLW). The toe of the revetment was extended in 1999 but no information on the length of the toe or the slope of the seaward face of the revetment is available. Since 1938, the shoreline at the West revetment has receded steadily and is now located approximately 400 ft. landward. This revetment has experienced the greatest landward recession of any segment of NBVC Point Mugu shoreline and the recession rate at the eastern end has accelerated since the mid-1990s. Therefore, proposed repairs and enhancements to the West revetment would include increasing the crest elevation from its current height of approximately 14 ft to approximately 18 ft. high; armoring the seaward slope; reinforcing the backside of the structure by adding larger, dense stone; and increasing the overall width of the revetment. The

proposed extension would be 125 ft down-coast while the crest elevation would be approximately 18 ft above MLLW and the width at the crest would be approximately 10 ft. The toe of the revetment extension would be approximately 2 ft below MLLW and covered with sand to match the existing beach profile. The extension would be constructed of 4-6 ton armor stone and have a 2:1 seaward facing slope. Approximately 2,600 tons of armor stone and 1,700 tons of under-layer stone would be required. The extension is intended to move localized erosion at the eastern end of the West revetment to a location down-coast from Building PM-812. Since, the shoreline at the extended end of the revetment will continue to erode beach and dune area down-coast due to end-effect scour, the eroded sand dunes would be partially restored with excavated material, or other beach-quality sand, to reduce the risk of waves overtopping the dunes and causing damage to Beach Road. The amount of sand needed is dependent on the condition of the beach at the time of construction. The dimensions of the sand dune and project footprint would be calculated based on the current need for sand retention and replenishment. By adding sand at the top of the beach or dune profile, this will act as a sacrificial sand source to help reduce localized dune losses. The existing sand fencing at the base of the dunes would be extended to reduce sand erosion and loss from wind transport. Revegetation of the dunes with native dune plants would be done to further protect the dunes from erosion. (See Figure 5)

Another component of the proposed project is relocating mission-critical airfield lighting control equipment currently located in Building PM-812. The building is located behind, or land-ward side of, the West revetment, along Beach Road and has experienced damage from flooding due to long periods of an above-average storm event in 2011 and continually deteriorated state of the revetment. The building contains airfield lighting control equipment critical to flight operations. There are two proposed locations for relocating the airfield lighting equipment: Tidal Gate #844 site or South M Avenue site. The Tidal Gate #844 site (currently the preferred alternative) would require the 5,500 square feet of space for construction of a of building and parking spaces and if onsite utilities are not adequate, construction of utilities using existing utility corridors. Access to Tidal Gate #844 site is via an unpaved service road [Marine Air Detachment (MAD) road]. The South M Avenue site would require the same building and parking space; however there is an existing building, Building PM-81, at the proposed site which would require expansion. Extension of utilities may also be required. Access to this site is via a paved road. Once the airfield lighting equipment and infrastructure is relocated to either site, Building PM-812 would be demolished. (See Figures 6 and 7)

In addition to the above repairs and relocation, the reconstruction of a 300-foot portion of Beach Road and repaving the entire stretch of road is included in the proposed project. Beach Road runs parallel to the coastline along the entire length of NBVC Point Mugu and is considered a mission-critical transportation pathway, especially to ordnance storage facilities. Reconstruction would require milling the surface (i.e., removing some of the existing pavement to achieve a flat surface), repairing the base and sub-base of the road, and repaving with asphalt. For the next 5-10 years, the remainder of Beach Road, extending from Ditch Road to Laguna Road, would only

require pothole repair and patching of cracks as needed. Additional milling, deep patching, base and sub-base repairs and repaving would occur every 10-15 years as needed.

The final component of the proposed project is dune recontouring at Ormond and/or Holiday Beaches with East Ormond being the preferred location. The dune recontouring would be performed at a 1:1 ratio (habitat loss to habitat restored) to offset the loss of nesting habitat for western snowy plover and California least tern as a result of extending the West revetment. Non-native plant species have artificially stabilized the foredunes on East Ormond and Holiday beaches resulting in accretion of sand and increasing size of the foredunes but resulting in a reduction of sand movement into the backdunes and loss of open sand sheet habitat, preferred by the birds. Recontouring would be performed with a bulldozer in order to restore sand movement to the backdune areas and would be accomplished over approximately 3 days. (See Figures 8)

**EFFECTS ANALYSIS**

As defined in Section 304 of the CZMA, 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." NBVC Point Mugu is owned and operated by the Navy and, therefore, is excluded from the coastal zone. The Navy recognizes that Federal actions on land excluded from the coastal zone may affect uses and resources within the coastal zone. Accordingly, the Navy analyzed the impacts of the proposed project on the coastal zone by looking at reasonable foreseeable, direct and indirect effects on the coastal uses or resources. Also analyzed were the relevant management program enforceable policies, and the Coastal Resources Planning and Management Policies (CRPMP).

While the California coast regularly experiences erosion, flooding, and significant storm events, sea level rise associated with climate change will exacerbate these natural forces, leading to significant social, environmental, and economic impacts. The State of California provides sea level rise ranges for planning analysis, derived from published work by the National Research Council. The State uses a range of 2-12 inches by 2030, 5-24 inches by 2050 and 17-66 inches by 2100. (CCC Sea Level Rise Policy Guidance 2015) .

Although the Proposed Action is intended to repair pre-existing structures to ensure protection of infrastructure and resources from the effects of coastal flooding and storm surge, sea level rise still has the potential to impact the shoreline protection enhancements and structures proposed as well as have detrimental impacts to existing facilities on NBVC Point Mugu. A plan to regularly monitor the condition of existing shoreline protective devices and the risk level to assets and infrastructure is needed. Managed retreat, as a strategic response to sea level rise, is a multiphase, long-term adaptive strategy that requires considerable planning, time, and funding. As stated in the Shoreline Protection Study prepared for the NBVC Point Mugu, managed retreat would be a reasonable strategy for addressing the long-term rate of coastal erosion associated with the Mugu Submarine Canyon headwall retreat and the uncertain impacts of climate change; however, other near-term causes contributing to erosion and shoreline retreat would not be

addressed and would leave infrastructure and assets vulnerable to damage from more frequent, short-term events, such as storms, putting operations at risk.

To minimize risk from current and potential future sea level rise, two strategies have been considered: adaptation and managed retreat. First, incorporating sea level rise estimates into the engineering plans for expanding the height and width of the revetments and for the siting and building height design of new proposed facilities is implementing an adaptation strategy. Second, relocating critical infrastructure away from the coast and out of areas potentially affected by sea level rise is implementing a managed retreat strategy. The proposed project incorporates both of these strategies through the proposed elevation heights of the revetments and the relocation of airfield lighting equipment further away from the shoreline.

**Public Access (Coastal Resources Planning and Management Policies [CRPMP] Section 30210 *et seq.*), Recreation (CRPMP Sections 30220 *et seq.*)**

The proposed project would occur within the boundaries of NBVC Point Mugu where access is controlled and restricted to military personnel, Department of Defense (DoD) employees and retirees, authorized contractors and official visitors. There is no public access to the project sites and no public recreation opportunities located within the project sites. DoD access to the beaches on the seaward side of the revetments is often limited or closed for safety and mission requirements associated with the airfield, weapons movements, and missile launches or closed to conserve sensitive habitat areas. Beach areas within or adjacent to the Central revetment, including Family Beach, are used for recreation or surfing by base personnel and their families. All other beach areas are restricted from recreational use at NBVC Point Mugu, including Ormond and Holiday Beach. These are restricted and completely closed off to all personnel (due to protected species, and ordnance safety). The only recreation beaches at NBVC Point Mugu open are Family Beach and Surf Point (both within the Central revetment area). Surf Point is well recognized by the general surf community as being one of the best waves in California. Access to the Surf Point is restricted from the general public, with exception to the occasional open public surf contests (most recent in 2012). Construction activities associated with the revetment repairs and expansion, as well as the sand replenishment and dune re-contouring may temporarily affect access to the shoreline on the seaward side of those areas. The construction schedule would depend upon weather and wave conditions but are anticipated to occur during the winter months when beach use for recreation is at its lowest period and is outside shorebird nesting activity periods. While some portions of the recreational beaches within or adjacent to the Central revetment may be temporarily unavailable during construction, construction is not taking place on these beaches and the majority of the beach area would still be available for recreational use.

Therefore, there would be no effect to public access and recreation.

**Marine Environment (CRPMP Sections 30230 *et seq.*)**

The proposed project components are all primarily on land or intertidal zone and there is no proposed in-water construction activity. However, due to the location of the revetments, temporary effects from construction as well as permanent effects of new infrastructure or buildings have the potential to affect coastal waters and wetlands on or adjacent to the proposed sites. Water resources in the project area are the intertidal zone along the shoreline and the saltmarsh wetlands at the proposed relocation site for a new building to house the airfield lighting equipment.

The width of the intertidal zone along a shoreline is defined as the average distance between high tide and low tide with the average tidal range being 3.7 ft. The width of the intertidal zone fluctuates with the tidal range and can be estimated as the product of the horizontal gradient (or slope) in the nearshore littoral zone and the tidal range. The nearshore slope at the West revetment is 1:45 (i.e., for every 45 ft in the horizontal direction, the elevation changes by 1 ft.) and thus the mean width of the intertidal zone would be approximately 167 ft. At the Central revetment the nearshore slope is 1:35 and the mean width of the intertidal zone is 130 ft. The nature of waves is also an important consideration for this project. At NBVC Point Mugu, the coastline faces southwest. Waves approaching from the northwest are the largest and carry the most energy and usually do the most damage; however, waves approaching from the south are refracted by the Mugu Submarine Canyon which focuses and intensifies energy on NBVC Point Mugu and result in greater wave heights than occur elsewhere along the coast. Offshore storms have generated waves with heights between 12 and 19 ft approaching from the northwest. The design of the shoreline protection devices must consider the following factors: maximum wave height, storm- generated increase in water level, sea level rise, and the amount of scour occurring at the base of the structure. Based on the estimates of these factors, the West Revetment must be capable of withstanding waves 8.3 to 10.9 ft and the Central Revetment must be able to withstand wave between 9.2 and 17.2 ft.

Potential affects to the intertidal zone from the proposed projects result from construction vehicles transporting and installing armor stone at the revetments and replenishing the sand dune down-coast of the West revetment since this activity will be within the zone. The activity would likely loosen and introduce additional sandy sediments into the water column of intertidal and nearshore waters. Additional suspended sediments would result in an increase in turbidity, reducing water quality and potentially affecting biological resources that may be present in the nearshore waters. Although the increases in turbidity may occur, any impacts would be localized and temporary, lasting only as long as the equipment and materials are being used on site. After construction activity is complete, sedimentation and turbidity levels would quickly return to pre-construction levels as less turbid, up-coast waters are transported into the local intertidal zone. Sediments entrained in the water column would be transported down-coast and deposited on beaches or be transported offshore as part of the natural longshore transport within the littoral cell. The seaward face of the revetments would be constructed or repaired to establish a 2:1

(horizontal to vertical) slope, which is similar to existing conditions at the intact sections of the revetments. Stone, sand, and other materials (e.g., filter cloth) used to repair and expand the West and Central revetments would be free from chemical contaminants that have the potential to impact water quality in nearshore waters. A hazardous materials plan would be prepared that outlines procedures for the use and clean-up of hazardous materials (e.g., fuel) should an accidental spill occur. The deposition and entrainment of sand at the revetments by breaking waves would be the same as it is under existing conditions. Reducing the slope of the seaward face of the revetments to 2:1 would reduce the rate of scour from backwash at the toe of the revetments. However, beach directly seaward of the revetments may eventually have a steeper slope than adjacent beaches where a revetment is not installed. The proposed repairs and enhancement to West and Central revetment and the extension of the west revetment would not affect the direction or energy of waves approaching the shoreline and would not significantly alter littoral transport of sand within the cell. Slight changes to the beach topography by extending the West revetment would not significantly change littoral transport of beach sand along the coastline and would have no effect on the longshore current.

There are 2,139 acres of wetlands on NBVC Point Mugu representing 48 percent of the total area of the installation. The largest body of water on NBVC is Mugu Lagoon. The two proposed relocation sites at Tide Gate #844 and South M Avenue are both located adjacent to saltmarsh (Army Corps of Engineer jurisdictional) wetlands, though they do not overlay Mugu Lagoon and are far enough upstream where no impacts to the Lagoon are anticipated. Construction at either the Tide Gate #844 or South M Avenue sites would require a 5,500 square foot site and thus 0.13 acres of wetlands may be permanently impacted. This would represent an impact to 0.007 percent of the total acres of wetlands located on NBVC Point Mugu. The loss of wetlands would be offset using some portion of the 30 acres of proactively restored wetlands the Navy has already completed or the additional 120 acres of potential wetland restoration sites identified. Installation of power cables and other utilities may be needed at the South M Avenue site which may require directional drilling under the wetlands resulting in disturbance to silty clay sediments but would not damage root systems of above-ground vegetation. There is potential for runoff of sediments and debris entering adjacent wetland areas from the construction site. To minimize the potential for impacts (e.g., an increase in turbidity), sediment fences would be installed during construction activities. Potential, long term impacts to water quality at the site from contaminants (e.g., engine oil) associated with parked vehicles may occur. To minimize this impact, the final design of the site would include low impact development strategies.

Mugu Lagoon is also part of the Laguna Point to Latigo Point Area of Special Biological Significance (ASBS), which is located along the coast and in offshore waters in both Los Angeles and Ventura counties. The NBVC Point Mugu and Mugu Lagoon are located at the northern boundary of the Laguna Point to Latigo Point ASBS. No discharges of pollutants into coastal waters are expected during construction at the Central and West revetments; therefore, there would be no effects to the ASBS.

The project areas are also located within the 100-year floodplain of Calleguas Creek; therefore there is the potential to impacts to the floodplain. Those impacts would be reduced as would any effects to the marine waters through implementation of standard construction Best Management Practices (BMPs); a construction National Pollutant Discharge Elimination System (NPDES) permit; a construction Storm Water Pollution Protection Plan; Erosion Control Plans and the use of catch devices and sheeting are designed to minimize water quality degradation. The project would not affect the current on-site or off-site drainage or any existing drainage structures nor require modification of existing drainage structures.

Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC) are designated for Pacific Coast Groundfish and Coastal Pelagic Species in the nearshore marine and estuarine habitats at NBVC Point Mugu. Impacts to EFH and HAPC are similar to those for the intertidal zone such as increased turbidity during construction.

Therefore, there would be no effect to the biological productivity, water quality, or the marine environment.

**Land Resources (CRPMP Section 30240 *et seq.*)**

NBVC Point Mugu consists of a developed area, dominated by non-native vegetation, and a large salt marsh estuary and beach that supports a variety of native plants and wildlife, including special status species. The project area is primarily located along the south to southwest facing beach encompassing developed areas, and the degraded beach and coastal dune system extending to the end of West revetment. Special status bird species that may occur within the project area include: light-footed Ridgway's rail, California least tern, and western snowy plover, all listed on the Federal Endangered Species list. Other birds with a special status are: Belding's savannah sparrow (state endangered list) and California brown pelican (delisted by federal and state as endangered but still designated as Fully Protected Species in CA. The only marine mammals with the potential to occur at the project sites are California sea lions, harbor seals, and Northern elephant seals because of their tendency to haul out on the beaches on base.

Impacts to federally listed species will be addressed using the Programmatic Biological Opinion (PBO 1-8-99-F-24) for NBVC Point Mugu. The listed bird species may be disturbed by noise and visual stimuli during the project construction activity. Individuals would be expected to move away from the project area and therefore would not be exposed to noise levels that would cause hearing damage or loss or suffer risk of injury due to equipment strikes. However the visual and noise disturbances could cause disruption of foraging behaviors and nest loss as a result of abandonment or increased predation. The impacts would be avoided by the implementation of Environmental Protective Measures required within the PBO such as scheduling construction to avoid nesting periods and if construction cannot be avoided during these times, a qualified biologist would conduct weekly surveys for the presence of active nests. If active nests are found within 300 feet, construction would be postponed until nesting is complete and no evidence of new nesting activity.

Impacts to vegetation (other than wetlands which are discussed in the Marine Environment section) would occur with the extension of the West revetment resulting in the loss of approximately 0.18 acres of sparsely vegetated upper beach and dune habitat. These impacts would be offset by the restoration and revegetation of dunes down-coast from the West revetment. The sand dune replenishment area would be partially restored and planted with native dune vegetation while non-native vegetation would be removed.

Impacts to marine mammals are limited to airborne noise from construction activities and temporary loss of haul-out habitat on sandy beaches seaward of the revetments and temporarily adjacent to the revetments when construction equipment is present. The pinnipeds are not known to use the beaches for pupping. Harbor seals are the most abundant of three pinnepeds at NBVC Point Mugu but they prefer the more protected Mugu Lagoon over the coastal beach habitat which is directly exposed to waves and wind from the Pacific Ocean. The other two pinnepeds prefer the coastal beaches however they are less abundant than the seals. Temporary loss of haul-out habitat in the project area would occur but once construction is complete, there would be no appreciable net loss of haul-out habitat. In the meantime, the majority of beaches along the NBVC Point Mugu shoreline would remain undisturbed and available to the marine mammals. If a behavioral response to construction noise were to occur, the effect on the animal would be temporary and minimal with no long-term to the individual or the population of either marine mammal.

There are no known archeological or historical resources within the vicinity of the area of potential effect defined for the project. If any sensitive cultural resources are encountered during revetment repair and expansion or the beach road repair, construction would be suspended until an archeologist could determine the significance of the encountered resource(s).

Therefore, there would be no effects to land resources as a result of the proposed projects.

**Development (CRPMP Section 30250 *et seq.*)**

Scenic and Visual Quality. The proposed project is primarily located along the shoreline of a military installation with controlled access. The repairs and enhancements to existing shoreline protection structures would not appreciably alter the visual quality of the area. Sand dune replenishment and dune recontouring would not be noticeable to the casual observer. And relocation of the airfield lighting equipment into a new building or into an existing building within a developed area would be consistent with the surrounding visual character. Due to the restricted access of the project areas inside an active military installation, these activities are not subject to high-volume close-proximity public viewing nor would the project block or hinder public views of coastal resources. During construction activities, there would be temporary visual impacts though the impact would be minimal since there are fewer viewers in the area. Overall, the visual landscape would not appear to have changed once the construction is complete.

Air Quality. Project emissions would not exceed annual conformity de minimis thresholds identified for the South Central Coast Air Basin. Additionally, annual project construction emissions would not be regionally significant in the air basin, as they would be substantially less than 10 percent of the applicable conformity-related emissions limits estimated by the South Central Coast Air Basin. The Proposed Action would conform to the State Implementation Plan and would not trigger a Conformity Determination under the Clean Air Act, as amended. Therefore, the Proposed Action would have no effects to coastal resources related to air quality.

Therefore, there would be no effect to the visual, scenic, or air quality of coastal resources.

**CONCLUSION**

In accordance with the Federal CZMA of 1972, as amended, Section 307 (c)(1), the Coastal Consistency Negative Determination demonstrates that the proposed project would be undertaken in a manner as to not affect coastal uses or resources.

The Navy respectfully requests your concurrence. If you need additional information, or if you have any questions, please do not hesitate to contact Ms. Deb McKay at 619-532-2284 or email at deborah.mckay@navy.mil.

**Figure 1 - Area Map**

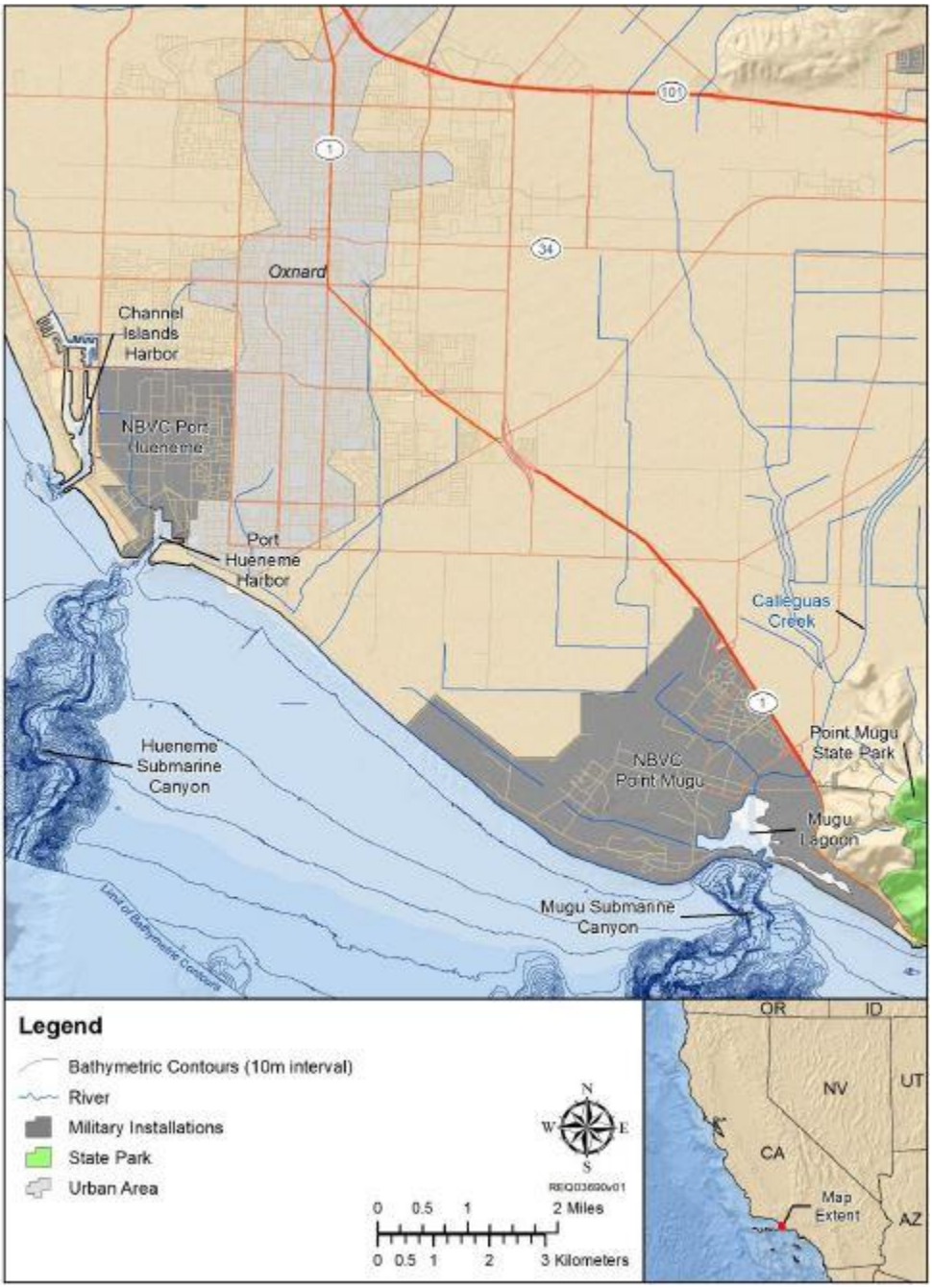


**Figure 2 - Site Map of Shoreline Protection Structures**

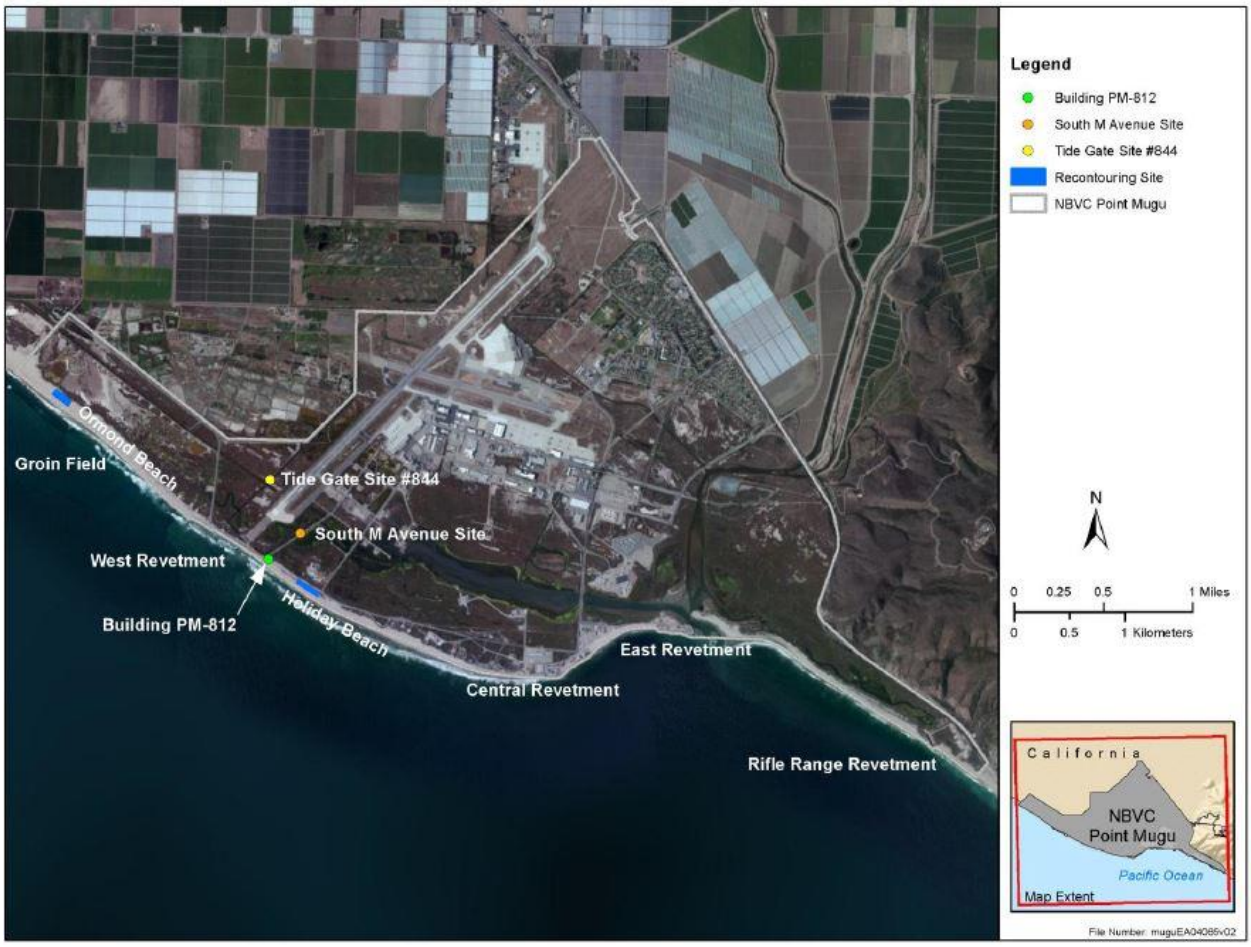
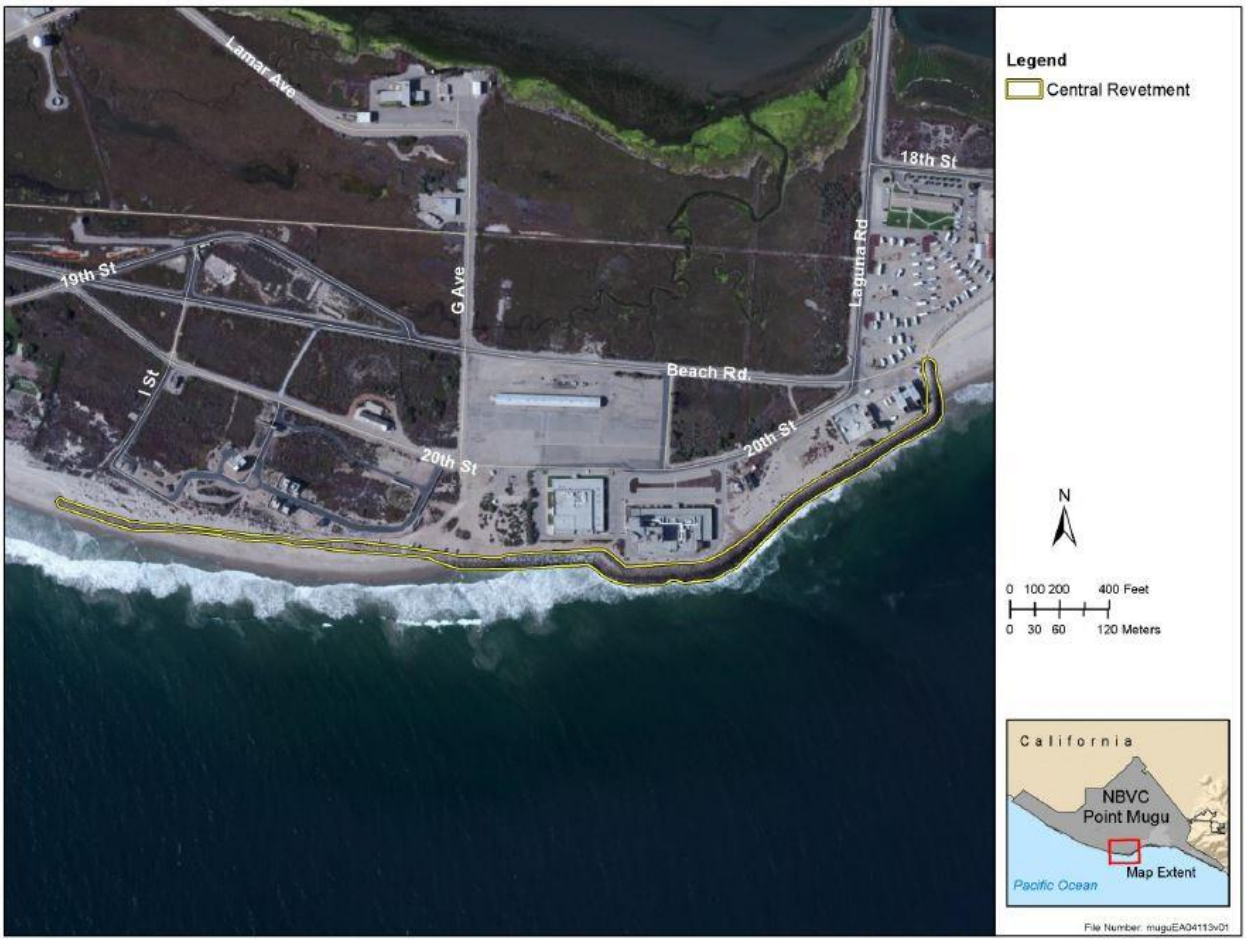


**Figure 3 - Table of Shoreline Protection History at NBVC Point Mugu**

| Timeframe | Event Description |
|---|---|
| Pre 1938 | Natural shoreline condition. Shoreline from Point Hueneme to Mugu Rock was essentially stable (Herron and Harris, 1966). |
| 1938–1939 | Arrowhead jetties constructed at Port Hueneme, west jetty extended to head of Port Hueneme Submarine Canyon. 2,600,000 cubic yards (yd.$^3$) of material placed on down-coast (i.e., Hueneme Beach). |
| 1938+ | Up-coast beach advanced as sand built up against west jetty at Port Hueneme; down-coast retreated approximately 700 feet (ft.) from 1938 to 1948. |
| Mid 1950s | Erosion extended 8 miles down-coast to Naval Base Ventura County (NBVC) Point Mugu; emergency 500,000 yd.$^3$ beach fill placed to protect ammunition bunkers. |
| 1960 | Channel Islands Harbor constructed; 6,200,000 yd.$^3$ of sand placed on Hueneme and Ormond Beaches. |
| 1960+ | United States Army Corps of Engineers Sand Bypassing program at Channel Islands Harbor begins. |
| 1964 | Rifle Range Revetment was constructed. |
| 1967 | Three groins constructed by Navy to protect access road at NBVC Point Mugu. |
| 1967+ | West seawall constructed by Navy to protect access road at NBVC Point Mugu. |
| 1966–1968 | Navy constructed Central Revetment to protect research facilities and East Revetment to protect recreational facilities on the northwest side of Mugu Lagoon. Revetments were constructed under an emergency basis. |
| 1983 | Rifle Range, East and Central Revetments damaged during winter storms. Emergency repairs made to East and Central Revetments. |
| 1987 | North Rifle Range abandoned. Repairs to the remaining Rifle Range included sheet-pile and metal pontoon retaining walls along with a support dike. |
| 1988 | East and Central Revetments severely damaged; subsequent emergency repairs made. |
| Nov 1992 | East Revetment damaged (most damage occurred west of pier) and subsequently repaired. |
| 1994–1995 | East Revetment failed, recreational pier was destroyed. Most damage occurred at west end of revetment. |
| 1997 | Almost half of the East Revetment was removed and landward infrastructure relocated or removed. Western flank of East Revetment also re-established. |
| 1997 | Approximately 950 ft. of the Central Revetment was improved by adding outer layer of 6-ton armor stone along the central portion of the revetment and extending the toe 20-40 ft. seaward. |
| 1998–1999 | Central Revetment improvements to increase height, extend toe, and add outer layer of armor stone. |
| 2002 | Stone was added (capped) to the west end of the Central Revetment (west of Building PM-761). |
| 2009–2010 | The east end of the West Revetment was extended 100 ft. |

**Figure 4 - Aerial of Central Revetment & Section of Proposed Repair**



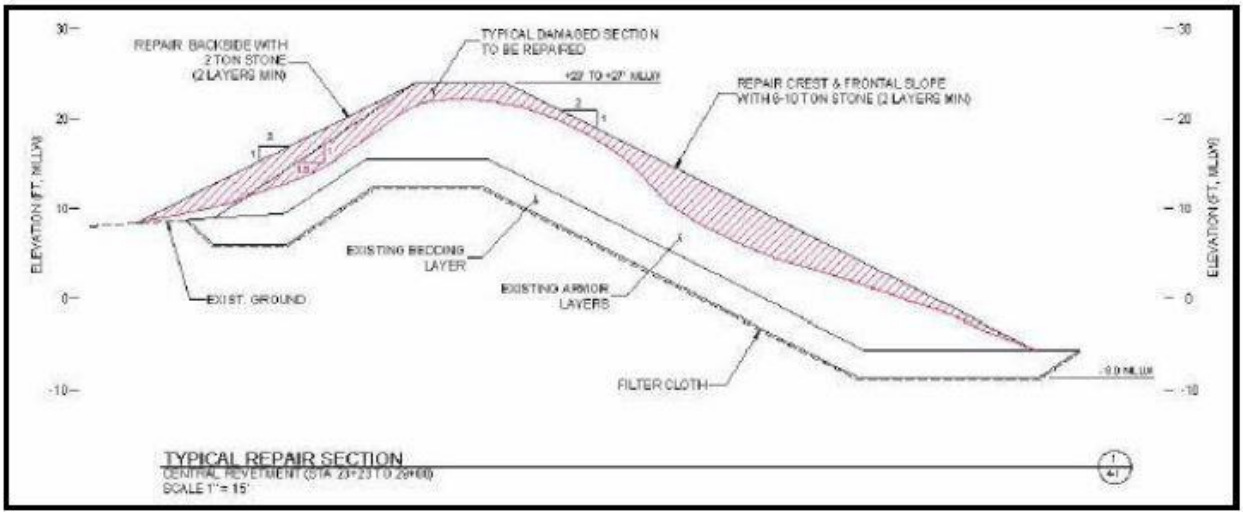
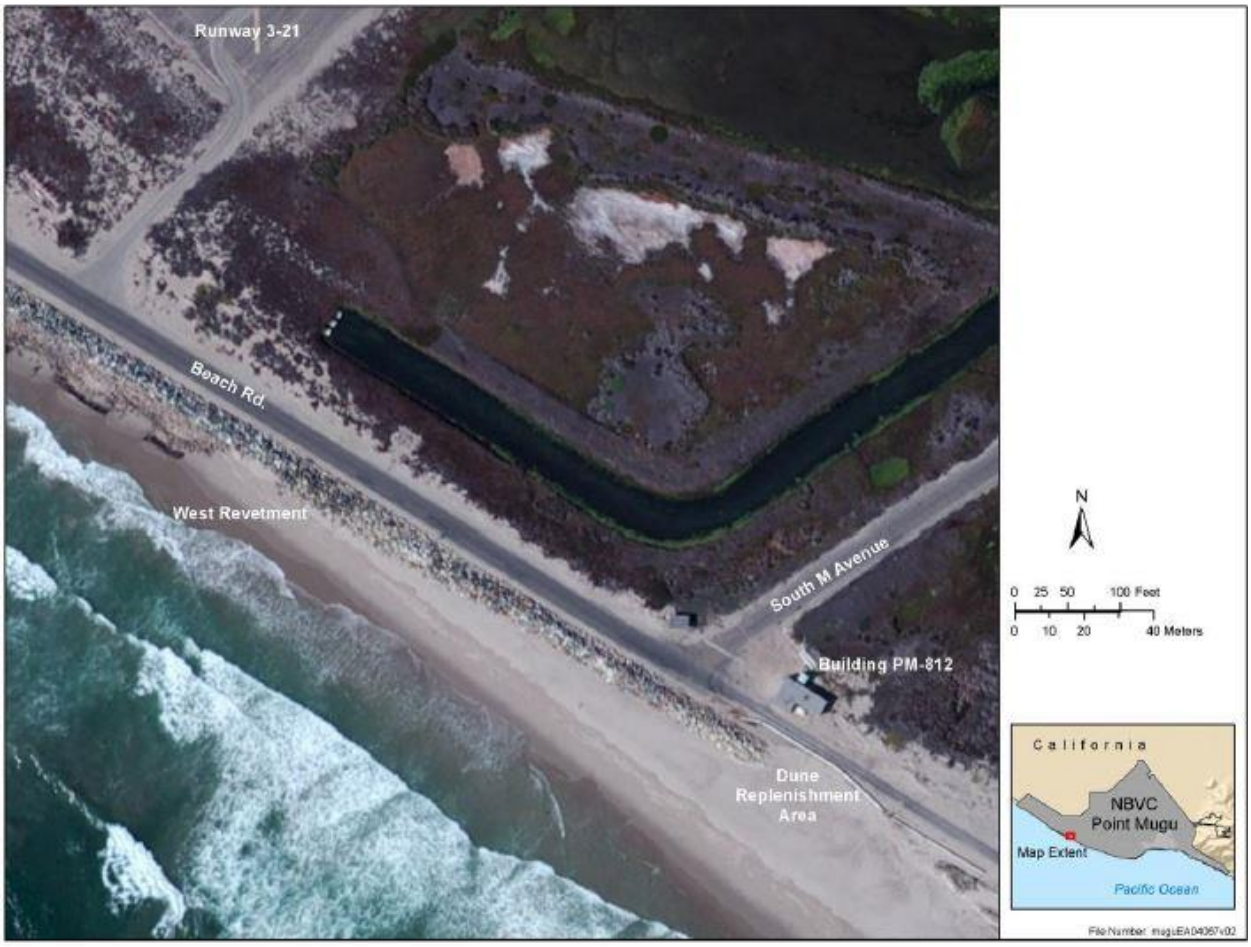



**Figure 5 - Aerial of West Revetment and Section of Proposed Extension**



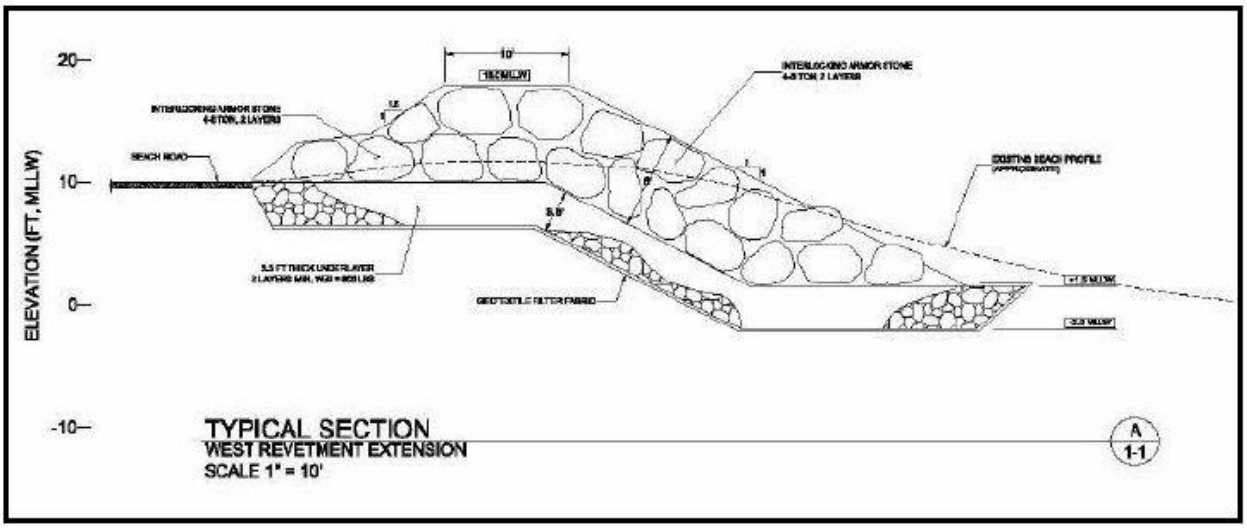



**Figure 6 - Existing Site of Airfield Lighting Equipment & Storm Damage Photo**

**Figure 7 - Proposed Relocation Sites**

**Figure 8 – Dune Recontouring Sites**

# APPENDIX D: PROGRAMMATIC BIOLOGICAL OPINION

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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:
08EVEN00-2015-F-0074

September 25, 2015

C. D. Janke
Captain, U.S. Navy
Naval Base Ventura County
311 Main Road, Suite 1
Point Mugu, California 93042

Subject: Reinitiation of Formal Consultation on the Programmatic Biological Opinion for Ongoing Operations at Naval Base Ventura County, Point Mugu, Ventura County, California (8-8-15-F-5R)

Dear Captain Janke:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the modified project description of ongoing activities at the Naval Base Ventura County Point Mugu (Point Mugu), and their effects on the federally endangered salt marsh bird's-beak (*Cordylanthus maritimus ssp. maritimus*), California least tern (*Sterna albifrons browni*), and light-footed clapper rail (*Rallus longirostris levipes*), and the federally threatened western snowy plover (*Charadrius nivosus nivosus*), in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). We received your October 14, 2014 request for reinitiation of formal consultation on October 24, 2014.

This biological opinion will supersede the previous programmatic biological opinion for ongoing operations at Naval Base Ventura County Point Mugu (1-8-99-F-24). The Navy requested re-initiation of formal consultation after proposing a new activity and modifications to several other activities; all other activities covered under the original programmatic biological opinion are incorporated herein. The Navy determined that the proposed actions will have no effect on least Bell's vireo (*Vireo bellii pusillus*) or tidewater goby (*Eucyclogobius newberryi*).

We have based our biological opinion on information that accompanied your October 14, 2014 request for reinitiation of consultation, including the revised biological assessment (Navy 2014) and other information contained in our files. We can make available a complete record of this consultation at the Ventura Fish and Wildlife Office.

The light-footed clapper rail is included in a complex of the genus *Rallus* that recently underwent taxonomic revision. Based on their analysis of the genetics of the clapper rail (*R. longirostris*) and the closely related king rail (*R. elegans*), Maley and Brumfield (2013) concluded that the 21 recognized subspecies of *R. longirostris* actually comprise 3 distinct species; Ridgway's rail (*R. obsoletus*), mangrove rail (*R. longirostris*), and clapper rail (*R. crepitans*). The light-footed clapper rail, as listed by

the Service as an endangered species, would be subsumed under the Ridgway's rail along with 3 other formerly recognized subspecies. For our purposes, the currently listed taxon is still the light-footed clapper rail (*Rallus longirostris levipes*). Until the Service formally recognizes the taxonomic changes and rectifies the status of the new species that includes the light-footed clapper rail as Ridgway's rail, we must continue to analyze the species as it was listed.

**Consultation History**

On June 6, 2001 the Service issued a programmatic biological opinion to the Navy for ongoing and proposed future activities at Point Mugu (Service 2001). Since issuing the biological opinion, the Navy has provided the Service with annual reports documenting impacts to listed species as a result of the covered activities and the Navy's response to such impacts as well as any monitoring, mitigation, or research activities that were implemented in association with the biological opinion.

On October 14, 2014, the Navy requested reinitiation of formal consultation to update changes in listed species presence and status, as well as changes in Point Mugu's mission, mission support, and natural resource activities. The Navy determined the proposed project was not likely to adversely affect the salt marsh bird's-beak because their populations are flagged for avoidance and only a small potential exists for impacts from falling jet assisted take-off bottles or trampling of plants from the few activities requiring access to the habitat where salt marsh bird's-beak occurs. On June 24, 2015, our staffs discussed including salt marsh bird's-beak in the consultation due to the potential for adverse effects from ongoing activities in the future.

## BIOLOGICAL OPINION

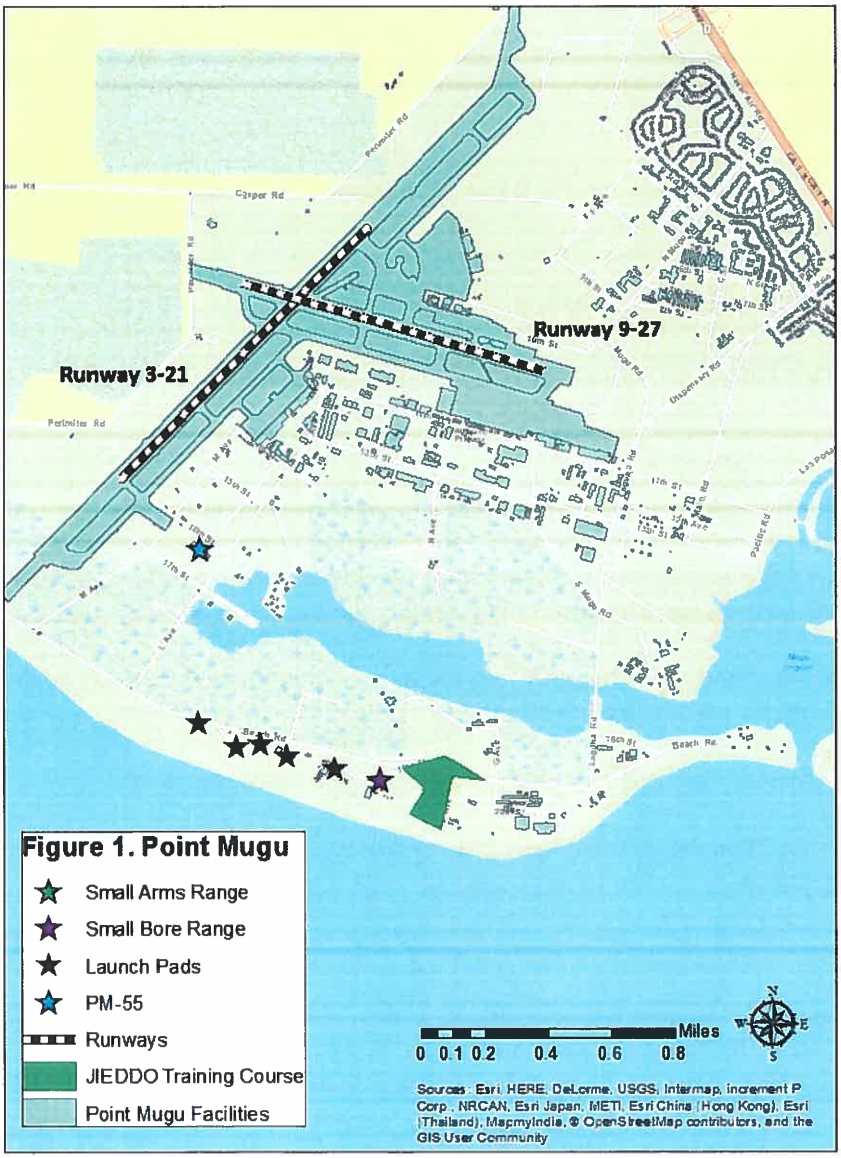
### DESCRIPTION OF THE PROPOSED ACTIONS

Point Mugu supports a variety of defense-related activities in close proximity to habitats that support several listed species. Point Mugu comprises 4,490 acres on the coast of southern California, eight miles southeast of Port Hueneme, California (Figure 1). The base supports approximately 2,200 acres of jurisdictional delineated wetlands, including the largest functioning salt marsh in coastal southern California. Mugu Lagoon, an estuarine coastal salt marsh, provides food, nesting, sheltering, breeding, and nursery habitat for numerous invertebrate, fish, bird, and plant species. Freshwater inflow comes primarily from Calleguas Creek, supplemented by several drains and sloughs that collect runoff from agricultural and urban uses upstream.

The Navy proposes to modify beach missile launches, waterfowl hunting, Explosive Ordnance Disposal, federal, state, and county training operations, and introduce a new Joint Improvised Explosive Device Defeat Organization training program; the Navy is not proposing changes to other ongoing and existing activities. Activities that the Navy is not proposing to add or modify are indicated below by "existing" next to the activity and are not changing from the original programmatic biological opinion (Service 2001); consequently, we do not anticipate the effects of these activities will be different than those from the original biological opinion.

The following paragraphs describe new, modified, and existing activities that the Navy has determined are having, or are expected to have, effects on listed species, and associated avoidance and conservation

measures intended to minimize the effect of the proposed actions on salt marsh bird's-beak, California least terns, light-footed clapper rails, and western snowy plovers. In the biological assessment (2014), the Navy states that there may be cases where some of the measures proposed in the following sections would not be implemented if the Navy determines they are infeasible or not possible. The biological assessment contains additional information on the proposed activities. Figure 1 depicts the various features and facilities at Point Mugu.



Joint Improvised Explosive Device Defeat Organization Training (new)

The Joint Improvised Explosive Device Defeat Organization (JIEDDO) training course focuses on roadside explosive device training, as troops survey the area for improved explosive devices. This involves foot and vehicle traffic along roads, with some troops carrying firearms and at times discharging blanks. The training period varies, with two weeks of training each month throughout the year.

The Navy proposes to implement the following measures to minimize the effects of the JIEDDO training on federally listed species:

1. If a light-footed clapper rail nest is within 300 feet of the training area, the Navy will ensure any activities that may generate loud sounds within 300 feet of the nest will be avoided or minimized; and

2. Navy environmental personnel will survey to locate active listed species nests to ensure measures are followed.

Explosive Ordnance Disposal (modified)

Explosive Ordnance Disposal operations currently take place at Naval Weapons Station China Lake; however, if ordnance is found at Point Mugu that cannot be safely transported to China Lake, it must be detonated at Point Mugu. The location proposed for disposing of ordnance is a four-sided berm that is located directly behind the small bore range, unless ordnance is too dangerous to move to that location. Detonations previously occurred within a 3-sided concrete structure at Point Mugu and produced noises ranging from 64 to 105 decibels at 1,000 feet. Point Mugu anticipates an average of one disposal event occurring annually. Western snowy plovers nest in the immediate area, with California least terns and light-footed clapper rails present in surrounding areas.

The Navy proposes to implement the following measures to minimize the effects of the explosive ordnance disposal on federally listed species:

1. The Navy will use the minimal charge required to detonate ordnance;

2. The Navy will conduct detonations close together so birds are not displaced from preferred sites for long periods;

3. The Navy will use alternate locations for ordnance detonation away from listed species; and

4. The Navy will conduct nest monitoring to assess locations and avoid the nests nearest to the disposal site. The Navy will also monitor the nests nearest to the site to document any adverse effects should they occur. The results of nest monitoring may help to determine if any other conservation measures or management can be implemented to help aid in minimizing effects associated with explosive ordnance disposal.

Federal, State, and County Training Operations (modified)

The Navy occasionally provides emergency management training for Naval Base Ventura County personnel and Point Mugu is also a training location for other Navy programs, military, federal, state, or local entities. This training may involve multi-agency task forces to simulate events such as panga landings, terrorist threats, rescue operations, natural disasters, or other emergency situations. The activities vary significantly, but usually involve multiple personnel, vehicles, and foot traffic. At times, these activities may also involve helicopter support, boat activity, and beach landings. Helicopter sounds can average 87 decibels at 500 feet to 78 decibels at 1,000 feet. For perspective, normal conversation is approximately 60 decibels, a loud factory is approximately 80 decibels, and noise levels of 120 decibels are painful to human perception. On average, two to four of these training events occur each year. In the past, these activities have occurred on Family Beach and outside of sensitive breeding areas for listed species; however, future operations may require trainings to occur at other areas throughout the installation when conditions in less sensitive areas do not meet the training goals, including areas adjacent to western snowy plover, California least tern, and light-footed clapper rail habitat.

The Navy proposes to implement the following measures to minimize the effects of emergency management training for Navy, military, federal, state, or local entities on federally listed species:

1. The Navy will center activities at Family Beach and the JIEDDO training area to avoid listed species habitats;

2. The Navy will restrict ground-based activity on the beach or marsh if a listed species is nesting within 500 feet with an unobstructed view of the activity;

3. The Navy will not conduct ground-based activity that generates high sound levels due to detonations or firearms within 500 feet of an active nest;

4. The Navy will not land or hover helicopters within 1,000 feet of an active listed species nest on the beach or marsh; and

5. Navy environmental personnel will survey to locate active listed species nests to ensure measures are followed.

Missile Launches (existing)

The Navy fires missiles from Building PM-55 which is located just north of the Mugu Lagoon. The majority of launches entail jet assisted take-off bottles to assist the launch of missiles and are discarded 1 to 2 seconds after the missile is airborne. These bottles primarily fall into the wetland immediately in front of the launch pad (the drop zone) and may fall into habitat supporting listed species. The Navy launches 50 to 70 missiles (approximately 12 feet long) and 1 to 10 larger missiles annually from Building PM-55. Noise levels from the launches vary by drone and missile type. Noise durations at Building PM-55 range from 0.56 seconds to 27 seconds and peak noise levels range from 161 decibels at 50 feet to 115 decibels at 3,000 feet. On rare occasions missiles have crashed in the marsh, sometimes

resulting in small fires, and require immediate access for retrieval of the missile. The Navy has documented western snowy plovers, California least terns, and light-footed clapper rails nesting within the drop zone.

The Navy proposes to implement the following measures to minimize the effects of missile launches on federally listed species:

1. The Navy will restrict foot access into the area between M Street and South G Street. The Environmental Division office will coordinate access into launch areas during non-emergency situations;

2. The Navy will remove jet assisted take-off bottles from the marsh; and

3. The Navy will remove jet assisted take-off bottles outside of the nesting season.

The Navy proposes to implement the following conservation measures to aid the recovery and conservation of federally listed species affected by missile launches:

1. The Navy will manage predators within the launch area to aid listed species recovery;

2. The Navy will manage invasive plants within the launch area to restore or maintain listed species habitat; and

3. The Navy will conduct nest and population monitoring to assess status of species and determine ways to avoid, or reduce any impacts from operations. The Navy may also use surveys to determine if any other conservation measures or management can be implemented to help aid in recovery.

<u>Beach Missile Launch Operations and Associated Activities (modified)</u>

In addition to the launches described above from Building PM-55, the Navy launches missiles from operational pads located adjacent to the beach. At times, additional equipment to support launches is placed on adjacent operational areas or the beach itself. In the original biological opinion (Service 2001), launch operations only occurred from Pad Bravo. In 2003, the Service amended the biological opinion at the Navy's request to add Pad Charlie; Pad Alpha and Nike Zeus launch operations are covered under the Countermeasures biological opinion (Service 2014a). Under the modified project description, the Navy proposes to add Nike Zeus Sister Site as an operational pad for launch operations and launch-related activities. Addition of this site would not increase the number or frequency of launches, but merely provide an alternative location. Currently, the Navy launches 1 to 4 missiles from the beach launch pads each year. The Navy may use jet assisted take-off bottles during launch activities from the beach pads; however, the Navy estimates the fall out area for approximately 95 percent of these bottles will occur in the near shore ocean environment. Noise levels resulting from these launches are similar to those described above for missile launches occurring at Building PM-55.

These beach launch pads are located directly inland of sandy beach habitat, which is habitat that supports known nesting locations for the western snowy plover and California least terns. Other activities linked

to missile launches may occur on or very close to the sandy beach habitat. These operations usually involve radar tracking, camera set-up, and installation of meteorological equipment in areas immediately adjacent to or, when required, within western snowy plover and least tern breeding habitat.

The Navy proposes to implement the following measures to minimize the effects of beach missile launch operations and associated activities on federally listed species:

1. If a listed species nest is on or in close proximity (within 500 feet) to the launch, the Navy will utilize a different site;

2. The Navy will not allow operational personnel on the beach year-round unless authorized or escorted by Natural Resource personnel; and

3. Natural Resource personnel will coordinate placement of equipment on the beach to minimize any impacts to nesting birds and ensure equipment is a minimum of 100 feet away from active nests.

The Navy proposes to implement the following conservation measures to aid the recovery and conservation of federally listed species affected by beach missile launch operations and associated activities:

1. The Navy will manage predators on beach nesting habitat to aid listed species recovery;

2. The Navy will remove invasive plants from beach habitat to restore and maintain the areas for listed species;

3. The Navy will close some beaches year-round to reduce additional disturbance to listed species; and

4. The Navy will conduct nest and population monitoring to assess the status of species and determine ways to avoid or reduce any impacts from operations. The Navy may also use surveys to help determine if any other conservation measures or management can be implemented to aid in recovery.

<u>Tracking Equipment (existing)</u>

Operations involved with tracking equipment consist of radar and aircraft tracking devices, cameras, and meteorological equipment placed on operational areas and pads adjacent to beach or on sand beach habitat to support various military testing (not related to missile launches). The Navy uses tracking equipment approximately 5 to 10 times on operational pads and 1 to 3 times on adjacent beaches annually. Personnel typically set up the equipment and leave; therefore, disturbance usually occurs only during set up, maintenance visits, and equipment removal. Western snowy plovers have nested on the Bravo launch pad since 2008; California least terns also nest on beaches adjacent to the launch pads.

The Navy proposes to implement the following measures to minimize the effects of tracking equipment on federally listed species:

1. If an active nest is on an operation pad/area, the Navy will select a different pad location for the placement of tracking equipment;

2. If equipment is required to be on the beach, the Navy will place the equipment a minimum of 100 feet from active nests;

3. If equipment on the beach requires personnel continually at or visiting the site, the Navy will place equipment a minimum of 300 feet from active nests;

4. If beach equipment is in place longer than a week, the Navy will place spike stripping on equipment as needed if it acts as a perch for raptors;

5. The Navy will prohibit operational personnel from entering the beach unless authorized, or at times escorted by, Natural Resource personnel; and

6. The Navy will conduct bi-weekly nest monitoring to assess the location of active nests to reduce and/or avoid impacts from placing equipment.

Aircraft Operations and Support (existing)

Point Mugu supports nearly every type of aircraft in the Department of Defense aircraft inventory; other agencies such as the Federal Bureau of Investigation and the U.S. Coast Guard also operate out of Point Mugu. Aircraft at Point Mugu consist of propeller and jet aircraft, as well as rotorcraft. Sounds of aircraft range from 65 to 70 decibels during flyovers, and on approach and take-off the sound of jets can reach up to 140 decibels at 25 feet. Air operations also include fleet-supported unmanned aerial vehicles, such as VX-30's and Fire Scout, which can vary in size from hobby-model size to full size aircraft; the Navy does not anticipate any impacts to listed species as a result of the addition of Fire Scout to air operations.

The Navy contracts U.S. Dept. of Agriculture Wildlife Services to support the Bird/Wildlife Air Strike Hazard (BASH) program to reduce wildlife threats on the airfield and approach area; BASH activities are covered under a separate biological opinion (Service 2014b).

Aircraft operations utilize the four runways at Point Mugu. Airfield support vehicles such as airfield maintenance, Federal Fire, and BASH team require access to the airfield to support base operations. At times, aircraft arrivals and departures fly over habitats or near habitats occupied by California least terns, western snowy plovers, and light-footed clapper rails; western snowy plovers also nest on the airfield.

The Navy proposes to implement the following measures to minimize the effects of aircraft operations and support on federally listed species:

1. Outside of take-off and landing, the Navy will keep fixed-winged and rotorcraft at or above 500 feet above ground level over all listed species habitat;

2. The Navy will instruct any aircraft transiting Point Mugu to stay above 500 feet above ground level;

3. The Navy will forward the location of any western snowy plover nests found on the airfield to appropriate personnel that drive on the airfield to avoid accidentally crushing the nest; and

4. The BASH team, in coordination with the Environmental Division, will regularly monitor for the presence of western snowy plovers to ascertain whether the birds are nesting on the airfield. If nests are found, the BASH team will forward the location to appropriate personnel that drive on the airfield to avoid accidentally crushing the nest.

Air Show (existing)

Point Mugu air shows are held at various times throughout the year; the most recent occurred in August of 2010 and an air show is planned for September of 2015. On average, Point Mugu air shows occur once every few years, but may be held annually. The Point Mugu Air Show uses Runway 3-21 and includes several low and loud over-flights over a three-day period by a variety of aircraft and rotorcraft; bombing and strafing demonstration activities are usually included. The air show also includes ground-based, jet-powered vehicles which produce high noise levels.

The Navy proposes to implement the following measures to minimize the effects of air shows on federally listed species:

1. The Environmental Division will screen any new air show activities for potential impacts to listed species and discuss with air operations and the Ventura Fish and Wildlife Office ways to reduce those impacts, if and when possible;

2. The Navy will keep the air show activity centered 700 to 1,000 feet north of the runway 9-27 and 3-21 intersections;

3. Jet-powered ground vehicles will begin on Runway 3-21 and travel south to reduce sound intrusion into light-footed clapper rail habitat;

4. During the air show, the Navy will restrict strafing to the west side of runway 3-21 in grassland areas to stay further away from listed species habitats; and

5. The Navy will conduct biological monitoring in listed species habitats when the air show occurs during the nesting season to document any disturbance to listed species. The Navy will include the results from the monitoring in the annual programmatic report.

Infrastructure Maintenance and Development (existing)

The Public Works Department and contractors repair and maintain infrastructure such as roads, facilities, culverts, seawalls, and utilities. Other projects may include adding additional infrastructure such as new utility lines, culverts, roads, extending and enforcing seawalls, and other infrastructure. These projects may involve heavy equipment and various levels of activity. The majority of these activities occur outside of sensitive areas and occur in the developed areas of the base, but maintenance and development has the potential to occur in or near listed species habitat. The Navy estimates 3 to 5 maintenance

projects and 1 project that involves adding to existing infrastructure may occur per year in or adjacent to western snowy plover, California least tern, and light-footed clapper rail habitats.

The Navy proposes to implement the following measures to minimize the effects of infrastructure maintenance and development on federally listed species:

1. The Navy will submit projects to the Project Review Board to determine how to avoid or reduce impacts to listed species;

2. A biologist will monitor any activities occurring in sensitive areas to ensure measures required to reduce disturbance are followed;

3. Where possible, the Navy will place overhead utilities underground or reroute them within listed species habitat to avoid collisions;

4. The Navy will maintain road speeds to a maximum of 25 miles per hour in sensitive areas;

5. The Navy will maintain stop signs at culvert crossing locations along Ditch Road, L Street, and M Street to reduce injury or mortality of listed species due to project vehicles;

6. The Navy will restrict maintenance or development activities if an active nest of a listed bird species is within 300 feet and view of the nest is unobstructed;

7. If a nest is within 500 feet of a project site, a biologist will monitor the birds' behavior during project activities; non-emergency projects will cease if the biologist determines potential nest loss is indicated by the bird's behavior. If the bird ceases incubation during the activity and does not return to its nest within 30 minutes, project activities will stop. During extreme heat or cold, or if winds exceed 10 miles per hour, the bird must return within 15 minutes or the project will stop;

8. The Navy will site development of new infrastructure outside of habitat for listed species;

9. The Navy will time projects near listed species outside of the nesting season; and

10. The Navy will strategically place driftwood near any nests along road shoulders that are in danger of being crushed to deter vehicles from that site.

The Navy proposes to implement the following conservation measures to aid the recovery and conservation of federally listed species affected by infrastructure maintenance and development:

1. The Navy will restore wetlands to create additional habitat for the light-footed clapper rail;

2. The Navy will remove invasive plants from western snowy plover, California least tern, and light-footed clapper rail habitat; and

3. Biologists will conduct bi-weekly nest monitoring to assess locations of active nests to ensure protective measures are followed.

Boundary Fence Maintenance (existing)

Point Mugu has two perimeter fences that are on sandy beaches. The western fence separates Point Mugu from Ormond Beach and is within western snowy plover and California least tern nesting habitat. No listed species or nesting habitat is present within the eastern fence line, which separates Point Mugu from Point Mugu State Park. The Navy periodically performs maintenance on these fences due to salt spray, wind erosion, and vandalism. At times, maintenance requires heavy equipment on the beach, as when old pilings need to be replaced. On average, the Navy performs fence maintenance every 3 to 5 years.

The Navy proposes to implement the following measures to minimize the effects of boundary fence maintenance on federally listed species:

1. The Navy will schedule repairs outside of the nesting season (March 1 to September 15);

2. Normal repairs will not occur if a nest is within 500 feet of the project site;

3. A biologist will monitor projects when repairs cannot wait until after the nesting bird season has ended;

4. When heavy equipment is operating, a biologist will monitor and cease project activity when listed species are in close proximity to the equipment; and

5. A biologist will conduct nest monitoring to assess the location of active nests to ensure protective measures are followed.

Force Protection Operations (existing)

Point Mugu Force Protection continually patrols the installation which primarily entails driving on paved roads, but also involves walking on the beach to monitor the western fence line. On average, Force Protection monitors the fence line once a day. On occasion, Force Protection must access natural areas (marsh and other beach areas) with or without dogs if trespassers are seen or reported. Force Protection may need to enter California least tern and western snowy plover nesting areas 5 to 10 times a year to detain or search for trespassers.

The Navy proposes to implement the following measures to minimize the effects of force protection operations on federally listed species:

1. The Navy will educate officers on the status of listed species on the base and associated beach closures;

2. When Navy biologists observe and call in trespassers in nesting areas to Force Protection, biologists will provide an access route to Force Protection that may reduce potential trampling of nests;

3. The Navy will provide Force Protection officers with a PowerPoint presentation with pictures of western snowy plover and California least tern nests to reduce the potential of trampling nests;

4. Biologists will flag a nest-free beach access corridor for officers to do regular searches for trespassers along the western fence-line;

5. The western fence-line will be maintained to reduce trespassing and reduce the need to move further into sensitive areas;

6. Road speeds will be a maximum of 25 miles per hour in sensitive areas;

7. The Navy will maintain stop signs at culvert crossing locations along Ditch Road, L Street, and M Street to reduce the injury or mortality of listed species due to strikes by patrol and other vehicles;

8. The Navy will place warning signs and cones along roads where California least tern chicks are observed to alert drivers to slow down and watch for and avoid the chicks if they are on the road;

9. Biologists will conduct bi-weekly nest monitoring to assess the location of active nests to help reduce and/or avoid impacts of Force Protection officers accessing the beaches; and

10. Navy biologists will enter nesting areas after trespassers are apprehended and out of the area to determine if any adverse impacts to active nests occurred.

Firing Ranges (existing)

As part of ongoing training requirements, personnel need to have firearms qualification per Navy regulations. Weapons for use at the small-bore range are most commonly 9 millimeters, 0.38 caliber, and 12 gauge shotguns. The small-bore range and 1st Naval Construction Group small arms range is usually operational from 2 to 5 days per week for 4 to 5 hours per day, with on average one night per month. These sites are adjacent to sandy beach habitat occupied by western snowy plovers. The Navy previously closed the small bore range during western snowy plover nesting season, but opened it year-round in 2005 after the range was modified to meet the requirements in the previous biological opinion (1-8-99-F-24); the small arms range is located approximately 2 miles southeast of Mugu Lagoon.

The Navy proposes to implement the following measures to minimize the effects of fire ranges on federally listed species:

1. The Navy will operate ranges for the sole purpose of training or qualifying Navy and other federal, state, or other non-federal agencies and not for recreational purposes; and

2. Biologists will conduct nest monitoring to assess the location of active nests to monitor impacts from range activity.

Pest Management (existing)

Pest management activities include roadside weed control, weed control in landscaped and operational areas, aquatic weed control in drainage ditches, mosquito control, and pest control in industrial and residential areas. A variety of trapping methods, herbicides, and pesticides are used to carry out these

activities. Application of chemicals and biological controls is performed by a licensed pest control applicator under the direction of the Facility Support Contracts office and Navy Environmental Division representative. Mosquito control occurs in marsh habitats occupied by clapper rail and salt marsh bird's-beak and areas adjacent to western snowy plover and California least tern habitats.

The Navy proposes to implement the following measures to minimize the effects of pest management on federally listed species:

1. The Navy will implement an Integrated Pest Management approach to reduce the need to access sensitive areas and reduce herbicide use;

2. The Navy will not spray herbicides in areas where salt marsh bird's-beak is close to roadsides;

3. To reduce disturbance to listed species, the Navy will not use low-flying helicopters to disperse larvicide for mosquito control;

4. The Navy will educate pesticide applicators on listed species and protective measures; and

5. The Natural Resource Department will coordinate with pesticide applicators when they must access habitat occupied by listed species for mosquito control during the nesting season to ensure a biologist escorts applicators if they are treating within 500 feet of active nesting areas.

<u>Recreation (existing)</u>

*Skeet Shooting (existing)*

The Skeet and Trap range is located on the coast, at the eastern end of the western snowy plover nesting areas. The range is currently inactive and the Navy is unsure if or when it may re-open; however, for the purposes of this biological opinion, we will include it as a future continued activity. Historically, the range was operational two to three days a week; frequency of use is not anticipated to change. Skeet and trap shooting sports consist of firing shotguns at airborne clay targets. The noise may be loud and clay pigeons sometimes fall onto the beach zone.

*Beach Use (existing)*

Family Beach and Surfer's Beach are the two beaches used for recreation at Point Mugu. Activities include sunbathing, fishing, surfing, and other typical beach activities. Western snowy plovers can be found roosting on Family Beach during the winter. During most of the year, Surfer's Beach has little to no upper beach, with tidal waters inundating the beach all the way to the seawall.

The Navy proposes to implement the following measures to minimize the effects of beach use on federally listed species:

1. All dogs must be kept on a leash;

2. Only Family Beach and Surfer's Beach will be open to recreation; and

3. The Navy will educate visitors with brochures and signs describing listed species, where they occur, their sensitivity, and avoidance measures.

*Special Events (existing)*

Special recreational events occur throughout the year, although not as regularly as other recreational activities. These special events include triathlons, running, and cycling events that may take place immediately adjacent to listed species habitat. On average, these events occur once a year and at times involve routes along Beach Road. An annual triathlon began in 2006, for which the effects to listed species and protective measures were documented in letters in 2006 and 2007 seeking the Service's concurrence that the effects would not be adverse. We concurred with your determinations in letters dated May 11, 2006, and May 10, 2007.

The Navy proposes to implement the following measures to minimize the effects of special events on federally listed species:

1. Biologists will survey roads to locate any active nests close to the road shoulder;

2. The Navy will provide information to athletes on listed species and avoidance measures;

3. Biologists will be present during race events if there is a potential for disturbance to nesting listed species;

4. The Navy will establish a quiet zone (no cheering) to reduce disturbance during the nesting season;

5. Spectators will be excluded from sensitive areas; and

6. Race ground personnel will not be allowed within 300 feet of an active nest along the roadside.

*Waterfowl Hunting (modified)*

The Navy allows waterfowl hunting to occur on the base from October to January. Hunting is primarily confined to the far western portion of Mugu Lagoon and within the central basin of Mugu Lagoon, along Calleguas Creek. Hunting occurs on Saturdays and Sundays, and for the first hour after sunrise on Wednesdays. There are 13 hunting blinds, which are available for use by active duty, retirees, civil service, and contractors. New blinds are at times built within existing hunting areas, as well as blinds removed. The modification to this program from the original biological opinion is the Navy's proposal to resume hunting in the section between the runway and M Street. The Navy previously restricted hunting in this area to reduce disturbance to light-footed clapper rail as this area overlaps with habitat occupied by light-footed clapper rail. The Navy would now like to re-open the area to assist the Bird and Animal

Aircraft Strike Hazard Program, as hunting pressure reduces the abundance of waterfowl in this area directly adjacent to the airfield and reduces the Bird Aircraft Strike Hazard risk.

The Navy proposes to implement the following measures to minimize the effects of waterfowl hunting on federally listed species:

1. The Navy will flag Salt marsh bird's-beak in hunting areas so hunters know to avoid the plants whenever possible;

2. The Navy will educate hunters on listed species and avoidance measures;

3. The Navy will close select hunting blinds if high proportions of salt marsh bird's-beak surround the blind (if a 1 acre area immediately surrounding the blind supports more than 0.05 acre of salt marsh bird's-beak); and

4. The Environmental Division will manage the hunting program to ensure the program minimizes impacts to salt marsh bird's-beak and other listed species.

The Navy proposes to implement the following conservation measures to aid the recovery and conservation of federally listed species affected by waterfowl hunting:

1. Biologists will collect and plant seeds to establish new salt marsh bird's-beak populations;

2. The Navy will restore habitat for salt marsh bird's-beak pollinators; and

3. The Navy will control invasive plants to restore salt marsh bird's-beak habitat.

Unmanned Aircraft (existing)

The Navy utilizes a variety of types and sizes of unmanned aircraft from model-sized helicopters and planes to full-sized helicopters and planes. These aircraft consist of operational squadrons as well as support of the Naval Air Warfare Center, Weapons Division's research, development, acquisition, test and evaluation program. Larger aircraft take off from the runway and some of the smaller aircraft are able to launch from beach operational pads or other operational areas. Sound exposure can range from 74 to 118 decibels at 1,000 feet for large unmanned aircraft to well within range of ambient sound conditions (40 to 70 decibels at 500 to 1,000 feet) for smaller unmanned aircraft. The number and types of aircraft used varies based on testing requirements.

The Navy proposes to implement the following measures to minimize the effects of unmanned aircraft on federally listed species:

1. Unmanned aerial vehicles and supporting aircraft flights will be restricted to an altitude of 1,000 feet above ground level or greater. Lower altitude flights will only involve small and quiet unmanned aerial vehicles. Active western snowy plover, California least tern, and light-footed clapper rail nests and occupied pinniped rookeries during pupping/breeding seasons will not be overflown at lower than 500 feet by any unmanned aircraft.

2. Large unmanned aerial vehicles will follow established flight patterns at Point Mugu;

3. To eliminate the potential for new ground disturbance impacts, the Navy will launch and recover unmanned aerial vehicles solely on existing graded and/or paved areas including: airstrips, roadways, and pad sites. The Navy will restrict Group 3, 4, and 5 aerial vehicles (larger vehicles that require ground take-off) to any existing sites large enough to accommodate them without impacts. These aerial vehicles have redundant systems in place to prevent unplanned landings and will not be used on beach pads during sensitive bird species nesting seasons. The Navy may launch Group 1 and 2 aerial vehicles (smaller vehicles) from any existing site during sensitive bird nesting seasons, but only if no active western snowy plover, California least tern, or light-footed clapper rail nests are within 300 feet of the flight path;

4. 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 adverse effects to marine mammals, sea turtles, or birds. The Navy will follow standard range clearance procedures, 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. The Navy will conduct Unmanned Systems operations during daylight hours, when possible. Night testing will only be conducted if range scheduling prevents daylight testing or if operationally required. If night operations are required, the Navy will select a suitable location to minimize disturbance to wildlife;

6. Before a weapon (including lasers) can be fired, the Navy will require as standard procedure that no persons, wildlife, reflective surfaces, or non-target obstructions of any sort are present within the hazard area, which is specific to the type of 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 are within the nominal hazard zone identified in the Risk Hazard Assessment; and

7. The Navy will include results of biological monitoring in an annual report that will be submitted to the Service summarizing activities related to these activities.

Natural Resource Management (existing)

Natural resources management includes all activities intended to manage biological resources at Point Mugu to support the implementation of the Integrated Natural Resources Management Plan and biological opinion requirements. Population and nest monitoring are the primary activities that may impact listed species; the Navy holds a recovery permit (TE-06621) to cover disturbances associated with those activities. Habitat restoration includes chemical treatment of invasive species, restoring wetland habitat, and invasive plant control by using heavy equipment. These restoration activities are conducted during the non-nesting season or away from active nesting areas if done during nesting season.

The Navy implements a predator management program to remove nonnative predators and problematic native predators from listed species habitat. Predator control efforts occur year round; however, most management occurs during listed species nesting seasons. Species targeted for removal at Point Mugu include: feral cats, feral dogs, red fox, striped skunks, opossums, black rats, ground squirrels, coyotes, and raccoons. Avian predators such as gulls, ravens, crows, shrikes, owls, and raptors are selectively removed or relocated; the Navy holds a depredation permit (MD-117501) to cover these activities. The Navy accomplishes removal by shooting, lethal trapping, or trapping and relocating. Efforts are made to target predators that are present in nesting areas, as well as adjacent or outlying areas, and not random removal of predators that may not be affecting listed species. Discharging firearms and setting and maintaining traps can disturb western snowy plovers, California least terns, and light-footed clapper rails.

The Navy proposes to implement the following measures to minimize the effects of natural resource management on federally listed species:

1. The Navy will schedule invasive plant removal and wetland restoration outside of the nesting season in active nesting areas;

2. The predator manager will have experience with locating nests and will be informed about all current nesting areas to avoid accidental crushing of nests;

3. No firearms will be discharged if a listed species is potentially in harm's way; and

4. The Navy will place any predator traps an appropriate distance away from active nests to avoid impacts.

## ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATIONS

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the range-wide condition of the salt marsh bird's-beak, California least tern, light-footed clapper rail, and western snowy plover, the factors responsible for their condition, and their survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of salt marsh bird's-beak, California least tern, light-footed clapper rail, and western snowy plover in the action area, the factors responsible for their condition, and the relationship of the action area to the survival and recovery of these species; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the salt marsh bird's-beak, California least tern, light-footed clapper rail, and western snowy plover; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities, that are reasonably certain to occur in the action area, on the salt marsh bird's-beak, California least tern, light-footed clapper rail, and western snowy plover.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed federal action in the context of the current status of the salt marsh bird's-beak, California least tern, light-footed clapper rail, and western snowy plover, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the salt marsh bird's-beak, California least tern, light-footed clapper rail, and western snowy plover in the wild by reducing the reproduction, numbers, and distribution of that species.

STATUS OF THE SPECIES

**Salt marsh bird's-beak**

Salt marsh bird's-beak was federally listed as endangered in 1978 (43 FR 44801), a final recovery plan was approved on December 6, 1985 (Service 1985a), and a 5-year review was released on August 13, 2009 (Service 2009a). The California by the Department of Fish and Game listed the species as endangered on October 5, 1979. Since the time of listing in 1979, the taxonomic classification and nomenclature of *Cordylanthus maritimus* ssp. *maritimus* has changed as a result of genetic studies, and the Service has submitted a proposal to formally change the name of the listed entity to *Chloropyron maritimum* ssp. *maritimum* (Service 2009a). The information below is derived from the final recovery plan (1985a), 5-year review (2009a), Newman (1981), Vanderwier and Newman (1984), Dunn (1987), and information from our files.

Salt marsh bird's-beak plants are annual, hemiparasitic (i.e., it receives nutrition from both photosynthesis and from connections to the roots of host plants), halophytes (i.e., it tolerates or thrives in alkaline soils), that grow up to 16 inches tall with numerous branches and flowers arranged on multiple flower stalks. Known host plants for salt marsh bird's-beak include pickleweed (*Salicornia* spp.), shoregrass (*Monanthochloe littoralis*), salt grass (*Distichlis spicata*), Frankenia (F*rankenia grandifolia* [*F. salina*]), alkali-heath (*Frankenia grandiflora*), tule (*Scirpus robustus*), broad-leaved cattail (*Typha latifolia*), and sea-lavender (*Limonium californicum*). The hemiparatisic existence is cited as a possible reason that salt marsh bird's-beak is able to flourish in hot, dry conditions of late summer, although the importance of this relationship to host plants has not been documented.

Historically, salt marsh bird's-beak was known from 18 sites between northern Baja California and Santa Barbara County. Between 1975 and 1985, the subspecies was found in only six general areas including San Quintin, the Tijuana River Estuary, Sweetwater Marsh, Carpinteria Marsh, Mugu Lagoon[1], and Upper Newport Bay. Since 1985, two small populations were found at Morro Bay, San Luis Obispo County, thereby expanding the known range of the species by approximately 105 miles (169 kilometers) north of the next closest occurrences at Carpinteria Marsh in Santa Barbara County, California.

Salt marsh bird's-beak occupies a narrow elevational band within each marsh. This limitation may be due to the dispersal of seeds into suitable sites where germination and seedling establishment are possible. Two major mechanisms are probably responsible for the dispersal of salt marsh bird's-beak seeds. Physical factors, such as currents, tides, wave action, and sheet flow may move seeds within the marsh.

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[1] The Mugu Lagoon general area includes occurrences that were documented at Mugu Lagoon, the Ventura County Game Preserve and Ormond Beach in 1980, 1982, and 1983.

Tidal action may also disperse seeds between marshes, as the seeds have been shown to remain viable after floating for up to 50 days. Animals may also serve as vectors for salt marsh bird's-beak seeds. Many wading birds use salt marsh habitats where salt marsh bird's-beak is found and often move between these marshes during migration, potentially carrying seeds on their legs or feathers. Consequently, the distribution of salt marsh bird's-beak within a salt marsh varies from year to year and the presence of the plant in certain areas does not necessarily indicate the exclusive repositories of seed.

Seed viability is enhanced by a period of dormancy as germination rate has been shown to be highest after two years of dormancy. Dormancy is broken by a reduction in salinity due to an infusion of fresh water via rainfall or groundwater and is required for successful germination. Seeds generally germinate over a 3 to 5 week period in March or April, and individual plants senesce in late July after flowering and setting seed.

Salt marsh habitat has never been extensive within the range of salt marsh bird's-beak, and it has been further reduced by marina and industrial development, recreation, and housing. Many marshes have been filled and diked to control flood and tide waters, further reducing salt marsh bird's-beak habitat by altering tidal and freshwater influx regimes. Foot traffic and vehicles trample the plants, and combined with soil compaction, this has a negative impact on salt marsh bird's-beak. Evidence indicates that even moderate foot traffic can damage fragile seedlings and make it difficult for seeds to germinate. Application of herbicides along railroad rights-of-way where they pass through high marsh habitat has been postulated as having a negative effect on salt marsh bird's-beak populations in these areas due to direct contact with the chemicals and overspray.

*Recovery plan for salt marsh bird's-beak*

The goal of the recovery plan for salt marsh bird's-beak (Service 1985a) is to delist the species by protecting, securing and managing sufficient salt marsh bird's-beak colonies within 12 major marshes within the historical range of the plant in the United States. The recovery plan for salt marsh bird's-beak is based on data collected in the early 1980s, before populations to the north of Santa Barbara County were considered to be part of the subspecies. As such, the criteria for downlisting and delisting require reevaluation.

The recovery plan contains detailed criteria by which salt marsh bird's-beak can be considered for downlisting and delisting. The downlisting criteria for salt marsh bird's-beak are:

1. Protection of self-sustaining salt marsh bird's-beak populations in 8 major marshes within the historical range of the species in the United States;

2. Populations must be self-maintaining for at least 5 consecutive years; and

3. Each protected area within each of the 8 secure marsh totals at least fifteen acres of high marsh habitat at appropriate elevations for salt marsh bird's-beak.

The delisting criteria for salt marsh bird's-beak are:

1. Protection of self-sustaining salt marsh bird's-beak populations in 12 major marshes within the historical range of the species in the United States;

2. Populations must be self-maintaining for at least 10 consecutive years; and

3. Each protected area within each of the 12 secure marsh totals at least twenty acres of high marsh habitat at appropriate elevations for salt marsh bird's-beak.

*Salt marsh bird's-beak 5-year status review*

The salt marsh bird's-beak 5-year review (Service 2009a) states that the subspecies continues to be threatened by habitat loss due to local channelization, water diversion, and freshwater inflows. Since that time, however, State and Federal regulations have greatly reduced this threat. The 5-year review states that there are seven extant coastal marsh areas that support salt marsh bird's-beak in the United States. Climate change, invasive nonnative plants, influx of water-sewage effluent, off-road vehicles, trampling, and habitat restoration projects will make it difficult to maintain suitable elevation and hydrological conditions necessary to support his taxon. Additionally, since listing, the taxon's genetics and breeding system have been identified. Based on the ongoing and newly discovered threats, the 5-year review concludes that salt marsh bird's-beak continues to meet the criteria for listing as an endangered species under the Act.

**California least tern**

The California least tern, which is one of three subspecies of least tern in the United States, was federally listed as endangered in 1970 (35 FR 16047). The Service issued a revised recovery plan for the species in 1985 (Service 1985b) and completed a 5-year status review in September 2006 (Service 2006a). The Service has not designated critical habitat for the California least tern. The State of California listed the California least tern as endangered in 1971. The California least tern is a fully protected species under California law (see California Fish and Game Code, Section 3511). The following description of the California least tern's basic ecology was compiled from the final recovery plan (Service 1985b).

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

Since 1970, nesting sites have been documented in California from the San Francisco Bay area to the Tijuana River at the Mexican border (Marschalek 2006), and in Mexico around the Gulf of California and on the west coast of Baja California from Ensenada to San José del Cabo at the tip of the peninsula (Lamb 1927, Grinnell 1928, Patten and Erikson 1996). In California, the species was historically concentrated in

Los Angeles, Orange, and San Diego Counties; between Ventura County and the San Francisco Bay area, only Guadalupe Dunes-Mussel Rock Dunes, and Purisima Point have been used regularly by California least terns (Marschalek 2006). Large nesting colonies along the California coast have been discontinuous and are spread out on beaches at the mouths of larger estuaries. The Santa Margarita River mouth in San Diego County generally hosts the largest number of California least terns among all locations.

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

The decline of the California least tern is attributed primarily to the loss and fragmentation of breeding and foraging habitat due to the gradual urban development of the California coast. The Pacific Coast Highway, constructed in the early 1900s, is thought to have contributed substantially to the decline of the species as construction of the highway eliminated many nesting locations and facilitated access for development and recreation along the coast.

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

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

*Recovery Plan for the California Least Tern*

The 1985 final recovery plan for the California least tern (Service 1985b) states that the goal of recovery efforts is reclassification of the species from endangered to threatened, and ultimately, delisting of the species. The recovery plan states that reclassification to threatened status may be considered when:

1. There are at least 1,200 breeding pairs distributed in at least 15 of 23 coastal management areas;

2. Each of the 15 "secure" coastal management areas must have at least 20 breeding pairs; and

3. Each of the 15 "secure" coastal management areas must have a 3-year mean reproductive rate of at least 1.0 young fledged per breeding pair.

The recovery plan states that delisting of the California least tern may be considered when:

1. At least 1,200 breeding pairs are distributed in at least 20 of 23 coastal management areas;

2. Each of the 20 "secure" coastal management areas must have a 5-year mean reproductive rate of at least 1.0 young fledged per breeding pair; and

3. The San Francisco Bay, Mission Bay, and San Diego Bay are included within the 20 secure management areas with 4, 6, and 6 secure colonies respectively.

*5-year Review for the California Least Tern*

The 5-year review for the California least tern (Service 2006a) states that the recovery criteria in the recovery plan do not reflect the best available and most up-to date information on the biology of the species and its habitat. Since the completion of the recovery plan, new information about the species population dynamics and its threats had been discovered. In addition, the California least tern population in California had increased from 600 pairs in 1973 to approximately 7,100 pairs in 2005, and the number of sites used by the species had nearly doubled since the time of listing, with most of the California least tern colonies occurring in Southern California. While the number of California least terns had increased at the San Francisco Bay colonies, no increase in the number of colonies had been observed in the Bay area, as required by the recovery plan's delisting criteria. Despite the level of production (fledged young per year) declining and continuing on a downward trend (Marschaleck 2006), new information suggested that the California least tern population was continuing to increase.

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

**Light-footed Clapper rail**

The light-footed clapper rail is one of three subspecies of *Rallus longirostris* in California, all of which are listed as endangered. The light-footed clapper rail was listed as endangered in October, 1970 (35 FR

16047). A recovery plan was adopted in 1977 and revised in 1985 (Service 1985c). The light-footed clapper rail is a fully protected species under California law (see California Fish and Game Code, Section 3511). The following information is primarily taken from the recovery plan (Service 1985c) and a report on the species' biology (Service 1980).

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

The light-footed clapper rail is found in salt marshes/tidal sloughs, where cordgrass and pickleweed are the dominant vegetation. Density of nests is typically highest in tall cordgrass, and the largest numbers of light-footed clapper rails are in marshes with the most cordgrass. This species requires a healthy salt marsh environment with the correct vegetation for nesting, abundant food in the form of crabs and invertebrates, and tidal flats interspersed with vegetation for foraging. These conditions are found in salt marshes with tidal influence sufficient to maintain a normal salinity range and prevent stagnation. If suitable habitat is present, other factors seem to have little influence on light-footed clapper rail numbers, as predation by itself is seldom limiting, and light-footed clapper rails are generally tolerant of human activity if it does not result in habitat degradation.

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

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

*Recovery plan for the light-footed clapper rail*

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

suitable coastal marsh habitat, protecting all remaining suitable habitat, and managing this habitat for the benefit of the light-footed clapper rail.

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

1. The breeding population of light-footed clapper rails in California is at least 800 pairs;

2. Approximately 10,000 acres of suitably managed wetland habitat are adequately protected; and

3. The protected habitat consists of at least 50 percent of marsh vegetation suitable for light-footed clapper rails in at least 20 marsh complexes.

*Light-footed clapper rail 5-year status review*

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

**Western snowy plover**

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

The western snowy plover is a small shorebird in the family Charadriidae. Individuals weigh from 1.2 to 2 ounces and range in length from 5.9 to 6.6 inches (Page et al. 1995). Coloration is pale gray-brown above and white below, with a white hindneck collar and dark lateral breast patches, forehead bar, and eye patches. The bill and legs are blackish. In breeding plumage, males usually have black markings on the head and breast; in females, usually one or more of these markings are dark brown. Individual birds 1 year or older are considered to be breeding adults. The mean annual life span of western snowy plovers is estimated at about 3 years, but an individual was documented as at least 15 years old (Page et al. 1995). Western snowy plovers forage for invertebrates in intertidal zones, the wrack line, dry sandy areas above the high tide line, salt pans, mud flats, and the edges of salt marshes.

The western snowy plover breeding season generally occurs between March 1 and September 30, although breeding can start/end earlier or later depending on latitude. Individuals nest near tidal waters along the mainland coast and offshore islands from southern Washington to southern Baja California, Mexico, with most nesting occurring on unvegetated to moderately vegetated, dune-backed beaches and sand spits. Other less common nesting habitats include salt panes, dredge spoils, and salt pond levees. Nests consist of a shallow scrape or depression, sometimes lined with beach debris (e.g., small pebbles, shell fragments, plant debris, and mud chips); nest lining increases as incubation progresses. Nests are usually located within 328 feet of water, but can be farther away when there is no formative vegetative barrier between the nest and water (Page and Stenzel 1981).

Both males and females incubate the eggs, which take about 27 days to hatch. Polyandrous double brooding is common in coastal California (Warriner et al. 1986). The chicks are precocial, feeding on their own within hours of hatching; however, they are unable to fly until approximately four weeks old. Females generally desert males and broods by the sixth day, and thereafter the chicks are typically accompanied by only males. Females obtain new mates and initiate new nests while males rear the broods. The majority of western snowy plovers return to the same breeding area in subsequent breeding seasons, although some disperse within and between years (Warriner et al. 1986, Stenzel et al. 1994).

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

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

Historical records indicate that nesting western snowy plovers were once more widely distributed and abundant in coastal Washington, Oregon, and California; however, the western snowy plover has experienced widespread loss of nesting habitat and reduced reproductive success at many nesting locations. The reasons for the decline and degree of threats vary by geographic location, but the primary threat is habitat destruction and degradation. Habitat loss and degradation can be primarily attributed to human disturbance, urban development, introduced plant species, and expanding predator populations.

There are still relatively few western snowy plovers in Washington and Oregon. In 2006, Pearson et al. (2006) estimated 70 adults along the Washington coast, and Lauten et al. (2006) estimated 177 to 179 adults along the Oregon coast. California currently supports at least 90 percent of the listed population, and eight geographic areas support over three-quarters of the California coastal breeding population: San Francisco Bay, Monterey Bay, Morro Bay, the Callendar-Mussel Rock Dunes area, the Point Sal to Point Conception area, the Oxnard lowland, Santa Rosa Island, and San Nicolas Island (Page et al. 1991).

Prior to 1970, western snowy plovers bred at 53 coastal locations in California. Between 1970 and 1981, western snowy plovers stopped breeding in parts of San Diego, Ventura, and Santa Barbara Counties, most of Orange County, and all of Los Angeles County (Page and Stenzel 1981). By 1991, 78 percent of the remaining breeding population in coastal California nested at only eight sites: San Francisco Bay, Monterey Bay, Morro Bay, Callendar-Mussel Rock dunes area, Point Sal to Point Conception area (Vandenberg Air Force Base), Oxnard lowlands, Santa Rosa Island, and San Nicolas Island (Page et al.

1991). In 1991, the estimated breeding population of western snowy plovers in coastal California was 1,371, and by 2000, this number had dropped to 976 (Page 2000). Western snowy plovers had abandoned all historical breeding sites in Santa Barbara County south of Point Conception (Page and Stenzel 1981), presumably due to disturbance or habitat destruction (Lafferty 2000). However, following the protection of a wintering population of western snowy plovers, nesting resumed at Coal Oil Point (Lafferty et. al. 2003). In 2006, approximately 2,231 adults occurred in coastal California and San Francisco Bay (window survey including correction factor) (Service 2007). In 2012, 1,621 western snowy plovers (not including correction factor) were observed during summer window surveys in California (Service 2014c).

Western snowy plover habitat is subject to erosion and accretion and is highly susceptible to degradation by human activities including mechanized beach cleaning; construction of seawalls, breakwaters, jetties, piers, homes, hotels, parking lots, access roads, trails, bike paths, day-use parks, marinas, ferry terminals, recreational facilities, and support services that may cause direct and indirect losses of breeding and wintering habitat for the western snowy plover. Urban development has permanently eliminated nesting habitat on beaches in southern Washington (Brittell et al. 1976), Oregon (Oregon Department of Fish and Wildlife 1994), and California (Page and Stenzel 1981).

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

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

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

Between 2005 and 2012, surveyors in Ventura County reported between 164 and 221 western snowy plovers, with an average of 189. The actual number of western snowy plovers in the Ventura County is

likely slightly higher after accounting for individuals not observed during surveys. Naval Base Ventura County, including Point Mugu and San Nicolas Island, supports the majority of the western snowy plovers in Ventura County; however, in recent years, larger flocks at McGrath State Beach and Ormond Beach have decreased the proportion of Ventura County western snowy plovers on Point Mugu (Service 2013).

*Recovery plan for the western snowy plover*

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

The recovery plan contains detailed criteria by which the western snowy plover can be considered for delisting. The delisting criteria are summarized as follows:

1. An average of 3,000 breeding adults, distributed among 6 recovery units, has been maintained for 10 years;

2. A yearly average productivity of at least one fledged chick per male has been maintained in each recovery unit in the last 5 years prior to delisting; and

3. Mechanisms have been developed and implemented to assure long-term protection and management of breeding, wintering, and migration areas to maintain the subpopulation sizes and average productivity specified in Criteria 1 and 2.

*Western snowy plover 5-year status review*

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

ENVIRONMENTAL BASELINE

**Action Area**

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the

action (50 Code of Federal Regulations 402.02). The action area for this biological opinion is the entire 4,490-acre base because the proposed activities could occur throughout the base.

**Habitat Characteristics of the Action Area**

Approximately 2,200 acres of the 4,490-acre base is composed of estuarine coastal salt marsh that provides food, nesting, sheltering, breeding, and nursery habitat for numerous invertebrate, fish, bird, and plant species. Salt marsh is the most common ecosystem mapped at 12%, open water accounts for approximately 9%, tidal flats/sands/beach/mudflats at 10%, and developed and un-vegetated habitat is mapped at approximately 31%. The federally listed species are most commonly found in the intertidal salt marsh habitat (light-footed clapper rail and salt marsh bird's-beak) and coastal dune and bluff habitat (western snowy plover and California least tern). The biological assessment (Navy 2014) contains more detailed descriptions of the structure and condition of the intertidal salt marsh and coastal dune and bluff habitats occurring on base.

**Previous Consultations in the Action Area**

On December 20, 2006, the Service provided the Navy with a biological opinion to cover activities associated with the Bird/Animal Air Strike Hazard Program (Service 2006c). The Service concluded that the proposed program was not likely to jeopardize the continued existence of the salt marsh bird's-beak, California least tern, light-footed clapper rail, or the western snowy plover. On October 4, 2013, the Navy requested reinitiation of the Bird/Animal Air Strike Hazard Program biological opinion in order to expand the project area to include an area not covered in the original biological opinion, which was provided by the service on July 22, 2014 (Service 2014b). The Service concluded that the proposed program was not likely to jeopardize the continued existence of the salt marsh bird's-beak, California least tern, light-footed clapper rail, or the western snowy plover.

On March 20, 2014, the Service issued the Navy a second biological opinion to cover activities related to Countermeasures Testing and Training (Service 2014a). The Service concluded that the proposed program was not likely to jeopardize the continued existence of the California least tern, light-footed clapper rail, or the western snowy plover.

**Condition of Salt marsh bird's-beak in the Action Area**

The primary occurrence of salt marsh bird's-beak is located west of Runway 3-21; however, a few remnant populations are located in specific areas east of the runway. The distribution of salt marsh bird's-beak on base is affected by the influx of fresh water from the adjacent duck hunting clubs to the north for some populations, and by tidal inundation and rainfall levels for other populations. The nearby hunting clubs actively manage the duck ponds to maintain water in the ponds during the winter. At times the ponds overflow, which discharges water into culverts that convey water underneath Perimeter Road and into the marsh. These freshwater inputs may help preserve, and perhaps enhance, populations of salt marsh bird's-beak west of the runway.

Populations of salt marsh bird's-beak have been declining at Point Mugu for several years. Certain sub-populations have fluctuated either in size or shown shifts in the occupied footprint; select sites have disappeared entirely or have significantly reduced density and distribution. The decrease may be

attributed to rainfall patterns or perhaps other causes such as climate change, decreases in pollinators, or changes in tidal influence. During the last wet year in 2006, the population at Point Mugu was mapped at 2.8 acres; the following table depicts the continual decrease or salt marsh bird's-beak over the recent years.

| Year | Acres of mapped salt marsh bird's-beak |
|---|---|
| 2010 | 1.2 acres |
| 2011 | 1.7 acres |
| 2012 | 1 acre |
| 2013 | 0.7 acre |
| 2014 | 0.5 acre |

In 2011 and 2006, the Navy mapped salt marsh bird's-beak in several areas where it has not been documented for several years, with no apparent change in suitability of habitat. Based on the location and isolation of these populations, the Navy assumes the reappearance is a result of dormant seed bank rather than seed dispersal. Timing and amount of rainfall is likely a significant factor in the reduced recruitment of salt marsh bird's-beak; host plant populations appear to be stable. The Navy anticipates climate change and associated sea level rise will likely have a significant effect to populations on base and other sites.

**Condition of California least tern in the Action Area**

California least terns primarily nest in three locations at Mugu Lagoon: East Ormond Beach, Holiday Beach, and the Eastern Arm. Factors affecting hatching success at Point Mugu are nest predation, high tides, wind conditions, and predator pressures on adults; predation pressure by raptors could lead to indirect abandonment of nests or direct abandonment when a nesting adult is taken. Fledgling success at Point Mugu is closely tied with available prey as well as chick predation. The following table depicts the estimated number of fledglings from 2006 to 2014.

| Year | Number of California least tern fledglings |
|---|---|
| 2006 | 108 fledglings |
| 2007 | 139 fledglings |
| 2008 | 79 fledglings |
| 2009 | 133 fledglings |
| 2010 | 98 fledglings |
| 2011 | 68 fledglings |
| 2013 | 6 fledglings |
| 2014 | 118 fledglings |

An extreme wind event in 2011 was the single largest factor impacting productivity that year; 145 nests failed as a result. The California least tern population has increased over the years due to beach closures and predator management; however, fledgling success is still low as the population is closely tied to limited available food resources. Predation also results in lowered nest success rates, despite the Navy's intensive predator control efforts.

**Condition of Light-footed Clapper Rail in the Action Area**

Light-footed clapper rail habitat at Mugu Lagoon is not the typical cordgrass (*Spartina sp.*) marsh. Instead, most rails at Mugu Lagoon nest in stands of spiny rush (*Juncus acutus*) and in isolated high marsh areas within hummocks of pickleweed (*Salicornia sp.*). A majority of the light-footed clapper rails nest in habitats between the runway and South G Avenue, with some nesting activity on brackish habitat to the far west and adjacent to Calleguas Creek. Light-footed clapper rails can be present in the area adjacent to the JIEDDO training course; however, since 2002, nesting is usually a minimum of 1,000 feet away from training area.

Light-footed clapper rail populations have slowly increased at Point Mugu. The Navy suspects that winter predation by raptors may be one of the factors affecting the population on base. As of 2013, annual light-footed clapper rail surveys in Mugu Lagoon have occurred for 31 years. The subpopulation fluctuated between three and seven pairs for nearly 20 years until management efforts by the Navy fostered population growth. The Point Mugu subpopulation was the sixth largest subpopulation in California in 2011 and seventh largest in 2012. Management efforts include predator control, release of captive-reared individuals, and wetland restoration. The following table depicts the estimated number of light-footed clapper rails 2008 to 2013.

| Year | Number of light-footed clapper rails |
|---|---|
| 2008 | 5 pairs |
| 2009 | 9 pairs |
| 2010 | 12 pairs |
| 2013 | 23 pairs |

**Condition of Western Snowy Plover in the Action Area**

The sandy beaches at Point Mugu provide both nesting and wintering habitat for western snowy plovers; western snowy plovers are present on base year round. The beaches and salt pannes provide relatively secure breeding and foraging sites because public access is restricted and because of current management policies enacted by the Navy. Breeding plovers from the beaches of Mugu Lagoon move south after nesting season ends, and are replaced by individuals from more northern latitudes. The Navy has also documented western snowy plovers at Point Mugu nesting in atypical areas such as the airfield, developed concrete and asphalt pads, and salt pannes far from beach habitats; the numbers of western snowy plovers nesting in these atypical areas has steadily ben increasing. Nest loss is typically attributed to predation, high tides, and wind events. The Navy has not documented a clear difference in nesting abandonment of western snowy plovers nesting in proximity to operational areas at Point Mugu in comparison to plovers

nesting in areas further away from operational areas. Therefore, nesting locations do not appear to be effected by Navy activities.

For several years the Navy has been monitoring the nesting success of western snowy plovers at Point Mugu; population survey data does not indicate a clear trend for how the population is changing. Population surveys can be very dynamic and not the best indicator of the breeding population. Adult breeding plover surveys show daily variability and the number of nests documented yearly varies based on nest loss and searcher efficiency. It is likely, however, that the western snowy plover population at Point Mugu has experienced some growth. Over the recent year, The Navy estimates approximately 30 to 35 breeding pairs of western snowy plover occur on base; the following table depicts the overall percentage of hatched nests from 2006 to 2012. The Navy does not band plover chicks so the fledgling success is unknown.

| Year | Success of western snowy plover nest hatchlings |
|---|---|
| 2006 | 79 percent |
| 2007 | 65 percent |
| 2008 | 77 percent |
| 2009 | 63 percent |
| 2010 | 49 percent |
| 2011 | 51 percent |
| 2012 | 40 percent |

The decline in nesting success at Point Mugu in recent years is mostly attributed to predation by common ravens, with natural events such as inundation of the beach and active nests during high tide and strong winds burying eggs with sand contributing to the decline as well.

EFFECTS OF THE ACTION

**Summary of Impacts under the Existing Programmatic Biological Opinion**

Since implementation of the original 2001 programmatic biological opinion, the only confirmed adverse effects to listed species are occasional vehicles strikes on roads (two light-footed clapper rails, six western snowy plovers, and one California least tern), one aircraft strike, and one western snowy plover nest that was on an operational area and was run over before the nest was located by Navy biologists. The Navy has not documented any adverse effects resulting from noise impacts from aircraft, air show, launching of missiles, infrastructure maintenance, explosive ordnance devices, or firing ranges in the last 14 years. Impacts from the aforementioned activities likely only resulted in a brief disturbance from the sounds from some activities, with either temporary ceases in nest incubation or species acclimated to those disturbances with no disturbance response. The revised biological assessment (Navy 2014) contains additional details of data that demonstrates listed species' acclimation to Navy activities.

**Effects of the Proposed Action on Salt marsh bird's-beak**

Salt marsh bird's-beak and its habitat may be affected by a few of the proposed activities. Jet assisted take-off bottles falling from drone launch operations can land on individual plants. There is only one small population within the typical fallout zone, so we anticipate these impacts are unlikely to occur. Navy personnel accessing marsh habitat for specific activities may trample salt marsh bird's-beak plants. Each year the Navy maps and flags salt marsh bird's-beak so the plants can be easily avoided from and effects of trampling are minimized. Furthermore, the Navy reduces impacts to this species and its habitat through the project review process and with implementation of the Integrated Natural Resources Management Plan. Waterfowl hunters may enter flagged areas to retrieve fallen waterfowl; however, hunting occurs during the winter after the plants have died so trampling of individual plants by hunters is unlikely. Therefore, we anticipate waterfowl hunters would affect few, if any, plants but may cause disturbance to the sediment and seed bed. Trampling and soil compaction by foot traffic can damage seedlings and inhibit germination (Service 1985a). The Navy proposes numerous measures to minimize these potential effects. First, the Navy will flag salt marsh bird's-beak in hunting areas so hunters know to avoid occupied areas whenever possible. Second, the Navy will educate hunters on listed species and avoidance measures. Third, the Navy will close select hunting blinds if salt marsh bird's-beak is present in high proportion (if a 1 acre area immediately surrounding the blind supports more than 0.05 acre of salt marsh bird's-beak) around the blind. Lastly, the Environmental Division manages the hunting program to ensure the activities minimize impacts to salt marsh bird's-beak and other listed species.

Pest management activities, including roadside weed control, aquatic weed control in drainage ditches, and mosquito control, have the potential to adversely affect salt marsh bird's-beak within the action area. A variety of trapping methods, herbicides, and pesticides are used to carry out these activities. The Navy proposes several protective measures to minimize the impacts of pest management activities on salt marsh bird's-beak. The Navy will only use products approved for use in wetlands in or directly adjacent to wetland habitats. The Navy will avoid herbicide application during rain events and weather forecasts that predict rain within 72 hours, and color herbicides with a biodegradable dye to facilitate visual control of application. The Navy uses an Integrated Pest Management approach to reduce the need to access sensitive areas and reduce herbicide use. Furthermore, herbicide use is prohibited in areas where salt marsh bird's-beak is close to roadsides. The Navy will also educate applicators on listed species and associated protective measures and require applicators to coordinate with the Natural Resource Department for access to areas where listed species occur. Given these measures the Navy proposes, we do not anticipate any adverse effects to salt marsh bird's-beak plants from pest management activities.

The Navy also proposes to implement several conservation measures designed to aid in the recovery and conservation of salt marsh bird's-beak. First, the Navy will collect and plant salt marsh bird's-beak seeds to establish new populations on Point Mugu. Second, the Navy will restore habitat for salt marsh bird's-beak pollinators. Lastly, the Navy will control invasive plants to restore salt marsh bird's-beak habitat throughout base. Overall, given the Navy's proposed avoidance, minimization, and conservation measures, we anticipate adverse effects to salt marsh bird's-beak from the proposed activities would be minimal.

**Effects of the Proposed Action on the Recovery of salt marsh bird's-beak**

The recovery plan for salt marsh bird's-beak focuses on: (1) increasing population numbers distributed across the historical range of salt marsh bird's-beak; (2) conducting intensive ongoing management for the species and its habitat and developing mechanisms to ensure management in perpetuity; and (3) monitoring salt marsh bird's-beak populations and threats to determine success of recovery actions and refine management actions.

We do not expect the Navy's proposed ongoing activities will substantially affect the conservation or recovery of salt marsh bird's-beak within the action area, in terms of the recovery strategy described in the recovery plan because:

1. Mugu Lagoon will continue to serve as a relatively secure germination and growth site for salt marsh bird's-beak;

2. Under the Integrated Natural Resources Management Plan, the Navy will continue to protect areas occupied by salt marsh bird's-beak;

3. The Navy will collect seeds and establish new populations of salt marsh bird's-beak;

4. The Navy enhances salt marsh bird's-beak habitat by exotic plant removal and establishing new populations; and

5. The Navy will restore habitat for salt marsh bird's-beak pollinators.

The proposed action could adversely affect salt marsh bird's-beak individuals that occur within the action area through trampling or disturbance to the sediment and seed bed. These effects would be minimized by the proposed avoidance and minimization measures, as well as continued implementation of the Navy's Integrated Natural Resources Management Plan. Not only do we anticipate that the proposed actions will not interfere with the species' recovery, we expect the Navy's protective and conservation measures would aid in the recovery of the salt marsh bird's-beak.

**Effects of the Proposed Action on California least tern**

California least terns may be affected by the ongoing and proposed activities proposed at Point Mugu. Many of the proposed activities generate loud noises that have the potential to adversely affect foraging California least terns. Other activities would not have an effect as terns forage within developed areas and in other areas where activities regularly take place. Loud noises may cause terns to flush and leave the area, moving elsewhere to forage. Because there is available adjacent habitat, we anticipate the effect of a tern leaving its immediate site due to this disturbance would be short-term and minimal. Additionally, the Navy will keep disruptive air activity away from California least tern habitat to the greatest extent possible by: (1) if operationally feasible, choosing a different site greater than 500 feet from an active California least tern nest to conduct activities; (2) restricting ground-based activities that generate high sound levels due to detonations or firearms within 500 feet of an active California least tern nest; (3) outside of take-off and landing, restricting fixed-winged and rotorcraft at or above 500 feet above ground level over California least tern habitat; (4) instructing any aircraft transiting Point Mugu to

stay above 500 feet above ground level; and (5) restricting helicopters from landing or hovering within 1,000 feet of an active California least tern nest. Given these measures and the amount of available habitat on base, we anticipate effects of loud noises generated by activities would be minimized; we do, however, anticipate effects from loud noises would not be avoided and potential effects described above would likely occur.

Proposed activities and human presence have the potential to cause a California least terns to flush and vacate its nest if the activity is occurring in close proximity to the nest. The Navy has found that terns typically return to their nest shortly after disturbance to resume incubation. If, however, the nest is within 50 feet of an activity, the disturbance is continuous, or if the activity involves loud and moving equipment, terns may not return until the activity has ceased. If adult California least terns are flushed from an active nest, predators may have an opportunity to prey upon eggs and/or chicks, or the eggs and chicks may be exposed to temperatures they are unable to tolerate. If activities continue for more than a day, terns may abandon the nest. Activities could also lead to increased predation risk due to the creation of tracks leading to and from a nest site. There is also a very small potential that California least tern nests could be struck by falling jet assisted take-off bottles or aircraft.

The Navy has proposed numerous protective measures to minimize the effects of ongoing activities at Point Mugu. First, the Navy will conduct surveys as necessary to locate active California least tern nests to ensure impacts are minimized and avoided, if feasible. Second, the Navy will site projects outside of California least tern habitat, when possible. Third, the Navy will implement the following restrictions within beach habitat: (1) equipment will be placed at least 100 feet from active tern nests; (2) if equipment requires personnel regularly visiting the site, equipment must be at least 300 feet from active tern nests; (3) ground-based activity on the beach will be at least 500 feet from an active tern nest; (4) if equipment is placed on the beach for longer than a week, spike stripping will be installed if equipment acts as a perch for raptors. The Navy will ensure that all activities proposed on beach habitats will be authorized and coordinated with Natural Resource Personnel. Fourth, the Navy will educate visitors and personnel on California least tern presence, sensitivity, and avoidance measures. Fifth, Navy biologists will accompany personnel as necessary and appropriate to minimize impacts to California least terns. Lastly, activities will occur outside of the nesting season when possible. Given the protective measures proposed by the Navy, we anticipate adverse effects to nesting California least terns resulting from proposed ongoing activities will be minimized and controlled; however, as we stated under *Description of the Proposed Action*, the Navy states that these measures would only be implemented if considered feasible or possible. In cases where implementing these measures is not considered operationally feasible or possible, the adverse effects to California least terns described above (e.g., nest abandonment) would likely occur

California least terns may be struck by vehicles that are utilizing roads to support operations late in the nesting season when fledglings and adults congregate at culvert crossings due to the abundance of prey. The Navy has found younger tern chicks nesting on Holiday Beach loafing on Beach Road awaiting parents to return with prey. The Navy will restrict road speed to a maximum of 25 miles per hour in sensitive areas and ensure stop signs are posted at culvert crossings in appropriate areas to reduce the potential for terns to be struck by vehicles. The Navy also will place warning signs and cones along the road when California least tern chicks are observed to alert drivers. If a California least tern happens to nest along road shoulders and is in danger of being crushed, the Navy will strategically place drift wood near any nests to deter vehicles from that site. We anticipate the measures proposed by the Navy will

minimize, but not avoid, impacts associated with vehicles on California least terns; consequently, anticipate mortality or injury of California least terns may still occur.

Pest management activities, including roadside weed control, aquatic weed control in drainage ditches, and mosquito control, have the potential to adversely affect California least terns within the action area. A variety of trapping methods, herbicides, and pesticides are used to carry out these activities. Water flow could transport herbicides and/or pesticides into California least tern foraging areas. Herbicides and pesticides could have profound impacts on the diversity and productivity of aquatic communities (Relyea 2005) and may indirectly affect California least terns. The Navy proposes several protective measures to minimize the impacts of pest management activities on California least terns. First, the Navy will only use products approved for use in wetlands in or directly adjacent to wetland habitats. Second, the Navy will restrict herbicide application during rain events and weather forecasts that predict rain within 72 hours, and to color herbicides with a biodegradable dye to facilitate visual control of application. Third, the Navy will use an Integrated Pest Management approach to reduce the need to access sensitive areas and reduce herbicide use. Fourth, the Navy will educate applicators on listed species and associated protective measures, and require applicators to coordinate spraying with the Natural Resource Department for access to California least tern habitat for mosquito control during the nesting season to ensure a biologist escorts the applicator if they are treating within 500 feet of active California least terns nesting areas. Given these measures the Navy proposes to implement, we anticipate adverse effects to California least terns from pest management activities would be minimized.

The lagoon provides a relatively secure breeding and foraging site because public access is restricted and because of current management policies. Beach habitats are closed to entry and any access must be vetted through the base's Environmental Division to ensure no impacts to nesting terns occur. Furthermore, the Navy monitors and manages California least tern breeding habitat to maximize survival and productivity. The Navy surveys for and tracks nests to determine hatching success, removes select predators to aid in recovery of the population, and maintains habitat to control the spread of invasive species. Project impacts to this species and its habitat are avoided and minimized through the project review process and with implementation of the Integrated Natural Resources Management Plan.

The Navy also proposes to implement several conservation measures designed to aid in the recovery and conservation of the California least tern. First, the Navy will conduct nest and population monitoring as appropriate to assess status of California least tern and determine ways to avoid or reduce any impacts from operations, or determine if additional measures or management can be implemented to help aid in recovery. Second, the Navy will manage predators to aid in recovery of the California least tern. Third, the Navy will manage invasive plants in beach habitat to restore and maintain California least tern habitat. Lastly, the Navy will close beaches that support California least terns year-round to reduce additional disturbances to terns. Overall, given the Navy's proposed avoidance and conservation measures, we anticipate adverse effects to California least tern from the proposed activities would be minimal.

**Effects of the Proposed Action on the Recovery of the California least tern**

The recovery plan for California least tern focuses on: (1) developing and implementing site specific management plans; (2) preserving and properly managing nesting habitat; (3) protecting colonies against certain predation pressures and other disturbances; (4) refining management techniques through additional research; (5) developing a conservation education program; (6) enforcing laws and regulations

that protect the California least tern and its habitat; and (7) determining the status of California least tern in Baja California, Mexico.

The 5-year review for the California least tern recommends: (1) that the recovery plan be revised; (2) continued management of existing nest sites; and (3) the creation of new nest sites and site expansion at existing sites.

Some of the recovery activities from the recovery plan or 5-year review have been implemented by the Navy within the action area. The proposed action is not within Mexico and it does not involve or include research for the species and unlawful activities. Therefore, the proposed action is neutral as to these tasks and recommendations identified in the recovery plan and 5-year review. Although the proposed action does not include a site specific management plan, the Navy does have an Integrated Natural Resources Management Plan that includes measures to protect California least tern nesting and foraging areas. The Navy implements additional recovery programs such as nest monitoring and predator management, and includes an education program which covers the California least tern.

The project will not affect the overall recovery goals as described in the recovery plan or 5-year review because the remaining areas within the action area will continue to serve as foraging and nesting areas for California least terns. In fact, we expect the Navy's protective and conservation measures will continue to result in a net benefit for the recovery of the California least tern.

**Effects of the Proposed Action on the Light-footed Clapper rail**

Light-footed clapper rails may be affected by the ongoing and existing activities proposed at Point Mugu. Many of the proposed activities generate loud noises that have the potential to adversely affect resting and foraging light-footed clapper rails. Other activities do not normally generate loud noises that would carry to areas supporting light-footed clapper rail and personnel would not normally be in view; we do not anticipate such activities would have an effect. Loud noises may cause light-footed clapper rails to flush and leave the area, moving to roost or forage elsewhere. Because there is available adjacent habitat, we anticipate the effect on a rail of being flushed by a noise would be short-term and minimal. Given documented observations, the Navy suspects light-footed clapper rails are acclimated to loud ambient conditions due to regular aircraft, launch operations, and discharge of firearms and pyrotechnics. During past air show monitoring, the Navy observed light-footed clapper rails foraging normally when jet aircraft flew at low altitudes directly above them. Light-footed clapper rails also continue to utilize and nest in areas of the marsh where firearms, pyrotechnics, and missile launches occur overhead. A more significant effect of loud noises may be the potential of an egg cracking when a rail is startled; however, launches occur at Point Mugu and the Navy has never found evidence of an egg damaged from launch operations.

The Navy proposes to keep disruptive air activity away from light-footed clapper rail habitat to the greatest extent possible by: (1) restricting ground-based activity that generates high sound levels due to detonations or firearms within 500 feet of an active nest; (2) outside of take-off and landing, restricting fixed-winged and rotorcraft at or above 500 feet above ground level over light-footed clapper rail habitat; and (3) instruct any aircraft transiting Point Mugu to stay above 500 feet above ground level. The Navy also proposes measures specific to the air show, which has potential to cause disruptive air activity that can impact light-footed clapper rails. The Navy proposes to: (1) center the show 700 to 1,000 feet north

of the runway 9-27 and 3-21 intersections (see figure 1 above) away from light-footed clapper rail habitat; (2) prohibit helicopters from landing or hovering within 1,000 feet of an active light-footed clapper rail nest; (3) ensure all jet-powered ground vehicles begin on Runway 3-21 and travel south to reduce sound into light-footed clapper rail habitat; and (4) restrict strafing for the Air Show to the west side of runway 3-21 in grassland areas to stay further away from light-footed clapper rail habitats.

Proposed activities and human presence have the potential to result in nesting rails temporarily leaving a nest if the activity is occurring in close proximity to the nest. A light-footed clapper rail may return shortly after disturbance to resume incubation; however, if a nest is in close proximity to an activity, the disturbance is continuous, or if activity involves loud equipment, it may cause rails to not return until activity has ceased. During the bird's absence from an active nest, predators may have an opportunity to prey upon eggs and/or chicks, or the eggs and chicks may be exposed to temperatures they are unable to tolerate. If activities continue for more than a day, rails may abandon the nest. Observations by Navy biologists have documented that rails tend not to leave a nest if personnel remain at least 20 feet away. As rails normally are in vegetative cover, it is the sound of the activity rather than the visual presence of people which results in potential disturbance. As adults are more at risk of predation when not in cover, they do not leave cover of nest readily and likely remain and continue to incubate unless disturbance is significant; however, a rail's willingness to incubate in proximity to activity does vary by individual. The Navy proposes numerous protective measures to minimize impacts to light-footed clapper rail nests from ongoing activities on base including: conducting nest monitoring to assess locations of nearest nests and monitor for any adverse effects to light-footed clapper rails; restricting foot access into areas the area between M Street and South G Street where the majority of light-footed clapper rails occur; utilizing alternate locations and siting operations outside and away from light-footed clapper rail habitat, as operationally feasible; requiring a biologist to monitor any activities occurring in sensitive areas to ensure any measure required to reduce disturbance is followed; scheduling activities outside the nesting season (March 1 – September 15) whenever possible; restricting maintenance or development if an active light-footed clapper rail nest is within 300 feet and view is unobstructed, unless it is an emergency situation; and, if a nest is within 500 feet of a project site, a biologist will be present to monitor the birds' behavior. Non-emergency projects will cease if the biologist determines that a potential exists for the nest to be lost. Given the protective measures proposed by the Navy, we anticipate adverse effects to light-footed clapper rails resulting from proposed ongoing activities will be minimized; however, the Navy states that some of these measures would only be implemented if considered feasible or possible. In cases where implementing these measures is not considered feasible or possible, the adverse effects to light-footed clapper rails described above (e.g., nest abandonment) would likely occur.

Light-footed clapper rails occur in the area where the majority of jet assisted take-off bottles fall; the Navy periodically removes these bottles from the area. Removal of the bottles has the potential to disturb light-footed clapper rails that occur in the vicinity. The potential also exists, however small, that light-footed clapper rail nests may be struck by falling jet assisted take-off bottles. The Navy proposes to remove jet assisted take-off bottles outside nesting season (March 1 – September 15). We anticipate this will minimize the potential to disturb nesting rails when retrieving the bottles. When the JATO bottles are removed outside of the nesting season, individual light-footed clapper rails may be disturbed and move away, but we don't think these effects will be substantial because the birds will likely return to their territories once the disturbance has ended.

Light-footed clapper rails may also be struck by vehicles that are utilizing roads to support operations as rails may cross over roads into adjacent habitats. The Navy proposes to maintain road speed to a

maximum of 25 miles per hour in sensitive areas and ensure stop signs are posted at culvert crossings in appropriate areas to reduce the potential for rails to be struck by vehicles. Since the Service issued the original 2001 programmatic biological opinion, two rails have been reportedly struck by vehicles. We anticipate the likelihood of collisions is very low and the measures proposed by the Navy will further lessen the risk of collision by reducing speed of vehicles in sensitive areas and increasing driver awareness.

The lagoon represents a relatively secure breeding and foraging site because public access is restricted and because of current Navy management policies. Salt marsh habitats are closed to entry and any access must be vetted through the base's Environmental Division to ensure no impacts occur. Furthermore, The Navy monitors and manages light-footed clapper rail breeding habitat to maximize survival and productivity. The Navy conducts surveys, protects inhabited areas from disturbance, enhances habitat and manages predators. Project impacts to this species and its habitat are avoided and minimized through the project review process. Natural resource management and strategies in the Integrated Natural Resources Management Plan contribute to overall recovery objectives for light-footed clapper rail.

The Navy also proposes to implement several conservation measures designed to aid in the recovery and conservation of the light-footed clapper rail. First, the Navy will conduct nest and population monitoring as appropriate to assess status of the light-footed clapper rail and determine ways to avoid or reduce any impacts from operations, or determine if additional measures or management can be implemented to help aid in recovery. Second, the Navy will manage invasive plants to restore and maintain light-footed clapper rail habitat. Lastly, the Navy will restore wetlands to create additional habitat for light-footed clapper rails. Overall, given the Navy's proposed avoidance and conservation measures, we anticipate adverse effects to light-footed clapper rails from the proposed activities would be minimal.

**Effects of the Proposed Action on the Recovery of the light-footed clapper rail**

The recovery plan for the light-footed clapper rail focuses on: (1) restoring suitable coastal marsh habitat; (2) protecting all remaining suitable habitat; and (3) managing this habitat for the benefit of the light-footed clapper rail.

As part of the proposed action the Navy will implement the conservation measures listed above, which include: conducting nest and population monitoring, managing invasive plants to restore and maintain light-footed clapper rail habitat, and restoring wetlands to create additional habitat for light-footed clapper rails. Additionally, the Navy will continue to implement Point Mugu's Integrated Natural Resources Management Plan. Under the Integrated Natural Resources Management Plan, the Navy protects light-footed clapper rail nesting and foraging areas, and implements additional recovery programs such as population and nesting monitoring and predator management. Therefore, the proposed action supports all three tasks specified in the recovery plan.

**Effects of the Proposed Action on Western snowy plover**

Western snowy plovers may be affected by the ongoing and existing activities proposed at Point Mugu. Many of the proposed activities generate loud noises that have the potential to adversely affect nesting, roosting, and foraging western snowy plovers. Most activities would not have an effect as they are conducted are far enough away from the shoreline where plovers are found. Loud noises may cause

plovers to flush and leave the area, moving elsewhere to roost or forage. Because there is available adjacent habitat, we anticipate the effect to a plover leaving its location due to disturbance would be short-term and minimal. The Navy will keep disruptive air activity away from western snowy plover habitat to the greatest extent possible by (1) choosing a different site, if operationally feasible, greater than 500 feet from an active western snowy plover nest to conduct activities; (2) avoid ground-based activity that generates high sound levels due to detonations or firearms within 500 feet of an active nest; (3) outside of take-off and landing, restricting fixed-winged and rotorcraft at or above 500 feet above ground level over western snowy plover habitat; (4) instructing any aircraft transiting Point Mugu to stay above 500 feet above ground level; and (5) restricting helicopters from landing or hovering within 1,000 feet of an active western snowy plover nest. Given these measures and the amount of available habitat on base, we anticipate effects of loud noises generated by activities would be minimized, but not avoided; therefore, we anticipate effects associated with loud noises may still occur.

The proposed activities and human presence have the potential to cause a western snowy plover to temporarily leave its nest if the activity is occurring in close proximity to the nest. The Navy has found that plovers typically return shortly after disturbance to resume incubating their eggs. If, however, the nest is within 50 feet of the activity, disturbance is continuous, or if the activity involved is loud and involves moving equipment, plovers may not return until activity has ceased. Such actions may disrupt natural behaviors or cause plovers to abandon nests within the area or cause plovers attempting to nest to relocate to other areas. If adult western snowy plovers are flushed from an active nest, predators may have an opportunity to prey upon eggs and/or chicks, or the eggs and chicks may be exposed to temperatures they are unable to tolerate. Activities could also lead to increased predation risk due to increased tracks leading to and from the nest site. There is also a very small potential that western snowy plover nests could be struck by falling jet assisted take-off bottles or aircraft.

The Navy has proposed measures to minimize the effects of ongoing activities at Point Mugu. First, the Navy will conduct surveys as necessary to locate active western snowy plover nests to ensure impacts are minimized and avoided, if feasible. Second, whenever possible, the Navy will site projects outside of western snowy plover habitat. Third, if operationally feasible, the Navy will implement the following restrictions within beach habitat: (1) equipment will be placed at least 100 feet from active plover nests; (2) if equipment requires personnel regularly visiting the site, equipment must be at least 300 feet from active plover nests; (3) ground-based activity on the beach will be at least 500 feet from an active plover nest; and (4) if equipment is placed on the beach for longer than a week, spike stripping will be placed if equipment acts as a perch for raptors. The Navy will ensure that all activities proposed on beach habitats will be authorized and coordinated with Natural Resource Personnel. Fourth, the Navy will educate visitors and personnel on western snowy plover presence, sensitivity, and avoidance measures. Fifth, Navy biologists will accompany personnel as necessary and appropriate to minimize impacts to western snowy plovers. Lastly, activities will occur outside of the nesting season when possible. Given the protective measures proposed by the Navy, we anticipate adverse effects to nesting western snowy plovers resulting from proposed ongoing activities will be minimized and controlled; however, the Navy states that some of these measures would only be implemented if considered feasible or possible. In cases where implementing these measures is not considered feasible or possible, the adverse effects to western snowy plovers described above (e.g., nest abandonment) would likely still occur.

Western snowy plovers, especially those nesting along road shoulders, may be struck by vehicles that are utilizing roads to support operations. Plovers nesting along shoulders, on operational pads, and on the airfield have the potential to be accidentally crushed by vehicles. Western snowy plover chicks in these

areas can be at a higher risk of being struck by a vehicle because they are unable to fly until they are approximately four weeks of age. As we previously mentioned under the *Status of the Species – western snowy plover* section, females generally desert males and broods by the sixth day, and thereafter the chicks are typically accompanied by only males. If a male happened to lead a brood of chicks along road shoulders, on operational pads, and on the airfield, the whole brood could be injured or killed if they are unable to fly of out harm's way. The Navy will restrict road speed to a maximum of 25 miles per hour in sensitive areas and ensure stop signs are posted at culvert crossings in appropriate areas to reduce the potential for plovers to be struck by vehicles. If a western snowy plover happens to nest along a road shoulder and is in danger of being struck, the Navy will strategically place drift wood near any nests to deter vehicles from that site. We anticipate the measures proposed by the Navy will minimize impacts associated with vehicles on western snowy plovers; however, not all vehicle strikes of plovers are likely to be avoided as the proposed measures have been in place since the original programmatic biological opinion in 2001 and since then, the Navy has recorded six western snowy plovers killed by vehicles on the base.

Pest management activities, including roadside weed control, aquatic weed control in drainage ditches, and mosquito control, have the potential to adversely affect western snowy plovers within the action area. A variety of trapping methods, herbicides, and pesticides are used to carry out these activities. Water flow could transport herbicides and/or pesticides into western snowy plover foraging areas. Herbicides and pesticides could have profound impacts on the diversity and productivity of aquatic communities (Relyea 2005) and may indirectly affect western snowy plovers. The Navy proposes several protective measures to minimize the impacts of pest management activities on western snowy plovers. The Navy will only use products approved for use in wetlands in or directly adjacent to wetland habitats. The Navy also will avoid herbicide application during rain events and weather forecasts that predict rain within 72 hours, and to color herbicides with a biodegradable dye to facilitate visual control of application. The Navy utilizes an Integrated Pest Management approach to reduce the need to access sensitive areas and reduce herbicide use. Additionally, the Navy will educate applicators on listed species and associated protective measures. The Navy will require pesticide applicators to coordinate with the Natural Resource Department when needing to access western snowy plovers habitat for mosquito control during the nesting season to ensure a biologist escorts the applicator if they are treating within 500 feet of active western snowy plovers nesting areas. Given these measures the Navy proposes to implement, we anticipate adverse effects to western snowy plovers from pest management activities would be minimized.

Beach and salt marsh habitats are closed to entry and any access must be vetted through the base's Environmental Division to ensure no impacts occur. Furthermore, the Navy monitors and manages western snowy plover breeding habitat to maximize survival and productivity. The Navy conducts population and nesting surveys, protects inhabited areas from disturbance, enhances habitat and manages predators. The Navy avoids and minimizes project impacts to this species and its habitat through the project review process and by implementing of the Integrated Natural Resources Management Plan. The Navy also proposes to implement several conservation measures designed to aid in the recovery and conservation of the western snowy plover. First, the Navy will conduct nest and population monitoring as appropriate to assess status of the western snowy plover and determine ways to avoid or reduce any impacts from operations, or determine if additional measures or management can be implemented to help aid in recovery. Second, the Navy will manage predators to aid in recovery of the western snowy plover. Third, the Navy will manage invasive plants in beach habitat to restore and maintain western snowy plover habitat. Lastly, the Navy will close beaches that support western snowy plovers year-round to

reduce additional disturbances. Overall, given the Navy's proposed avoidance and conservation measures, we anticipate adverse effects to western snowy plovers from the proposed activities would be minimal.

**Effects of the Proposed Action on the Recovery of the western snowy plover**

The recovery plan for western snowy plover focuses on: (1) increasing population numbers distributed across the range of the western snowy plover; (2) conducting intensive ongoing management for the species and its habitat and developing mechanisms to ensure management in perpetuity; and (3) monitoring western snowy plover populations and threats to determine success of recovery actions and refine management actions.

The Navy supports all three recovery activities identified in the recovery plan. The Navy's Integrated Natural Resources Management Plan includes measures to protect nesting and foraging areas that help to increase population numbers of western snowy plovers. The Navy monitors and surveys for western snowy plovers throughout the base. The Navy also conducts intensive ongoing management for the species and its habitat and continually determines ways to avoid or reduce any impacts from base operations, or determine if additional measures or management can be implemented to help aid in recovery.

The proposed project will not affect the overall recovery goals as described in the recovery plan because location CA–99, as defined in the recovery plan, will continue to serve its function as a breeding and wintering site for the western snowy plover. We anticipate implementation of the Navy's protective and conservation measures could result in a net increase of the suitable and available breeding and wintering habitats for the western snowy plover at Point Mugu.

## CUMULATIVE EFFECTS

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

## CONCLUSION

The regulatory definition of "to jeopardize the continued existence of the species" focuses on assessing the effects of the proposed action on the reproduction, numbers, and distribution, and their effect on the survival and recovery of the species being considered in the biological opinion. For that reason, we have used those aspects of the species' status as the basis to assess the overall effect of the proposed action on the species. We group the discussion of effects on the California least tern, western snowy plover, and light-footed clapper rail because the effects of the proposed Program would be similar. We describe species-specific effects individually, where appropriate.

**Salt marsh bird's-beak**

Reproduction

The proposed activities would affect a small proportion of the habitat available on Point Mugu and, to a lesser degree, the entire geographic range of salt marsh bird's-beak. Furthermore, the Navy has proposed measures that have the potential to create additional suitable habitat for salt marsh bird's-beak. Therefore, we conclude that the proposed activities would not reduce the reproduction of salt marsh bird's-beak in the wild rangewide.

Numbers

Some plants could be adversely affected by getting trampled or by herbicide application. Overall, we anticipate measures included as part of the proposed project could create additional salt marsh bird's-beak habitat within the action area. The Navy will implement measures to avoid or minimize the likelihood of adverse effects to salt marsh bird's-beak. The number of salt marsh bird's-beak we expect to be adversely affected by the proposed activities is very small both in the action area and relative to its entire range. Therefore, we do not expect existing and ongoing activities at Point Mugu will reduce the number of salt marsh bird's-beak plants rangewide.

Distribution

We do not anticipate the proposed activities would reduce the overall distribution of salt marsh bird's-beak at Point Mugu. The Navy proposes conservation measures that have the potential to establish new populations and increase the distribution of salt marsh bird's-beak at Point Mugu and thus expand or enhance the range of the species. Therefore, we do not expect the effects of the proposed actions will reduce the distribution of salt marsh bird's-beak rangewide.

Recovery

Overall, we expect the impacts resulting from the proposed activities would not inhibit the conservation or recovery of salt marsh bird's-beak in the action area or throughout its range. Given the avoidance and conservation measures proposed by the Navy, we have determined the proposed projects are not only consistent with the recovery goals of the California least tern, but the protective and conservation measures proposed by the Navy will promote recovery of the salt marsh bird's-beak.

Conclusion for salt marsh bird's-beak

After reviewing the current status of salt marsh bird's-beak, the environmental baseline for the action area, the effects of the proposed activities and the cumulative effects, it is the Service's biological opinion that the existing and ongoing activities, as proposed, are not likely to jeopardize the continued existence of the salt marsh bird's-beak. We have determined that the reproduction, numbers, and distribution of the species would not be diminished and the measures included as part of the proposed actions are consistent with the recovery goals and the protective and conservation measures proposed by the Navy would promote recovery of salt marsh bird's-beak.

**California least tern, light-footed clapper rail, and western snowy plover**

Reproduction

Activities that occur during the breeding season and create loud noise or create other disruptions in breeding areas could temporarily reduce the quality of breeding habitat and could cause nest abandonment and/or injury or death to adults, fledglings, and eggs. Such disruptions could potentially affect a proportion of breeding California least terns, light-footed clapper rails, and western snowy plovers at Point Mugu. The ongoing activities proposed on base, however, would not cause direct loss of breeding habitat, and the amount of habitat that would be temporarily affected is a small portion of these species' breeding habitat on base and even less so relative to their rangewide status. The Navy will also survey for and avoid active California least tern, light-footed clapper rail, and western snowy plover nests during activities with a potential to affect the species and implement numerous avoidance measures mentioned above. We expect these measures to minimize disturbances to breeding activity. Therefore, we expect few breeding California least terns, light-footed clapper rails, and western snowy plovers would be affected by the proposed activities, and the activities would not reduce their reproduction rangewide.

Number

We are unable to determine the precise number of California least terns, light-footed clapper rails, and western snowy plovers that would occur in the action area at any time and may be affected by the proposed activities because numbers of individuals in the action area varies between breeding and non-breeding seasons, and from year to year. The proposed activities could directly and indirectly affect individual California least terns, light-footed clapper rails, and western snowy plovers to the point of injury or death, although we expect injury or mortality to be uncommon. We expect that noise and human presence could displace individuals during the proposed activities that occur within eyesight or close range of these species. The Navy will survey for and avoid active California least terns, light-footed clapper rails, and western snowy plover nests during activities with a potential to affect the species and implement measures to avoid or minimize the likelihood of adverse effects to the species as mentioned above; we anticipate these measures would minimize disturbances to breeding activity. The number of California least terns, light-footed clapper rails, and western snowy plovers we expect to be affect by the proposed activities is very small relative to the entirety of their ranges. Therefore, we do not expect the proposed actions would reduce their numbers rangewide.

Distribution

In the action area, California least terns, light-footed clapper rails, and western snowy plovers could occur near any locations subject to the proposed activities. The proposed action could temporarily displace these species from portions of the action area and could cause injury or mortality of a small number of individuals annually; however, the Navy would implement the avoidance measures listed above to minimize the risk of adverse effects on individuals. Furthermore, the proposed activities would affect only a small proportion of the habitat available on Point Mugu and to a lesser degree the geographic ranges of the California least tern, light-footed clapper rail, and western snowy plover. Therefore, we do not expect the effects of the proposed actions to reduce the distribution of these species rangewide.

Recovery

*California least tern*

According to the recovery plan for California least tern the strategy for the species' recovery focuses on: (1) developing and implementing site specific management plans; (2) preserving and properly managing nesting habitat; (3) protecting colonies against certain predation pressures and other disturbances; (4) refining management techniques through additional research; (5) developing a conservation education program; (6) enforcing laws and regulations that protect the California least tern and its habitat; and (7) determining the status of California least tern in Baja California, Mexico.

The project would not diminish the overall recovery goals as described in the recovery plan. The remaining areas within the action area will continue to serve as foraging and nesting areas for California least terns. Furthermore, implementation of the proposed project is consistent with the recovery goals of the California least tern and promote recovery of the species.

*Light-footed clapper rail*

The recovery plan for the light-footed clapper rail focuses on: (1) restoring suitable coastal marsh habitat; (2) protecting all remaining suitable habitat; and (3) managing this habitat for the benefit of the light-footed clapper rail.

The project would not diminish the overall recovery goals as described in the recovery plan. As part of the proposed action the Navy will implement protective and conservation measures that are consistent with the recovery goals of the light-footed clapper rail and will promote recovery of the species.

*Western snowy plover*

The recovery plan for western snowy plover focuses on: (1) increasing population numbers distributed across the range of the western snowy plover; (2) conducting intensive ongoing management for the species and its habitat and developing mechanisms to ensure management in perpetuity; and (3) monitoring western snowy plover populations and threats to determine success of recovery actions and refine management actions.

The project would not diminish the overall recovery goals as described in the recovery plan. As part of the proposed action the Navy will implement protective and conservation measures that are consistent with the recovery goals of the light-footed clapper rail and will promote recovery of the species.

Conclusion for California least tern, light-footed clapper rail, and western snowy plover

After reviewing the current status of California least tern, light-footed clapper rail, and western snowy plover, the environmental baseline for the action area, the effects of the proposed actions and the cumulative effects, it is the Service's biological opinion that the existing and ongoing activities at Point Mugu, as proposed, are not likely to jeopardize the continued existence of the California least tern, light-footed clapper rail, and western snowy plover. We have determined that the reproduction, numbers, and distribution of the species would not be diminished and the measures included as part of the proposed

actions are consistent with the recovery goals and the protective and conservation measures proposed by the Navy would promote recovery of the California least tern, light-footed clapper rail, and western snowy plover.

## INCIDENTAL TAKE STATEMENT

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

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species; however, limited protection of listed plants is provided at section 9(a)(2) to the extent that the Act prohibits the removal and reduction to possession of federally listed plants from areas under Federal jurisdiction, the malicious damage or destruction of such plants on areas under Federal jurisdiction, and the destruction of listed plants on non-Federal areas in violation of State law or regulation or in the course of a violation of a State criminal trespass law.

**California least tern**

We anticipate that few California least terns will be killed or injured by the proposed activities (i.e., vehicle collision, opportunistic predation, jet assisted take off bottles crushing individual California least terns or nests, consuming fish contaminated with toxic herbicides and/or pesticides, etc.). As a result of repeated or substantial disturbances (i.e., human presence, loud noise from missile launches and other activities, etc.), we also conclude that a subset of California least terns may experience a significant disruption of normal behavioral patterns leading to injury or mortality (e.g., nest abandonment, loss of foraging opportunity), constituting take in the form of harassment.

We cannot quantify the precise numbers of California least terns that may be taken as a result of the actions that the Navy has proposed because California least terns move over time and their populations vary seasonally and annually. The protective measures proposed by the Navy are likely to prevent mortality or injury of most individuals and minimize most harassment that could occur. In addition, finding a dead or injured California least tern is unlikely due to their small size, cryptic coloring, and the presence of numerous scavengers (i.e., gulls, ravens, coyotes).

Consequently, we are unable to reasonably anticipate the actual number of California least terns that would be taken by the proposed project. The environmental baseline and effects analysis sections of this biological opinion indicate that adverse effects to California least terns would likely be low given the

proposed measures to minimize and avoid such effects. Therefore, we anticipate that take of California least terns would also be low. We also recognize that for every California least tern found dead or injured, other individuals may be taken that are not detected, so when we determine an appropriate take limit, we are anticipating that the actual take would be higher and we set the number at a low limit. Because this is not a framework programmatic biological opinion, we must set a take level at which consultation must be reinitiated. Based on the numbers of California least terns in the action area, the avoidance and minimization measures the Navy proposes, and the potential effects, if 3 California least terns are taken in a calendar year as a result of implementation of the existing and ongoing activities at Point Mugu, or if 4 California least tern nests fail as a result of these activities in a calendar year, the Navy must reinitiate formal consultation with the Service. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

**Light-footed clapper rail**

We anticipate that few light-footed clapper rails will be killed or injured by the proposed activities (i.e., vehicle collision, opportunistic predation, jet assisted take off bottles crushing individual light-footed clapper rails or nests, consuming fish contaminated with toxic herbicides and/or pesticides, etc.). As a result of repeated or substantial disturbances (i.e., human presence, loud noise from missile launches and other activities, etc.), a subset of light-footed clapper rails may experience a significant disruption of normal behavioral patterns leading to injury or mortality (e.g., nest abandonment, loss of foraging opportunity), constituting take due to harassment.

We cannot quantify the precise numbers of light-footed clapper rails that may be taken as a result of the actions that the Navy has proposed because light-footed clapper rails move over time and their populations vary seasonally and annually. The protective measures proposed by the Navy are likely to prevent mortality or injury of most individuals. In addition, finding a dead or injured light-footed clapper rail is unlikely.

Consequently, we are unable to reasonably anticipate the actual number of light-footed clapper rails that would be taken by the proposed project. The environmental baseline and effects analysis sections of this biological opinion indicated that adverse effects to light-footed clapper rails would likely be low given the proposed measures to minimize and avoid such effects. Therefore, we anticipate that take of light-footed clapper rails would also be low. We also recognize that for every light-footed clapper rail found dead or injured, other individuals may be taken that are not detected, so when we determine an appropriate take limit, we are anticipating that the actual take would be higher and we set the number at a low limit. Because this is not a framework programmatic biological opinion, we must set a take level at which consultation must be reinitiated. Based on the number of light-footed clapper rails in the action area, the proposed avoidance and minimization measures, and past incidents involving take of light-footed clapper rails, if more than one (1) light-footed clapper rail is taken in a calendar year as a result of implementation of the existing and ongoing activities at Point Mugu, or if 2 light-footed clapper rail nests fail as a result of these activities in a calendar year, the Navy must reinitiate formal consultation with the Service. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

**Western snowy plover**

We expect that few western snowy plovers could be killed or injured by the proposed activities (i.e., vehicle collision, opportunistic predation, jet assisted take off bottles crushing individual western snowy plovers or nests, consuming fish contaminated with toxic herbicides and/or pesticides, etc.). We also conclude that western snowy plovers within the action area subject take in the form of harassment (i.e., human presence, loud noise from missile launches and other activities, etc.). As a result of harassment, a subset of western snowy plovers may experience a significant disruption of normal behavioral patterns leading to injury or mortality (e.g., nest abandonment, loss of foraging opportunity).

We cannot quantify the precise numbers of western snowy plovers that may be taken as a result of the actions that the Navy has proposed because western snowy plovers move over time and their populations vary seasonally and annually. The protective measures proposed by the Navy are likely to prevent mortality or injury of most individuals.

Consequently, we are unable to reasonably anticipate the actual number of western snowy plovers that would be taken by the proposed project. The environmental baseline and effects analysis sections of this biological opinion indicated that adverse effects to western snowy plovers would likely be low given the proposed measures to minimize and avoid such effects. Therefore, we anticipate that take of western snowy plovers would also be low. We also recognize that for every western snowy plover found dead or injured, other individuals may be taken that are not detected, so when we determine an appropriate take limit, we are anticipating that the actual take would be higher and we set the number at a low limit.

Because this is not a framework programmatic biological opinion, we must set a take level at which consultation must be reinitiated. Based on the number of western snowy plovers in the action area, the proposed avoidance and minimization measures, and the potential effects we've identified, if 3 or more adult western snowy plovers are taken in a calendar year as a result of implementation of the existing and ongoing activities at Point Mugu the Navy must reinitiate formal consultation with the Service. As we previously mentioned in this biological opinion, the Navy has documented a steady increase in the number of western snowy plovers nesting in high risk areas such as road shoulders, operational pads, and airfields. Because chicks are unable to fly until they are approximately four weeks of age, they may not be able to fly out of harm's way and have potential to be at high risk of injury or mortality in such areas; additionally, chicks tend to stay in broods so multiple chicks could be injured or killed by project activities. Based on their biology, the number of western snowy plovers in the action area, the proposed avoidance and minimization measures, and the potential effects we've identified, if 5 or more western snowy plover chicks are taken in a calendar year as a result of implementation of the existing and ongoing activities at Point Mugu the Navy must reinitiate formal consultation with the Service. In addition, if 7 or more western snowy plover nests fail as a result of these activities within a calendar year, the Navy must also reinitiate formal consultation with the Service. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

## REASONABLE AND PRUDENT MEASURES/TERMS AND CONDITIONS

The Service's evaluation of the effects of the proposed action includes consideration of the measures developed by the Navy, and repeated in the Description of the Proposed Action portion of this biological opinion, to minimize the adverse effects of the proposed action on salt marsh bird's-beak, western snowy

plover, California least tern, and light-footed clapper rail. The Service believes these measures are adequate and appropriate to minimize the impacts of the incidental take of California least terns, light-footed clapper rails, and western snowy plovers. Therefore, we are not including any reasonable and prudent measures and terms and conditions in this incidental take statement. Any subsequent changes in the minimization measures proposed by the Navy may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR 402.16.

REPORTING REQUIREMENTS

For each year this biological opinion is in effect, the Navy must provide a written annual report describing Program activities during the previous year to the Service by February 15th. The reports must contain information on (1) the type of activities that occurred in the action area (e.g., construction activities, monitoring, etc.), (2) the location of these activities, (3) a description of the habitat in which these activities occurred, (4) the number of listed species affected and the manner in which they were affected, (5) steps taken to avoid or minimize effects, (6) the results of any surveys conducted for salt marsh bird's-beak, western snowy plover, California least tern, and the light-footed clapper rail in the previous year; (7) a record of observations of any other listed species observed during Program activities, and (8) any other pertinent information. The first report will be due January 31st following the first Program activities conducted pursuant to this biological opinion.

DISPOSITION OF DEAD OR INJURED SPECIMENS

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

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

Any remains of dead western snowy plovers, California least terns, or light-footed clapper rails must be placed with educational or research institutions holding the appropriate State and Federal permits. The Navy's salvage permit identifies the deposition of dead or injured species at the Western Foundation of Vertebrate Zoology (439 Calle San Pablo, Camarillo, California 93012, (805) 388-9944).

## CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service does not have any additional conservation recommendations supplementary to actions already proposed to be implemented by the Navy.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the reinitiation request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) will have lapsed and any further take would be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions about this biological opinion, please contact Rachel Henry of my staff at (805) 644-1766 extension 333, or by e-mail at rachel_henry@fws.gov.

Sincerely,

Stephen P. Henry
Field Supervisor

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