Final Environmental Assessment for 2015 West Coast Civilian Port Defense Training Exercise

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Lead Agency
Department of the Navy

Action Proponent
Commander, U.S. Pacific Fleet

FINAL ENVIRONMENTAL ASSESSMENT

FOR 2015 WEST COAST CIVILIAN PORT DEFENSE TRAINING EXERCISE

Lead Agency for the EA: Department of the Navy

Cooperating Agency: None

Title of the Proposed Action: 2015 West Coast Civilian Port Defense

Designation: FINAL

ABSTRACT

The United States Department of the Navy (Navy) prepared this Final Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 et seq.), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [C.F.R.] §§1500 et seq.), Navy Procedures for Implementing NEPA (32 C.F.R. §775), and the Chief of Naval Operations Instruction 5090.1D and its accompanying manual M-5090.

This EA evaluates the potential environmental impact of West Coast Civilian Port Defense training. Civilian Port Defense training activities are scheduled every year, typically alternating between the east and west coasts of the United States (U.S.). Civilian Port Defense training activities are planned to occur on the U.S. west coast in the fall of 2015 at one of two locations identified by Surface and Mine Warfighting Development Center. The purpose of the Proposed Action is to ensure strategic U.S. ports remain free of mine threats. Civilian Port Defense training events employ the use of various mine detection sensors, which utilize active acoustics, for detection of mines and mine-like objects in and around various ports. This EA evaluates the following alternatives: the No Action Alternative, Alternative 1 (Preferred Alternative), which would allow training to occur within the Ports of Los Angeles/Long Beach proposed action area, and includes an area within Naval Weapons Station Seal Beach, and Alternative 2 which would allow for training to occur in the Port of San Diego action area as analyzed in the Hawaii Southern-California Training and Testing (HSTT) Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS). In this EA, the Navy analyzed potential environmental impacts that could result from activities under the No Action Alternative, Alternative 1, and Alternative 2. The resources evaluated include air quality, bottom sediment, marine habitats, marine invertebrates, seabirds, fish and essential fish habitat, sea turtles, marine mammals, and socioeconomic resources.

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Executive Summary

PROPOSED ACTION

The purpose of the Proposed Action is to train personnel in the skills necessary to ensure U.S. ports remain free of mine threats. Civilian Port Defense training activities occur every year utilizing naval forces with expertise in mine warfare, typically alternating between the east and west coasts of the United States. Civilian Port Defense training activities would occur on the U.S. west coast in the fall of 2015 at one of the two possible locations identified by Surface and Mine Warfighting Development Center.

Naval forces provide mine warfare capabilities to defend the homeland per the Maritime Operational Threat Response Plan. These training activities are conducted in conjunction with other federal agencies, principally the Department of Homeland Security. The three pillars of Mine Warfare include airborne (helicopter), surface (ship and unmanned vehicles), and undersea (divers, marine mammal systems, and unmanned vehicles), all of which may be used in order to ensure that strategic U.S. ports are cleared of mine threats. Civilian Port Defense training events are conducted in ports or major surrounding waterways, within the shipping lanes, and seaward to the 300 foot (ft, 91 meter [m]) depth contour. The events employ the use of various mine detection sensors, some of which utilize high frequency active acoustics for detection of mines and mine-like objects in and around various ports. Assets used during Civilian Port Defense training typically include up to four unmanned underwater vehicles, marine mammal systems, up to two helicopters operating (two to four hours during daylight) at altitudes as low as 75 to 100 ft (23 to 31 m), two Explosive Ordnance Disposal platoons, a Littoral Combat Ship or Landing Dock Platform and a Mine Warfare Ship. The Mine Warfare Class ship (e.g. AVENGER, measuring 225 ft [69 m]) is a surface mine countermeasure vessel specifically outfitted for mine countermeasure capability. The Proposed Action also includes the placement, use, and recovery of up to 26 bottom placed non-explosive mine training shapes, mine detection (identifying objects), and mine neutralization (disrupting or disabling). The entire training event takes place over multiple weeks utilizing a variety of assets and scenarios.

ALTERNATIVES

For this Environmental Assessment (EA), three alternatives were analyzed as part of the Proposed Action, including the No Action Alternative and two action alternatives. Under the No Action Alternative, Civilian Port Defense training would not occur on the west coast. Alternative 1, the Preferred Alternative, would allow for training to occur within the Ports of Los Angeles/Long Beach proposed action area and includes a portion of the entrance into Anaheim Bay at Naval Weapons Station Seal Beach. Alternative 2 would allow for training to only occur in the Port of San Diego action area described and previously analyzed in the Hawaii Southern-California Training and Testing (HSTT) Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS).

ENVIRONMENTAL CONSEQUENCES

Potential environmental stressors include physical (vessel movement, sea-floor devices, in-water devices, vessel/aircraft emissions, aircraft strike and accessibility), energy (electromagnetic devices and laser), acoustic stressors (vessel/aircraft noise, acoustic transmission), and secondary stressors (transmission of disease and parasites). The potential environmental consequences of these stressors have been analyzed in this EA for resources associated with the physical, biological, and socioeconomic environment. Quantitative analysis was performed on marine mammals regarding the potential impact from acoustic transmissions. For those resources for which non-impulsive acoustic thresholds have not been established and/or appropriate information was not available, a qualitative approach was taken (e.g., acoustic impacts on invertebrates and fish).

The results of the analysis indicate that none of the alternatives considered would significantly impact the physical, biological, or socioeconomic environments.

The Navy informally consulted with the National Marine Fisheries Service (NMFS) under Section 7 of the Endangered Species Act (ESA) and received their concurrence with the Navy's finding that the Proposed Action may affect, but is not likely to adversely affect ESA-listed species.

Effects for Civilian Port Defense training activities under Alternative 2 are detailed and analyzed within the HSTT EIS/OEIS and therefore incorporated by reference in this EA. Effects for Civilian Port Defense training activities under Alternative 1 are addressed in this EA. Under Alternative 1, the Preferred Alternative, Marine Mammal Protection Act species were predicted to be exposed to acoustic transmissions that equated to level B harassment levels. No ESA-listed marine mammals had predicted exposures to level B harassment levels. No level A exposures are predicted from the Proposed Action. An Incidental Harassment Authorization was provided by NMFS for the predicted level B exposures.

The Proposed Action is not expected to affect the marine resources under jurisdiction of the California Coastal Act and California Coastal Management Program or the public's enjoyment of those resources and a Negative Determination for the activities described in Alternative 1 (preferred Alternative) under the Coastal Zone Management Act's Federal Consistency program was submitted to the state of California for their concurrence. Finally, there would be no significant cumulative impacts as a result of implementing the Proposed Action in combination with past, present, or reasonably foreseeable future projects in any of the Alternative locations.

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Acronyms and Abbreviations

°C	Degrees Celsius
°F	Degrees Fahrenheit
° N	Degrees North latitude
° S	Degrees South latitude
CAA	Clean Air Act
CASS	Comprehensive Acoustic System Simulation
CFR	Code of Federal Regulations
CO	carbon monoxide
dB	decibel(s)
DoN	Department of the Navy
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ft	Foot/feet
FR	Federal register
G	gauss
g/bhp-hr	grams per brake horsepower-hour
GRAB	Gaussian Ray Bundle
HAPC	Habitat Areas of Particular Concern
hp	horsepower
HSTT	Hawaii-Southern California Training and Testing
Hz	Hertz
kg	Kilogram(s)
kHz	Kilohertz
km	Kilometer(s)
km^2	Square kilometer(s)
lb	pound(s)
LCS	Littoral Combat Ship
LIDAR	Light detection and ranging
LPF	Landing Platform Dock
m	Meter(s)
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
mi	Mile(s)
mi^2	Square mile(s)
MMPA	Marine Mammal Protection Act
NAAQS	National Ambient Air Quality Standards
NAEMO	Navy Acoustic Effects Model
NEPA	National Environmental Policy Act
nm	Nautical miles
NMFS	National Marine Fisheries Service
NMSDD	Navy Marine Species Density Database
NO_2	Nitrogen dioxide

NO_x	Nitrogen oxide(s)
OAML	Navy's Oceanographic Atmospheric Master Library
OEIS	Overseas Environmental Impact Statement
OPNAVINST	Chief of Naval Operations Instruction
Pb	lead
$PM_{2.5}$	particulate matter less than 2.5 microns
PM_{10}	particulate matter less than 10 microns
PTS	Permanent Threshold Shift
RES	Relevant Environmental Suitability
RONA	Record of Non-Applicability
SCAB	South Coast Air Basin
SEL	Sound Exposure Level
SO_2	sulfur dioxide
SPL	Sound Pressure Level
TPY	tons per year
TTS	Temporary Threshold Shift
μPa	micropascale(s)
U.S.	United States
U.S.C	United States Code
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compound(s)
yd	Yard(s)

CHAPTER 1 PURPOSE AND NEED

1.1 INTRODUCTION

Civilian Port Defense training activities are scheduled every year, typically alternating between the east and west coasts of the United States (U.S.). Civilian Port Defense training activities would occur on the U.S. west coast in the fall of 2015 at one of the two possible locations identified by Surface and Mine Warfighting Development Center. Civilian Port Defense training activities were included in the Hawaii-Southern-California Training and Testing (HSTT) Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS). However, the preferred location for 2015 within the Ports of Los Angeles and Long Beach and San Pedro Bay, and includes a portion of the entrance into Anaheim Bay at Naval Weapons Station Seal Beach, is outside the HSTT study area and therefore, was not considered in the HSTT EIS/OEIS. Since these areas are encompassed within the larger proposed action area the entire proposed action area is described collectively as Los Angeles/Long Beach.

This Environmental Assessment (EA) has been prepared by the United States (U.S.) Department of the Navy (Navy) in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 et seq.), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [C.F.R.] §§1500 et seq.), Navy Procedures for Implementing NEPA (32 C.F.R. §775), and the Chief of Naval Operations Instruction 5090.1D and its accompanying manual M-5090.

1.2 PURPOSE AND NEED

The purpose of the Proposed Action is to train personnel in the skills necessary to ensure U.S. ports remain free of mine threats. Ultimately this Navy training activity is needed to support the Department of Defense mission to defend U.S. territory from attack by state and non-state actors. Naval forces provide mine warfare capabilities to defend the homeland per the Maritime Operational Threat Response Plan. These training activities are conducted in conjunction with other federal agencies, principally the Department of Homeland Security. The three pillars of Mine Warfare include airborne (helicopter), surface (ship and unmanned vehicles), and undersea (divers, marine mammal systems, and unmanned vehicles), all of which are used in order to ensure that strategic U.S. ports are cleared of mine threats. Civilian Port Defense training events employ the use of various mine detection sensors, some of which utilize high frequency active acoustics, for detection of mines and mine-like objects in and around various ports.

1.3 APPLICABLE LAWS AND DIRECTIVES

1.3.1 National Environmental Policy Act

NEPA (42 U.S.C §§ 4321 *et seq.*) was enacted to provide for the consideration of environmental factors in Federal agency planning and decision making, including a series of pertinent alternatives. NEPA requires Federal agencies to analyze the potential impacts of a Proposed Action to the human environment, which includes the physical, biological, and socioeconomic environments and the relationship of people with that environment. The Navy undertakes environmental planning for major Navy actions occurring throughout the world in accordance with applicable laws, regulations, and executive orders. Presidential Proclamation 5928, issued December 27, 1988, extended the exercise of U.S. sovereignty and jurisdiction under international law to 12 nautical miles (nm); however, the proclamation expressly provides that it does not extend or otherwise alter existing federal law or any associated jurisdiction, rights, legal interests, or obligations.

1.3.2 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) (16 U.S.C §§ 1451 *et seq*.) was enacted to protect the coastal environment from demands associated with residential, recreational, and commercial uses. The CZMA provisions encourage states to develop coastal management programs for managing and balancing competing uses of the coastal zone. Each state, in order to receive Federal approval, is required to define the boundaries of the coastal zone, to identify uses of the area to be regulated by the state, the mechanism for controlling such uses, and broad guidelines for priorities of uses within the coastal zone.

The CFR (15 CFR § 930.36) states: "Federal agencies shall review their proposed Federal agency activities which affect any coastal use or resource in order to develop consistency determinations which indicate whether such activities will be undertaken in a manner consistent to the maximum extent practicable with enforceable policies of approved management programs." A Negative Determination was provided to the California Coastal Commission for their concurrence with the Navy's determination that there would be no effect on the coastal zone or coastal resource of the State of California. The Navy received concurrence on the Negative Determination from the California Coastal Commission on July 17, 2015 (Appendix D).

1.3.3 Clean Air Act

The Clean Air Act (42 U.S.C §§ 7506[c]) regulates air emissions from area, stationary, and mobile sources and requires Federal actions in nonattainment areas (an area considered to have air quality worse than the National Ambient Air Quality Standards) or maintenance areas (an area previously designated as nonattainment which has been re-designated under the Clean Air Act) to conform to an applicable State Implementation Plan. The State Implementation Plan is designed to achieve or maintain an attainment designation for air pollutants as defined by the National Ambient Air Quality Standards, which protect public health and the environment. The goal of the Act was to set and achieve National Ambient Air Quality Standards in every state by 1975.

The Clean Air Act was amended in 1977 primarily to set new goals (i.e., dates) for achieving attainment of National Ambient Air Quality Standards, because many areas of the country had failed to meet the deadlines. However, the 1990 amendments were intended to meet unaddressed or insufficiently addressed problems such as acid rain, ground-level ozone, stratospheric ozone depletion, and air toxics. The criteria and procedures to be used to demonstrate conformity are explained in 40 CFR Parts 51 and 93. The Navy concluded that formal Conformity Determination procedures are not required, resulting in a Record of Non-Applicability (Appendix C-1).

1.3.4 Endangered Species Act

The Endangered Species Act (ESA) (16 U.S.C. §§ 1531 *et seq.*) applies to Federal actions in two respects. First, the ESA requires that Federal agencies, in consultation with the responsible wildlife agency, ensure that proposed actions are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat (16 U.S.C. § 1536 (a)(2)). Regulations implementing ESA expand the consultation requirement to include those actions that "may affect" a listed species or adversely modify critical habitat.

Second, if an agency's proposed action would "take" a listed species, then the agency must obtain an incidental take authorization from the responsible wildlife agency. The ESA defines the term "take" to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt any such conduct" (16 U.S.C. §1532(19)). The regulatory definitions of "harm" and "harass" are relevant to the Navy's determination as to whether the proposed action would result in adverse effects on listed species.

- Harm is defined by regulation as "an act which actually kills or injures" fish or wildlife (50 CFR § 222.102).
- Harass is defined by regulation to mean 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" (50 CFR § 17.3).

The Navy informally consulted with the National Marine Fisheries Service (NMFS) under Section 7 of the Endangered Species Act (ESA) and received their concurrence with the Navy's finding that the Proposed Action may affect, but is not likely to adversely affect ESA-listed species.

1.3.5 Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) (16 U.S.C. §§ 1361 *et seq.*) established, with limited exceptions, a moratorium on the "taking" of marine mammals in waters or on lands under U.S. jurisdiction. The act further regulates "takes" of marine mammals by U.S. citizens on the high seas. The term "take," as defined in Section 3 (16 U.S.C. § 1362) of the MMPA, means "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal."

The Fiscal Year 2004 National Defense Authorization Act adopted the definition of "military readiness activity" as set forth in the Fiscal Year 2003 National Defense Authorization Act (Public Law 107-314). A "military readiness activity" is defined as "all training and operations of the Armed Forces that relate to combat" and "the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use." For military readiness activities, such as the Proposed Action, the relevant definition of harassment is any act that:

- Injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild ("Level A harassment"), or

- Disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered ("Level B harassment") (16 U.S.C. § 1632 (18)(B)).

An Incidental Harassment Authorization under MMPA was provided by NMFS for the predicted level B exposures.

1.3.6 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. §§ 1801 *et seq.*), enacted to conserve and restore the nation's fisheries, includes a requirement for National Marine Fisheries Service (NMFS) and regional fishery councils to describe and identify Essential Fish Habitat (EFH) for all species that are federally managed. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Under the Magnuson-Stevens Act, Federal agencies must consult with the Secretary of Commerce regarding any activity or proposed activity that is authorized, funded, or undertaken by the agency that may adversely affect EFH.

The Magnuson-Stevens Act was implemented to conserve and manage the fisheries resources and anadromous (fish species that migrate from salt water to freshwater to breed) species resources of the U.S. In accordance with 62 Federal Register (FR) 66535, the Magnuson-Stevens Act applies only to Federal waters, within the Exclusive Economic Zone.

The Navy determined that the Proposed Action would not result in a significant adverse effect on EFH and is not required to consult with NMFS under the Magnuson-Stevens Act.

1.3.7 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (16 U.S.C. §§ 703 *et seq.*) was enacted to ensure the protection of shared migratory bird resources. The Migratory Bird Treaty Act prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit. The Migratory Bird Treaty Act protects a total of 1,026 bird species; the list of species protected by the Migratory Bird Treaty Act appears in 50 CFR § 10 and 20. The United States Fish and Wildlife Service (USFWS) regulations authorize permits for takes of migratory birds for activities such as scientific research, education, and depredation control.

USFWS regulations at 50 CFR § 21.15 authorize takes resulting from otherwise lawful military readiness activities. This rule does not authorize takes under ESA, and the USFWS retains the authority to withdraw or suspend the authorization for incidental takes occurring during military readiness activities under certain circumstances.

Under this regulation, the Navy must consider the potential environmental effects of its actions and assess the adverse effects of military readiness activities on migratory birds at the individual and population level. If a Proposed Action may result in a significant adverse effect on a population of migratory bird species, the Navy shall consult with the U.S. Fish and Wildlife Service (USFWS) to develop and implement appropriate conservation measures to minimize or mitigate these effects. Conservation measures, as defined in 50 CFR § 21.3, include project designs or mitigation activities that are reasonable from a scientific, technological, and economic standpoint and are necessary to avoid, minimize, or mitigate the take of migratory birds or other potentially adverse impacts. Furthermore, a significant adverse effect on population is defined as an effect that could, within a reasonable period of time, diminish the capacity of a population of a migratory bird species to sustain itself at a biologically viable level.

The Navy determined that the Proposed Action would not result in a significant adverse effect on a population of migratory bird species and is not required to consult with the U.S. Fish and Wildlife Service (USFWS) under the Migratory Bird Treaty Act.

1.4 INCORPORATION BY REFERENCE

The Council on Environmental Quality regulations allow for the incorporation of relevant material by reference with the intent of reducing the bulk of the document. NEPA documentation already exists for Civilian Port Defense activities in the HSTT EIS/OEIS Study Area, and more specifically within the Port of San Diego. The HSTT Study Area is situated from Dana Point to San Diego, California, and extends out more than 600 nm southwest into the Pacific Ocean. Dana Point, California, is 27 nm southeast of the nearest location in the Alternative 1 analysis, the ports of Los Angeles and Long Beach. Where possible in this document, physical and biological descriptions, as well as affected environment analyses, were incorporated by referenced from the HSTT EIS/OEIS. The HSTT EIS/OEIS is available at www.hstteis.com. Table 1-1 provides a cross reference of the sections of the HSTT EIS/OEIS that relate to the sections in this EA.

Table 1-1. HSTT EIS/OEIS Reference Sections Used in the Civilian Port Defense EA.

Civilian Port Defense EA Section	HSTT Existing Environment Sections	Environmental Effects Sections with HSTT References
Biological Resources		
Invertebrates and Benthic Communities (3.2.1)	Marine Habitats (3.3) Marine Vegetation (3.7) Marine Invertebrates (3.8)	Seafloor Devices (3.0.5.3.3.4, 3.3.3.2.5, 3.7.3.2.3, 3.8.3.3.3) Electromagnetic Devices (3.8.3.2.1)
Seabirds (3.2.2)	Seabirds (3.6)	Vessel Movement (3.0.5.3.3.1, 3.6.3.3.2) Seafloor Devices (3.0.5.3.3.4) In-Water Devices (3.0.5.3.3.2, 3.6.3.3.2) Electromagnetic Devices (3.0.5.3.2.1, 3.6.3.2.1,) Lasers (3.0.5.3.2.2) Acoustic (3.0.5.3.1.1, 3.0.5.3.1.6, 3.0.5.3.1.7, 3.6.2.3, 3.6.3.1.1, 3.6.3.1.5)
Fish (3.2.3) and EFH (3.2.4)	Fish (3.9)	Vessel Movement (3.0.5.3.3.1, 3.9.3.3.1) Seafloor Devices (3.0.5.3.3.4, 3.9.3.3.3) In-Water Devices (3.0.5.3.3.2, 3.9.3.3.1) Electromagnetic Devices (3.0.5.3.2.1, 3.9.3.2.1) Lasers (3.0.5.3.2.2) Acoustic (3.0.5.3.1.1,3.0.5.3.1.6, 3.0.5.3.1.7, 3.9.2.1, 3.9.3.1, 3.9.3.1.2)
Sea Turtles (3.2.5)	Sea Turtles (3.5)	Vessel Movement (3.0.5.3.3.1, 3.5.3.3.1) Seafloor Devices (3.0.5.3.3.4, 3.5.3.3.4,) In-Water Devices (3.0.5.3.3.2, 3.5.3.3.2) Electromagnetic Devices (3.0.5.3.2.1, 3.5.3.2.1) Lasers (3.0.5.3.2.2) Acoustic (3.0.5.3.1.1,3.0.5.3.1.6, 3.0.5.3.1.7, 3.5.2.2, 3.5.3.1.12,
Marine Mammals (3.2.6)	Marine Mammals (3.4)	Vessel Movement (3.0.5.3.3.1, 3.4.3.4.1) Seafloor Devices (3.0.5.3.3.4, 3.4.3.4.4) In-Water Devices (3.0.5.3.3.2, 3.4.3.4.2) Electromagnetic Devices (3.0.5.3.2.1, 3.4.3.3.1) Lasers (3.0.5.3.2.2) Acoustic (3.0.5.3.1.1,3.0.5.3.1.6, 3.0.5.3.1.7, 3.4.3.2, 3.4.3.2.1)
Socioeconomic Resources		
Commercial Transportation and Shipping (3.3.1)	Transportation and Shipping (3.11.2.1)	Accessibility (3.11.3.1.1.1)
Commercial and Recreational Fishing (3.3.2)	Commercial and Recreational Fishing (3.11.2.2)	Accessibility (3.11.3.1.1.2)
Tourism (3.3.3)	Tourism (3.11.2.4)	Accessibility (3.11.3.1.1.4) Aircraft Noise (3.11.3.3.1.1)
Subsistence Use (3.3.4)	Subsistence Use (3.11.2.3)	Accessibility (3.11.3.1.1.3)

CHAPTER 2 PROPOSED ACTIONS AND ALTERNATIVES

2.1 PROPOSED ACTION

Civilian Port Defense training activities are naval mine warfare exercises conducted in support of maritime homeland defense, per the Maritime Operational Threat Response Plan. These activities are conducted in conjunction with other federal agencies, principally the Department of Homeland Security. The three pillars of Mine Warfare include airborne (helicopter), surface (ship and unmanned vehicles), and undersea (divers, marine mammal systems, and unmanned vehicles), all of which are used in order to ensure that strategic U.S. ports are cleared of mine threats. Civilian Port Defense training events are conducted in ports or major surrounding waterways, within the shipping lanes, and seaward to the 300 foot (91 meter [m]) depth contour. The events employ the use of various mine detection sensors, some of which utilize high frequency (greater than 10 kilohertz [kHz]) active acoustics for detection of mines and mine-like objects in and around various ports. Active acoustic transmission would be used intermittently over approximately 8 days during the two week long training event during the late October–early November 2015 timeframe. Assets used during Civilian Port Defense training could include up to four unmanned underwater vehicles, marine mammal systems, up to two helicopters operating (two to four hours during daylight) at altitudes as low as 75 to 100 ft (23 to 31 m), two Explosive Ordnance Disposal (EOD) platoons, a Littoral Combat Ship or Landing Dock Platform and a Mine Warfare Class Ship. The Mine Warfare Class Ship (e.g. AVENGER) is a surface mine countermeasure vessel specifically outfitted for mine countermeasure capability.

Table 2-1. Vessel Types, Lengths and Drafts, and Speeds Used During the Civilian Port Defense Training Activities.

Type	Length/Draft	Typical Operating Speed
Littoral Combat Ship	115 m/18 m (4 m displacement)	<10 knots
Landing Platform Dock	208 m/32 m (7 m displacement)	< 10 knots
Mine Warfare Class Ship (Mine Countermeasure)	68 m/12 m (12 m displacement)	5-8 knots

The Proposed Action also includes the placement, use, and recovery of up to 26 bottom placed non-explosive mine training shapes. These mine training shapes, are relatively small, and generally less than 6 ft (1.8 m) in length. Mine shapes may be retrieved by Navy divers, typically explosive ordnance disposal personnel, and may be brought to beach side locations to ensure that the neutralization measures are effective and the shapes are secured. The final step in training is a beach side activity that involves explosive ordinance disposal personnel assessing the retrieved mine shape to gather facts (intelligence) on the type and identifying how the mine works, disassembling the non-explosive mine shape or disposing of it. This final step in the activities will take place on the existing Navy boat ramp at Naval Weapons Station Seal Beach inside the entrance to Anaheim Bay. The entire training event takes place over two weeks utilizing a variety of assets and scenarios, not counting the time required to tether mine shapes on the seabed and to retrieve any that may remain at the end of the training.

2.1.1 Mine Detection Systems

Mine detection systems are used to locate, classify, and map suspected mines (Figure 2-1). Once located, the mines can either be neutralized or avoided. These systems are specialized to either locate mines on the surface, in the water column, or on the sea floor.

- **Towed or Hull-Mounted Mine Detection Systems**. These detection systems use acoustic and low-energy laser or video sensors to locate and classify suspect mines. Helicopters, ships, and unmanned vehicles are used for towed systems, which can rapidly assess large areas.
- **Unmanned/Remotely Operated Vehicles**. These vehicles use acoustic and video or low-energy laser systems to locate and classify mines. Unmanned/remotely operated vehicles provide mine warfare capabilities in nearshore littoral areas, surf zones, ports, and channels.
- **Airborne Laser Mine Detection Systems**. Airborne laser detection systems work in concert with neutralization systems. The detection system initially locates mines and a neutralization system is then used to relocate and neutralize the mine.
- **Marine Mammal System**. Navy personnel and Navy marine mammals work together to detect specified underwater objects. The Navy deploys trained bottlenose dolphins and California sea lions as part of the marine mammal mine-hunting and object-recovery system.

Sonar systems to be used during Civilian Port Defense training would include AN/SQQ-32, AN/AQS-24 and handheld sonars (AN/PQS 2A). The AN/SQQ-32 is a high frequency (between 10 and 200 kHz) sonar system; the specific source parameters of the AN/SQQ-32 are classified. The AN/AQS-24 (well above 200 kHz) and handheld sonars are categorized as *de minimis* sources, by the Navy in coordination with the regulator, National Marine Fisheries Service. These are sources are defined as sources with low source levels, narrow beams, downward directed transmission, short pulse lengths, frequencies above (outside) known hearing ranges, or some combination of these factors (Department of the Navy 2013). Therefore, *de minimis* sources have been determined to not have the potential to impact marine mammals.

2.1.2 Mine Neutralization

Mine neutralization systems disrupt, disable, or detonate mines to clear ports and shipping lanes. Mine neutralization systems can clear individual mines or a large number of mines quickly. Two types of mine neutralization could be conducted, mechanical minesweeping and influence system minesweeping. Mechanical minesweeping consists of cutting the tether of mines moored in the water column or other means of physically releasing the mine. Moored mines cut loose by mechanical sweeping must then be neutralized or rendered safe for subsequent analysis. Influence system minesweeping utilizes electromagnetic devices which simulate the magnetic, electric, acoustic, seismic, or pressure signature of a ship so that the mine detonates (no in-water detonations would occur as part of the Proposed Action).

Figure 2-1. Mine Countermeasure Scenarios.

A mine warfare class ship type, used for mine countermeasures (top); inert mine-like training shape (middle left); concept for unmanned underwater vehicle use (middle right); Explosive Ordnance Disposal dive boat (bottom left); SH-60 helicopter in low hover (bottom right).

2.2 ALTERNATIVES

Screening criteria for alternatives to be evaluated in this EA include locations that demonstrate (1) water depths of less than 300 ft (91 m), (2) near shipping lanes proximate to major ports, and (3) outside sensitive habitats. Twenty-four previously unanalyzed locations were originally considered; however, pre-planning efforts eliminated multiple locations based on these screening criteria. Of these 24 locations, some ports were eliminated because the water depth of the port was too deep or because of their close proximity to environmentally sensitive habitats. Further examination reduced the number of potential locations to only those most likely to support future training events based on preliminary acoustic analyses. However, given this specific requirement to conduct a quantitative analysis of the impacts to marine mammals from active acoustic sources and whether it would be feasible to complete all consultation requirements under MMPA and ESA for multiple locations by the fall of 2015, the anticipated date of the proposed action, only two areas in California were identified as priority areas that could support a CPD training exercise on the west coast in 2015. Specifically, the areas considered in this EA include: Ports of Los Angeles/Long Beach and the Port of San Diego. The Ports of Los Angeles and Long Beach were deemed highest priority based on operational needs.

Furthermore, the action area in the vicinity of the Ports of Los Angeles and Long Beach was selected because of its proximity to San Pedro Bay, Anaheim Bay and Naval Weapons Station Seal Beach and it is an area of heavy commercial shipping traffic, which provides a realistic setting within a unique maritime environment (Figure 2-2). The preferred alternative focused on the highest priority ports for 2015 as well as an alternate port to conduct training activities in San Diego, where coverage for Civilian Port Defense training is currently provided within the HSTT EIS/OEIS. Three alternatives were analyzed as part of the Proposed Action: the No Action Alternative and two action alternatives.

2.2.1 No Action Alternative

Under the No Action Alternative, the Civilian Port Defense training would not occur on the west coast in 2015.

2.2.2 Alternative 1 (Preferred Alternative) – Lost Angeles/Long Beach

Alternative 1, the Preferred Alternative, would allow for training to occur within the Los Angeles/Long Beach proposed action area Figure 2-3. This area would include the use of the entrance to and areas within Anaheim Bay and Naval Weapons Station Seal Beach. Only unmanned underwater vehicles (UUVs), EOD Divers and marine mammal systems would be utilized inside Anaheim Bay. The training would take place for approximately two weeks during the fall of 2015.

2.2.3 Alternative 2 – San Diego

Alternative 2 would allow for training to occur within San Diego, which is covered within the HSTT EIS/OEIS Study Area and this analysis is incorporated by reference. The activities in this alternative would be the same as Alternative 1 and occur within the same timeframe.

2.2.4 Alternatives Eliminated from Further Consideration

Other action alternatives analyzed but not further considered include geographic, seasonal and operational alterations. Geographic alternatives cannot be carried forward due to environmental constraints (i.e., sensitive habitats) that would limit the scope of the training. Seasonal alternatives are not feasible because the events are dictated by training plans; delay to an alternate season may not meet operational requirements. Finally, altering the operations (e.g., reducing source level or limiting duration) is not feasible because the Navy needs the ability to utilize the diverse and multi-dimensional capabilities of specific environmental conditions (bathymetry, topography and weather) found in the proposed action area to maintain high levels of readiness.

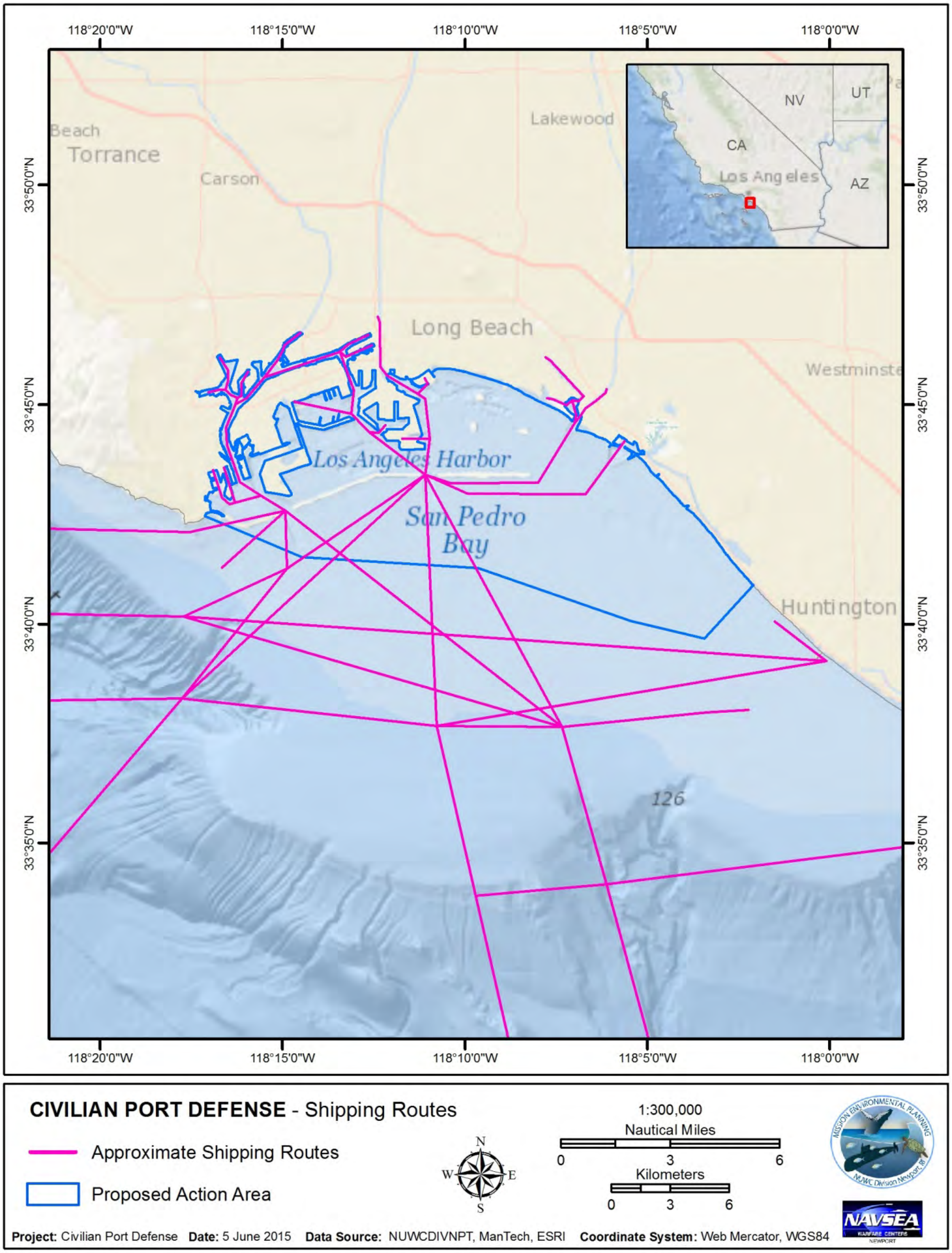

Figure 2-2. Approximate Shipping Routes in the Proposed Action Area.

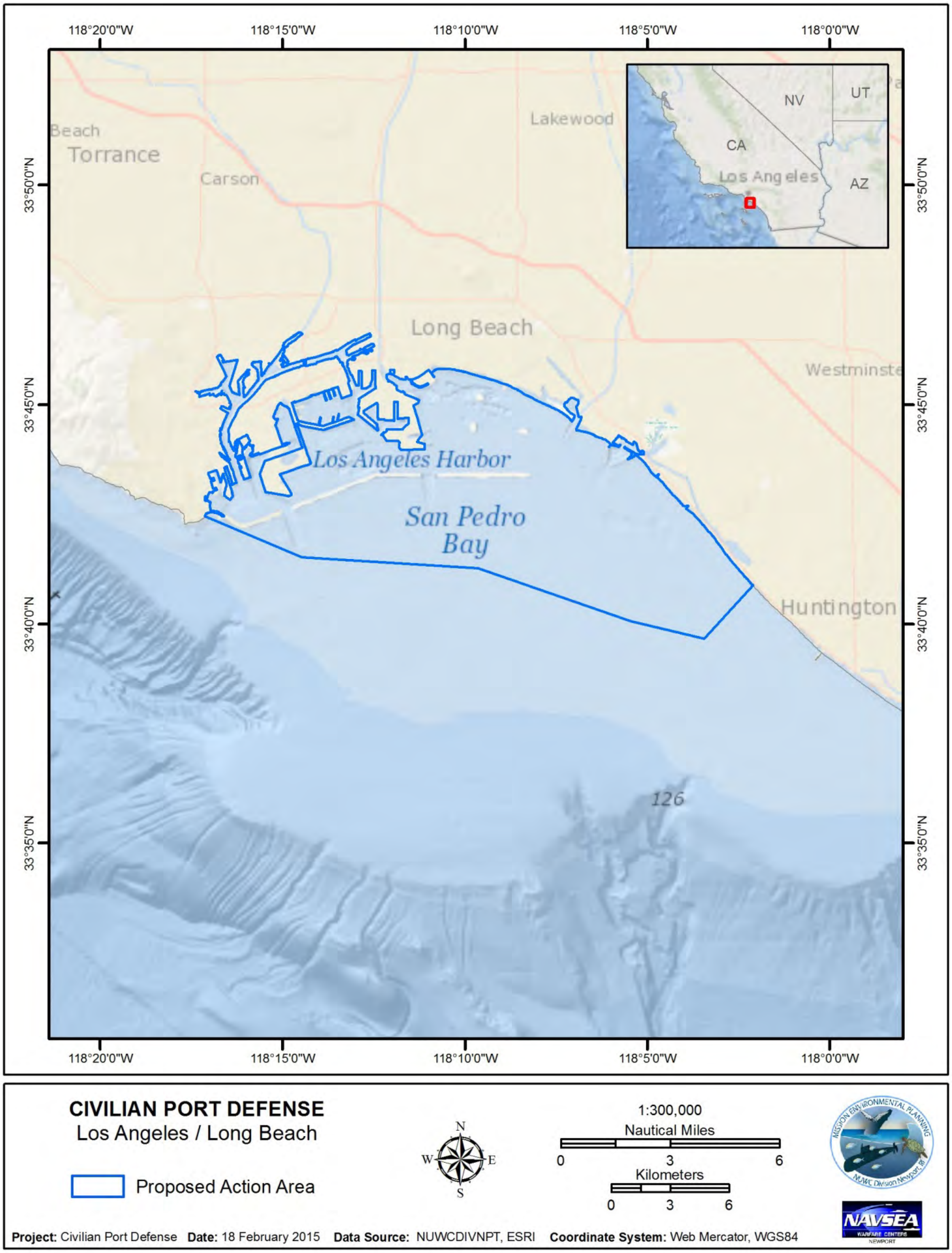

Figure 2-3. Los Angeles/Long Beach Proposed Action Area.

2.3 RESOURCE ANALYSIS

As part of the process to determine the potential impacts from the Proposed Action, the Navy identified potential resources and issues to be analyzed for each alternative (Table 2-2). Some issues typically addressed in NEPA documents were eliminated from further analysis during this process—these include topics primarily related to actions conducted within terrestrial environments. Table 2-3 lists all other resources eliminated from further analysis for each alternative and provide an explanation for their dismissal.

Table 2-2. Relevant Resources and Potential Impact of the Proposed Action.

Resource	Potential Stressors
Physical Environment	
Air Quality	Surface vessels and helicopters have the potential to impact air quality.
Bottom Sediment	The deployment of seafloor devices (training mine shapes) has the potential to impact bottom sediment.
Biological Environment	
Invertebrates and Benthic Communities	Physical disturbance, energy transmissions (i.e. lasers), and acoustic transmissions have the potential to impact invertebrates. Physical disturbance has the potential to impact marine vegetation. Acoustic transmission and energy transmission do not have the potential to impact marine vegetation
Seabirds	Physical disturbance and acoustic transmissions have the potential to impact seabirds.
Fish	Physical disturbance, energy transmissions, and acoustic transmissions have the potential to impact fish.
Essential Fish Habitat	Physical disturbance of the water column and bottom sediment have the potential to impact EFH.
Sea Turtles	Physical disturbance, energy transmissions, and acoustic transmissions have the potential to impact sea turtles.
Marine Mammals	Physical disturbance, energy transmissions, and acoustic transmissions have the potential to impact marine mammals. Transmission of Marine Mammal Diseases and Parasites, as a secondary stressor, has the potential to impact marine mammals.
Socioeconomic Environment	
Commercial and Recreational Fisheries	Fishing activities will not be prevented though presence of the activity may deter fishing from taking place within the proposed action area. Vessel movement, object placements and acoustic transmissions have the potential to impact fish.
Commercial Shipping and Transportation	Portions of the proposed action area overlap with designated shipping and ferry routes. Shipping or transportation would not be impacted during training activities but could have partial delays.
Recreational Boating and Tourism	Recreational boaters, swimmers, and divers may temporarily avoid the proposed action area during training activities.

Table 2-3. Resources Eliminated from Analysis.

Physical Environment	
Airspace	The majority of Proposed Action would occur on or in the water. Low flying helicopters may be used for a portion of the training but will not interfere with regular public airspace usage given the altitude at which the helicopters operate. Helicopters would deploy directly from the Littoral Combat Ship. Therefore, the Proposed Action would not impact use of airspace.
Floodplains and Wetlands	The Proposed Action would occur in open water and would not impact the physical attributes of floodplains or wetlands. Therefore, the Proposed Action would not impact floodplains or wetlands.
Geology	No construction or dredging is planned as part of the Proposed Action. Therefore, the Proposed Action would not impact geological resources.
Land Use	The Proposed Action would occur in open water and not on land. Therefore, the Proposed Action would not impact land use.
Terrestrial Environment	The Proposed Action would occur offshore. Therefore, the Proposed Action would not impact the terrestrial environment including parks, forests, and prime and unique farmland.
Water Quality	No vessel fueling activities would take place at sea during the Proposed Action and no discharges would occur. No explosive charges would be used so no chemicals related to explosives would be released. The Proposed Action would not release any chemicals or other pollutants into the water and therefore, would not impact water quality.
Wild and Scenic Rivers	The Proposed Action would occur on or in open bay and ocean waters. Therefore, the Proposed Action would not impact wild and scenic rivers.
Biological Environment	
Plankton	The Proposed Action would not affect the light, temperature, or nutrient characteristics of the water column and would not impact plankton.
Terrestrial Wildlife	The Proposed Action would occur offshore and would not impact terrestrial wildlife.
Socioeconomic Environment	
Aesthetics	Vessel movements and helicopter movements would be consistent with vessels and aircraft commonly occurring in the area. Therefore, the Proposed Action would not impact aesthetics.
Archaeological and Historical Resources	No archaeological or historical resources are located within the proposed action area. Therefore, the Proposed Action would not impact archaeological and historical resources.
Environmental Justice	The Proposed Action would occur on the water and there would be no disproportionately high or adverse human health or environmental impacts on minority or low-income populations. Therefore, the Proposed Action would not impact environmental justice.
Infrastructure	No modification of infrastructure would occur as a result of the Proposed Action. Therefore, the Proposed Action would not impact infrastructure.
Utilities	The Proposed Action would not occur near any utilities. Therefore, the Proposed Action would not impact utilities.

CHAPTER 3 EXISTING ENVIRONMENT

This chapter provides the relevant baseline information regarding the environment where the Preferred Alternative would occur in the waters surrounding the Ports of Los Angeles/Long Beach. Alternative 2, Port of San Diego, is fully analyzed within the HSTT EIS/OEIS and therefore, no additional existing environmental information will be presented on that alternative. The existing environmental information from the HSTT EIS/OEIS is available at www.hstteis.com.

3.1 PHYSICAL ENVIRONMENT

Point Conception is a biogeographic break where the northern and southern ecosystems of the west coast converge. Point Conception is an environmental "transition zone" between the warm Californian Province and the cooler water regime of the Oregonian Province, resulting in differences in climate, topography, flora (algal communities), fauna (fish and invertebrates), and marine environment on either side of this break (Horn and Allen 1978; Murray and Bray 1993; Murray and Littler 1981). Point Conception is also the northernmost point of the Southern California Bight, a biologically diverse marine transition zone attributed to the confluence of the southward-flowing, cold water California current and the northward-flowing, warm-water California countercurrent.

The waters of the Southern California Bight overlay an alternating series of 2,000 to 8,000 ft (610 to 2,438 m) deep basins and surfacing mountains that form nine offshore islands or island groups and several large submerged banks and seamounts (National Research Council 1990). Additionally, 32 submarine canyons on the continental slope border the U.S. portion of the bight, including 20 canyons that cut into the mainland shelf. Important features throughout the bight include deep water close to shore, steep slopes, and narrow island and mainland shelves. Although no true estuaries penetrate the mainland coast, there are at least 25 wetland systems in coastal lagoons and at the mouth of transient streams and rivers (National Research Council 1990).

3.1.1 Air Quality

Existing air quality at a given location can be described by the concentrations of various pollutants in the atmosphere. The main pollutants of concern considered in this air quality analysis include volatile organic compounds (VOCs), ozone (O3), carbon monoxide (CO), nitrogen oxides (NOx), sulfur oxide (SOx) particulate matter less than 10 microns in diameter but greater than 2.5 microns in diameter (PM10), and particulate matter less than or equal to 2.5 microns in diameter (PM2.5). Although VOCs or NOx (other than nitrogen dioxide [NO2]) have no established ambient air quality standards, they are important as precursors to O3 formation. These criteria pollutants have national and/or state ambient air quality standards.

The U.S. Environmental Protection Agency (USEPA) establishes the National Ambient Air Quality Standards (NAAQS), while the California Air Resources Board (CARB) establishes the state standards, termed the California Ambient Air Quality Standards (CAAQS) (California Air Resources Board 2013). The South Coast Air Quality Management District has been delegated the authority to enforce the federal and state standards in the proposed action area (Table 3-1). A few coastal California counties are classified as attainment areas of the eight-hour standard for ozone (40 CFR § 81.322). Attainment areas are areas that meet the National Ambient Air Quality Standards for specific pollutants. Under the Clean Air Act of 1970, only non-attainment areas are required to limit and act to decrease emissions below the National Ambient Air Quality Standards.

In Southern California, there are several counties classified as non-attainment areas. Portions of San Luis Obispo County and San Diego County are classified as marginal for ozone. A portion of Ventura County is a serious ozone non-attainment area. Los Angeles County (the portion within the South Coast Air Basin) and Orange County are extreme non-attainment areas, also for ozone.

Table 3-1. California and National Ambient Air Quality Standards (California Air Resources Board 2013)

Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147µg/m^3)		
Respirable Particulate Matter (PM10)[8]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM 2.5)[8]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[9]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[10]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[10]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[10]	—	
Lead [11, 12]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles [13]	8 Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	**NO NATIONAL STANDARDS**		

Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride [11]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.
8. On December 14, 2012, the national annual PM 2.5 primary standard was lowered from 15 µg/m3 to 12.0 µg/m^3. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM10 standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
9. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
10. On June 2, 2010, a new 1-hour SO2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
11. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
12. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
13. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

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3.1.2 Greenhouse Gases and Climate Change

Present in Earth's lower atmosphere, greenhouse gases play a critical role in maintaining Earth's temperature by trapping some of the long-wave infrared radiation emitted from the Earth's surface that would otherwise escape into space. According to the Environmental Protection Agency, greenhouse gases include the following: carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, perfluorocarbons, and hydrofluorocarbons. Human activities that emit additional greenhouse gases to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and amplifying the warming of Earth. Rising atmospheric concentrations of greenhouse gases in excess of natural levels enhance the greenhouse effect, which contributes to global warming of Earth's lower atmosphere. Resulting large-scale changes in ocean circulation patterns, precipitation patterns, global ice cover, biological distributions, and other changes to the earth system are collectively referred to as climate change.

Per capita, California's gross emissions of greenhouse gases measured at 12.1 tons of carbon dioxide equivalent per person in 2012 (California Environmental Protection Agency Air Resources Board 2014). The transportation sector is the main contributor to greenhouse gas emissions (36 percent) in the state of California (California Environmental Protection Agency Air Resources Board 2014). Water-borne vessels contributed 10.1 million metric tons of carbon dioxide equivalent to the gross state emissions in 2012 (California Environmental Protection Agency Air Resources Board 2014). Emissions from military transportation activities are not included in the inventory total for the State, and would represent less than 1 percent of total statewide emissions (California Environmental Protection Agency Air Resources Board 2014). The potential impacts of proposed greenhouse gas emissions are by nature global, individual sources of greenhouse gas emissions are not large enough to have any noticeable effect on climate change.

Executive Order 13693 was enacted on 19 March 2015 with the goal to maintain federal leadership in sustainability and greenhouse gas emission reductions. This Executive Order lays out guidelines for federal agencies to reduce their annual greenhouse gas emissions and focus on renewable energy. However, vehicles and equipment that are associated with "combat support, combat service support, tactical or relief operations, or training for such operations or spaceflight vehicles" are excluded from reduction requirements and would not count towards an agency's total annual emission.

Additionally, the California Global Warming Solutions Act of 2006 (AB32) directs the State of California to reduce statewide GHG emissions to 1990 levels by the year 2020. Groups of states also have formed regionally based collectives (such as the Western Climate Initiative) to jointly address GHG pollutants.

3.2 BIOLOGICAL ENVIRONMENT

3.2.1 Invertebrates and Benthic Communities

3.2.1.1 Marine Vegetation

The following discussion provides an overview of the predominant marine vegetation species and habitat types known to occur in the proposed action area. Seven vegetation types are described: diatoms, dinoflagellates, blue-green algae, green algae, brown algae, red algae, and flowering grasses. Major taxonomic groups potentially located within the proposed action area are described in Table 3-2. Marine vegetation species designated as Essential Fish Habitat

(EFH) under the Magnuson-Stevens Act are described in Section 3.2.4. No ESA-listed marine vegetation species are known to occur within the proposed action area.

Table 3-2. Taxonomic Groups of Marine Vegetation that May Occur in the Proposed Action Area.

Taxonomic Group	Description	Vertical Distribution Within the Proposed Action Area
Dinoflagellates (Phylum Dinophyta)	Most are photosynthetic single-celled algae that have two flagella; some live inside other organisms as zooxanthellae. Some produce toxins that can result in red tide or ciguatera poisoning.	Photic zone
Diatoms (Phylum Heterokontophyta)	Unicellular or colonial algae that have a silica shell called a frustule and form the base of the marine food web.	Photic zone
Blue-green algae (Phylum Cyanobacteria)	Bacteria that are usually unicellular, but may appear in colonial arrangements; many form mats that attach to reefs and produce nutrients for other marine species through nitrogen fixation.	Photic zone
Green algae (Phylum Chlorophyta)	Marine species occur as unicellular algae, filaments, and large seaweeds.	Photic zone and seafloor
Brown algae (Phylum Heterokontophyta)	Brown and golden-brown algae are large multicellular seaweeds that often grow on the surface of rocks but can also be epiphytic, endophytic, or pelagic.	Photic zone and seafloor
Red algae (Phylum Rhodophyta)	Single-celled algae and multi-celled large seaweeds; some species form calcium deposits.	Photic zone and seafloor
Seagrass and cordgrass (Phylum Spermatophyta)	Flowering plants, which are adapted to salty marine environments in mudflats, marshes, intertidal and subtidal coastal waters, providing habitat and food for many marine species.	Seafloor

The composition and life history of species in the Los Angeles/Long Beach proposed action area are similar to the California areas described in the HSTT EIS/OEIS. Therefore, a summary of information is provided here; detailed information can be found in the HSTT EIS/OEIS Section 3.7.2.2.

Factors that influence the distribution and abundance of marine vegetation include: the availability of light and nutrients, water quality, water clarity, salinity level, seafloor type (important for rooted or attached vegetation), currents, tidal schedule, and temperature (Green and Short 2003). Marine ecosystems depend almost entirely on the energy produced by photosynthesis of marine plants and algae, which is the transformation of the sun's energy into chemical energy, as well as oxygen-producing bacteria (Castro and Huber 2000). In surface waters of the open ocean and coastal waters, as well as within the portion of the water column illuminated by sunlight (the photic zone), marine algae and flowering plants provide oxygen, food, and habitat for many organisms (Dawes 1998).

Marine vegetation along the California coast is represented by more than 700 varieties of seaweeds (such as corallines and other red algae, brown algae, and green algae), seagrasses (Leet et al. 2001; Wyllie-Echeverria and Ackerman 2003), and canopy-forming kelp species (Wilson 2014). Extensive mats of red algae provide habitat in areas of exposed sediment along the

California coast (Adams et al. 2004; U.S. Department of the Navy and San Diego Unified Port District 2011). Areas within the influence of the California Current are considered moderately productive with a primary productivity range of 150 to 300 grams of Carbon per square meter per year (Hogan 2011). The marine vegetation in the seagrass and cordgrass taxonomic groups have more limited coastal and shallow water distributions. The relative distribution of seagrass is influenced by the availability of suitable substrate in low-wave-energy areas at depths that allow sufficient light exposure. Cordgrasses form dense colonies within salt marshes that develop in temperate areas that have protected, low-energy environments, along the intertidal portions of coastal lagoons, tidal creeks or rivers, or estuaries, wherever the sediment can support plant root development. From March to July, upwelling along the coast increases primary productivity. Fluctuations in the year to year productivity of the ecosystem are the result of the El Niño Southern Oscillation and the upwelling coastal phenomenon.

3.2.1.2 Invertebrates

The following discussion provides an overview of the predominant marine invertebrate species known to occur in the proposed action area (Table 3-3). Marine invertebrates are a large, diverse group of at least 50,000 species (Brusca and Brusca 2003), inhabiting both coastal waters and benthic habitats through the proposed action area. The greatest densities of marine invertebrates are usually on the seafloor (Sanders 1968).

The biogeography of the Los Angeles/Long Beach proposed action area is similar to the California areas described in the HSTT EIS/OEIS. Therefore, a summary of information is provided here; detailed information can be found in the HSTT EIS/OEIS Section 3.8.1.3.

Marine invertebrates in California inhabit coastal waters and benthic habitats (the ecological region at the lowest level of body of water, which includes the sediment surface and some sub-surface layers), including salt marshes, kelp forests, soft sediments, canyons, and the continental shelf. More than 260 species of sponges, hydroids, sea fans, mollusks, echinoderms, and ascidians (sea squirts) have been identified in the subtidal rocky reefs of Central and Southern California (Chess and Hobson 1997). Rock oysters and mussels dominate the tops of rocky reefs. The orange cup coral (*Balanophyllia elegans*) is a common stony coral in hard-bottom habitats of the shallow subtidal zones of Southern California (Bythell 1986; Kushner et al. 1999).

The soft bottom sediments of California's estuarine communities are highly productive, with a high diversity of invertebrates. Representative organisms in the soft-bottom communities of California estuaries, such as San Diego Bay, include crustaceans (e.g., caridean or bay shrimps, Pacific razor clams [*Siliqua patula*], gaper clams [*Tresus capax*], Washington clams [*Saxidomus gigantea*], littleneck clams [*Leukoma staminea*], and blue mussels [*Mytilus edulis*]) (Emmett et al. 1991; Kalvass 2001). Marine worms, crustaceans, and mollusks are the dominant invertebrates living on and in the soft bottom sediment and the submerged aquatic vegetation of California (U.S. Department of the Navy and San Diego Unified Port District 2011). In waters of the proposed action area, two marine invertebrate species, black abalone (*Haliotis cracherodii*) and white abalone (*Haliotis sorenseni*), are listed as endangered under the ESA. A summary of these species is provided below; a detailed description of black abalone and white abalone can be found in Sections 3.8.2.3 and 3.8.2.4, respectively, in the HSTT EIS/OEIS.

Table 3-3. Taxonomic Groups of Invertebrates that May Occur within the Proposed Action Area.

Taxonomic Group	Description	Vertical Distribution within the Proposed Action Area
Foraminifera, radiolarians, ciliates (Phylum Foraminifera)	Benthic and pelagic single-celled organisms; shells typically made of calcium carbonate or silica.	Water column and seafloor
Sponges (Phylum Porifera)	Benthic animals; large species have calcium carbonate or silica structures embedded in cells to provide structural support.	Seafloor
Corals, hydroids, jellyfish (Phylum Cnidaria)	Benthic and pelagic animals with stinging cells.	Water column and seafloor
Flatworms (Phylum Platyhelminthes)	Mostly benthic; simplest form of marine worm with a flattened body.	Water column and seafloor
Ribbon worms (Phylum Nemertea)	Benthic marine worms with a long extension from the mouth (proboscis) that helps capture food.	Seafloor
Round worms (Phylum Nematoda)	Small benthic marine worms; many live in close association with other animals (typically as parasites).	Water column and seafloor
Segmented worms (Phylum Annelida)	Mostly benthic, highly mobile marine worms; many tube-dwelling species.	Seafloor
Bryozoans (Phylum Bryozoa)	Bushy or lace-like animals that exist as filter feeding colonies attached to the seafloor and other substrates.	Seafloor
Cephalopods, bivalves, sea snails, chitons (Phylum Molluska)	A diverse group of soft-bodied invertebrates with a specialized layer of tissue called a mantle. Mollusks such as squid are active swimmers and predators, while others, such as sea snails, are predators or grazers, and others are filter feeders.	Water column and seafloor
Shrimp, crab, lobster, barnacles, copepods (Phylum Arthropoda – Crustacea)	Benthic or pelagic; some are immobile; with an external skeleton; all feeding modes from predator to filter feeder.	Water column and seafloor
Sea stars, sea urchins, sea cucumbers (Phylum Echinodermata)	Benthic predators and filter feeders with tube feet.	Seafloor

3.2.1.2.a Black Abalone

Black abalone (*Haliotis cracherodii*) is listed as endangered under the ESA. Critical habitat for black abalone was designated by NMFS in 2011. This designation includes approximately 139 square miles (mi^2; 360 square kilometers [km^2]) of rocky intertidal and subtidal habitat within five segments of California coast from north of San Francisco to the Palos Verdes Peninsula, including the Farallon Islands and Año Nuevo Island near San Francisco as well as the Channel Islands in the Southern California Bight. Critical habitat includes rocky intertidal and subtidal habitats from the mean higher high water line to a depth of 20 ft (6 m) as well as the coastal marine waters encompassed by these areas (50 CFR § 226). While the black abalone critical habitat does not fall within the proposed action area, the Palos Verdes peninsula is adjacent to the coast of Long Beach.

Black abalone prefers rocky intertidal and subtidal habitats (National Oceanic and Atmospheric Administration (NOAA) 2015a) from the shore to a depth of 197 ft (60 m) (California

Department of Fish and Game 2005), but more often only to 20 ft (6 m), where they wedge themselves between rocks (Butler et al. 2009). Their range extends from northern California to the southernmost point of Baja California, Mexico. The majority of black abalone may be found in the high intertidal zone where drift kelp fragments tend to be concentrated by breaking surf (Butler et al. 2009). Black abalones are herbivores that feed on a variety of kelp species. Black abalone may be present in the proposed action area, depending on the bottom type, as a rocky substrate is preferred.

Black abalone historically occurred from Crescent City, California, USA, to southern Baja California, Mexico (Butler et al. 2009), but today the species' constricted range occurs from Point Arena, California, USA, to Bahia Tortugas, Mexico, and it is rare north of San Francisco, California, USA (Butler et al. 2009), and south of Punta Eugenia, Mexico.

Massive declines in black abalone began in 1986 that resulted in significant large-scale population reductions by the early 1990s (Lafferty and Kuris 1993). Evidence of population decline has also been observed in central California (Raimondi et al. 2002). The Black Abalone Status Review Team estimates that, unless effective measures are put in place to counter the population decline caused by withering syndrome and overfishing, the species will be extinct within 30 years (Butler et al. 2009).

The ability to sense magnetic fields is thought to assist invertebrates with navigation and orientation (Lohmann et al. 1997a; Normandeau Associates Inc. et al. 2011). Neither of the ESA-listed abalone travel long distances during their lives, and thus, are not thought to be included in this group of electromagnetically sensitive invertebrates. However, because susceptibility is variable within taxonomic groups, it is not possible to make generalized predictions for groups of marine invertebrates.

Sensitivity thresholds vary by species ranging from 3 to 300 G, and responses included non-lethal physiological and behavioral changes (Normandeau Associates Inc. et al. 2011). Human-introduced electromagnetic fields could disrupt these cues and interfere with navigation, orientation, or migration. Because electromagnetic fields weaken exponentially with increasing distance from their source, large and sustained magnetic fields present greater exposure risks than small and transient fields (Normandeau Associates Inc. et al. 2011). Transient or moving electromagnetic fields such as the ones associated with the Proposed Action may cause temporary disturbance to susceptible organisms' navigation and orientation, but the fields would be small and would have no population level or long-term effects.

Studies of sound energy effects on invertebrates are few, and identify only behavioral responses. Non-auditory injury, permanent threshold shift (PTS), temporary threshold shift (TTS), and masking studies have not been conducted for invertebrates. Both behavioral and auditory brainstem response studies suggest that crustaceans may sense sounds up to 3 kHz, but best sensitivity is likely below 200 Hz (Goodall et al. 1990a; Lovell et al. 2005; Lovell et al. 2006b). Non-arthropod invertebrates have no air-filled cavities that are capable of detecting the pressure component of sound (Bundelmann 1992). Therefore, it is almost impossible to distinguish between behavioral reactions based on reception of sound, reception of water-borne or substrate-borne vibrations, or reception of local water movements (Bundelmann 1992). With the ambient noise levels of the proposed action area being elevated and the inability of any species of abalone to differentiate between types of noise or have the ability to hear the noise, the vessel noise from the proposed action would have no significant additional masking effect to the environment and would not impact white or black abalone.

Given the low probability of black abalone being in the proposed action area (low populations numbers and limited offshore suitable substrate), no anticipated Navy training activities near shore and tidal rocky habitat, limited likely reaction of invertebrates to sound or other stressors, the probability of being exposed to any stressor capable of eliciting a negative response is sufficiently low as to be discountable. Therefore, the black abalone is not carried forward further in this analysis.

3.2.1.2.b White Abalone

White abalone (*Haliotis sorenseni*) is listed as endangered under the ESA. Currently, no critical habitat has been designated for white abalone.

Historically, white abalone occurred from Point Conception, California to Punta Abreojos, Baja California, Mexico. They are the deepest-living of the west coast abalone species (Hobday and Tegner 2000): they had been caught at depths of 66 to 197 ft (20 to 60 m), but had been reported as having had the highest abundance at depths of 80 to 100 ft (25 to 30 m) (Cox 1960; Tutschulte 1976). At these depths, white abalones are found in open low relief rock or boulder habitat surrounded by sand (Davis et al. 1996; Tutschulte 1976). White abalone inhabits a more southern range than black abalone, beginning at Point Conception and extending to Baja California, Mexico (Figure 3-1). White abalone typically occupy deeper waters than black abalone, from depths of 80 to 100 ft (25 to 30 m), and prefer rocky habitat interspersed with sand channels, enabling them to feed on drifting macroalgae and red algae. In the Southern California Bight, white abalone are more commonly found near the offshore islands than the mainland coast (National Oceanic and Atmospheric Administration (NOAA) 2015b).

According to the California Department of Fish and Game (2005), white abalone are classified as "near extinction." Current population estimates indicate that white abalone may have declined by as much as 99 percent in the last 25 years. An abundance estimate based on deep survey data (Davis et al. 1998) estimated that 1,600 animals (Hobday and Tegner 2000) were spread over the entire geographic range documented for this species.

White abalones are herbivores that feed on drifting macroalgae and red algae (National Oceanic and Atmospheric Administration 2014). White abalone may be present in the proposed action area. However, population numbers are quite low and they are more common near offshore islands and underwater banks in areas of rocky substrate than the soft-bottom habitat typical of the proposed action area. Therefore, the white abalone is not carried forward further in this analysis.

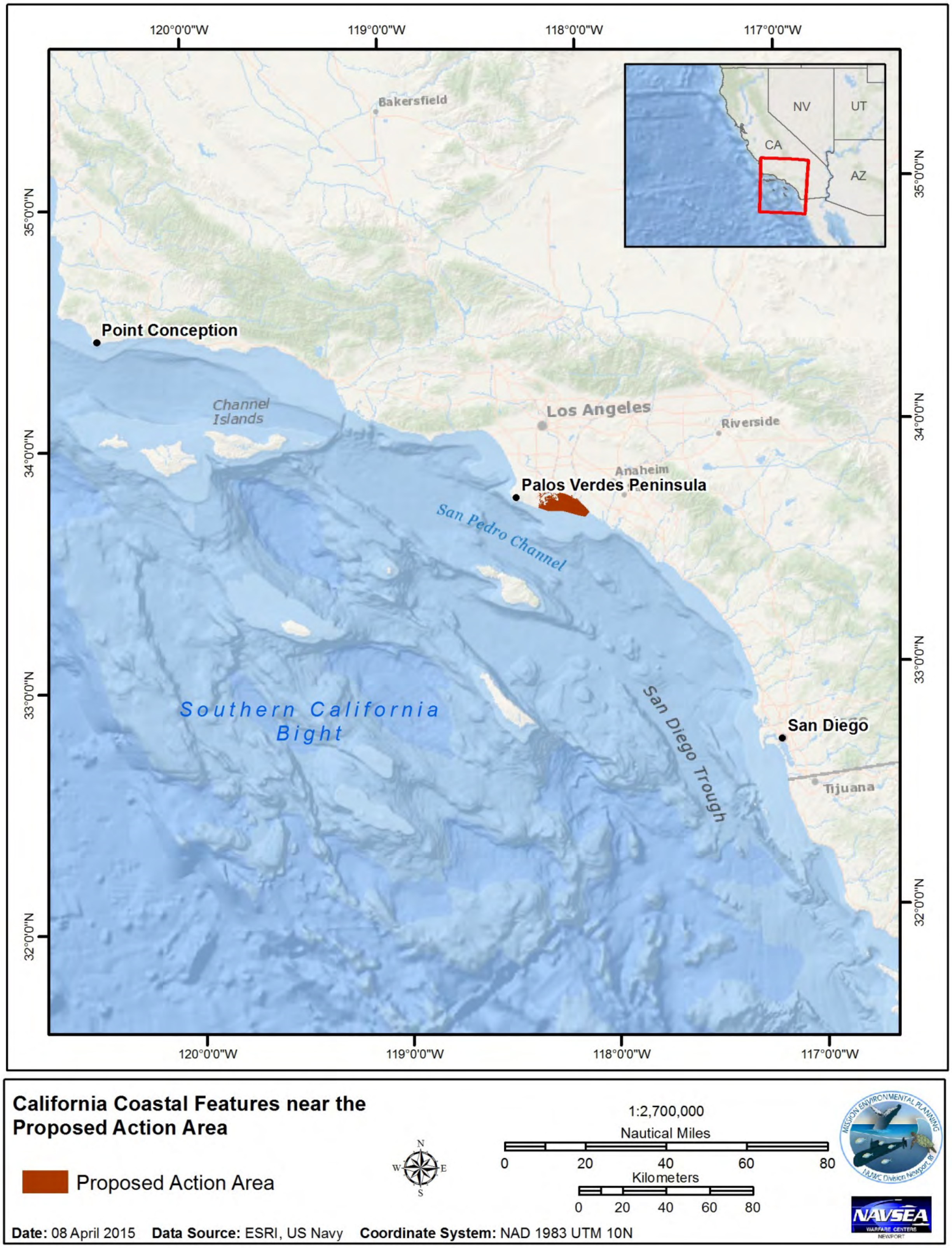

Figure 3-1. Southern California Coastal Features.

3.2.2 Seabirds

Seabirds are a diverse group that are adapted to utilizing marine environments (Enticott and Tipling 1997) and use coastal (nearshore) waters, offshore waters (continental shelf), or open ocean areas (Harrison 1983). Some seabirds look for food (forage) on the sea surface, whereas others dive to variable depths to obtain prey (Burger 2001). Many seabirds spend most of their lives at sea and come to land only to breed, nest, and occasionally rest (Schreiber and Chova 1986). Most species nest in groups (colonies) on the ground of coastal areas or oceanic islands, where breeding colonies number from a few individuals to thousands. Appendix A lists the seabird species protected under the Migratory Bird Treaty Act that may occur in the Los Angeles/Long Beach proposed action area and seasons of occurrence. Migration refers to the spring and fall months, though many species migration routes may overlap with their winter and summer distribution.

The species composition and life history in the Los Angeles/Long Beach proposed action area is similar to the California areas described in the HSTT EIS/OEIS. Therefore, a summary of information is provided here; detailed information can be found in the HSTT EIS/OEIS Section 3.6.

The California least tern (*Sterna antillarum browni*) is the only ESA-listed seabird species expected to occur within the proposed action area because of its coastal nature. California least tern is listed as endangered under the ESA. Currently, no critical habitat has been designated for this species.

California least terns typically arrive in California in April to breed and depart in August for their wintering grounds in Latin America. Their nesting range occurs along the Pacific coast from southern Baja California to San Francisco Bay. They nest near estuaries, bays, and harbors where their preferred prey, small fish, is abundant (California Department of Fish and Game 2014). For nesting, California least terns prefer habitats that consist of beaches, dunes, and sand bars along the coast (U.S. Fish and Wildlife Service 1985). They nest in areas generally free of vegetation above the high tide mark. Colony sites are often near estuaries, lagoons, rivers, or along the coast (U.S. Fish and Wildlife Service 1985). Atwood and Minsky (1983) noted that before the decline of the species, at least 82 percent of known nesting sites in California were within 1 mile (mi,1.6 kilometers [km]) of a river mouth or estuarine habitat.

Foraging habitats include nearshore ocean waters, bays, river mouths, salt marshes, marinas, river channels, lakes, and ponds (Thompson et al. 1997). California least terns feed within 2 mi (3.2 km) of the shoreline in ocean waters less than 60 ft (18.3 m) deep, with most foraging within 1 mi (1.6 km) of shore (Atwood and Minsky 1983). Atwood and Minsky (1983) also observed a tendency for foraging birds to be concentrated in coastal waters near major river mouths. Foraging habitat use varies within and between years, depending on the stage of breeding and prey availability (Atwood and Minsky 1983; BirdLife International 2014). Atwood and Minsky (1983) noted in their coastal colony study that, before terns disperse after breeding, they typically forage within 2 mi (3.2 km) of nesting sites, although large groups were occasionally observed foraging at greater distances from colonies, including inland water sources. The presence of eelgrass is important because it is habitat for several prey species of the least tern such as topsmelt (BirdLife International 2014).

Since the California least tern is not present in the proposed action area during the time of the Proposed Action (fall), there would be no impact to the terns from the proposed training.

3.2.3 Fish

The following discussion provides an overview of the predominant fish species known to occur in the proposed action area. The species life history and composition in the Los Angeles/Long Beach proposed action area is similar to the California areas described in the HSTT EIS/OEIS. Therefore, a summary of information is provided here; detailed information can be found in the HSTT EIS/OEIS Section 3.9. Additionally, detailed descriptions of ESA-listed species are provided.

The coastal areas off of the Los Angeles/Long Beach proposed action area is a region of highly productive fisheries within the California Current (Leet et al. 2001). The portion of the California Bight in the proposed action area is a transitional zone between cold and warm water masses, geographically separated by Point Conception. The cold-water California Current is rich in microscopic plankton (diatoms, krill, and other organisms), which form the base of the food chain in Southern California. Small coastal pelagic fishes depend on this plankton and in turn are preyed on by larger species (such as highly migratory species). Approximately 480 species of marine fish inhabit the Southern California Bight, and numerous fish species utilize spawning, nursery, feeding, and seasonal grounds in nearshore, inshore (including bays and estuaries), and offshore waters of Southern California (Cross and Allen 1993). The high fish diversity found in the proposed action area occurs for several reasons: (1) the ranges of many temperate and tropical species extend into Southern California, (2) the area has complex bottom features and physical oceanographic features that include several water masses and a changeable marine climate (Allen et al. 2006; Horn and Allen 1978), and (3) the islands and coastal areas provide a diversity of habitats that include soft bottom, rocky reefs, kelp beds, estuaries, bays, and lagoons. Although the Los Angeles/Long Beach proposed action area is not within the boundaries of the HSTT Study Area, the description in Section 3.9 of the HSTT EIS/OEIS provides additional details on the fish within the proposed action area.

A general description on habitat preference and life history of all ESA-listed fish species that may occur within the Los Angeles/Long Beach proposed action area is provided in this section. Table 3-4 summarizes these species and where they may be encountered.

Table 3-4. Federally-Listed ESA Fish Species that May Occur within the Proposed Action Area.

Common Name	Species Name	Evolutionary Significant Unit/Distinct Population Segment	ESA Status	Critical Habitat within Proposed Action Area
Steelhead Trout	*Oncorhynchus mykiss*	Southern California	Endangered	No
		South-Central California Coast	Threatened	No
Scalloped Hammerhead Shark	*Sphyma lewini*	Eastern Pacific	Endangered	No

3.2.3.1 Tidewater Goby

The tidewater goby (*Eucyclogobius newberryi*) is listed as endangered under the ESA. Designated critical habitat for the tidewater goby is located in freshwater rivers and streams in Del Norte, Humboldt, Mendocino, Sonoma, Marin, San Mateo, Santa Cruz, Monterey, San Luis Obispo, Santa Barbara, Ventura, and Los Angeles Counties in California, which do not overlap with the proposed action area.

Tidewater goby populations are discontinuously distributed along the coast of California including the coastal waters of the proposed action area. They inhabit areas as far north as Tillas Slough at the mouth of the Smith River in northern California and as far south as the Agua Hedionda Lagoon which is approximately 75 mi (120 km) south of the proposed action area (U.S. Environmental Protection Agency 2007).

Tidewater gobies inhabit the fresh-saltwater interface where salinity is less than 10 to 12 parts per thousand. These conditions occur at the upper edge of tidal bays (for example, Tomales, Bolinas, and San Francisco Bays) near the entrance of freshwater tributaries and in coastal lagoons formed at the mouths of coastal rivers, streams and seasonally wet canyons. These habitats provide the relatively shallow, and still, but not stagnant, water that tidewater gobies prefer (U.S. Environmental Protection Agency 2007). They also inhabit areas with pond weed and widgeon grass which provides shelter for young gobies. Adult tidewater gobies may migrate upstream from the estuaries into tributaries, a distance of 0.5 to 3.5 mi (0.8 to 5.6 km). Such upstream locations appear to also be used for reproduction (U.S. Environmental Protection Agency 2007). Tidewater gobies prey upon small invertebrates such as snails and insect larvae (Farallones Marine Sanctuary Association 2006). While the tidewater goby occurs along the coast of California, this species is not likely to overlap with the proposed action area due to its preference for fresh-saltwater interface where the proposed activities will not be conducted; therefore, the tidewater goby will not be discussed further in this document.

3.2.3.2 Steelhead Trout

Steelhead trout (*Oncorhynchus mykiss*) is an anadromous form of rainbow trout and is federally listed as endangered under the ESA. Of the 15 steelhead trout distinct population segments, the Southern California Coast segment is the one most likely to occur in the proposed action area (National Marine Fisheries Service 2014e) (Table 3-4). Critical habitat for steelhead trout, designated in areas of California, Oregon, Washington, and Idaho, occurs outside of the proposed action area.

Steelhead trout exhibit a great diversity of life history patterns, and are phylogenetically and ecologically complex. Steelhead trout may exhibit either an anadromous life style, or a freshwater residency, where they spend their entire life in freshwater (National Marine Fisheries Service 1997). Anadromous steelhead trout inhabit saltwater ecosystem for most of their life history and migrate upstream into freshwater habitats to spawn. The present distribution of steelhead trout extends from the Kamchatka Peninsula in Asia, east to Alaska and south to Southern California, although the species' historical range extended at least to Mexico (Good et al. 2005). Juvenile steelhead trout feed primarily on zooplankton. Adult steelhead trout feed on aquatic and terrestrial insects, mollusks, crustaceans, fish eggs, minnows, and other small fish species (National Marine Fisheries Service 2014e).

The steelhead trout that migrate to the ocean develop a much more pointed head, become more silvery in color, and typically grow much larger than the rainbow trout that remain in fresh water. Steelhead trout tend to move immediately offshore on entering the marine environment, although, in general, steelhead tend to remain closer to shore than other Pacific salmon species(Beamish et al. 2005). They generally remain within the coastal waters of the California Current (Beamish et al. 2005). The ocean distributions for listed steelhead trout are not known in detail, but steelhead trout are caught only rarely in ocean salmon fisheries. Studies suggest that steelhead trout do not generally congregate in large schools as do other Pacific salmon species (Burgner et al. 1992; Groot and Margolis 1991). Trends in abundance and reproductive success of Pacific salmonids are typically observed through monitoring in the streams and rivers in which they spawn. Boughton et al. (2005) assessed the occurrence of steelhead trout in southern California coastal watersheds in which the species occurred historically by conducting a combination of field reconnaissance and spot checks (snorkel surveys). Surveys indicated that between 38 percent and 45 percent of the streams surveyed in the range of the Southern California steelhead trout ESU contained the species, but that there were higher extirpation rates in the southern end of the range. Anthropogenic barriers appeared to be the factor most associated with extirpations. Of the 11 streams surveyed that drain into the proposed action area, only San Mateo Creek contained steelhead trout. Although the authors expressed some uncertainty, NMFS (2005) concluded that, with the exception of the small population in San Mateo Creek, the anadromous form of the species appears to be completely extirpated from all systems between the Santa Monica Mountains and the Mexican border. The San Mateo Creek population was formerly considered extirpated (Nehlsen et al. 1991), but California Department of Fish and Game documented presence of the species in 2003 (National Marine Fisheries Service 2005).

Many of the streams in this region contain resident populations of steelhead trout. The most recent monitoring data available for the Southern California steelhead ESU is from watersheds outside of the proposed action area (i.e., Santa Ynez River, Ventura River, Santa Clara River, Topanga Creek, and Malibu Creek). Surveys indicated that very small (<10 fish), but consistent, runs of the species occur in these areas on an annual basis (Ford 2011). The most recent status review report for the Southern California steelhead trout ESU questioned how such small annual runs could persist, and speculated that the runs could be maintained either by strays from some another source population or by production of smolts from the resident population of rainbow trout (Ford 2011).

Behavioral reactions of steelhead trout to non-impulsive acoustic sources could include temporary disruption or alteration of natural activities such as swimming, schooling, feeding, and migrating. Gearin et al. (2000) studied the effects of exposing fish to sounds produced by acoustic deterrent devices, which produce sounds in the mid frequency range. Adult sockeye salmon exhibited an initial startle response to the placement of inactive acoustic alarms but resumed their normal swimming pattern within 10 to 15 seconds. After 30 seconds, the fish approached the inactive alarm to within 1 ft (30 centimeters [cm]). When the experiment was conducted with an alarm active, the fish exhibited the same initial startle response from the insertion of the alarm into the tank; but were swimming within 30 cm of the active alarm within

30 seconds. After five minutes, the fish did not show any reaction or behavior change except for the initial startle response. However, since the Proposed Action uses sonar frequencies outside of the known hearing range of the steelhead trout, behavioral reactions are not expected.

In summary, the information available suggests extremely low abundance of Southern California steelhead trout in the proposed action area. The only fish observed in a watershed that drains into the Action Area were in San Mateo Creek in 2002. Additionally, watersheds further north have very low documented abundance, with surveys indicating annual returns of less than 10 fish. Southern California steelhead trout eggs, fry, or juveniles still in freshwater habitats will not be exposed to Navy activities. Steelhead trout juveniles or adults in coastal waters would be extremely rare in the proposed action area and are therefore not carried forward for analysis.

3.2.3.3 Scalloped Hammerhead Shark

The Eastern Pacific distinct population segment of scalloped hammerhead shark (*Sphyma lewini*), the only population occurring within the proposed action area, is listed as threatened under the ESA (79 FR 38213). Currently, no critical habitat is designated for scalloped hammerhead sharks.

The scalloped hammerhead shark is circumglobal (National Marine Fisheries Service 2014c), occurring in all temperate to tropical waters from the surface to depths of 902 ft (275 m) (Duncan and Holland 2006) from the surface to depths of 1,312 to 1,640 ft (400 to 500 m) and possibly deeper (Compagno 1984; Duncan and Holland 2006; Klimley and Nelson 1984; Miller et al. 2014). Although scalloped hammerhead sharks can be located in deep water, they appear to inhabit the thermocline in temperatures between 73 and 79 degrees Fahrenheit (°F; 23 and 26 degrees Celsius [°C]) (Bessudo et al. 2011; Ketchum et al. 2014a; Ketchum et al. 2014b) which can vary in depth by geographic location and season (Bessudo et al. 2011). The scalloped hammerhead shark remains close to shore during the day and moves to deeper waters at night to feed (Bester 2003). For example, Klimley (1993) documented nighttime migrations of scalloped hammerheads at depths ranging from 328 and 1,476 ft (100 to 450 m) near a seamount in the southern Gulf of California. A genetic marker study suggests that females typically remain close to coastal habitats, while males are more likely to disperse across larger open ocean areas (Daly-Engel et al. 2012). In the eastern Pacific, the scalloped hammerhead ranges from southern California (including the Gulf of California) to Panama, Ecuador, and northern Peru.

Scalloped hammerhead sharks are not a common Southern California species. Historically, three species of hammerhead sharks have been reported in California waters, although all are noted as uncommon species: smooth hammerhead shark (*Sphyrna zygaena*), bonnethead shark (*S. tiburo*), and scalloped hammerhead shark (*S. lewini*) (Robins et al. 1991; Shane 2001). All three species have similar eastern Pacific distributions with smooth hammerhead shark being the more frequent of the uncommon species in California waters (Allen et al. 2006). Furthermore, there have only been infrequent bycatches of scalloped hammerhead sharks in Southern California:

- First documented catch of a scalloped hammerhead in Southern California was for a single shark caught 1 mi (2 km) off Santa Barbara in 1977 (Fusaro and Anderson 1980).

- Three catches were recorded from Los Angeles County in 1984, with one shark reported as a juvenile (Seigel 1985).
- 19 juvenile sharks (9 females/10 males) were caught by commercial gillnet and scientific research gillnets in south San Diego Bay from 1996 to 1997 (Shane 2001).

Given the temperature preference for scalloped hammerhead sharks (73 to 79 °F [23 to 26°C]), there could be a possibility of relatively low presence in Southern California during warm water conditions including atypical warm water periods associated with strong El Niño events, or future summer water temperature elevations occurring as the result of climate change along the U.S. West Coast.

Adult scalloped hammerhead sharks consume a widely varied diet including teleost fishes, cephalopods, crustaceans, and rays (Bethea et al. 2011; National Marine Fisheries Service 2014c; Torres-Rojas et al. 2010; Vaske et al. 2009). Juveniles feed mainly on coastal benthic prey as well as epipelagic and benthic squid (Galván-Magaña et al. 2013; Musick and Fowler 2007; Torres-Rojas et al. 2010; Torres-Rojas et al. 2014).

3.2.4 Essential Fish Habitat

Regional Fishery Management Councils develop EFH for federally managed fish species which are included in their respective Fishery Management Plans. NMFS is responsible for approving and implementing the Fishery Management Plans under the Magnuson-Stevens Act.

Habitat Areas of Particular Concern (HAPC) are a subset of EFH. Fishery Management Councils are encouraged to designate HAPC under the Magnuson-Stevens Act. Habitat Areas of Particular Concern are identified based on habitat level considerations rather than species life stages as are identified with EFH. Several habitat types, identified as HAPC, focus on specific habitat locations such as seamounts and hard corals.

The Pacific Fishery Management Council has fishing regulation jurisdiction of the 317,690 mi2 (822,813 km2 (Carretta et al. 1995)) exclusive economic zone off Washington, Oregon, and California. The Pacific Fishery Management Council manages fisheries for approximately 119 species of salmon, groundfish, coastal pelagic species (sardines, anchovies, and mackerel), and highly migratory species (tunas, sharks, and swordfish). The Pacific Fishery Management Council is also active in international fishery management organizations that manage fish stocks that migrate through its area of jurisdiction, including the International Pacific Halibut Commission, the Western and Central Pacific Fisheries Commission (for albacore tuna and other highly migratory species), and the Inter-American Tropical Tuna Commission (for yellowfin tuna and other high migratory species). The Pacific Fishery Management Council has designated EFH and HAPC for these species, and within the proposed action area the following three Fishery Management Plans are applicable: 1) Pacific Coast Groundfish (Pacific Fishery Management Council 2014), 2) Coastal Pelagic Species (Pacific Fishery Management Council 2011a), and 3) Highly Migratory Species (Pacific Fishery Management Council 2011b) (Table 3-5).

Table 3-5. EFH and Habitat Areas of Particular Concern in the Proposed Action Area.

Management Unit	EFH	HAPC
Pacific Coast Groundfish	All waters and substrate less than or equal to 11,483 ft (3,500 m) to mean higher high water level or the upriver extent of saltwater intrusion. Seamounts in depths greater than 11,483 ft (3,500 m).	Estuaries, canopy kelp, seagrass, rocky reefs, and "areas of interest"
Coastal Pelagic Species	All marine and estuarine waters above the thermocline from the shoreline to 200 nm offshore.	None
Highly Migratory Species	All marine waters from the shoreline to 200 nm offshore.	None

3.2.4.1 Pacific Coast Groundfish

The Pacific Coast Groundfish Fishery Management Plan manages over 90 species within a large and ecologically diverse area. Designations of EFH for each species and their component individual life history stages are provided in Appendix C of the "Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery" document (Pacific Fishery Management Council 2014).

The overall extent of groundfish EFH for all managed species is identified as all waters and substrate within the following areas:

- All water and substrate less than or equal to 11,483 ft (3,500 m) to mean higher high water level or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 parts per thousand during the period of average annual low flow
- Seamounts in depths greater than 11,483 ft (3,500 m) as mapped in the EFH assessment geographic information system
- Areas designated as Habitat Areas of Particular Concern not already identified by the above criteria

Habitat Areas of Particular Concern

The Pacific Fishery Management Council has identified both areas and habitat types of five HAPC for the Pelagic Groundfish EFH: estuaries, canopy kelp, seagrass, rocky reefs, and areas of interest (e.g., undersea features, banks, seamounts, canyons). None of these areas are within the proposed action area; therefore, they are not further addressed in this document.

3.2.4.2 Coastal Pelagic Species

Coastal Pelagic Species inhabit the pelagic realm (i.e., live in the water column, not near the sea floor), and are usually found from the surface to 3,281 ft (1,000 m) deep. The Coastal Pelagic Species Fishery Management Plan includes four finfish and two invertebrates (market squid [*Doryteuthis opalescens*], krill, northern anchovy [*Engraulis mordax*], Pacific sardine [*Sardinops sagax*], Pacific mackerel [*Scomber japonicas*] and jack mackerel [*Trachurus symmetricus*],). Designated EFH for Coastal Pelagic Species includes all marine and estuarine waters above the thermocline from the shoreline to 200 nm offshore (Pacific Fishery Management Council 2011a).

No HAPC have been designated for coastal pelagic species.

3.2.4.3 Highly Migratory Species

Highly Migratory Species management unit species are found in temperate waters within the Pacific Fishery Management Council's region. Variations in the distribution and abundance of the management unit species are affected by ever-changing oceanic environmental conditions including water temperature, current patterns, and the availability of food. Sea surface temperatures and habitat boundaries vary seasonally and from year to year, with some Highly Migratory Species much more abundant from northern California to Washington waters during the summer and years with warmer waters than during winter and years with colder waters, due to increased habitat availability within the exclusive economic zone. Large gaps in the scientific knowledge exist about basic life histories and habitat requirements of a few management unit species. The migration patterns of the stocks in the Pacific Ocean are poorly understood and difficult to categorize despite extensive tagging studies for many species. Little is known about the distribution and habitat requirements of the juvenile life stages of tuna and billfish. Very little is known about the habitat of different life stages of most Highly Migratory Species which are not targeted by fisheries (e.g., certain species of sharks). Highly Migratory Species are harvested by U.S. commercial and recreational fisheries and by foreign fishing fleets, with only a fraction of the total harvest taken within the U.S. waters (Pacific Fishery Management Council 2011b). Highly Migratory Species are also an important component of the recreational sport fishery, especially in southern California (Pacific Fishery Management Council 2011b).

EFH for Highly Migratory Species consist of all marine waters from the shoreline to 200 nm offshore. Highly Migratory Species travel widely in the ocean, both in terms of area and depth. They are usually not associated with the features typically considered fish habitat (like estuaries, seagrass bed, or rocky bottoms). Their habitat selection appears to be less related to physical features and more to temperature ranges, salinity levels, oxygen levels, and currents (Pacific Fishery Management Council 2011b).

No HAPC have been designated for Highly Migratory Species.

3.2.5 Sea Turtles

Four species of sea turtles may inhabit the proposed action area: loggerhead (*Caretta caretta*) turtles, the East Pacific distinct population segment of green (*Chelonia mydas*) turtles, leatherback (*Dermochelys coriacea*) turtles, and olive ridley (*Lepidochelys olivacea*) turtles (National Marine Fisheries Service 2014d) (Table 3-6). All of these sea turtles are listed as threatened or endangered under the ESA. Within the proposed action area, the leatherback and loggerhead sea turtles are listed as endangered and the green and olive ridley turtles are listed as threatened. However, the breeding populations of olive ridley turtles on the Pacific coast of Mexico are listed as endangered under the ESA (National Marine Fisheries Service 2014d). Due to the inability to distinguish between the populations of endangered turtles from certain nesting beaches, olive ridley turtles are considered endangered wherever they are found.

Table 3-6. Sea Turtles that May Occur within the Proposed Action Area.

Common Name	Scientific Name	ESA Status	Occurrence
Loggerhead	*Caretta caretta*	Endangered	Year-round
Green	*Chelonia mydas*	Threatened[1]	Year-round
Leatherback	*Dermochelys coriacea*	Endangered	Year-round
Olive ridley	*Lepidochelys olivacea*	Threatened/Endangered	Year-round
[1] East Pacific distinct population segment			

The species composition and life history in the Los Angeles/Long Beach proposed action area is similar to the California areas described in the HSTT EIS/OEIS. Therefore, a summary of information is provided here; detailed information about sea turtles can be found in the HSTT EIS/OEIS Section 3.5.2.

3.2.5.1 Loggerhead Turtle

The North Pacific Ocean distinct population segment of loggerhead turtle (*Caretta caretta*) is most likely to occur in the proposed action area. This distinct population segment is listed as endangered under the ESA (76 FR 58868). Critical habitat has been designated for the loggerhead sea turtle, but is located outside of the proposed action area.

Loggerheads are circumglobal, inhabiting continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters. Major nesting grounds are generally located in temperate and subtropical regions, with scattered nesting in the tropics (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1998a). The loggerhead turtle is found in habitats ranging from hundreds of kilometers out to sea, as well as in inshore areas, such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers (Dodd Jr. 1988). Most of the loggerheads observed in the eastern North Pacific Ocean are believed to come from beaches in Japan where the nesting season is late May to August (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1998a). Migratory routes can be coastal or can involve crossing deep ocean waters (Schroeder et al. 2003). Loggerhead turtles travel to northern waters during spring and summer as water temperatures warm, and southward and offshore toward warmer waters in fall and winter; loggerheads are noted to occur year round in offshore waters of sufficient temperature. Loggerhead sea turtles feed mostly on hard-shelled prey such as conch and whelks.

In general, loggerhead sea turtles hearing sensitivity less than 1 kHz with greatest sensitivity between 50 to 800 Hz (Bartol et al. 1999; Lavender et al. 2014; Martin et al. 2012).

3.2.5.2 Green Turtle

Green sea turtles (Chelonia mydas) that may occur within the proposed action area are part of the East Pacific distinct population segment which is listed as threatened under the ESA (43 FR 32800). Critical habitat has been designated for the green sea turtle, but is located outside of the proposed action area.

Green turtles in the eastern North Pacific have been sighted from Baja California to southern Alaska, but most commonly occur from San Diego to more southern waters. Green turtles inhabit beaches for nesting, open ocean convergence zones during migration, and coastal areas for foraging in benthic habitats (National Marine Fisheries Service 2014a). Green sea turtles account for the greatest percentage of strandings in regional stranding records maintained by NMFS' West Coast Region (National Marine Fisheries Service West Coast Region 2015).

There is a year-round population of green turtles in Long Beach, California (Eguchi et al. 2010). This population mainly inhabits a 3 mi (4.8 km) stretch of the San Gabriel River in Long Beach that lies between two power plants which keeps the waters warm year-round. This population of green turtles is believed to be a small subpopulation (about 30 to 40 individuals) of the resident population that resides about 100 mi (160 km) down the coast in San Diego Bay. Green turtles appear to rely upon this warm water source and are unlikely to migrate into the bay or overlap with the proposed action area (Totten 2015). Green sea turtles feed primarily on seagrasses and algae.

3.2.5.3 Leatherback Turtle

The leatherback turtles (Dermochelys coriacea) is listed as endangered through its range under the ESA (61 FR 17). Critical habitat for leatherback turtles has been designated on the west coast of California, Oregon, and Washington (United States Fish and Wildlife Service 2012); critical habitat in California is located from Point Arguello in the south to Point Arena in the north, but is outside of the proposed action area.

Leatherback turtles are commonly known as pelagic animals, but they also forage in coastal waters (National Marine Fisheries Service 2014b). The leatherback turtle is the most widely distributed of all sea turtles, found from tropical to subpolar oceans, and nests on tropical and occasionally subtropical beaches (Gilman 2008; Myers and Hays 2006; National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992). Found from 71degrees North latitude (° N) to 47 degrees South latitude (° S),

it has the most extensive range of any adult turtle (Eckert 1995). Adult leatherback turtles forage in temperate and subpolar regions in all oceans, and migrate to tropical nesting beaches between 30° N and 20° S. Leatherbacks have a wide nesting distribution, primarily on isolated mainland beaches in tropical oceans (mainly in the Atlantic and Pacific Oceans, with few in the Indian Ocean) and temperate oceans (southwest Indian Ocean) (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992), and to a lesser degree on some islands. Leatherback turtles are highly migratory, exploiting convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters (Eckert and Eckert 1988; Eckert 1999; Morreale et al. 1994).

Few quantitative data are available concerning the seasonality, abundance, or distribution of leatherbacks in the central northern Pacific Ocean. In the eastern North Pacific Ocean, leatherback turtles are broadly distributed from the tropics to as far north as Alaska, where 19 occurrences were documented between 1960 and 2001 (Eckert 1993; Hodge and Wing 2000). Stinson (1984) concluded that the leatherback was the most common sea turtle in U.S. waters north of Mexico. Aerial surveys off California, Oregon, and Washington indicate that most leatherbacks occur in waters over the continental slope, with a few beyond the continental shelf (Eckert 1993). While the leatherback is known to occur throughout the California Current Large Marine Ecosystem, it is not known to nest anywhere along the U.S. Pacific Ocean coast.

In general, turtle sightings increase during summer, as warm water moves northward along the coast (Stinson 1984). Sightings may also be more numerous in warm years than in cold years. Leatherback sea turtles feed mainly on soft-bodied animals like salps and jellyfish. Leatherback turtles are regularly seen off the western coast of the United States, with the greatest densities found off central California. Off central California, sea surface temperatures are highest during the summer and fall, and oceanographic conditions create favorable habitat for leatherback turtle prey (jellyfish). Recent research measuring hatchling leatherback turtle auditory evoked potentials has shown that hatchling leatherbacks respond to tonal stimuli between 50 and 1,200 underwater (maximum sensitivity: 100 to 400 Hz) (Piniak et al. 2012).

3.2.5.4 Olive Ridley Turtle

Olive ridley sea turtles (Lepidochelys olivacea) that are part of the Pacific Coast of Mexico breeding population are listed as endangered under the ESA (61 FR 17), while all other populations are listed as threatened. Because it is difficult to distinguish between the two populations, all olive ridley sea turtles within the proposed action area will be considered part of the endangered population. There is currently no designated critical habitat for the olive ridley sea turtle.

In the eastern Pacific, olive ridley turtles nest along the Mexico and Central American coast, with large nesting aggregations occurring at a few select beaches located in Mexico and Costa Rica. Few turtles nest as far north as southern Baja California, Mexico (Brown and Brown 1982; Fritts et al. 1982). Olive ridley turtles occur off the coast of southern and central California, but are not known to nest on California beaches. Although they are the most abundant north Pacific sea turtle, surprisingly little is known of the oceanic distribution and critical foraging areas of Pacific ridley turtles. Olive ridley turtles are occasionally seen in shallow waters (less than 165 ft [50 m] deep), although these sightings are relatively rare (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1998b). In general, turtle sightings increase during summer as warm water moves northward along the coast (Steiner and Walder 2005; Stinson 1984). Olive ridley sea turtles feed primarily on benthic invertebrates such as lobster, crabs, tunicates, mollusks, and shrimp, but have also been known to eat algae and fish. There is no information on olive ridley turtle hearing. However, we assume that their hearing sensitivities will be similar to those of green, leatherback and loggerhead turtles: their best hearing sensitivity will be in the low frequency range, with maximum sensitivity below 400 Hz and an upper hearing range not likely to exceed 2,000 Hz.

3.2.6 Marine Mammals

The following discussion provides an overview of the marine mammal species known to occur in the proposed action area (Table 3-7). Cetaceans and pinnipeds are the two types of marine mammals that may occur in the proposed action area. All marine mammals are protected under the MMPA, and some are additionally protected under the ESA. Species that have a greater likelihood of occurrence within the proposed action area and those listed under the ESA are discussed below.

Table 3-7. Marine Mammals that May Occur within the Proposed Action Area.

Common Name	Scientific Name	ESA Status	Stock	Likelihood of Occurrence within the Proposed Action Area
Mysticetes				
Minke whale	*Balaenoptera acutorostrata*		California, Oregon, and Washington stock	Unlikely, prefer deeper waters (Northeast Pacific Minke Whale Project 2014)
Blue whale	*Balaenoptera musculus*	E	Eastern North Pacific stock	Unlikely, prefer deeper waters (National Oceanic and Atmospheric Administration 2015a)
Fin whale	*Balaenoptera physalus*	E	California, Oregon, and Washington stock	Unlikely, prefer deeper waters (National Oceanic and Atmospheric Administration 2015c)
Gray whale	*Eschrichtius robustus*		Eastern North Pacific stock	Present during migration (spring, fall) (Jones and Swartz 2009)
Humpback whale	*Megaptera novaeangliae*	E	California, Oregon, Washington, and Mexico stock	Possible in summer and fall (Angliss and Allen 2013)
Odontocetes				
Long-beaked common dolphin	*Delphinus capensis*		California stock	Present year-round (Gerrodette and Eguchi 2011)
Short-beaked common dolphin	*Delphinus delphis*		California, Oregon, and Washington stock	Possible, prefer deeper waters (Jefferson et al. 2008; Reeves et al. 2002a)
Short-finned pilot whale	*Globicephala macrorhynchus*		California, Oregon, Washington stock	Rare (Carretta et al. 2011)
Risso's dolphin	*Grampus griseus*		California, Oregon, and Washington stock	Possible, prefer deeper waters (Jefferson et al. 2013)
Pacific white-sided dolphin	*Lagenorhynchus obilquidens*		California, Oregon, and Washington stock	Possible, prefer deeper waters (Forney 1994; Forney et al. 1995; Green et al. 1992)
Northern right whale dolphin	*Lissodelphis borealis*		California, Oregon, and Washington stock	Possible year-round (Carretta et al. 2011)
Killer whale	*Orcinus orca*	E[1]	West Coast Transient stock	Possible year-round (Caretta et al. 2010)
Dall's porpoise	*Phocoeniodes dalli*		California, Oregon, and Washington stock	Unlikely, prefer deeper waters (Carretta et al. 2012)
Bottlenose dolphin	*Tursiops truncatus*		California, Oregon, and Washington Offshore stock and California Coastal stock	Present year-round (Jefferson et al. 2008; Wells et al. 2009)

Common Name	Scientific Name	ESA Status	Stock	Likelihood of Occurrence within the Proposed Action Area
Pinnipeds				
Guadalupe fur seal	*Arctocephalus townsendi*	T	Mexico stock	Possible (National Oceanic and Atmospheric Administration 2015d)
Northern fur seal	*Callorhinus ursinus*		California stock	Possible (Lander and Kajimura 1982; National Marine Fisheries Service 1993)
Northern elephant seal	*Mirounga angustirostris*		California breeding stock	Rare in fall (National Oceanic and Atmospheric Administration 2015e)
Harbor seal	*Phoca vitulina*		California stock	Present (Carretta et al. 2011)
California sea lion	*Zalophus californianus*		United States stock	Present (National Oceanic and Atmospheric Administration 2015b)

Footnotes: [1] *Southern Resident population only, not present in proposed action area*
E = Endangered, T = Threatened

The species composition and life history in the Los Angeles/Long Beach proposed action area is similar to the California areas described in the HSTT EIS/OEIS. Therefore, a summary of information is provided here; detailed information about marine mammals can be found in the HSTT EIS/OEIS Section 3.4.

3.2.6.1 ESA-Listed Marine Mammals

3.2.6.1.a Humpback Whale

Humpback whales (*Megaptera novaeangliae*) are listed as endangered under the ESA (35 FR 18319). Currently, there is no designated critical habitat for humpback whales. While several biologically important areas have been identified for humpback whales off the coast of California (Calambokidis et al. 2015), none are located within the proposed action area.

Humpback whales are distributed worldwide in all major oceans and most seas. They typically are found during the summer in high-latitude feeding grounds and during the winter in the tropics and subtropics around islands, over shallow banks, and along continental coasts, where calving occurs. Most humpback whale sightings are in nearshore and continental shelf waters; however, they frequently travel through deep oceanic waters during migration (Calambokidis et al. 2001; Clapham 2000; Clapham and Mattila 1990). Peak occurrence of humpback whales in Southern California from December through June (Calambokidis et al. 2001). During late summer, more humpback whales are sighted north of the Channel Islands, and limited occurrence is expected south of the Channel Islands (Caretta et al. 2010).

Humpback whales prey on a wide variety of invertebrates and small schooling fishes; the most common invertebrate prey are krill while the most common fish prey are herring, mackerel, sand lance, sardines, anchovies, and capelin (Clapham and Mead 1999). Feeding occurs both at the surface and in deeper waters. Humpback whale audiograms using a mathematical model based on the internal structure of the ear estimate sensitivity is from 700 Hz to 10 kHz, with maximum relative sensitivity between 2 kHz and 6 kHz (Ketten and Mountain 2014).

3.2.6.1.b Guadalupe Fur Seal

The Guadalupe fur seal (*Arctocephalus townsendi*) is listed as threatened under the ESA (50 FR 51252). The entire population of Guadalupe fur seals is considered to be part of one stock known as the Mexico stock. Currently, there is no designated critical habitat for Guadalupe fur seals.

Guadalupe fur seals' historic range included the Gulf of Farallones, California to the Revillagigedo Islands, Mexico (Belcher and Lee 2002; Rick et al. 2009). Currently, they breed mainly on Guadalupe Island, Mexico, 155 miles off of the Pacific Coast of Baja California. A smaller breeding colony, discovered in 1997, appears to have been established at Isla Benito del Este, Baja California, Mexico (Belcher and Lee 2002). Guadalupe fur seals inhabit the tropical waters of central and southern California and Mexico. During the breeding season (September to May), they are often found in coastal rocky habitats, though there is little information about where the seals reside outside of breeding season. Guadalupe fur seals breed mostly on Guadalupe Island off the coast of Mexico, but also off of Baja California and southern California's San Miguel Island (National Oceanic and Atmospheric Administration 2015d). The Channel Islands are used as haul outs for Guadalupe fur seals (Belcher and Lee 2002; Hanni et al. 1997). Catalina is the closest of the Channel Islands to the proposed action area at roughly 26 nm. Guadalupe fur seals feed on a variety of cephalopods, fish, and crustaceans (Arurioles-Gamboa and Camacho-Rios 2007). Specifically, scat analysis has shown that Guadalupe fur seals feed primarily on nine different vertically migrating squid species, a variety of myctophid fishes, and both Pacific and frigate mackerel (Gallo-Reynoso and Figueroa-Carranza 1996; Gallo-Reynoso et al. 2000). Guadalupe fur seals are possible within the proposed action area during the timeframe of the training. Guadalupe fur seals feed on a variety of cephalopods, fish, and crustaceans (Arurioles-Gamboa and Camacho-Rios 2007). Specifically, scat analysis has shown that Guadalupe fur seals feed primarily on nine different vertically migrating squid species, a variety of myctophid fishes, and both Pacific and frigate mackerel (Gallo-Reynoso and Figueroa-Carranza 1996; Gallo-Reynoso et al. 2000). Underwater hearing in otariid seals is adapted to low frequency sound and less auditory bandwidth than phocid seals. Hearing in otariid seals has been tested in two species present in the Action Area: California sea lion (Kastak and Schusterman 1998) and northern fur seal (Babushina et al. 1991; Moore and Schusterman 1987). Based on these studies, Guadalupe fur seals would be expected to hear sounds within the ranges of 50 Hz to 75 kHz in air and 50 Hz to 50 kHz in water.

3.2.6.2 Non-ESA-Listed Marine Mammals

3.2.6.2.a Gray Whale

Gray whales (*Eschrichtius robustus*) within the proposed action area are part of the Eastern North Pacific stock. The coast of the Southern California Bight has been declared a biologically important area for gray whales, including the area of the proposed action (Calambokidis et al. 2015). Gray whales primarily occur in shallow waters over the continental shelf and are considered to be one of the most coastal of the great whales (Jefferson et al. 2008; Jones and Swartz 2009). Photo identification studies of gray whales indicate that they move widely within and between areas on the Pacific coast, are not always observed in the same area each year, and may have multi-year gaps between re-sightings in studied areas (Calambokidis et al. 2002;

Calambokidis et al. 2004; Calambokidis et al. 1999; Quan 2000). Feeding grounds are generally less than 225 ft (69 m) deep (Jones and Swartz 2009). Breeding grounds consist of subtropical lagoons (Jones and Swartz 2009).

Eastern North Pacific gray whales are known to migrate along the California coast in the California Current ecosystem on both their northward and southward migration (Sumich and Show 2011). Eastern North Pacific gray whales are frequently observed in the proposed action area (Carretta et al. 2000b; Forney et al. 1995; Henkel and Harvey 2008; Hobbs et al. 2004). During aerial surveys off San Clemente Island, California, eastern North Pacific gray whales were the most abundant marine mammal from January through April, a period that covered both the northward and southward migrations (Carretta et al. 2000b; Forney et al. 1995). Although they generally remain mostly over the shelf during migration, some animals may be found in more offshore waters; which could be a secondary range (Jones and Swartz 2009; Rugh et al. 2008). Winter grounds extend from central California south along Baja California, the Gulf of California, and the mainland coast of Mexico.

Gray whales are primarily bottom feeders. Their prey includes a wide range of invertebrates living on or near the seafloor. This occurs during the summer in dense colonies on the continental shelf seafloor of arctic regions (Swartz et al. 2006). Gray whales occasionally engulf fishes, herring eggs, cephalopods, and crab larvae (Jefferson et al. 2008; Jones and Swartz 2009; Newell and Cowles 2006). Although generally fasting during the migration and calving season, opportunistic feeding (on whatever food is available) may occur in or near the calving lagoons or in the shallow coastal waters along the migration path (Jones and Swartz 2009). Eastern North Pacific Gray whales may be present in the proposed action area during the timeframe of the training.

3.2.6.2.b Long-beaked Common Dolphin

Long-beaked common dolphins (Delphinus capensis) that may be found in the proposed action area belong to the California stock (Carretta et al. 2012). The long-beaked common dolphin's range is considered to be within about 50 nm of the West Coast, from Baja California to just south of Monterey Bay. Long-beaked common dolphins primarily occur inshore of the 820 ft (250 m) isobath, with very few sightings in waters deeper than 1640 ft (500 m) (Gerrodette and Eguchi 2011). Stranding data and sighting records suggest that this species' abundance fluctuates seasonally and annually off California (Caretta et al. 2010; Zagzebski et al. 2006). They are found off Southern California year-round, but they may be more abundant during the warm-water months (May to October) (Bearzi 2005a, 2005b; Caretta et al. 2010; Evans 1994). The long-beaked common dolphin is not a migratory species, but seasonal shifts in abundance (mainly inshore/offshore) are known for some regions of its range. This species is thought to be a coastal forager, feeding mostly on pelagic fish, particularly those in the Scombridae, Scianidae, and Serranidae families (Niño-Torres et al. 2006). Long-beaked common dolphins are present year-round in the proposed action area.

3.2.6.2.c Short-Beaked Common Dolphin

On the Pacific coast of the United States, the majority of short-beaked common dolphin (*Delphinus delphis*) populations are found off of California, especially during summer and fall.

Short-beaked common dolphins prefer warm tropical to cool temperate waters that are primarily oceanic and offshore, 650 to 6,500 ft (200 to 2,000 m) deep (Jefferson et al. 2008; Reeves et al. 2002a), though within the Southern California Bight, short-beaked common dolphins are found in shallower waters (Carretta et al. 2011). Short-beaked common dolphins are capable of diving to at least 650 ft (200 m) to feed on fish from the deep scattering layer at night, and usually rest during the day. Short-beaked common dolphins prey on epipelagic schooling fish and cephalopods. While short-beaked common dolphins prefer deeper waters, their presence is possible in the proposed action area year-round.

3.2.6.2.d Risso's Dolphin

Off the U.S. west coast, Risso's dolphins (*Grampus griseus*) are commonly observed on the continental shelf in the Southern California Bight and in slope and offshore waters of California, Oregon, and Washington (Carretta et al. 2011). Risso's dolphins appear strongly to favor waters on the continental shelf and slope as opposed to deep waters of the oceanic zones, although they do occur in the latter areas, just at lower densities (Jefferson et al. 2013; Soldevilla et al. 2009). The Risso's dolphin appears to favor mid-latitudes ranging from 30° to 45°. These latitudes are where the species' highest densities are consistently found in most ocean basins, including the Pacific (Jefferson et al. 2013). Risso's dolphins feed mainly at night (Baird 2008; Jefferson et al. 2008), in the mid-water column from 33 to 164 ft (10 to 50 m; 45 percent). More time is spent in the mid-water column at night due to the presence of their primary prey of squid and other cephalopods (octopus and cuttlefish) (Reeves et al. 2002b). While Risso's dolphins prefer deeper waters, their presence is possible in the proposed action area year-round.

3.2.6.2.e Pacific White-Sided Dolphin

Pacific white-sided dolphins (*Lagenorhynchus obilquidens*) are found in temperate waters of the North Pacific from the continental shelf to the deep ocean. Largely pelagic, this species ranges from the Gulf of California to the Gulf of Alaska. The Pacific white-sided dolphins that may be present in the proposed action area belong to the California/Oregon/Washington stock, estimated at 59,000 individuals (National Oceanic and Atmospheric Administration 2015f). For the California stock, patterns from aerial and shipboard surveys (Barlow 1995, 1997; Forney et al. 1995; Green et al. 1992; Green et al. 1993) suggest seasonal north-south movements, with animals found primarily off California during the colder water months and shifting northward into Oregon and Washington as water temperatures increase in late spring and summer (Forney 1994; Forney et al. 1995; Green et al. 1992; Henderson et al. 2014). These dolphins prey on squid and schooling fish, such as lanternfish, anchovies, mackerel, and hake, and are capable of diving for more than six minutes to feed. However, many of their prey species travel vertically at night, limiting the necessity of diving to forage (Stroud et al. 1981). Henderson et al. (2011) proposed there may be two sub-populations of Pacific white-sided dolphins within Southern California based on differences in distinctive click types. While Pacific white-sided dolphins prefer deeper waters, their presence is possible in the proposed action area year-round. Campbell et al. (2015), however, documented a significant density decrease (-22 percent) across Southern California over a 10-year time period between July 2004 and November 2013. Additionally, Campbell et al. (2015) provide further evidence of the cool water distribution of Pacific white-sided dolphins with more winter-spring sightings as compared to summer-fall.

3.2.6.2.f Northern Right Whale Dolphin

The Northern right whale dolphin (*Lissodelphis borealis*) inhabits deep, temperate waters of the North Pacific Ocean. The Northern right whale dolphins that may be present in the proposed action area are members of the California/Oregon/Washington stock. This stock is typically located off the West Coast of the United States in shelf and slope waters, with seasonal movements into the Southern California Bight (Carretta et al. 2011). While their distribution varies based on oceanic conditions and seasons, typically their range stretches from northern Baja California, Mexico, to British Columbia. Northern right whales dolphins move south during the colder fall and winter months and north during the spring and summer (Barlow 1995; Forney et al. 1995; Green et al. 1992; Green et al. 1993). Pauly (1998) found that northern right whale dolphins feed mostly on mesopelagic fish (40 percent), followed closely by small squid (30 percent), large squid (20 percent), and miscellaneous fish (10 percent). Northern right whale dolphins may be found within the proposed action area during the timeframe of the training.

3.2.6.2.g Killer Whale

The Southern Resident killer whale (*Orcinus orca*) population is listed as endangered under the ESA, however this population's range does not extend to the proposed action area. Killer whales that may be found in the proposed action area belong to the West Coast Transient stock (Carretta et al. 2012).

Some populations are known to specialize in specific types of prey (Jefferson et al. 2008; Krahn et al. 2004). Transient killer whales, for example, have been found to feed exclusively on other marine mammals (Fertl et al. 1996; Jefferson et al. 2008). West Coast transient killer whales are possible in the proposed action area during the timeframe of the training.

3.2.6.2.h Bottlenose Dolphin

Bottlenose dolphins (*Tursiops truncatus*) that may be found in the proposed action area belong to the California coastal stock (Carretta et al. 2011). The California coastal stock is found within about 0.54 nm from shore (Carretta et al. 1998; Defran and Weller 1999; Hansen and Defran 1990), generally from San Francisco to the Mexican border (Carretta et al. 2009). An estimate of the population of this coastal stock of bottlenose dolphins is between 450 and 500 individuals (Carretta et al. 2009). In addition to the coastal stock, there is a California/Oregon/Washington offshore stock of bottlenose dolphins. Typically they prefer deeper waters than those in the proposed action area and are found further from the mainland than the coastal stock. Common bottlenose dolphins are found in coastal and continental shelf waters of tropical and temperate regions of the world. They occur in mostly enclosed or semi-enclosed seas. The species inhabits shallow, murky, estuarine waters and also deep, clear offshore waters in oceanic regions (Jefferson et al. 2008; Wells et al. 2009). Bottlenose dolphins are opportunistic feeders, taking a wide variety of fishes, cephalopods, and shrimps (Wells and Scott 1999). Nearshore bottlenose dolphins prey predominantly on coastal fish and cephalopods (Mead and Potter 1995). Pacific coast bottlenose dolphins feed primarily on surf perches and croakers (Wells and Scott 1999). While offshore bottlenose dolphins prefer deeper waters, their presence is possible in the proposed action area. Coastal bottlenose dolphins may be present year-round in the proposed action area.

3.2.6.2.i Northern Fur Seal

The range of the northern fur seal (*Callorhinus ursinus*) extends from coastal Alaska in the Bering Sea, throughout the Aleutian Islands and Gulf of Alaska and south to the Southern California Bight. The northern fur seals that may be present in the proposed action area are members of the San Miguel California stock. During the summer breeding season, most of the worldwide population is found on the Pribilof Islands in the southern Bering Sea, while the remaining animals are on rookeries in Russia, the Aleutian Islands, the Farallon Islands off San Francisco, and on San Miguel Island off southern California (Lander and Kajimura 1982; National Marine Fisheries Service 1993). During the non-breeding season, northern fur seals spend most of their time at sea, though a few may stay on islands year-round. During the summer breeding season, seals occupy rocky beaches, sandy beaches, and rocky islands. On occasion, individuals will move a few hundred feet inland (MarineBio Conservation Society 2014; Reeves et al. 2002a; Seal Conservation Society 2014). When foraging, fur seals make mostly shallow dives, usually to depths of 49 to 164 ft (15 to 50 m), though some dives may reach 820 ft (250 m) and last up to 3 minutes (MarineBio Conservation Society 2014; Reeves et al. 2002a; Seal Conservation Society 2014). Fur seals mostly feed at night, but may feed during the day if schools of prey are located near the surface. Analyses of northern fur seal stomach contents have revealed consumption of 26 species of fish and 9 species of cephalopods, some of which were the Californian anchovy, North Pacific hake, Jack mackerel, Pacific saury, sablefish, rockfish, and squid from the Loligo and Onychoteuthis genuses (Antonelis and Fiscus 1980). While the population of northern fur seals on San Miguel Island is much smaller than that in the Pribilof Islands, they are possibly present in the proposed action area year-round.

3.2.6.2.j Harbor Seal

Harbor seals (*Phoca vitulina*) inhabit coastal and estuarine waters from Baja California, north along the western coasts of the United States, Canada, and Southeast Alaska, west through the Gulf of Alaska and Aleutian Islands, and in the Bering Sea north to Cape Newenham and the Pribilof Islands. They haul out on rocks, reefs, beaches, and drifting glacial ice, and feed in marine, estuarine, and occasionally freshwaters (Carretta et al. 2011). Harbor seals generally are non-migratory and thus, are expected year-round throughout the proposed action area. In California, harbor seals breed on the Farallon and Channel Islands. Harbor seals feed on a variety of fish including herring, clupeids, flounder, hake, anchovy, codfish, sculpin, menhaden, sea bass, whiting, and capelin, and occasionally on mollusks and crustaceans (Alden et al. 2002; Reeves et al. 2002a). Harbor seals may be present in the proposed action area year-round.

3.2.6.2.k California Sea Lion

California sea lions (*Zalophus californianus*) range from the Pacific coast of Central Mexico north to British Columbia, Canada (National Oceanic and Atmospheric Administration 2015b). California sea lions will occupy shallow ocean waters, sea caves, rocks, and beaches. They will also congregate at marinas, wharves and buoys. California sea lions typically give birth in summer at rookeries from the Channel Islands south to Baja Mexico. The main diet consists of northern anchovy, market squid, sardines, pacific and jack mackerel, and rockfish as their favored prey (Alden et al. 2002; Reeves et al. 2002a). California sea lions may be present in the proposed action area year-round.

3.3 SOCIOECONOMIC ENVIRONMENT

3.3.1 Commercial Shipping and Transportation

Ocean shipping is a significant component of the Southern California regional economy. Key ports in Southern California include Los Angeles, Long Beach, and, to a lesser degree, San Diego. Of 150 U.S. ports evaluated by the U.S. Army Corps of Engineers, Los Angeles and Long Beach ranked eighth and sixth, respectively, in total trade (measured in tons) in 2012 (the most recent year data are available) (Waterborne Commerce Statistics Center 2009). The Ports of Los Angeles and Long Beach combined represent the busiest port along the West Coast of the United States. In 2012 and 2013, approximately 4,550 and 4,500 vessel calls, respectively, for ships over 10,000 deadweight tons arrived at the Ports of Los Angeles and Long Beach (Louttit and Chavez 2014; U.S. Department of Transportation). This level of shipping would mean approximately 9,000 large ship transits to and from these ports and through the proposed action area. By comparison, the next nearest large regional port, Port of San Diego, only had 318 vessel calls in 2012.

A significant amount of ocean traffic, consisting of both large and small vessels, transits through Southern California. For commercial vessels, the major transoceanic routes to the southwest pass north and south of San Clemente Island. Most vessels entering or leaving the Ports of Los Angeles or Long Beach travel either northwest through the Santa Barbara Channel, west just south of the northern Channel Islands, or south along the coast to San Diego, the Panama Canal, or South America.

3.3.2 Commercial and Recreational Fishing

Commercial landings data are maintained by the California Department of Fish and Wildlife and are grouped around major port areas. Commercial fishing is conducted offshore but the landings are brought back into the ports within the proposed action area. A wide range of fishing methods are using in this region that are fishery-specific such as drift gillnets, longline gear, troll gear, trawls, seining and traps or pots (Naval Undersea Warfare Center 2009). For the Port of Los Angeles, including Long Beach, the total commercial fisheries landings in 2012 were 163 million pounds (lb; 74 million kilograms [kg) worth $47,336,390 (California Department of Fish and Game 2013). Squid accounted for the most landings at 113 million lb (51 million kg) followed by Pacific sardines with 39 million lb (17 million kg).

Recreational fishing throughout California occurs at varying degrees of intensity and duration throughout the year. Recreational fishing typically occurs further offshore than within busy port areas. Fishing destinations and areas frequently change in response to changing conditions, but a number of charter boats leave from most ports throughout the proposed action area. The recreational fishing season generally occurs from late spring through the fall (Pacific Fishery Management Council (PFMC) 2011). In 2014 there were 1,149 recreational sports fishing license issued within the city of Long Beach, CA. This included 179 one day licenses, 46 two day licenses, and 2 lifetime licenses. Within the city of San Pedro, CA there were 2,982 licenses issued in 2014; including 354 one day licenses, 104 two day licenses, and 14 lifetime licenses. (California Department of Fish and Game 2015). There are a couple of known recreational fishing areas within the proposed action area. Rainbow Harbor which is located in Long Beach, California includes a dock (Pierpoint Landing) that allows recreational fishing (City of Long

Beach 2015) and the Belmont Veterans Memorial Pier also located in Long Beach provides a recreational fishing dock from dawn till midnight (Belmont Pier 2009). Other businesses, such as the Berth 55 Long Beach Sport Fishing and the Long Beach Marine Sport Fishing charter boat trips out from Long Beach into freshwater rivers or out into deeper waters of San Pedro Bay (City of Long Beach 2015; Seaguar 2015).
Although the proposed action area does not fall within the boundaries of the HSTT Study Area, the general recreational fishing discussion in Section 3.11.2.2 of the HSTT EIS/OEIS is applicable to the proposed action area.

3.3.3 Tourism

Coastal tourism and recreation can be defined as the full range of tourism, leisure, and recreationally oriented activities that take place in the coastal zone and the offshore coastal waters. These activities include coastal tourism development (e.g., hotels, resorts, restaurants, food industry, vacation homes, and second homes), and the infrastructure supporting coastal development (e.g., retail businesses, marinas, fishing tackle stores, dive shops, fishing piers, recreational boating harbors, beaches, and recreational fishing facilities). Also included is ecotourism (e.g., whale watching) and recreational activities such as recreational boating, cruises, swimming, recreational fishing, surfing, snorkeling, and diving (California Travel and Tourism Commission 2015).

The Port of Los Angles is mainly a concentrated container port; though, many cruise ships operate out of several terminals located within the port. Additionally, recreational boating and sport fishing tours are offered by a number of vendors who operate out of the port. Museums, restaurants and shopping opportunities are also available in the area. Several companies also operate out of the port of Long Beach with transportation services to Catalina Island. There are approximately 30 daily departures from Long Beach, Dana Point and Newport Beach headed to Catalina Island. Although the proposed action area does not fall within the boundaries of the HSTT Study Area, the description in section 3.11.2.4 of the HSTT EIS/OEIS provides additional details of tourism within California and is applicable to the proposed action area generally.

3.3.4 Subsistence Use

The U.S. Environmental Protection Agency considers subsistence fishers to be people who rely on non-commercial fish as a major source of protein. Subsistence fishers tend to consume non-commercial fish and/or shellfish at higher rates than other fishing populations, and for a greater percentage of the year, because of cultural and/or economic factors. Very few studies in the U.S. have focused specifically on subsistence fishers. The United States has issued no regulations to determine what or who would be considered a subsistence fisher. In addition, no particular criteria or thresholds (such as income level or frequency of fishing) definitively describe subsistence fishers. The U.S. Environmental Protection Agency issued guidance to states that at least 10 percent of licensed fishers in any area will be subsistence fishers (U.S. Environmental Protection Agency and Office of Air Quality Planning Standards 2011). Because the 10 percent estimate is not based on actual subsistence fishing data, this may overestimate or underestimate the actual number of subsistence fishers.

In Southern California, people fish off piers and in local bays, harbors, and waterways for regular subsistence rather than for recreation. In Los Angeles County, where a high cost of living and low incomes have produced food insecurity among certain populations, subsistence fishing is becoming more common. Although the economic value of subsistence fisheries may often be low, they may be critical for the livelihoods of many communities. Local community members might be engaged in subsistence fishing in the Long Beach area. However, specific information on subsistence fishing in Long Beach is not discussed in detail in this due to the challenge of separating subsistence fishing from recreational fishing. The California Department of Fish and Wildlife uses the term "recreational" to refer to fishermen that do not earn revenue from their catch but rather fish for pleasure and/or to provide food for personal consumption (Pitchon and Norman 2012). Although the proposed action area does not fall within the boundaries of the HSTT Study Area, a detailed description of subsistence use in California is described in the HSTT EIS/OEIS Section 3.11.2.3, and is applicable describing the resource within the proposed action area.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter discusses the potential environmental consequences of the Proposed Action to the physical, biological, and socioeconomic environments described in Chapter 3. Components of the Proposed Action that may potentially impact the environment include:

- Physical – vessel movement, seafloor devices, in-water devices, vessel/aircraft emissions, aircraft strike, and accessibility
- Energy – electromagnetic devices and low energy laser use
- Acoustic – vessel/aircraft noise and acoustic transmission
- Secondary – transmission of marine mammal diseases and parasites

Under the No Action Alternative, the Proposed Action would not occur; therefore, there would be no effect to the physical, biological, or socioeconomic environments. No further analysis of the No Action Alternative will be presented. Under Alternative 2, the action would occur as described and analyzed in the HSTT EIS/OEIS; the EIS/OEIS analyzed all potential effects of conducting Civilian Port Defense activities in the Port of San Diego. As such, no additional analysis will be provided herein. Table 1-1 identifies the sections of the HSTT EIS/OEIS that would be applicable to Alternative 2. Because the No Action Alternative and Alternative 2 need no further analysis, only the potential effects of Alternative 1 are provided herein.

4.1 IMPACTS TO THE PHYSICAL ENVIRONMENT

The stressors on the physical environment would result from vessel and aircraft emissions on air quality and seafloor devices on bottom sediment. No impact to the physical environment from acoustic or energy stressors would occur as a result of the Proposed Action. Acoustic transmission and aircraft noise do not interfere with water quality, marine sediments, or other physical oceanographic resources. Therefore, acoustic impacts to the physical environment will not be further discussed.

4.1.1 Air and Greenhouse Gas Emissions

Vessel and aircraft movements produce emissions and may impact air quality. The Civilian Port Defense support vessels include either a Landing Platform Dock or Littoral Combat Ship and a Mine Warfare ship, particularly a mine countermeasure class ship, which are diesel powered, whereas the smaller support crafts employ gasoline outboard engines. Since the land adjacent to the proposed action areas is an extreme non-attainment area for 8-hour ozone, a General Conformity Applicability Analysis was performed for Alternative 1 (Appendix C). Additionally, air emission factors such as lead and nitrogen dioxide (NO_2) are assessed for the Southcoast Air Basin which includes the proposed action area. In order to determine the potential emissions, the number of hours of boat operations per day was estimated. The number of hours was then multiplied by the number of days of Civilian Port Defense training activities for a total of 168 hours. For the two helicopter engines, the total annual emissions were calculated as 32 hours of operations. The maximum number of vessels (9), (2) helicopters, and (2) generators were used to calculate the maximum potential emissions production. The total amount of emissions of nitrogen oxides (NO_x) and Volatile Organic Compounds (VOCs), the two precursors of ozone, was summed to determine the potential impacts on local air quality. Emissions of NO_x and VOCs are reported in tons/year in order to make a direct comparison to "*de minimis*" (not significant) threshold levels established by the Environmental Protection Agency for serious non-attainment areas (40 CFR § 51.853). The threshold level for VOC is 10 tons per year, whereas the threshold for NO_x is 100 tons per year. The emission rates were based on manufacturer's information concerning fuel consumption for the engines and Environmental Protection Agency technical reports for the emissions factors (United States Environmental Protection Agency 2002, 2004, 2005a, 2005b, 2008a).

Emissions from MH-53 helicopters, gasoline and diesel powered vessels and auxiliary engines associated with the Proposed Action was determined to produce VOC and NO_x emissions below "*de minimis*" threshold levels (40 CFR§ 51.853); specifically, the amount of VOC emitted would be less than 7.3 tons per year, and the amount of NO_x emitted would be less than 8.9 tons per year. Therefore no significant impact to air quality is expected from the Proposed Action. The conformity analysis and the Navy Record of Non-Applicability for Clean Air Act Conformity are included in Appendix C.

Alternative 1 would make only a minimal contribution to greenhouse gas emissions; therefore, no significant impact to air quality from greenhouse gas emissions would occur from the Proposed Action.

In conclusion, emissions associated with Alternative 1 would not significantly impact the air quality of the physical environment.

4.1.2 Seafloor Devices

Seafloor devices, such as mine training shapes, are relatively small, generally less than 6 ft (1.8 m) in length. No more than 26 mine training shapes would be deployed at a time. These devices may be temporarily (7 to 30 days) deployed on the seafloor. Because of the short duration of their interaction with the seafloor, no corrosion of the devices is anticipated and, therefore, no metals are expected to be introduced into the environment. The placement and removal of devices on the seafloor, however, could result in a minor sediment disruption in the training areas. The sediment disruption would be limited to the area surrounding the device placed on the seafloor. The potential impact would be temporary and localized due to the minimal number of devices and the infrequency of training activities, and soft sediment is expected to shift back as it would follow a disturbance of tidal energy. No long-term increases in turbidity (sediment suspended in the water) would be anticipated.

In conclusion, seafloor devices associated with Alternative 1 would not significantly impact the physical environment.

4.2 IMPACTS TO THE BIOLOGICAL ENVIRONMENT

Impacts to the biological environment include vessel movement, seafloor devices, in-water devices, aircraft strike, aircraft noise, acoustic transmissions, electromagnetic and low-energy laser use. Secondary Stressors such as marine mammal systems used as part of the Civilian Port Defense training events, and their potential interaction with the biological environment, are also described below.

4.2.1 Physical Stressors

Evaluation of potential physical disturbance or strike risk considered the spatial overlap of the resource occurrence and potential striking objects. Analysis of impacts from physical disturbance or strike stressors focuses on the activities associated with the Proposed Action which cause an organism or habitat to be struck by an object moving through the air (e.g., aircraft), water (e.g., vessel movement, in-water devices), or placed onto the seafloor (e.g., seafloor devices). The area of operation, vertical distribution, and density of these items also play central roles in the likelihood of impact. Analysis of potential physical disturbance or strike risk also considered the speed of vessels as a measure of intensity.

4.2.1.1 Vessel Movement

This section address the following vessels that would be utilized during the Proposed Action: a Mine Warfare ship, particularly a mine countermeasure class ship (225 ft [68.5 m]), an afloat forward staging base (Littoral Combat Ship [387 ft, 118 m]or Landing Dock Platform [684 ft, 208 m]), and small support boats. This section does not analyze unmanned underwater vehicles or towed devices; these devices are analyzed in Section 4.2.2.4. All vessels would typically operate at speeds less than 10 knots (18 km/hour). Detailed analysis of the effects on invertebrates and benthic communities, seabirds, fish, EFH, sea turtles, and marine mammals are provided in HSTT EIS/OEIS “Impacts from Vessel Movement” sections for each resource. Although not within the Alternative 1 proposed action area, the analysis provided in HSTT EIS/OEIS is applicable because the species and effects would be similar. A summary of the effects on the resources is provided below. Where the effects to resources are different than the analysis in HSTT EIS/OEIS, greater detail is provided.

Vessels have the potential to affect invertebrates, birds, fish, sea turtles, and marine mammals by altering their behavior patterns or causing mortality or serious injury from collisions. Marine species are frequently exposed to vessel movement due to research, ecotourism, commercial, government, and private vessel traffic. It is difficult to differentiate between behavioral responses to vessel sound and visual cues associated with the presence of a vessel; thus, it is assumed that both play a role in prompting reactions from animals.

4.2.1.1.a Invertebrates and Benthic Communities

Vessel movement would result in short-term and localized disturbances to invertebrates utilizing the upper water column such as, zooplankton, salps, jellyfish, long-finned squid, and other cephalopods. However, no measurable effects on invertebrate populations in the water column would occur because the number of organisms exposed to vessel movements would be low relative to total invertebrate biomass.

Therefore, there would be no impact on invertebrates as a result of vessel movement associated with Alternative 1.

4.2.1.1.b Seabirds

The likelihood of vessel strike with seabirds is low. Strike would be associated with birds that are actively foraging or resting on the water surface at the time of the event. Seabirds which do not spend an extended amount of time foraging on the surface or only spend limited time within the water column have an even further reduced risk of vessel strike; therefore, these species were not included in the analysis. Birds would likely not forage in the area due to the activities taking place during the training. There could be a slightly increased risk of impacts during the fall migration when migratory birds are concentrated in coastal areas. However, despite this concentration, most birds would still be able to avoid collision with a vessel. Vessel movements could elicit brief behavioral or physiological responses, such as alert response, startle response, or fleeing the immediate area. Such responses typically conclude as rapidly as they occur. However, the general health of individual seabirds would not be compromised and no long-term or population level effects would be expected.

Pursuant to the ESA, vessel movement associated with Alternative 1 would have no effect on California least terns because this species is not present in the proposed action area during the time of the event. Pursuant to the Migratory Bird Treaty Act, vessel movement associated with Alternative 1 would not result in a significant adverse effect on migratory bird populations. See Appendix A for a list of birds in the proposed action area that are protected under the Migratory Bird Treaty Act.

4.2.1.1.c Fish

Exposure of fishes to vessel strikes is limited to those fish groups that are large, slow moving, and may occur near the surface (e.g., ocean sunfish and whale sharks). The likelihood of collision between vessels and adult or juvenile fish is extremely low because fish are highly mobile and are capable of detecting and avoiding approaching objects. Large slow moving fish such as ocean sunfish and whale sharks could be impacted (Speed et al. 2008). The potential for the vessel movement associated with the mine warfare training to impact these large fish is unlikely due to low population levels and wide dispersal in the area where these activities would occur. The Proposed Action is located near active shipping lanes and harbors (Figure 2-2) which are not preferred habitat for large oceanic fish such as the ocean sunfish (Miller and Lea 1972). Ichthyoplankton (fish eggs and larvae) in the water column could be displaced, injured, or killed by vessel and vehicle movement. The numbers of eggs and larvae exposed to vessels movement would be extremely low relative to total ichthyoplankton biomass; therefore, measurable changes on fish recruitment would not occur. Any behavioral reactions by adult or juvenile fish are not expected to result in changes in an individual's fitness, or species recruitment, and are not expected to result in long-term or population-level effects.

Pursuant to the ESA, vessel movement associated with Alternative 1 may affect, but is not likely to adversely affect scalloped hammerhead sharks because the effects of vessel movement overlapping with the species' presence are discountable or insignificant.

4.2.1.1.d Essential Fish Habitat

Vessel movement associated with the Proposed Action would have short term and temporary disturbance to the water column. Vessel movement in shallow waters would not disturb marine vegetation or sediments due to the disturbed nature of the existing area in busy port locations. The proposed action area encompasses active port locations with regular vessel movement with approximately 24 large ship calls to and from the port area per day; vessel movement associated with the Proposed Action are consistent with typical vessel traffic in the proposed action area (Louttit and Chavez 2014; U.S. Department of Transportation). Though vessel movement may result in temporary (days to weeks) and localized disturbance, the water column would not be altered in any measurable or lasting manner and there would be no adverse effect to EFH or HAPC from vessel movement. Pursuant to the Magnuson-Stevens Act, vessel movement associated with Alternative 1 would have no adverse effect to EFH and HAPC, and, as such, consultation under the Magnuson-Stevens Act is not required.

4.2.1.1.e Sea Turtles

Sea turtles have been observed to elicit short-term responses in their reactions to vessels, and their reaction time was greatly dependent on the speed of the vessel (Hazel et al. 2007). Sea turtles have been documented to flee frequently when encountering a slow-moving (2 knots [4 km/hour]) vessel, but infrequently when encountering a moderate-moving (6 knots [11 km/hour]) vessel, and only rarely when encountering a fast-moving (10 knots [18 km/hour]) vessel. The proportion of turtles that fled to avoid a vessel decreased significantly as vessel speed increased, and turtles that fled from moderate and fast approaches (6 and 10 knots [11 and 18 km/hr], respectively) did so at significantly shorter distances from the vessel than turtles that fled from slow approaches (Hazel et al. 2007). During the Proposed Action, vessel speeds would typically operate at speeds not exceeding 10 knots (18 km/hour) during transit and 3 knots (5.5 km/hour) during training, which would lessen the likelihood of vessel collisions with sea turtles. Sea turtles as a group are not common within the proposed action area and would at best be transitory. Any change to an individual's behavior is not expected to result in long-term or population-level effects. Therefore, collision with vessels is not expected to occur.

Pursuant to the ESA, vessel movement associated with Alternative 1 may affect, but is not likely to adversely affect, loggerhead turtles, green turtles, leatherback turtles, and olive ridley turtles, as the effects of vessel movement overlapping with the species' presence are discountable or insignificant.

4.2.1.1.f Marine Mammals

Marine mammals react to vessels in a variety of ways. Some respond negatively by retreating or engaging in antagonistic responses while other animals ignore the stimulus altogether (Terhune and Verboom 1999; Watkins 1986). Silber et al. (2010) concludes that large whales that are in close proximity to a vessel may not regard the vessel as a threat, or may be involved in a vital activity (i.e., mating or feeding) which may not allow them to have a proper avoidance response. Cetacean species generally pay little attention to transiting vessel traffic as it approaches, although they may engage in last minute avoidance maneuvers (Laist et al. 2001). Baleen whale responses to vessel traffic range from avoidance maneuvers to disinterest in the presence of vessels (Nowacek et al. 2007; Scheidat et al. 2004). Species of delphinids can vary widely in their reaction to vessels. Many exhibit mostly neutral behavior, but there are frequent instances of observed avoidance behaviors (Hewitt 1985; Würsig et al. 1998). Many species of odontocetes are frequently observed bow riding or jumping in the wake of a vessel (Norris and Prescott 1961; Ritter 2002; Shane et al. 1986; Würsig et al. 1998).

The size of a ship and speed of travel affect the likelihood of a collision. Reviews of stranding and collision records indicate that larger ships (262.5 ft [80 m] or larger) and ships traveling at or above 14 knots (26 km/hour) have a much higher instance of collisions with whales that result in mortality or serious injury (Laist et al. 2001). Proposed Action vessel speeds would not exceed 10 knots (18 km/hour) during training, which would lessen the likelihood of vessel collisions with marine mammals. Therefore, the probability of vessel collision during training activities is reduced. Additionally, the vessels associated with the Proposed Action would follow the standard operating procedures and mitigation measures outlined in Chapter 5 to avoid impacting marine mammals. Any change to an individual's behavior from vessel use is not expected to result in long-term or population-level effects. Therefore, collision with vessels is not expected to occur.

However, slow vessel speeds (less than 10 knots (18 km/hr) and the implementation of mitigation measures as described in Chapter 5 would further reduce the likelihood of a collision. Any change to an individual's behavior from vessel use is not expected to result in long-term or population-level effects.

Pursuant to the ESA, vessel movement associated with Alternative 1 may affect, but is not likely to adversely affect humpback whales and Guadalupe fur seals as the effects of vessel movement overlapping with the species' presence are discountable or insignificant. Pursuant to the MMPA, vessel movement associated with Alternative 1 is not expected to result in Level A or B harassment of marine mammals.

4.2.1.1.g Conclusion

In conclusion, vessel movement associated with Alternative 1 would not significantly impact invertebrates and benthic communities, seabirds, fish, EFH, sea turtles, or marine mammals.

4.2.1.2 Aircraft Strike

The Proposed Action may require low-altitude helicopter flights over the training area while towing deployed in-water devices. Aircraft strike would only have the potential to impact seabirds within the immediate vicinity of the Proposed Action. Other marine species are not likely to be affected from the overflight and do not have the potential for strike risks. Therefore, analysis of aircraft strike will not be provided for other biological resources. Most helicopters associated with mine countermeasures would operate at altitudes as low as 75 to 100 ft (23 to 31 m) for approximately two to four hours per test event. While bird strikes can occur anywhere aircraft are operated, Navy data indicate that they occur most often over land or close to shore. The majority of bird flight is below 3,000 ft (914 m) and approximately 95 percent of bird flight during migrations occurs below 10,000 ft (3,048 m) (U.S. Geological Survey 2006). Bird and aircraft encounters are more likely to occur during aircraft takeoffs and landings than when the aircraft is engaged in level low-altitude flight. Approximately 97 percent of aircraft-wildlife collisions occur at or near airports when aircraft are operating at or below 2,000 ft (610 m). In a study that examined 38,961 bird and aircraft collisions, Dobson (2010) found that the majority (74 percent) of collisions occurred below 500 ft (152 m). Given that most collisions occur below 500 ft (152 m), the low altitudes associated with the Propose Action may increase the potential risk to birds from aircraft strike.

Seabirds have the potential for behavioral impacts as well as possible strike impacts from aircrafts operating as part of the Proposed Action. In general, seabird populations consist of hundreds or thousands of individuals, ranging across a large geographical area. In this context, the loss of several or even dozens of birds due to physical strikes may not constitute a population-level impact, although some species gather in large flocks. Some bird strikes and associated bird mortalities or injuries could occur as a result of aircraft use; however, population-level impacts to seabirds would not likely result from aircraft strikes due to the limited time of operation, in-air noise and general aerial disturbance, birds are not likely to approach the aircraft and would likely avoid foraging in the area.

Pursuant to the ESA, aircraft strike associated with Alternative 1 would have no effect on California least terns because this species is not present in the proposed action area during the time of the event. Pursuant to the Migratory Bird Treaty Act, aircraft strike associated with Alternative 1 would not result in a significant adverse effect on migratory bird populations within the proposed action area. See Appendix A for a list of birds in the proposed action area that are protected under the Migratory Bird Treaty Act.

In conclusion, aircraft strike associated with Alternative 1 would not significantly impact seabirds.

4.2.1.3 Seafloor Devices

Seafloor devices, such as mine training shapes, are relatively small, generally less than 6 ft (1.8 m) in length. No more than 26 mine training shapes would be deployed at a time. These devices may be temporarily (7 to 30 days) deployed on the seafloor. Because of the short duration of their interaction with the seafloor, no corrosion of the devices is anticipated and, therefore, no metals are expected to be introduced into the environment. Seafloor devices are stationary and do not pose a threat to highly mobile organisms. These devices are bottom placed objects and would not impact seabirds because seabirds spend little time submerged and would not impact the birds' ability to forage. Therefore, seabirds are not further analyzed for impact from seafloor devices.

The placement and removal of objects on the seafloor, however, could result in a minor sediment disruption in the training areas. The sediment disruption would be limited to the area surrounding the object placed on the seafloor. The potential impact would be temporary and localized due to the minimal number of objects and the infrequency of training activities, and soft sediment is expected to shift back following a disturbance of tidal energy. No long-term increases in turbidity would be anticipated.

Detailed analysis of the effects on invertebrates and benthic communities including marine vegetation, marine mammals, fish, EFH, and sea turtles are provided in the HSTT EIS/OEIS "Impacts from Seafloor Devices" sections for each resource. Although not within the proposed action area, the analysis provided in the HSTT EIS/OEIS is applicable to the proposed action area because the species and effects would be similar. A summary of the effects on the resources are provided below. Where the effects to resources are different than the analysis in the HSTT EIS/OEIS, greater detail will be provided.

4.2.1.3.a Invertebrates and Benthic Communities

Deployment of seafloor devices would cause disturbance, injury, or mortality within the footprint of the device, may disturb marine invertebrates outside the footprint of the device, and would cause temporary local increases in turbidity near the ocean bottom. Objects placed on the seafloor may attract invertebrates, or provide temporary attachment points for invertebrates. Some invertebrates attached to the devices would be removed from the habitat when the devices are recovered. The impact of seafloor devices on invertebrates is likely to cause injury or mortality to individuals, but impacts to populations would be inconsequential due to the relatively small area of training and the dispersed short-term activities.

Seafloor device deployment or removal could impact marine vegetation by physically removal (e.g., uprooting), crushing, temporarily increasing the turbidity of waters nearby, or shading vegetation which may interfere with photosynthesis (Spalding et al. 2003). If marine vegetation is not able to photosynthesize, its ability to produce energy is compromised. However, the overlap of marine vegetation and seafloor devices is limited, and suspended sediments would settle in a few days with normal tidal movements and circulation patterns. Due to the quick recovery of most vegetation types and the temporary increase is suspended sediment, no long-term or population level effects on marine vegetation from seafloor devices is expected.

4.2.1.3.b Fish

Seafloor devices would be deployed by a surface vessel through the water column; this is where the potential for strike would occur. Before a potential seafloor device strike, some fish would sense a pressure wave through the water and respond by remaining in place, moving away from the object, or moving toward it (Hawkins and Johnstone 1978). Any fish displaced a small distance away by the movements from a sinking object nearby would likely resume normal activities after a brief disturbance. However, others could be disturbed and may exhibit a generalized stress response. If the object actually hit the fish, direct injury in addition to stress may result. The function of the stress response in vertebrates is to rapidly raise the blood sugar level to prepare the organism for the fight or flight response (Helfman et al. 2009).

The ability of a fish to return to what it was doing following a physical strike (or near miss resulting in a stress response) is a function of fitness, genetic, and environmental factors. Some organisms are more tolerant of environmental or human-caused stressors than others and become acclimated more easily. Within a species, the rate at which an individual recovers from a physical disturbance or strike may be influenced by its age, sex, reproductive state, and general condition. An organism that has reacted to a sudden disturbance by swimming at burst speed would tire after some time; its blood hormone and sugar levels may not return to normal for 24 hours (Helfman et al. 2009).

Exposure to seafloor devices used during the Proposed Action may cause short-term disturbance to an individual animal or, if struck, could lead to injury or death. The potential for fish to be close to a seafloor device during deployment, and therefore at risk to be struck, is very low, because of the relative position of fish within the water column relative to the deposition of the device. A possibility exists that a small number of fish at or near the surface may be directly impacted if they are in the area of deployment, or if they are near the point of physical impact at the time of seafloor device deployment, but the likelihood of one of these objects striking a fish is low. No long-term or population-level effects on fish from seafloor devices are expected.

Pursuant to the ESA, seafloor devices associated with Alternative 1 may affect, but are not likely to adversely affect scalloped hammerhead sharks as the effects of seafloor devices overlapping with the species' presence are discountable or insignificant.

4.2.1.3.c Essential Fish Habitat

As a result of their temporary nature (7 to 30 days), mine training shapes would not permanently impact the substrate on which they are placed. However, their presence would temporarily impair the ability of the substrate to function as a habitat for as long as the mine shape is in place. Mine shapes are deployed over soft bottom substrates (such as sand), therefore, hard bottom (such as consolidated rock) would not be impacted. Mine shape deployment exercises are done in areas of soft bottom substrates, and as a result, areas of live/hard bottom and coral would not be impacted.

Seafloor device placement could impact bottom sediment by temporarily increasing the turbidity of waters nearby. However, suspended sediments would settle within hours to a few days and disruption to the bottom sediment and water column would be temporary. Additionally, the seafloor devices associated with the proposed action would remain in place for (7 to 30 days) and are quickly removed, further reducing impacts to habitat.

Pursuant to the Magnuson-Stevens Act, seafloor devices associated with Alternative 1 would have a temporary and minimal impact on soft bottom substrate designated as EFH within the action area.

4.2.1.3.d Sea Turtles

Similar to the discussion for fish, above, short-term behavioral disturbance to an individual sea turtle could occur during the deployment of seafloor devices. The potential for a sea turtle to be close to a sea floor device during deployment or once on the sea floor is low because of the small geographic area within which the mine shapes would be deployed and the wide distribution of sea turtle habitat. Exposure to seafloor devices is not expected to change an individual's behavior, growth, survival, annual reproductive success, or lifetime reproductive success (fitness); thus, exposure to seafloor devices is not expected to result in population-level effects.

Pursuant to the ESA, seafloor devices associated with Alternative 1 may affect, but are not likely to adversely affect, loggerhead turtles, green turtles, leatherback turtles, and olive ridley turtles as the effects of seafloor devices overlapping with the species' presence are discountable or insignificant.

4.2.1.3.e Marine Mammals

Similar to the discussion for fish and sea turtles, above, short-term behavioral disturbance to an individual could occur during the deployment of seafloor devices. The potential for a marine mammal to be close to a sea floor device during deployment or once on the sea floor is low because of the small geographic area within which the mine shapes would be deployed and the wide distribution of marine mammal habitat. Exposure to seafloor devices is not expected to change an individual's behavior, growth, survival, annual reproductive success, or lifetime reproductive success (fitness). No long-term or population-level effects on marine mammals from seafloor devices are expected.

Pursuant to the ESA, seafloor devices associated with Alternative 1 may affect, but are not likely to adversely affect humpback whales and Guadalupe fur seals as the effects of seafloor devices overlapping with the species' presence are discountable or insignificant. Pursuant to the MMPA, seafloor devices associated with Alternative 1 are not expected to result in Level A or B harassment of marine mammals.

4.2.1.3.f Conclusion

In conclusion, seafloor devices associated with Alternative 1 would not significantly impact invertebrates and benthic communities, seabirds, fish, EFH, sea turtles, or marine mammals.

4.2.1.4 In-Water Devices

In-water devices associated with the Proposed Action include unmanned underwater vehicles and towed devices. These devices are self-propelled or towed through the water from helicopters. In-water devices are generally smaller than most other Navy vessels ranging from 27 ft (8 m) to about 49 ft (15 m). In-water devices can operate anywhere from the water surface to near-bottom.

Detailed analysis of the effects on invertebrates and benthic communities, seabirds, fish, EFH, sea turtles, and marine mammals are provided in the HSTT EIS/OEIS "Impacts from In-Water Devices" sections for each resource. Although not within the proposed action area, the analysis provided in the HSTT EIS/OEIS is applicable to this area because the species and effects would on the Proposed Action's environment be similar.

Unmanned underwater vehicles are slow moving (typically less than 4 knots) through the water column and have very limited potential to strike marine species because the animal in the water could avoid a slow moving object. Unmanned underwater vehicles and towed devices are closely monitored by observers manning other platforms in use during the training event. The devices which are towed through the water column by a helicopter are generally less than 33 ft (10 m) in length and operate at speeds of 10 to 40 knots (18 to 74 km/hour). Helicopter operation will be limited to two to four hours a day for no more than a four day period at a time. Due to the potential speed of the towed system, by helicopter, there is a potential for strike to marine resources and the use of in-water towed devices may cause short-term disturbance to an individual marine species.

4.2.1.4.a Invertebrates and Benthic Communities

The potential for an invertebrate strike by either the unmanned underwater vehicle or a towed system is similar to that identified for vessels. Invertebrates utilizing the upper water column may have short-term and localized disturbances; however, no long-term or population-level effects are expected. Additionally, in-water devices would not come in contact with the seafloor and would not pose a threat to benthic invertebrates.

4.2.1.4.b Seabirds

The only in-water devices that could strike seabirds are those that are towed by helicopters through the water during mine neutralization training. This is because these in-water devices are closer to the surface of the water. The other in-water devices used during mine neutralization training operate at greater water depths where there is no overlap between seabirds, which are at or just below the water surface, and those unmanned underwater vehicles, that move at a greater water depth. Most bird species fly at speeds of 17 to 26 knots (31 to 48 km/hr), but when threatened can increase their speed significantly. For example, duck species (such as wood duck and mallards) can fly over 52 knots (96 km/hr) and peregrine falcons can fly over 174 knots (322 km/hr) (Ehrlich et al. 1988). Helicopters towing the in-water device move at low altitudes and relatively slow air speeds, therefore, seabirds would detect the helicopter and cables and move out of the path of the in-water device. It is anticipated that most seabird species would move away from an unmanned vehicle or towed device. Additionally, it is likely that any seabirds in the vicinity of the approaching helicopter towing a device would be dispersed by the noise of the helicopter.

Pursuant to the ESA, in-water devices associated with Alternative 1 would have no effect on California least terns because this species is not present in the proposed action area during the time of the event. Pursuant to the Migratory Bird Treaty Act, in-water devices associated with Alternative 1 would not result in a significant adverse effect on migratory bird populations within the proposed action area. See Appendix A for a list of birds in the proposed action area that are protected under the Migratory Bird Treaty Act

4.2.1.4.c Fish

The potential for a fish to be struck by either the unmanned underwater vehicle or a towed system is similar to that identified for vessels. The likelihood of collision is low given the high mobility of most fishes (tuna, for example can swim up to 45 knots [83 km/hr] in short bursts) and their ability to detect and avoid approaching objects (National Oceanic and Atmospheric Administration 2011). However, large slow moving fish such as ocean sunfish and whale sharks could be impacted (Speed et al. 2008). The potential for the in-water devices associated with the mine warfare training to impact these large fish is unlikely due to low population levels and wide dispersal in the area where these activities would occur. The Proposed Action is located near active shipping lanes and harbors which are not preferred habitat for large oceanic fish (Brunnschweiler et al. 2009; Miller and Lea 1972).

The use of in-water devices may result in short-term and local displacement of fishes in the water column. However, these behavioral reactions are not expected to result in significant changes to an individual's fitness, or species recruitment, and are not expected to result in population-level impacts. Ichthyoplankton (fish eggs and larvae) in the water column could be displaced, injured, or killed by in-water devices. The numbers of eggs and larvae exposed to in-water devices would be extremely low relative to total ichthyoplankton biomass; therefore, measurable changes on fish recruitment would not occur.

Pursuant to the ESA, in-water devices associated with Alternative 1 may affect, but are not likely to adversely affect scalloped hammerhead sharks as the effects of in-water devices overlapping with the species' presence are discountable or insignificant.

4.2.1.4.d Essential Fish Habitat

Towed in-water devices are operated either on the sea surface or within the water column. Temporary disruption (days to weeks) to the water column would occur. The water column may be temporarily disturbed; however, the water would not be altered in any measurable or lasting manner. Unmanned underwater vehicles are typically propeller-driven, and operate within the water column. Physical disturbances and strikes of benthic substrate by in-water devices would cause damage to the devices and are avoided when possible. Lookouts on Navy vessels are trained to identify and to avoid physical impacts where possible. Therefore, there would be no adverse impact to benthic substrate or the water column as a result of the use of in-water devices.

Pursuant to the Magnuson-Stevens Act in-water devices associated with Alternative 1 would have no adverse impact of the quantity or quality of EFH or HAPC, and therefore consultation under the Magnuson-Stevens Act is not required.

4.2.1.4.e Sea Turtles

The potential for a sea turtle to be struck by either an unmanned underwater vehicle or a towed system is similar to that identified for vessels. Unmanned underwater vehicles move slowly through the water and have a limited potential to strike a sea turtle because sea turtles could avoid the slowly moving object. Towed mine warfare systems operate at higher speeds than the unmanned underwater vehicles and pose a greater collision risk. Although the potential for collision may affect an individual sea turtle, population level effects are not expected as it would not interfere with the populations' survival. However, any behavioral reactions from in-water devices are not expected to result in significant changes in an individual's fitness and are not expected to result in population-level effects.

Pursuant to the ESA, in-water devices associated with Alternative 1 may affect, but are not likely to adversely affect, loggerhead turtles, green turtles, leatherback turtles, and olive ridley turtles as the effects of in-water devices overlapping with the species' presence are discountable or insignificant.

4.2.1.4.f Marine Mammals

The potential for a marine mammal to be struck by either the unmanned underwater vehicle or a towed system is similar to that identified for vessels. Physical disturbance from the use of in-water devices is not expected to result in more than a momentary behavioral response. Unmanned underwater vehicles move slowly through the water column and have a limited potential to strike a marine mammals. Faster moving towed mine warfare systems pose a greater collision risk. However, the implementation of mitigation measures (Chapter 5) would reduce the likelihood of this collision. Any change to an individual's behavior from in-water devices is not expected to result in long-term or population-level effects.

Pursuant to the ESA, in-water devices associated with Alternative 1 may affect, but are not likely to adversely affect humpback whales and Guadalupe fur seals as the effects of in-water devices overlapping with the species' presence are discountable or insignificant. Pursuant to the MMPA, in-water devices associated with Alternative 1 are not expected to result in Level A or B harassment of marine mammals.

4.2.1.4.g Conclusion

In conclusion, in-water devices associated with Alternative 1 would not significantly impact invertebrates and benthic communities, seabirds, fish, EFH, sea turtles or marine mammals.

4.2.2 Energy

4.2.2.1 Electromagnetic Devices

During the Proposed Action electromagnetic mine neutralization systems would continuously create an electromagnetic field while being towed through the water column. This is done in order to replicate the electromagnetic signature of a passing ship. However, these devices would only be utilized intermittently throughout the short (two week) duration of the Proposed Action. The magnetic field generated by electromagnetic devices used during the Proposed Action is of relatively minute strength and dissipates quickly. The devices are moving through the water column, never remaining in the same location for more than a few seconds. Typically, the maximum magnetic field generated by the device would be approximately 23 gauss (G). This level of electromagnetic density is very low compared to magnetic fields generated by other everyday items. The magnetic field generated is between the levels of a refrigerator magnet (150 to 200 G) and a standard household can opener (up to 4 G at 4 inches [10 centimeters] away). The magnetic field generated by the mine warfare sources is comparable to the earth's magnetic field at a distance of 13.12 ft (4 m), which is approximately 0.5 G. The strength of the field at just under 26 ft (8 m) is only 40 percent of the earth's field, and only 10 percent at 79 ft (24 m). At a radius of 656 ft (200 m), the magnetic field generated by the electromagnetic devices utilized during the Proposed Action would be approximately 0.002 G (U.S Department of the Navy 2005). In other words, the magnetic field would generate out to a little over 656 ft (200 m), but weakens quickly as it increases in distance from the device.

ESA and MMPA regulations do not provide threshold criteria to determine the significance of the potential effects from activities that involve the use of varying electromagnetic frequencies. Many organisms, primarily marine vertebrates, have been studied to determine their thresholds for detecting electromagnetic fields (Normandeau Associates Inc. et al. 2011); however, no data are available on predictable responses to exposure above or below detection thresholds.

Detailed analysis of the effects on invertebrates, seabirds, fish, EFH, sea turtles, and marine mammals are provided in the HSTT EIS/OEIS "Impacts from Electromagnetic Devices" sections for each resource. Although not within the proposed action area, the analysis provided in HSTT EIS/OEIS is applicable to this area because the species and effects on the Proposed Action's environment would be similar. A summary of the effects on the resources is provided below. Marine vegetation are not sensitive to electromagnetic devices and are not included in the analysis.

4.2.2.1.a Invertebrates and Benthic Communities

Some arthropods (e.g., spiny lobster [*Panulirus argus*] and American lobster [*Homarus americanus*]) can sense magnetic fields, which is thought to assist the animal with navigation and orientation (Lohmann et al. 1997b; Normandeau Associates Inc. et al. 2011). These animals travel relatively long distances during their lives. This magnetic field sensation may exist in other invertebrates that travel long distances including commercially important and federally managed species (Normandeau Associates Inc. et al. 2011). However, because sensitivity is variable within taxonomic groups, it is not possible to make generalized predictions for groups of marine invertebrates. Sensitivity thresholds vary by species ranging from 3 to 300 G, and responses included non-lethal physiological and behavioral changes (Normandeau Associates Inc. et al. 2011). The primary use of magnetic cues seems to be navigation and orientation. Human-introduced electromagnetic fields could disrupt these cues and interfere with navigation, orientation, or migration. Because electromagnetic fields weaken exponentially with increasing distance from their source, large and sustained magnetic fields present greater exposure risks than small and transient fields, even if the small field is many times stronger than the earth's magnetic field (Normandeau Associates Inc. et al. 2011). Transient or moving electromagnetic fields may cause temporary disturbance to susceptible organisms' navigation and orientation, but the fields would be small and significantly weaken at 26 ft (8 m) away and would have no population level or long-term effects.

4.2.2.1.b Seabirds

Exposure of seabirds would be limited to those foraging at or below the surface (e.g., cormorants, loons, petrels, and grebes), because the electromagnetic fields generated by the devices within the water column would not extent into atmosphere. The electromagnetic fields generated would be temporary and localized (significantly diminished at a distance of 26 ft [8 m]), which would limit any influence on the surrounding environment. More importantly, the electromagnetic devices used are typically towed by a helicopter and it is likely that any seabirds in the vicinity of the approaching helicopter would be dispersed by the noise and disturbance generated by the helicopter and move away from the device before any exposure could occur. In the unlikely event that a seabird is temporarily disoriented by an electromagnetic device, it would still be able to re-orient using its internal magnetic compass to aid in navigation (Wiltschko et al. 2011). Due to the low level electromagnetic fields used in the mine warfare systems training it is not likely that seabirds would be affected from electromagnetic devices.

Pursuant to the ESA, electromagnetic devices associated with Alternative 1 would have no effect on California least terns because this species is not present in the proposed action area during the time of the event. Pursuant to the Migratory Bird Treaty Act use of electromagnetic devices associated with Alternative 1 would not result in a significant adverse effect on migratory bird populations. See Appendix A for a list of birds in the proposed action area that are protected under the Migratory Bird Treaty Act

4.2.2.1.c Fish

Some fishes have been identified as capable of detecting electromagnetic fields (primarily elasmobranchs, salmonids, tuna, eels, and stargazers). Electroreceptive marine fishes with ampullary (pouch) organs can detect considerably higher frequencies of 50 Hertz (Hz) to more than 2 kHz (Helfman et al. 2009). Potential impacts of electromagnetic activity on fishes may not be relevant to early life stages (eggs, larvae, juveniles) due to ontogenic (lifestage-based) shifts in habitat utilization (Botsford et al. 2009; Sabates et al. 2007). Some skates and rays produce egg cases that reside on the bottom, while many neonate and adult sharks occur in the water column or near the water surface. Other species may have an opposite life history, with egg and larval stages occurring near the water surface, while adults may be demersal.

For any electromagnetically sensitive fishes in close proximity to the source, the generation of electromagnetic fields has the potential to interfere with prey detection and navigation. They may also experience temporary disturbance of normal sensory perception or could exhibit avoidance reactions (Kalmijn 2000), resulting in alterations of behavior and avoidance of normal foraging areas or migration routes. However, these effects would only have the potential for occurrence to individuals within close proximity to the electromagnetic field. The devices would be emitting electromagnetic fields as they move through the water and would only be deployed for a temporary period during a typical four hour flight. No population-level or long-term effects are anticipated. Mortality from electromagnetic devices is not expected.

Pursuant to the ESA, electromagnetic fields emitted from these devices associated with Alternative 1 may affect, but are not likely to adversely affect scalloped hammerhead sharks as the effect of electromagnetic devices overlapping with the species' presence are discountable or insignificant.

4.2.2.1.d Essential Fish Habitat

The use of electromagnetic devices would be short term (days to weeks) and would not have an impact on the water column or seafloor. Electromagnetic devices are not known to have an impact on benthic habitats which are considered under the Magnuson-Steven Act. Substrate is unaffected by electromagnetic devices due to lack of a physical disturbance component. Although electromagnetic fields can extend to the seafloor, beds of submerged rooted vegetation are unaffected because they lack a central nervous system susceptible to electromagnetic stressors. Sedentary invertebrate communities should not be impacted because navigation and orientation is not required for these species, though mobile larvae may be affected. Therefore, for substrate and biogenic habitat EFH, there is no adverse impact expected from electromagnetic stressors. Likewise, there are no adverse impacts expected on these habitats within HAPC.

Pursuant to the Magnuson-Stevens Act, use of electromagnetic devices associated with Alternative 1 would have no adverse effect to EFH and HAPC, and therefore consultation under the Magnuson-Stevens Act is not required.

4.2.2.1.e Sea Turtles

Sea turtles use geomagnetic fields to navigate while at sea; changes in or interference with those fields may impact their movement (Lohmann and Lohmann 1996; Lohmann et al. 1997b). Experiments show that sea turtles can detect changes in magnetic fields, which may cause them to deviate from their original direction (Lohmann and Lohmann 1996; Lohmann et al. 1997b). If located in the immediate area (within about 656 ft [200 m]) where electromagnetic devices are being used, sea turtles could deviate from their original movements, but the extent of this disturbance is likely to be inconsequential. The electromagnetic devices used in the Proposed Action are relatively low intensity (0.002 G at 656 ft [200 m] from the source), temporary in duration, and very localized, and are therefore, not expected to cause more than short term behavioral disturbances.

Pursuant to the ESA, electromagnetic devices associated with Alternative 1 may affect, but are not likely to adversely affect, loggerhead turtles, green turtles, leatherback turtles, and olive ridley turtles as the effects of electromagnetic devices overlapping with the species' presence are discountable or insignificant.

4.2.2.1.f Marine Mammals

Based on the available literature, no evidence of electrosensitivity in marine mammals was found except recently in the Guiana dolphin (Czech-Damal et al. 2011). Normandeau et al. (2011) reviewed available information on electromagnetic and magnetic field sensitivity of marine organisms (including marine mammals) for an impact assessment of offshore wind farms for the U.S. Department of the Interior and concluded there is no evidence to suggest any magnetic sensitivity for sea lion or fur seals.

Fin, humpbacks, and sperm whales have shown positive correlations with geomagnetic field differences. Although none of the studies have determined the mechanism for magnetosensitivity, the suggestion from these studies is that whales can sense the Earth's magnetic field and may use it to migrate long distances. Cetaceans appear to use the Earth's magnetic field for migration in two ways: as a map by moving parallel to the contours of the local field topography, and as a timer based on the regular fluctuations in the field allowing animals to monitor their progress on this map (Klinowska 1990). Cetaceans do not appear to use the Earth's magnetic field for directional information (i.e. they do not use magnetic fields as an internal compass) (Klinowska 1990). Potential impacts to marine mammals associated with electromagnetic fields are dependent on the animal's proximity to the source and the strength of the magnetic field. Electromagnetic fields associated with the Proposed Action are relatively weak (only 10 percent of the earth's magnetic field at 79 ft [24 m]), temporary in duration and localized. Once the source is turned off or is moved from a location, the electromagnetic field is gone. If a marine mammal is sensitive to electromagnetic fields, it would have to be present within the electromagnetic field (approximately 656 ft [200 m] from the source) during the activity in order to detect it. Due to the mitigation measures outlined in Chapter 5, which would be in effect during the Proposed Action, the chance occurrence of a marine mammal in close enough vicinity to the electromagnetic device is unlikely. Research suggests that pinnipeds are not sensitive to electromagnetic fields (Normandeau Associates Inc. et al. 2011).

Detection does not necessarily signify a significant biological response rising to the level of take as defined under the ESA. Given the small area associated with mine fields, the infrequency and short duration of magnetic energy use, the low intensity of electromagnetic energy sources, and the density of cetaceans in these areas, the likelihood of ESA-listed cetaceans being exposed to electromagnetic energy at sufficient intensities to create a biologically relevant response is so low as to be discountable.

Pursuant to the ESA, electromagnetic devices associated with Alternative 1 would have no effect on the Guadalupe fur seal and may affect, but are not likely to adversely affect humpback whales as the effects of electromagnetic devices overlapping with the species' presence are discountable or insignificant. Pursuant to the MMPA, electromagnetic device use associated with Alternative 1 is not expected to result in Level A or B harassment of marine mammals.

4.2.2.1.g Conclusion

In conclusion, electromagnetic devices associated with Alternative 1 would not significantly impact invertebrates and benthic communities, seabirds, fish, EFH, sea turtles, or marine mammals.

4.2.2.2 Lasers

The Proposed Action would employ low- energy lasers (similar in nature to Light Detection and Ranging (LIDAR) systems) that would be connected to mine detection sensors. The lasers would be employed in a small portion of the proposed action area and for approximately eight days during the two week long Proposed Action.

Within the category of low energy lasers, the highest potential level of exposure would be from an airborne laser beam directed at the ocean's surface. An assessment on the use of low energy lasers by the Navy determined that low energy lasers have an extremely low potential to impact marine biological resources (Swope 2010). The assessment determined that the maximum potential for laser exposure is at the ocean's surface, where laser intensity is greatest (Swope 2010). Any heat that the laser generates would rapidly dissipate due to the large heat capacity of water and the large volume of water in which the laser is used. Based on the parameters of the low energy lasers and the behavior and life history of major biological groups, it was determined the greatest potential for impact would be to the eye of a sea turtle or marine mammal. Invertebrates and benthic communities, seabirds, fish, and EFH would not be impacted from the use of lasers. Therefore, pursuant to the ESA, the use of lasers associated with Alternative 1 would have no effect on listed seabirds or fish. Pursuant to the Migratory Bird Treaty Act, use of lasers associated with Alternative 1 would not result in a significant adverse effect on migratory bird populations. Finally, pursuant to the Magnuson-Stevens Act, use of lasers associated with Alternative 1 would have no adverse impact on EFH, and therefore consultation under the Magnuson-Stevens Act is not required.

4.2.2.2.a Sea Turtles

While all points on a sea turtle's body would have roughly the same probability of laser exposure, only eye exposure is of concern for low-energy lasers. Swope (2010) evaluated light detection and ranging (LIDAR) and determined that due to the way the system is used, animals would only be exposed to one pulse from the LIDAR. Swope calculated the single exposure limited for various species of marine mammals and sea turtles and determined that the energy associated with the laser, at the surface was below a single exposure limit for all species. There is no suspected effect due to heat from the laser beam. Furthermore, 96 percent of a laser beam projected into the ocean is absorbed, scattered, or otherwise lost (Guenther et al. 1996). To experience potentially biological relevant exposure to low energy lasers, a turtle's eye would have to be exposed to a direct laser beam for at least 10 seconds to sustain damage. During the Proposed Action, exposure to lasers will be less than 10 seconds, and when combined with the laser platform movement and the movement of sea turtles and the dissipation of laser energy in the water, no sea turtles are predicted to incur injury (Swope 2010). Therefore, lasers associated with the Proposed Action are not expected to impact sea turtles.

Pursuant to the ESA, laser use associated with Alternative 1 would have no effect on loggerhead turtles, green turtles, leatherback turtles, and olive ridley turtles.

4.2.2.2.b Marine Mammals

The potential for impacts to marine mammals from low-energy laser use would be the same as described for sea turtles. Given the usage characteristics, platform movement, and animal movement, it would not be possible for a marine mammal to experience eye damage from the low-energy lasers used during the Proposed Action. Therefore, low-energy lasers associated with the Proposed Action are not expected to impact marine mammals.

Pursuant to the ESA, low-energy laser use associated with Alternative 1 would have no effect on humpback whales and Guadalupe fur seals. Pursuant to the MMPA, low-energy laser use associated with Alternative 1 is not expected to result in Level A or B harassment of marine mammals.

4.2.2.2.c Conclusion

In conclusion, low- energy laser use associated with Alternative 1 would have no impact on invertebrates and benthic communities, sea birds, fish, EFH, sea turtles, or marine mammals.

4.2.3 Acoustic Stressors

The acoustic stressors associated with the Proposed Action include vessel noise, aircraft noise, and high frequency acoustic transmissions. In order to determine the potential impacts of these stressors on marine species, the hearing capabilities of each taxonomic group is discussed first. Each stressor is then discussed as it relates to the ability of the taxonomic group to perceive and react to each sound source.

4.2.3.1 Hearing Capabilities of Marine Species

Details regarding the hearing capabilities of each taxonomic group are provided in the HSTT EIS/OEIS "Hearing and Vocalization" sections for each resource (Table 1-1). Although not within the proposed action area, the discussion provided in the HSTT EIS/OEIS is applicable to this area because the information is general for all species. A summary of the hearing capabilities for each resource is provided below.

4.2.3.1.a Invertebrates and Benthic Communities

Hearing capabilities of invertebrates are largely unknown, although they are not expected to hear the high frequencies of the sources proposed for use, as all sources are 3 kHz or greater (Lovell et al. 2005; Popper 2008). Studies of sound energy effects on invertebrates are few, and identify only behavioral responses. Non-auditory injury, permanent threshold shift (PTS), temporary threshold shift (TTS), and masking studies have not been conducted for invertebrates. Both behavioral and auditory brainstem response studies suggest that crustaceans may sense sounds up to three kHz, but best sensitivity is likely below 200 Hz (Goodall et al. 1990b; Lovell et al. 2005; Lovell et al. 2006a). Most cephalopods (e.g., octopus and squid) likely sense low-frequency sound below 1,000 Hz, with best sensitivities at lower frequencies (Budelmann 2010; Mooney et al. 2010b; Offutt 1970; Packard et al. 1990). A few cephalopods may sense higher frequencies up to 1,500 Hz (Hu et al. 2009a).

4.2.3.1.b Seabirds

Little is known about the general or underwater hearing of diving seabirds or. The limited data on hearing in birds have shown that birds are highly sensitive to low-frequency sounds in the air. No data exists on the underwater hearing of birds (Dooling and Therrien 2012), but some studies have suggested that birds may hear low frequency sounds underwater (Croll et al. 1999). However, Dooling and Therrien (2012) state that if similar patterns were observed in diving birds as in humans underwater, birds may not hear well underwater. Dooling (2002) provides a complete summary of what is known about basic hearing capabilities of a variety of bird species. Birds hear best at frequencies between approximately 1 and 5 kHz in-air, with absolute sensitivity often approaching 0–10 decibel (dB) sound pressure level at the most sensitive frequency, which is typically in the region of 2–3 kHz. On average, the spectral limit of "auditory space" available to a bird for vocal communication extends from about 0.5 to 6.0 kHz (Dooling 2002). Although not all bird species have been studied, Dooling does point out that birds are unusual among vertebrates in the remarkable consistency of their auditory structures and their basic hearing capabilities, such as absolute thresholds and range of hearing. Dooling also notes that compared to most mammals, including humans, birds do not hear well at either high or low frequencies. At the high-frequency end of the audiogram, there are no cases in which birds hear at frequencies higher than about 15 kHz.

For diving birds, foraging behavior consists of diving underwater to capture and consume their prey (Siegfried 1974). This diving behavior, therefore, is associated with the time a diving bird spends fully submerged underwater. Activity budgets, the percentage of time spent in different activities per day, have been well studied in the ornithology field (Bergan et al. 1989; McKinney and McWilliams 2005; Quinlan and Baldassarre 1984; Siegfried 1974), but no studies have been conducted to determine how long diving birds spend underwater, where they would be subject to underwater noise.

4.2.3.1.c Fish

All fish have two sensory systems to detect sound in the water: the inner ear, which functions very much like the inner ear in other vertebrates, and the lateral line, which consists of a series of receptors along the fish's body (Popper 2008). The inner ear generally detects relatively higher-frequency sounds, while the lateral line detects water motion at low frequencies (below a few hundred Hz) (Hastings and Popper 2005).

Although hearing capability data only exist for fewer than 100 of the 32,000 fish species, current data suggest that most species of fish detect sounds from 50 to 1,000 Hz, with few fish hearing sounds above 4 kHz (Popper 2008). It is believed that most fish have their best hearing sensitivity from 100 to 400 Hz (Popper 2003). Additionally, some clupeids (shad in the subfamily Alosinae) possess ultrasonic hearing (i.e., able to detect sounds above 100,000 Hz) (Astrup 1999).

4.2.3.1.d Sea Turtles

Sea turtle ear anatomy is very different than what is found in mammals. Turtles do not have an external ear, and the tympanum is a continuation of the facial tissue (Moein and Musick 2003). The internal anatomy of a reptile ear is less complex compared to that of a mammal, and there is some thought that bone conduction plays a role in the perception of underwater sound. It is generally agreed that whatever the mechanism, sea turtle hearing thresholds are high. For much of their life, sea turtles exist in a noisy environment along the coast. Ambient noise in the inshore areas is heavily weighted to low-frequency sound (Hawkins and Myrberg 1983). This may, in part, explain their high hearing threshold for low-frequency sound.

Investigations on auditory sensitivity of sea turtles suggest that it is limited to low-frequency bandwidths. Sea turtles are low-frequency hearing specialists, typically hearing frequencies from 30 to 2,000 Hz, with a range of maximum sensitivity between 100 and 800 Hz ((Bartol and Ketten 2006a; Bartol and Musick 1999; Lenhardt 2002; Lenhardt 1994; Ridgway et al. 1969). Hearing below 80 Hz is less sensitive but still potentially usable (Lenhardt 1994).

Maximal sensitivity for green sea turtles has been recorded at 300-400 Hz, with a rapid decline in sensitivity for lower and higher frequency tones (Ridgway et al. 1969). Using an underwater method in which reactions were measured using auditory brainstem responses, green turtle hearing range was measured to be 100-800 Hz for smaller juveniles with the larger adults hearing only the lower end of this range, 100-500 Hz (Ketten and Bartol 2005). Underwater research using auditory brainstem responses a hearing range of approximately 100-900 Hz was reported for hatchling loggerheads, 100-700 Hz for juvenile 2-year-old loggerheads, and 100-400 Hz for 3-year-old loggerheads. Overall, the peak in loggerhead sensitivity occurred in the 500-600 Hz range. Finally, the juvenile olive ridley turtles that were tested showed a lower-range of hearing from 100-500 Hz (Ketten and Bartol 2005). Audiometric information is not available for leatherback sea turtles; however, their anatomy suggests they would hear similarly to other sea turtles. Functional hearing is assumed for this analysis to be between 10 Hz and 2 kHz.

4.2.3.1.e Marine Mammals

The hearing mechanism for marine mammals is similar to that of terrestrial mammals. It is comprised of an outer ear, a fluid-filled inner ear with a frequency-tuned membrane interacting with sensory cells, and an air-filled middle ear, which provides a connection between the outer ear and inner ear (Nedwell et al. 2004). Odontocetes (toothed whales) have a broad range, with hearing sensitivity measured between 75 Hz and 180 kHz (Finneran et al. 2002; Richardson et al. 1995a), and good functional hearing between 200 Hz and 100 kHz (Richardson 1995). Most small to medium-sized odontocetes can hear high frequencies (i.e., above 10 kHz), extending up to 80 to 180 kHz in some individuals (Finneran et al. 2002; Richardson et al. 1995a).

Anatomical and paleontological evidence suggests that the inner ears of mysticetes (baleen whales) are well adapted for hearing at lower frequencies (Ketten 1998; Richardson 1995).

4.2.3.2 Vessel Noise

Marine species within the proposed action area may be exposed to vessel noise during the Proposed Action. The potential impact from vessel noise is from masking (sound that interferes with the audibility of another sound) of other biologically relevant sounds. The proposed action area has high levels of anthropogenic noise due to the industrialized waterfronts (e.g., harbors, marinas, shipping lanes). Vessel noise could disturb seabirds, fish, sea turtles, and marine mammals, and potentially elicit an alerting, avoidance, or other behavioral reaction. Some marine species may have habituated to vessel noise, and may be more likely to respond to the sight of a vessel rather than the sound of a vessel, although both may play a role in prompting reactions (Hazel et al. 2007). The ambient noise level within active shipping areas of Los Angeles/Long Beach has been estimated around 140 dB sound pressure level (Tetra Tech Inc 2011). Existing ambient acoustic levels in non-shipping areas around Terminal Island in the Port of Long Beach have been estimated between 120 dB and 132 dB (Tetra Tech Inc 2011). With ambient levels of noise being elevated, the additional vessel noise from the Proposed Action would likely be masked by the baseline environmental conditions and marine species would not likely be impacted by the sounds associated with the Proposed Action, but perhaps by the sight of an approaching vessel or the shadow of a helicopter.

Detailed analysis of the effects on invertebrates, seabirds, fish, sea turtles, and marine mammals are provided in the HSTT EIS/OEIS "Impacts from Vessel/Aircraft Noise" sections for each resource. Although not within the proposed action area, the analysis provided in the HSTT EIS/OEIS is applicable to this area because the species and effects to the Proposed Action's environment would be similar. While some invertebrates and benthic communities may potentially be susceptible to the impacts of anthropogenic noise, many organisms in natural situations that experience either chronic- or repeated-noise exposure, may respond through habituation, tolerance and sensitization (Wale et al 2013). Due to the existing high ambient acoustic levels within active shipping areas of Los Angeles/Long Beach, invertebrates and benthic communities are excluded from further analysis for impacts from vessel and aircraft noise. A summary of the effects on seabirds, fish, sea turtles, and marine mammals is provided below.

4.2.3.2.a Seabirds

Auditory masking related to seabird hearing will not impact seabirds as they spend a limited amount of time underwater and do not actively use underwater sound related to their biologically relevant sounds. However, vessel noise could elicit short-term behavioral or physiological responses but are not likely to disrupt major behavior patterns, such as migrating, breeding, feeding, and sheltering, or to result in serious injury to any seabirds. Beason (2004) notes that birds exposed to up to 146 A-weighted decibels referenced at 20 micropascals (dB re 20 μPa) sound pressure level in air within 325 ft (99.1 m) of the noise source flushed but then returned within minutes of the disturbance. Vessel noise from the Proposed Action is not expected to be as high as this noise level. Birds would not be impacted from the additional vessel noise generated by the proposed action, compared to the background vessel noise generated within the port locations.

Pursuant to ESA, vessel noise associated with Alternative 1 would have no impact on California least terns because this species is not resent in the proposed action area during the time of the event. Pursuant to the Migratory Bird Treaty Act, vessel noise associated with Alternative 1 would not result in a significant adverse effect on migratory bird populations. See Appendix A for a list of birds in the proposed action area that are protected under the Migratory Bird Treaty Act.

4.2.3.2.b Fish

An increase in background sound can have an effect on the ability of a fish to hear a potential mate or predator, or to glean information about its general environment. In effect, acoustic communication and orientation of fish may potentially be restricted by noise regimes in their environment that are within the hearing range of the fish. With the ambient noise levels of the proposed action area being elevated, the vessel noise from the proposed action would have no significant additional masking effect to the environment and therefore would not impact fish.

Noise from the small number of Navy vessels and boats is also not expected to impact fish as available evidence does not suggest that ship noise can injure or kill a fish (Popper 2014). Further, we would expect the species to engage in avoidance behavior if vessels are moving in their direction. Misund (1997) found that fish ahead of a ship showed avoidance reactions at ranges of 160 to 490 ft (49–149 m). When the vessel passed over them, some species of fish responded with sudden escape responses that included lateral avoidance or downward compression of the school. We do not expect temporary behavioral reactions (e.g., temporary cessation of feeding) to impact individual fitness as individuals will resume feeding upon cessation of the sound exposure and unconsumed prey will still be available in the environment. Furthermore, while small boat, and it could be assume larger vessel, sounds may influence some fish behavior for some species (ex., startle response, masking), other fish species can be equally unresponsive (Becker et al. 2013).

Pursuant to the ESA, vessel noise associated with Alternative 1 would have no effect on scalloped hammerhead sharks.

4.2.3.2.c Sea Turtles

Little is known about how sea turtles use sound in their environment. Based on knowledge of their sensory biology (Bartol and Ketten 2006b; Bartol and Musick 2003; Levenson et al. 2004)), sea turtles may be able to detect objects within the water column (e.g., vessels, prey, predators) via some combination of auditory and visual cues. However, research examining the ability of sea turtles to avoid collisions with vessels shows they may rely more on their vision than auditory cues (Hazel et al. 2007). Similarly, while sea turtles may rely on acoustic cues to identify nesting beaches, they appear to rely on other non-acoustic cues for navigation, such as magnetic fields (Lohmann and Lohmann 1996) and light (Avens and Lohmann 2003). Additionally, they are not known to produce sounds underwater for communication. With the ambient noise levels of the proposed action area being elevated, the vessel noise from the proposed action would have no significant additional masking effect to the environment and therefore would not impact a sea turtle's ability to perceive other biologically relevant sounds. Sea turtles are frequently exposed to research, ecotourism, commercial, government, and private vessel traffic. Some sea turtles may have habituated to vessel noise (Hazel et al. 2007). Any reactions are likely to be minor and short-term avoidance reactions, leading to no long-term consequences for the individual or population.

Pursuant to the ESA, vessel noise associated with Alternative 1 would have no effect on loggerhead turtles, green turtles, leatherback turtles, and olive ridley turtles.

4.2.3.2.d Marine Mammals

Critical ratios have been determined for pinnipeds (Southall et al. 2000, 2003) and detections of signals under varying masking conditions have been determined for active echolocation and passive listening tasks in odontocetes (Au and Pawloski 1989; Erbe 2000; Johnson 1971). These studies provide baseline information from which the probability of masking can be estimated. Clark et al.(2009) developed a methodology for estimating masking effects on communication signals for low frequency cetaceans, including calculating the cumulative impact of multiple noise sources. This technique was used in Stellwagen Bank National Marine Sanctuary and showed, when two commercial vessels pass through a North Atlantic right whale's optimal communication space (estimated as a sphere of water with a diameter of 12 mi [20 km]), that space is decreased by 84 percent. This methodology relies on empirical data on source levels of calls (which is unknown for many species), and requires many assumptions about ambient noise conditions and simplifications of animal behavior, but it is an important step in determining the impact of anthropogenic noise on animal communication. Vocal changes in response to anthropogenic noise can occur across the repertoire of sound production modes used by marine mammals, such as whistling, echolocation click production, calling, and singing. Changes to vocal behavior and call structure may result from a need to compensate for an increase in background noise. In cetaceans, vocalization changes have been reported from exposure to anthropogenic sources such as sonar, vessel noise, and seismic surveying.

Vessel noise could elicit an alerting, avoidance, or other behavioral reaction. Based on studies of a number of species, mysticetes are not expected to be disturbed by vessels that maintain a reasonable distance from them, which varies with vessel size, geographic location, and tolerance levels of individuals. Odontocetes could have a variety of reactions to passing vessels, including attraction, increased traveling time, decreased feeding behaviors, diving, or avoidance of the vessel, which may vary depending on their prior experience with vessels. For pinnipeds, data indicate tolerance of vessel approaches, especially for animals in the water. Navy vessels do not purposefully approach marine mammals and are not expected to elicit significant behavioral responses. The implementation of mitigation as described in Chapter 5 would further reduce any potential impacts of vessel noise. With the ambient noise levels within the proposed action area being elevated already, the vessel noise from the Proposed Action would have no significant additional masking effect to the environment and therefore would not impact marine mammals.

Pursuant to the ESA, vessel noise associated with Alternative 1 would have no effect on humpback whales and Guadalupe fur seals. Pursuant to the MMPA, vessel noise associated with Alternative 1 is not expected to result in Level A or B harassment of marine mammals.

4.2.3.2.e Conclusion

In conclusion, vessel noise associated with Alternative 1 would not significantly impact invertebrates and benthic communities, seabirds, fish, EFH, sea turtles, or marine mammals.

4.2.3.3 Aircraft Noise

Seabirds, fish, sea turtles, and marine mammals may be exposed to aircraft-generated noise wherever aircraft overflights occur in the proposed action area. Rotary-wing aircraft (helicopters) are used throughout the proposed action area. Helicopters produce low-frequency sound and vibration (Pepper et al. 2003; Richardson et al. 1995b). Most marine invertebrates would not sense low- frequency sounds above the ambient noise levels, distant sounds or aircraft noise transmitted through the air-water interface.

Noise generated from helicopters is transient in nature and variable in intensity. Helicopter sounds contain dominant tones from the rotors that are generally below 500 Hz. Helicopters often radiate more sound forward than aft. The underwater noise produced is generally brief when compared with the duration of audibility in the air. The sound pressure level from an H-60 helicopter hovering at a 50 ft (15 m) altitude would be approximately 125 dB re 1 μPa at 1 m below the water surface, which is lower than the ambient sound that has been estimated in and around the Ports of Los Angeles/Long Beach. Helicopter flights associated with the Proposed Action could occur at altitudes as low as 75 to 100 ft (23 to 31 m), and typically last two to four hours.

Detailed analysis of the effects on invertebrates, seabirds, fish, sea turtles, and marine mammals are provided in the HSTT EIS/OEIS "Impacts from Vessel/Aircraft Noise" sections for each resource. Although not within the proposed action area, the analysis provided in the HSTT EIS/OEIS is applicable to this area because the species and effects to the proposed action area would be similar. Invertebrates and benthic communities would not be close enough to a hovering helicopter to potentially experience impacts to sensory structures, and therefore are not included further for this analysis. A summary of the effects on seabirds, fish, sea turtles, and marine mammals is provided below.

4.2.3.3.a Seabirds

The low altitude of helicopter activity increases the likelihood that seabirds would respond to noise from helicopter overflights. Helicopters travel at relatively slow speeds (less than 100 knots [185 km/hour]) which increase the duration of noise exposure. Some studies have suggested that birds respond more to noise from helicopters than from fixed-wing aircraft (Larkin et al. 1996; Service 1994). Noise from low-altitude helicopter overflights would be expected to elicit short-term behavioral or physiological responses in exposed seabirds. Repeated exposure of individual seabirds or groups of seabirds is unlikely based on the dispersed nature of the overflights (two to four hours per event) and seabird's capability to avoid or rapidly vacate an area of disturbance. Therefore, the general health of individual seabirds would not be compromised. Startle or alert reactions to aircraft are not likely to disrupt major behavior patterns, such as migrating, breeding, feeding, or sheltering, or to seriously injure any seabirds.

Pursuant to the ESA, aircraft noise associated with Alternative 1 would have no effect on California least terns because this species is not present in the proposed action area during the time of the event. Pursuant to the Migratory Bird Treaty Act, aircraft noise associated with Alternative 1 would not result in a significant adverse effect on migratory bird populations. See Appendix A for a list of birds in the proposed action area that are protected under the Migratory Bird Treaty Act.

4.2.3.3.b Fish

Fish may be exposed to aircraft-generated noise wherever aircraft overflights occur; however, sound is primarily transferred into the water from air in a narrow cone under the aircraft. Some species of fish could respond to noise associated with low-altitude aircraft overflights or to the surface disturbance created by downdrafts from helicopters. Aircraft overflights have the potential to affect surface waters and, therefore, to expose fish occupying those upper portions of the water column to sound and general disturbance potentially resulting in short-term behavioral or physiological responses. If fish were to respond to aircraft overflights, only short-term behavioral or physiological reactions (e.g., swimming away and increased heart rate) would be expected, however no long-term or population level impacts on fish are expected from aircraft noise.

Pursuant to the ESA, aircraft noise associated with Alternative 1 may affect, but is not likely to adversely affect scalloped hammerhead sharks as the effects of aircraft noise overlapping with the species' presence are discountable or insignificant.

4.2.3.3.c Sea Turtles

Sea turtles may respond to both the physical presence and to the noise generated by the aircraft. Underwater sounds from aircraft are strongest just below the surface and directly under the aircraft. Low flight altitudes of helicopters during the Proposed Action may occur under 100 ft (31 m) and may elicit a behavioral response due to the proximity to sea turtles, the slower airspeed, and therefore longer exposure duration, and the downdraft created by the helicopter's rotor. Sea turtles would likely avoid the area under the helicopter. It is unlikely that an individual would be exposed repeatedly for long periods of time due to the short duration of training.

Pursuant to the ESA, aircraft noise associated with Alternative 1 may affect, but is not likely to adversely affect, loggerhead turtles, green turtles, leatherback turtles, and olive ridley turtles as the effects of aircraft noise overlapping with the species' presence are discountable or insignificant.

4.2.3.3.d Marine Mammals

Marine mammals may respond to both the physical presence and to the noise generated by the aircraft. Underwater sounds from aircraft are strongest just below the surface and directly under the aircraft. Low flight altitudes of helicopters during the Proposed Action may occur under 100 ft (31 m) and may elicit a somewhat stronger behavioral response due to the proximity to marine mammals, the slower airspeed and therefore longer exposure duration; and the downdraft created by the helicopter's rotor (Figure 2-1). Marine mammals would likely avoid the area under the helicopter. It is unlikely that an individual would be exposed repeatedly for long periods of time due to the short duration of training. Marine mammals located at or near the surface when aircraft flies overhead at low-altitude may be startled, divert their attention to the aircraft, or avoid the immediate area by swimming away or diving. Short-term reactions to aircraft are not likely to disrupt major behavior patterns such as migrating, breeding, feeding, and sheltering, or to seriously injure any marine mammals.

Pursuant to the ESA, aircraft noise associated with Alternative 1 may affect, but is not likely to adversely affect, humpback whales and Guadalupe fur seals as the effects of aircraft noise overlapping with the species' presence are discountable or insignificant. Pursuant to the MMPA, aircraft noise associated with Alternative 1 is not expected to result in Level A or B harassment of marine mammals.

4.2.3.3.e Conclusion

In conclusion, aircraft noise associated with Alternative 1 would not significantly impact invertebrates and benthic communities, seabirds, fish, EFH, sea turtles or marine mammals.

4.2.3.4 Acoustic Transmissions

Sonar systems to be used during the Proposed Action raining would include AN/SQQ-32, AN/AQS-24 and handheld sonars (AN/PQS 2A). Of these sonar sources, only the AN/SQQ-32 would require quantitative acoustic effects analysis, given its source parameters, which are classified. The remaining sources are either above the hearing range of marine species or have narrow beam widths and short pulse lengths that would not result in any effects to marine species. All active acoustic sources proposed for Civilian Port Defense training would emit signals considered to be high-frequency (greater than 10 kHz).

Detailed analysis of the effects on invertebrates, seabirds, fish and EFH, sea turtles, and marine mammals are provided in the HSTT EIS/OEIS "Impacts from Acoustic Stressors" sections for each resource. Although not within the proposed action area, the analysis provided in the HSTT EIS/OEIS is applicable to this area because the species and effects on the Proposed Action's environment would be similar. A summary of the effects on the resources is provided below. Sea turtles cannot hear or are not sensitive to high-frequency acoustic transmissions and are not included further in the analysis.

4.2.3.4.a Invertebrates

Very little is known about sound detection and use of sound by aquatic invertebrates (Montgomery et al. 2006; Popper et al. 2001). Organisms may detect sound by sensing either the particle motion or pressure component of sound, or both. Aquatic invertebrates probably do not detect pressure since many are generally the same density as water and few, if any, have air cavities that would function like the fish swim bladder in responding to pressure (Popper et al. 2001). Many marine invertebrates, however, have ciliated "hair" cells that may be sensitive to water movements, such as those caused by currents or water particle motion very close to a sound source (Mackie and Singla 2003). These cilia may allow invertebrates to sense nearby prey or predators or help with local navigation. Marine invertebrates may produce and use sound in territorial behavior, to deter predators, to find a mate, and to pursue courtship (Popper et al. 2001).

Both behavioral and auditory brainstem response studies suggest that crustaceans may sense sounds up to 3 kHz, but best sensitivity is likely below 200 Hz (Goodall et al. 1990a; Lovell et al. 2005; Lovell et al. 2006b). Most cephalopods (e.g., octopus and squid) likely sense low-frequency sound below 1,000 Hz, with best sensitivities at lower frequencies (Mooney et al. 2010a; Packard et al. 1990). A few cephalopods may sense higher frequencies up to 1,500 Hz (Hu et al. 2009b). Squid did not respond to toothed whale ultrasonic echolocation clicks at sound pressure levels ranging from 199 to 226 dB re 1 micro Pascal peak-to-peak, likely because these clicks were outside of squid hearing range (Wilson et al. 2007). However, squid exhibited alarm responses when exposed to broadband sound from an approaching seismic airgun with received levels exceeding 145 to 150 dB re 1 microPascal root mean square (McCauley et al. 2000).

It is expected that most marine invertebrates would not sense high-frequency sonar associated with the Proposed Action. Most marine invertebrates would not be close enough to active sonar systems to potentially experience impacts to sensory structures. Any marine invertebrate capable of sensing sound may alter its behavior if exposed to sonar. Although acoustic transmissions produced during the Proposed Action may briefly impact individuals, intermittent exposures to sonar are not expected to impact survival, growth, recruitment, or reproduction of widespread marine invertebrate populations.

4.2.3.4.b Seabirds

Birds have been reported to hear best at mid-frequencies (1–5 kHz), and are not likely to hear the high-frequency signals associated with the Proposed Action. National Marine Fisheries Service (2003) concluded that, even if some diving birds were able to hear high frequency signals (frequencies from 10 kHz to 20 kHz), it is unlikely to have an impact because: 1) there is no evidence seabirds use underwater sound, 2) seabirds spend a small fraction of time submerged, and 3) seabirds could rapidly fly away from the area and disperse to other areas if disturbed. Even if underwater hearing is similar to in-air hearing, only the lowest frequencies of the broadband sonar source would be, at best, within the very high end of the hearing range. Further, the lack of sensitivity to these frequencies and the complete inability of birds to hear the higher frequency sources would preclude auditory and behavioral effects.

Pursuant to the ESA, acoustic transmissions associated with Alternative 1 would have no effect on California least terns because this species is not present in the proposed action area during the time of the event. Pursuant to the Migratory Bird Treaty Act, acoustic transmissions associated with Alternative 1 would not result in a significant adverse effect on migratory bird populations. See Appendix A for a list of birds in the proposed action area that are protected under the Migratory Bird Treaty Act

4.2.3.4.c Fish

Few fish species have been shown to be able to detect the high-frequency sounds associated with the Proposed Action. For those species that may be able to hear the transmissions, direct injury is unlikely to occur because of relatively lower peak pressures and slower rise times than potentially injurious sources such as explosives. Limited mortality has been shown to occur when fish are subjected to an intense sound source, but only when fish are very close to the source (Popper 2008). Those species of fish tested at a distance from the source show no mortality and probably no long-term effects. Still, the results to date are of considerable interest and importance, and clearly show that exposure to many types of loud sounds may have little or no impact on fish. Since the footprint of the sources used in the Proposed Action is minimal, the majority of fish with potential exposure to a loud sound would be far enough from the sources for the sound level to have attenuated considerably.

Physical effects from acoustic exposure include a TTS or resonance of gaseous or air-filled organs (i.e., swimbladders). TTS is a temporary elevation of hearing threshold at specific frequencies (a decrease in hearing sensitivity) which fully recovers over time and is the result of exposure to sound. The magnitude and duration of TTS are related to the received level, duration, spectral distribution, and temporal pattern of the signal. The TTS effect has been demonstrated in several fish species where investigators used exposure to either long-term increased background levels (Smith et al. 2004) or intense, but short-term, sounds (Popper et al. 2005). Additionally, there is no evidence of permanent hearing loss (e.g., deafness), often referred to in the mammalian literature as PTS, in fish. Unlike in mammals when deafness often occurs as a result of the permanent loss of sensory hair cells, sensory hair cells in the ear of fish are replaced after they are damaged or killed (Lombarte et al. 1993; Smith et al. 2006). As a consequence, any hearing loss in fish may be as temporary as the time course needed to repair or replace the sensory cells that were damaged or destroyed (Smith et al. 2006). Therefore, permanent loss of hearing in fish would not result from exposure to sound.

A fundamentally critical question regarding TTS is how much the temporary loss of hearing would impact survival of fish. During a period of hearing loss, fish will potentially be less sensitive to sounds produced by predators or prey, or to other acoustic information about their environment. Most marine fish species are limited to detecting frequencies below 1.5 kHz and cannot hear high-frequency sonar that would be used during the Proposed Action. While the hearing abilities of the ESA listed species in the proposed action area have not been tested specifically, based on studies of species with similar auditory system structures and lack of specializations for enhanced hearing, these species are likely unable to detect the sounds of the Proposed Action. Thus, there is little or no likelihood of there being TTS as a result of exposure to these sonars. It is possible that high-frequency sonar is detectable by some fish that can detect frequencies above 1.5 kHz, and for some, as high as 180 kHz, such as sciaenid species and clupeids. However, the likelihood of TTS in these species is small since the duration of exposure of fish to a moving source during proposed Civilian Port Defense training activities is very low; exposure to a maximum sound level (which, due to attenuation, is generally well below the source level) would only be for a few seconds as the vessel or vehicle moves by.

Another issue is the effect of human-generated sound on the behavior of wild fish, and whether exposure to the sounds would alter the behavior of a fish in a manner that would affect its way of living such as where it tries to find food or how well it can find a mate. Behavioral responses to loud noise could include a startle response, such as the fish swimming away from the source, the fish “freezing” and staying in place, or scattering (Popper 2003).

Studies have also shown that high-frequency emissions may be detected by some fish species. Experiments on several species of the Clupeidae (i.e., herrings, shads, and menhadens) have obtained responses to frequencies between 40 and 180 kHz (Astrup 1999); however, not all clupeid species tested have demonstrated this very high-frequency hearing. Mann et al. (1998) reported that the American shad can detect sounds from 0.1 to 180 kHz with two regions of best sensitivity: one from 0.2 to 0.8 kHz, and the other from 25 kHz to 150 kHz. This shad species has relatively high thresholds (about 145 dB re 1μPa), which should enable the fish to detect odontocete clicks at distances up to about 656 ft (200 m) (Mann et al. 1997). None of the ESA-listed species in the proposed action area are hearing specialists.

If hearing specialists were present, they would have to in close vicinity to the source to experience effects from the acoustic transmission. While a large number of fish species may be able to detect low- frequency sonar, some mid-frequency sonar and other active acoustic sources, low-frequency and mid-frequency acoustic sources are not planned as part of the Proposed Action. Overall effects to fish from active sonar sources would be localized, temporary and infrequent.

Pursuant to the ESA, acoustic transmissions associated with Alternative 1 would have no effect on scalloped hammerhead sharks.

4.2.3.4.d Essential Fish Habitat

The potential effect on EFH is assessed in terms of quality. Sonar transmissions would result in no changes to the physical, biological, or chemical properties of the water and substrate. Additionally, sonar transmissions would not result in a potential loss of or injury to, benthic organisms, prey species, and their habitat. As outlined above, no physiological effects on fish (e.g., loss of or injury to prey species) from acoustic transmissions are expected. Acoustics may create a short term (days to weeks) impacts to habitat quality through increased sound.

Pursuant to the Magnuson-Stevens Act, acoustic transmissions associated with Alternative 1 would have temporary and minimal impact on the water column only and would have no effect to HAPC.

4.2.3.4.e Marine Mammals

In assessing the potential effects on marine mammals expected to occur in the proposed action area from acoustic transmissions, a variety of factors must be considered, including source characteristics, animal presence, animal hearing range, duration of exposure, and impact thresholds for species that may be present. Mine warfare sonar employs high frequencies (above 10 kHz) that attenuate rapidly in the water, thus producing only a small area of potential auditory masking. Higher-frequency mine warfare sonar systems are typically outside the hearing and vocalization ranges of mysticetes; therefore, mysticetes are unlikely to be able to detect the higher frequency mine warfare sonar, and these systems would not interfere with their communication or detection of biologically relevant sounds. Pinnipeds produce sounds both in air and water that range in frequency from approximately 100 Hz to several tens of kHz and it is believed that these sounds only serve social functions (Miller 1991) such as mother-pup recognition and reproduction.

Odontocetes may experience some limited masking at closer ranges as the frequency band of many mine warfare sonar overlaps the hearing and vocalization abilities of some odontocetes; however, the frequency band of the sonar is narrow, limiting the likelihood of auditory masking. The Proposed Action is limited in duration and dispersion of the activities in space and time reduce the potential for auditory masking effects from proposed activities on marine mammals. The only system quantitatively modeled was the AN/SQQ-32 for its potential effects to marine mammals. The AN/AQS-24 and handheld sonars are considered *de minimis* sources, which are defined as sources with low source levels, narrow beams, downward directed transmission, short pulse lengths, frequencies above known hearing ranges, or some combination of these factors (Department of the Navy 2013). *De minimis* sources have been determined to not have potential impact to marine mammals.

Potential acoustic impacts could include non-recoverable physiological effects, recoverable physiological effects, and behavioral effects. Criteria and thresholds for measuring these effects induced from underwater acoustic energy have been established for marine mammals. PTS in hearing is the criterion used to establish the onset of non-recoverable physiological effects, TTS in hearing is the criterion used to establish the onset of recoverable physiological effects, and a behavioral response function is used to determine non-physiological behavioral effects. As described in Section 1.3.5, the MMPA describes Level A harassment as injury or potential significant injury and Level B harassment as potential significant disturbance. An analysis of the potential effects to marine mammals from the proposed acoustic sources was conducted using a methodology that calculates the total sound exposures level and maximum sound pressure level that a marine mammal may receive from the acoustic transmissions. The Navy Acoustic Effects Model (NAEMO) was used for all modeling analysis (Marine Species Modeling Team 2012). Environmental characteristics (e.g., bathymetry, wind speed, and sound speed profiles) and source characteristics (i.e., source level, source frequency, transmit length and interval, and horizontal beam width) are used to determine the propagation loss of the acoustic energy, which was completed using the Comprehensive Acoustic System Simulation/Gaussian Ray Bundle (CASS/GRAB) propagation model. The propagation loss then was used in NAEMO to create acoustic footprints, model source movements, and calculate received energy levels around the source. Animats, or representative animals, are distributed based on density data obtained from the Navy Marine Species Density Database (NMSDD) (Department of the Navy 2012). This database is based on surveys, published population estimates, and a Relative Environmental Suitability (RES) model (Kaschner et al. 2006). The energy received by each distributed animat within the model is summed into a total sound exposure level, which is compared to the acoustic effects criteria to calculate potential exposures at the PTS and TTS level. Additionally, the maximum sound pressure level received by each animat predicts probability of behavioral harassment via the behavioral risk function. Details on the modeling methodology, density data, and criteria and thresholds used to determine effects can be found in Appendix B.
The output from the acoustic modeling provide both the predicted ranges to the various levels of effect as well as estimated exposures of marine mammal species.

Range to effects

The predicted range to effects from the operation of the AN/SQQ-32 demonstrates the distance an animal has to be away from the source to have a behavioral or TTS effect (Table 4-1). These ranges to effects are well within the mitigation zone outlined in Chapter 5. These mitigation measures would help reduce or eliminate the estimated TTS exposures in Table 4-2.

Table 4-1. Range to Effects from the AN/SQQ-32 in Los Angeles/Long Beach.

Hearing Group	Range to Effects Warm Season (m)	
	Behavioral	TTS
Low Frequency Cetacean	1,900	<50
Mid-Frequency Cetacean	2,550	<50
High Frequency Cetacean	2,550	194
Phocidae water	2,500	<50
Otariidae Odobenidae water	2,200	<50

Marine Mammal Modeling Results

The quantitative analysis suggest that seven species may be exposed to sound pressure levels exceeding the threshold for behavioral effects, and five species may be exposed to sound energy levels above the threshold for TTS (Table 4-2). No marine mammal species are expected to experience PTS, injury or mortality from the Proposed Action.

Results suggest that without the implementation of mitigation measures Pacific white-sided dolphin, Risso's dolphin, coastal bottlenose dolphin, short-beaked common dolphin, long-beaked common dolphin, California sea lions and harbor seals would have behavioral exposures. Of the seven species, these predictions indicate potential for non-injurious harassment exposure levels (Level B) in five odontocetes (highlighted in Table 4-2). No ESA-listed species have predicted behavioral or Level B exposures. An Incidental Harassment Authorization has been prepared in regards to the seven species with predicted exposures. The Incidental Harassment Authorization application was submitted to National Marine Fisheries Service on April 16, 2015 (see Appendix F). The Incidental Harassment Authorization application has more detail related to the exposures and has been submitted to NMFS under separate cover. A Final Rule for an Incidental Harassment Authorization will be published in the Federal Register and will go into effect immediately prior to conducting Civilian Port Defense training.

Table 4-2. Marine Mammal Acoustic Exposure Estimate for 8-Days of Operation in the Proposed Action Area.

Common Name	Behavioral	TTS	PTS
Mysticetes			
Gray whale	0	0	0
Humpback whale*	0	0	0
Odontocetes			
Pacific White-Sided dolphin	21.48	18.66	0
Risso's dolphin	15.92	4.8	0
Bottlenose dolphin	0	0	0
Bottlenose dolphin coastal	29.2	19.2	0
Short-beaked common dolphin	422.10	305.06	0
Long-beaked common dolphin	2.62	5.33	0
Northern right whale dolphin	0	0	0
Dall's porpoise	0	0	0
Pinnipeds			
Guadalupe fur seal*	0	0	0
Northern fur seal	0	0	0
California sea lion	45.62	0	0
Northern elephant seal	0	0	0
Harbor seal	7.82	0	0

*Denotes ESA listed species
Cells highlighted in yellow indicate potential exposures (greater than 0.5 for MMPA species) to marine mammals

Given a very conservative approach and assuming all of the odontocetes would impact behavioral patterns to a significant degree, the implementation of the mitigation measures, as outlined in Chapter 5, would likely reduce the anticipated number of incidental takes from the Proposed Action. Species with the highest numbers of predicted takes include the short-beaked common dolphin, Risso's dolphin and California sea lion. These animals are some of the most numerous within the Los Angeles/Long Beach area. Activities similar to the Proposed Action have been occurring within the HSTT area for many years, though many of these activities occur, the general population trends of some of the species (long-beaked common dolphin, California sea lion and harbor seal) with predicted exposures have been increasing. This demonstrates that these types of activities have not been having population level effects (Carretta et al. 2012; Carretta et al. 2013).

The short-beaked common dolphin, which has the highest number of predicted exposures typically, can travel in pods consisting of a few hundred individuals. The pod size can range from 2–10,000 individuals with a mean of 162 individuals (Barlow and Forney 2007; Carretta et al. 2000a; Henderson et al. 2011; Jefferson et al. 2008). A pod of animals this large in size would be spotted far enough away to apply the mitigation as outlined in Chapter 5. Other odontocetes with predicted exposures also travel in pods consisting of more than one animal and mitigation measures, would be effective for the reduction of predicted exposures to these species as well.

Animals that do experience TTS may have reduced ability to detect relevant sounds such as predators, prey, or social vocalization until their hearing recovers. Recovery from a threshold shift (i.e., TTS; temporary partial hearing loss) can take a few minutes to a few days depending on the severity of the initial shift. Threshold shifts do not necessarily affect all hearing frequencies equally, so some threshold shifts may not interfere with an animal's ability to hear biologically relevant sounds. For exposures resulting in TTS, long-term consequences for populations would not be expected as the range to TTS is well within the mitigation zone and TTS exposures would be minimal as part of the Proposed Action.

Therefore, pursuant to the ESA, acoustic transmissions associated with Alternative 1 would have no effect to humpback whales or Guadalupe fur seals. In accordance with MMPA, the acoustic transmission associated with Alternative 1 may result in the incidental take of marine mammals (Table 4-2) in the proposed action area; however, any behavioral reactions in marine mammals to acoustic transmissions are expected to have no more than a minor effect on individual animals and no adverse effect on the populations of these species. An Incidental Harassment Authorization has been prepared and submitted to NMFS under separate cover.

4.2.3.4.f Conclusion

In conclusion, acoustic transmission associated with Alternative 1 would not significantly impact invertebrates, benthic communities, sea birds, fish, EFH, sea turtles, or marine mammals.

Furthermore, based on discussions above in relevant sections for habitat, invertebrates, and fish, there would be no effects to marine mammals resulting from loss or modification of marine mammal habitat or prey species related to the Proposed Action.

4.3 SECONDARY STRESSORS

5.4.1 Transmission of Marine Mammal Diseases and Parasites

The U.S. Navy deploys trained Atlantic bottlenose dolphins (*Tursiops truncatus*) and California sea lions (*Zalophus californianus*) for integrated training involving two primary mission areas; to find objects such as inert mine shapes, and to detect swimmers or other intruders around Navy facilities such as piers. When deployed, the animals are part of what the Navy refers to as Marine Mammal Systems. These Marine Mammal Systems include one or more motorized small boats, several crew members, and a trained marine mammal. Based on the standard procedures with which these systems are deployed, it is not reasonably foreseeable that use of these marine mammals systems would result in the transmission of disease or parasites to cetacea or pinnipeds in the Proposed Action Area based on the following.

Each trained animal is deployed under behavioral control to find the intruding swimmer or submerged object. Upon finding the 'target' of the search, the animal returns to the boat and alerts the animal handlers that an object or swimmer has been detected. In the case of a detected object, the human handlers give the animal a marker that the animal can bite onto and carry down to place near the detected object. In the case of a detected swimmer, animals are given a localization marker or leg cuff that they are trained to deploy via a pressure trigger. After deploying the localization marker or leg cuff the animal swims free of the area to return to the animal support boat. For detected objects, human divers or remote vehicles are deployed to recover the item. Swimmers that have been marked with a leg cuff are reeled-in by security support boat personnel via a line attached to the cuff.

Marine mammal systems deploy approximately 1 to 2 weeks before the beginning of a training exercise to allow the animals to acclimate to the local environment. There are 4 to 12 marine mammals involved per exercise. Systems typically participate in object detection and recovery, both participating in mine warfare events, and assisting with the recovery of inert mine shapes at the conclusion of an event. Marine Mammal Systems may also participate in port security and anti-terrorism/force protection events.

During the past 40 years, the Navy Marine Mammal Program has deployed globally. To date, there have been no known instances of deployment-associated disease transfer to or from Navy marine mammals. Navy animals are maintained under the control of animal handlers and are prevented from having sustained contact with indigenous animals.

When not engaged in the training event, Navy Marine Mammals are either housed in temporary enclosures or aboard ships involved in training exercises. All marine mammal waste is disposed of in a manner approved for the specific holding facilities. When working, sea lions are transported in boats and dolphins are transferred in boats or by swimming along-side the boat under the handler’s control. Their open-ocean time is under stimulus control and is monitored by their trainers.

Navy marine mammals receive excellent veterinarian care (per SECNAVINST 3900.41E). Appendix A, Section 8, of the Swimmer Interdiction Security System Final EIS (Space and Naval Warfare Systems Center 2009) provides an overview of the veterinary care provided for the Navy's marine mammals. Appendix B, Section 2, of the Swimmer Interdiction Security System Final EIS provides detailed information on the health screening process for communicable diseases. The following is a brief summary of the care received by all of the Navy's marine mammals:

1. Qualified veterinarians conduct routine and pre-deployment health examinations on the Navy's marine mammals; only animals determined as healthy are allowed to deploy.

2. Restaurant-quality frozen fish are fed to prevent diseases that can be caused by ingesting fresh fish (e.g., parasitic diseases).

3. Navy animals are routinely dewormed to prevent parasitic and protozoal diseases.

4. If a valid and reliable screening test is available for a regionally relevant pathogen (e.g., polymerase chain reaction assays for morbillivirus), such tests are run on appropriate animal samples to ensure that animals are not shedding these pathogens.

The Navy Marine Mammal Program routinely does the following to further mitigate the low risk of disease transmission from captive to wild marine mammals during training events:

1. Marine mammal waste is disposed of in an approved system dependent upon the animal's specific housing enclosure and location.

2. Onsite personnel are made aware of the potential for disease transfer, and report any sightings of wild marine mammals so that all personnel are alert to the presence of the animal.

3. Marine mammal handlers visually scan for indigenous marine animals, for at least 5 minutes before animals are deployed and maintain a vigilant watch while the animal is working in the water. If a wild marine mammal is seen approaching or within 100 m, the animal handler will hold the marine mammal in the boat or recall the animal immediately if the animal has already been sent on the mission.

4. The Navy obtains appropriate state agriculture and other necessary permits and strictly adheres to the conditions of the permit.

Due to the very small amount of time that the Navy marine mammals spend in the open ocean; the control that the trainers have over the animals; the collection and proper disposal of marine mammal waste; the exceptional screening and veterinarian care given to the Navy's animals; the visual monitoring for indigenous marine mammals; and an over forty year track record with zero known incidents, there is no scientific basis to conclude that the use of Navy marine mammals during training activities would have an effect on wild ESA-listed marine mammals.

Pursuant to the ESA, marine mammal systems associated with Alternative 1 would have no effect on humpback whales or Guadalupe fur seals. Pursuant to the MMPA, marine mammal systems associated with Alternative 1 are not expected to result in Level A or B harassment of marine mammals.

4.3.1.1 Conclusion

In conclusion, marine mammal systems associated with Alternative 1 would not significantly impact marine mammals.

4.4 Impacts to the Socioeconomic Environment

The stressors on the socioeconomic environment would be related to accessibility and aircraft noise. No impact on the socioeconomic environment would occur from other physical or energy stressors related to the Proposed Action.

4.4.1 Accessibility

The proposed action area is located near an active shipping channel and major ports. Though activities are proposed around the entrance to and areas within Anaheim Bay, the area would not be closed down and vessels would still be able to transit through. Commercial vessels entering these shipping channels would not be restricted by Navy activities. The Proposed Action is not set to occur within the active shipping channels. Potential disruptions to commercial shipping are limited or avoided by the Navy issuing Notices to Mariners through the U.S. Coast Guard. Notices to Mariners advise commercial ship operators, commercial fishermen, recreational fishermen, recreational boaters, and other users of the area that the military would be operating in a specific area, allowing them to plan their activities accordingly. These procedures are established and implemented for the safety of the public and have been employed regularly over time for other activities in the Southern California area without significant socioeconomic impacts on commercial shipping activities. The notice would advise vessels transiting around the entrance to and areas within Anaheim Bay to maintain a safe distance from the small Navy crafts used by the marine mammal systems and the EOD divers. Larger Navy ships would not enter the breakwater of Anaheim Bay and would be displaying appropriate flags. Commercial and recreational fisheries would only be restricted within established safety zones, if at all, during the short-duration and localized nature of the Proposed Action, and would be notified via Notices to Mariners. Additionally, there would be no restrictions to land based activities which would impact subsistence use or recreational fishing.

Many recreational activities engaged in by both tourists and residents take place within a few miles of land or on the shoreline or near shore areas, such as beaches, piers, recreational facilities, and visitor-serving attractions. Shoreline and near shore recreational activities including sailing, swimming, shoreline and pier fishing would not be impacted by the Proposed Action as Navy training activities would not overlap geographically with these recreational activities.

The Navy temporarily limits public access to areas where there is a risk of injury or property damage through the use of Notices to Mariners. Published notices allow recreational users to adjust their routes to avoid areas where the training is occurring. If civilian vessels are within a training area at the time of a scheduled operation, Navy personnel continue operations and avoid them if it is safe and possible to do so. If avoidance is not safe or possible, the operation may relocate or be delayed. In some instances where safety requires exclusive use of a specific area, nonparticipants in the area are asked by the U.S. Coast Guard to relocate to a safer area for the duration of the operation. Because Navy training activities are primarily short-term in duration, impacts on tourism activities from rerouting or postponing activities would be negligible.

Offshore activities include snorkeling and diving which take place primarily at known recreational sites, including shipwrecks and reefs and are not typically conducted within the active harbors and port areas. Other tourism activities such as whale watching, boating, or use of other watercraft occur farther out at sea and would not be impacted by in-shore training. Individual boaters engaged in tourism activities, such as whale watching and fishing, monitor navigational information and would not be restricted during the Proposed Action. Vessels are responsible for being aware of designated danger areas in surface waters and any Notices to Mariners that are in effect. Operators of recreational or commercial vessels have a duty to abide by maritime requirements as administered by the U.S. Coast Guard; the U.S. Coast Guard supports the Civilian Port Defense training activities to ensure the training area is clear of non-participating vessels.

In conclusion, with the implementation of the procedures described above to avoid potential disruptions to other ocean users or by issuing Notices to Mariners, accessibility under the Proposed Action would not significantly impact commercial shipping and transportation, commercial and recreational fishing, tourism and subsistence use.

4.4.2 Aircraft Noise

Airborne sound associated with the Proposed Action has the potential to disrupt human and marine resources within the proposed action area. Noise generated from helicopters is transient in nature and extremely variable. Only one helicopter at a time would be used during the Civilian Port Defense training. Training events are temporary in nature and flights would be short term. This could potentially disrupt some tourism activities by increasing in-air noise levels; however, the location of the training events is not within high tourism areas such as local beaches. The proposed training activities would occur around major ports which have regular shipping and cruise ship traffic. The temporary addition of helicopters to the area is not expected to impact local businesses or revenue generation.

In conclusion, with the implementation of mitigation measures, aircraft noise associated with Alternative 1 would not significantly impact commercial shipping and transportation, commercial and recreational fishing, tourism and subsistence use.

4.5 CUMULATIVE IMPACTS

The Council on Environmental Quality regulations defines cumulative effects as the impact on the environment that results from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. The effects of a specific action may be undetectable but when considered in conjunction with other actions, or other incremental effects, can lead to a measurable environmental impact. Long-term impacts are those caused by an action, but the results may appear later in time or farther removed in distance but are still reasonably foreseeable.

4.5.1 Past and Current Activities

Historically, the Port of Long Beach was the home of the Long Beach Naval Shipyard and Long Beach Naval Station. Both facilities have been decommissioned and the land was transferred to the Port of Long Beach for development into additional cargo facilities. Past use of the Port of Los Angeles include the multiple landfills which have been constructed between the existing breakwater and Terminal Island. The breakwater was constructed in 1937 and dredging of the main channel into the Port was completed in 1983. Other major harbor improvements included purchasing and creating land to expand terminals and replace older wharves to accommodate the weight of the new containers (Port of Los Angeles 2014).

In 2013, the channel deepening project for the Port of Los Angeles was completed. The project removed 151 acres (61 hectares) of sediment to make the Main Channel depth 53 ft (16 m) below mean low water. The dredged material was used to help construct lands for eventual terminal development and provide environmental enhancements at various locations in the Port of Los Angeles (Port of Los Angeles 2014).

Currently the Port of Long Beach is undergoing the Middle Harbor redevelopment. This redevelopment was approved in 2009 and will create 14,000 new jobs while cutting air pollution in half (Port of Long Beach 2014). The nine year-long projects will upgrade wharfs, water access, as well as expand the on-dock rail yard. It will implement aggressive environmental measures of the Green Port Policy and the San Pedro Bay Ports Clean Air Action Plan (Port of Long Beach 2014). On-going shore side work is expected to continue into the future to continue upgrading the facility to the emerging needs of shipping and transportation.

Current projects in the port of Los Angeles include backland improvement and wharf improvements. Additionally, during the recent hurricane in August of 2014, damage to the breakwater was caused. Currently on-going replacement of the large boulders used in the breakwater and repair will be taking place on the most damaged sections.

4.5.2 Reasonably Foreseeable Future Activities

Future dredging projects are reasonably foreseeable to maintain channel depths for larger vessels. Other wharf expansion however, is not currently projected. Future shore side revitalization and reclamation projects are expected to continue for the Port of Los Angles and the Port of Long Beach to continue meeting the needs of the changing shipping and transportation industry.

It is anticipated with the dredging of these areas that the container ships regularly entering these harbors will continue and the on-going vessel traffic will most likely increase with expansions of the terminals. Maintenance dredging is conducted at least once every five years (Port of Los Angeles 2014).

Construction of two new cruise ship terminals is proposed for the Outer Harbor area. The terminals would be designed to accommodate the berthing of a Freedom Class or equivalent cruise vessel. This project is currently on hold as the environmental permitting is being prepared, but is likely to occur in the future.

4.5.3 Cumulative Impact Analysis

4.5.3.1 Physical Environment

The on-going and planned dredging of the major port areas throughout California will have long term impacts on the physical environment. The maintenance of deep water ports will continue to remove sediment and material to maintain depths needed for shipping and passenger ships. The new facilities will be able to handle larger ships and added cargo handling ability. Dredging and other port activities such as vessel movement would have some air quality impact; however, the Navy concludes that the *de minimis* thresholds for applicable criteria pollutants would not be exceeded by implementation of the Proposed Action. Greenhouse gas emissions under the Proposed Action would be below the 25,000 metric tons of CO2*e* levels proposed in the revised draft NEPA guidance by the CEQ (CEQ 2014). Therefore, when added to the impacts from other potentially cumulative actions, the Proposed Action would not result in significant cumulative impacts to air quality. A conformity analysis and Record of Non-Applicability are included in Appendix C. Additionally, the placement and removal of bottom objects on the seafloor would result in a minor sediment disruption and would be limited to the area surrounding the device placed on the seafloor. The potential impact would be temporary and localized due to the minimal number of devices. Soft sediment is expected to shift back similar to a disturbance of tidal energy and not result in long-term cumulative increases in turbidity. Due to the short duration of the Proposed Action, there would be no significant cumulative impact to the physical environment as a result of the Proposed Action in combination with past, present or future planned projects.

4.5.3.2 Biological Environment

The on-going and planned dredging and expansion of the Port of Los Angeles and Long Beach will have long term effects on the immediate biological environment surrounding the pier areas and within the channels that lead to the port of calls. The increase in shipping and cruise ships would potentially impact more marine species directly surrounding the port areas. The frequent dredging could potentially impact prey availability as well as habitat for fish and other benthic marine species and marine vegetation. Marine mammals, sea turtles, and avian species would most likely increasingly avoid these areas as the industrial nature of the ports would create a less desirable area to forage. The Proposed Action would not increase the biological impacts caused by the increase in dredging, water quality issues, or increased vessel traffic as described in sections 4.4.1 and 4.4.2. Due to the short duration and temporary nature of the Proposed Action, there would be no significant cumulative impact to the biological environment as a result of the Proposed Action in combination with past, present or future planned projects.

4.5.3.3 Socioeconomic Environment

The on-going expansion of ports and terminal facilities in Los Angeles and Long Beach to accommodate more cargo ships will have long-term beneficial impacts on the socioeconomic environment. The increase in port and terminal facilities will help bring in extra revenue to the area which will have a positive impact on the socioeconomic environment. The Proposed Action would not increase socioeconomic impacts caused by the expansion and upgrading of terminal and port facilities. On-going recreational fishing occurs at several pier locations within the proposed action area, the Proposed Action is not expected to have any impact on the regular fishing activities at these pierside locations (Belmont Pier 2009; City of Long Beach 2015; Seaguar 2015). Due to the short duration and temporary nature of the Proposed Action, there would be no significant cumulative impact to the socioeconomic environment as a result of the Proposed Action in combination with past, present or future planned projects.

CHAPTER 5 STANDARD OPERATING PROCEDURES AND MITIGATION MEASURES

The mitigation measures applicable to Civilian Port Defense activities in the Proposed Action are the same as those identified in Chapter 5 of the HSTT EIS/OEIS. Both standard operating procedures and mitigation measures would be implemented during the Proposed Action. Standard operating procedures serve the primary purpose of providing for safety and mission success, and are implemented regardless of their secondary benefits (e.g., to a resource). Mitigation measures are used to avoid or reduce potential impacts. The standard operating procedures and mitigation measures that are applicable to the Proposed Action are provided below.

5.1 STANDARD OPERATING PROCEDURES

5.1.1 Vessel Safety

For the purposes of this chapter, the term 'ship' is inclusive of surface ships and surfaced submarines. The term 'vessel' is inclusive of ships and small boats (e.g., rigid-hull inflatable boats).

Ships operated by or for the Navy have personnel assigned to stand watch at all times, day and night, when moving through the water (underway). Watch personnel undertake extensive training in accordance with the U.S. Navy Lookout Training Handbook or civilian equivalent, including on-the-job instruction and a formal Personal Qualification Standard program (or equivalent program for supporting contractors or civilians), to certify that they have demonstrated all necessary skills (such as detection and reporting of floating or partially submerged objects). Watch personnel are composed of officers, enlisted men and women, and civilian equivalents. Their duties may be performed in conjunction with other job responsibilities, such as navigating the ship or supervising other personnel. While on watch, personnel employ visual search techniques, including the use of binoculars, using a scanning method in accordance with the U.S. Navy Lookout Training Handbook or civilian equivalent. After sunset and prior to sunrise, watch personnel employ night visual search techniques, which could include the use of night vision devices.

A primary duty of watch personnel is to detect and report all objects and disturbances sighted in the water that may be indicative of a threat to the ship and its crew, such as debris, a periscope, surfaced submarine, or surface disturbance. Per safety requirements, watch personnel also report any marine mammals sighted that have the potential to be in the direct path of the ship as a standard collision avoidance procedure. Because watch personnel are primarily posted for safety of navigation, range clearance, and man-overboard precautions, they are not normally posted while ships are moored to a pier. When anchored or moored to a buoy, a watch team is still maintained but with fewer personnel than when underway. When moored or at anchor, watch personnel may maintain security and safety of the ship by scanning the water for any indications of a threat (as described above).

While underway, Navy ships (with the exception of submarines) greater than 65 ft (20 m) in length have at least two watch personnel; Navy ships less than 65 ft (20 m) in length, surfaced submarines, and contractor ships have at least one watch person. While underway, watch personnel are alert at all times and have access to binoculars. Due to limited manning and space limitations, small boats do not have dedicated watch personnel, and the boat crew is responsible for maintaining the safety of the boat and surrounding environment.

All vessels use extreme caution and proceed at a “safe speed” so they can take proper and effective action to avoid a collision with any sighted object or disturbance, and can be stopped within a distance appropriate to the prevailing circumstances and conditions.

5.1.2 Aircraft Safety

Pilots of Navy aircraft make every attempt to avoid large flocks of birds in order to reduce the safety risk involved with a potential bird strike.

5.1.3 Laser Procedures

The following procedures are applicable to lasers of sufficient intensity to cause human eye damage.

5.1.3.1 Laser Operators

Only properly trained and authorized personnel operate lasers.

5.1.3.2 Laser Activity Clearance

Prior to commencing activities involving lasers, the operator ensures that the area is clear of unprotected or unauthorized personnel in the laser impact area by performing a personnel inspection or a flyover. The operator also ensures that any personnel within the area are aware of laser activities and are properly protected.

5.1.4 Underwater Vehicle Procedures

For activities involving unmanned underwater vehicles, the Navy evaluates the need to publish a Notice to Airmen or Mariners based on the scale, location, and timing of the activity.

5.1.5 Towed In-Water Device Procedures

Prior to deploying a towed device from a manned platform, there is a standard operating procedure to search the intended path of the device for any floating debris (e.g., driftwood) or other potential obstructions (e.g., concentrations of floating vegetation [Sargassum or kelp paddies] and animals), which have the potential to cause damage to the device.

5.2 MITIGATION MEASURES

For the mitigation measures described below, the Lookout Procedures and Mitigation Zone Procedure sections from the HSTT EIS/OEIS have been combined. For details regarding the methodology for analyzing each measure, see the HSTT EIS/OEIS Chapter 5.

5.2.1 Acoustic Stressors

5.2.1.1 High-Frequency Active Sonar

The Navy will have one Lookout on ships or aircraft conducting high-frequency active sonar activities associated with mine warfare activities at sea.

Mitigation will include visual observation from a vessel or aircraft (with the exception of platforms operating at high altitudes) immediately before and during active transmission within a mitigation zone of 200 yards (yd, 183 m) from the active sonar source. If the source can be turned off during the activity, active transmission will cease if a marine mammal is sighted within the mitigation zone. Active transmission will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on a determination of its course and speed and the relative motion between the animal and the source, (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes for an aircraft-deployed source, (4) the mitigation zone has been clear from any additional sightings for a period of 30 minutes for a vessel-deployed source, (5) the vessel or aircraft has repositioned itself more than 400 yd (366 m) away from the location of the last sighting, or (6) the vessel concludes that dolphins are deliberately closing in to ride the vessel’s bow wave (and there are no other marine mammal sightings within the mitigation zone).

5.2.2 Physical Disturbance and Strike

5.2.2.1 Vessels

While underway, vessels will have a minimum of one Lookout.

Vessels will avoid approaching marine mammals head on and will maneuver to maintain a mitigation zone of 500 yd (457 m) around observed whales, and 200 yd (183 m) around all other marine mammals (except bow riding dolphins), providing it is safe to do so.

5.2.2.2 Towed In-Water Devices

The Navy will have one Lookout during activities using towed in-water devices when towed from a manned platform.

The Navy will ensure that towed in-water devices being towed from manned platforms avoid coming within a mitigation zone of 250 yd (229 m) around any observed marine mammal, providing it is safe to do so.

APPENDIX A MIGRATORY BIRD TREATY ACT SPECIES

Appendix Table A-1. Migratory Bird Treaty Act Protected Seabird Species that May Occur near the Proposed Action Area.

Species Name	Common Name	Seasonality of Occurrence
Aix sponsa	Wood duck	Winter
Anas acuta	Northern pintail	Winter
Anas americana	American wigeon	Winter
Anas clypeata	Northern shoveler	Winter
Anas crecca	Green-winged teal	Winter
Anas cyanoptera	Cinnamon teal	Year-round
Anas discors	Blue-winged teal	Winter
Anas platyrhynchos	Mallard	Year-round
Oxyura jamaicensis	Ruddy duck	Year-round
Charadrius alexandrinus	Snowy plover	Year-round
Charadrius nivosus	Snowy plover	Year-round
Charadrius semipalmatus	Semipalmated plover	Winter
Haematopus bachmani	Black oystercatcher	Year-round
Himantopus mexicanus	Black-necked stilt	Year-round
Larus delawarensis	Ring-billed gull	Winter
Larus glaucescens	Glaucous-winged gull	Winter
Larus heermanni	Heermann's gull	Winter
Larus occidentalis	Western gull	Year-round
Larus philadelphia	Bonaparte's gull	Winter
Larus thayeri	Thayer's gull	Winter
Limosa fedoa	Marbled godwit	Winter
Numenius phaeopus	Whimbrel	Winter
Phalaropus fulicaria	Red phalarope	Migration
Phalaropus lobatus	Red-necked phalarope	Migration
Pluvialis dominica	American golden plover	Migration
Pluvialis fulva	Pacific golden plover	Winter
Pluvialis squatarola	Black-bellied plover	Winter
Ptychoramphus aleuticus	Cassin's auklet	Year-round
Recurvirostra americana	American avocet	Year-round
Rissa tridactyla	Black-legged kittiwake	Winter
Stercorarius longicaudus	Long-tailed jaeger	Migration
Stercorarius maccormicki	South polar skua	Migration
Stercorarius parasiticus	Parasitic jaeger	Winter
Stercorarius pomarinus	Pomarine jaeger	Winter
Sterna antillarum	Least tern	Summer
Sterna caspia	Caspian tern	Migration
Sterna elegans	Elegant tern	Migration
Sterna forsteri	Forster's tern	Year-round, Migration
Sterna hirundo	Common tern	Migration
Sterna paradisaea	Arctic tern	Migration
Sternula antillarum browni	California least tern	Spring; Summer
Synthilboramphus scrippsi	Scripps's murrelet	Summer; Migration
Synthliboramphus craveri	Craveri's murrelet	Migration
Synthliboramphus hypoleucus	Gualaupe murrelet	Summer, Migration
Tringa flavipes	Lesser yellowlegs	Winter
Tringa melanoleuca	Greater yellowlegs	Winter

Species Name	Common Name	Seasonality of Occurrence
Uria aalge	Common murrelet	Winter, Year-round
Xema sabini	Sabine's gull	Migration
Ardea alba	Great egret	Year-round
Ardea herodias	Great blue heron	Year-round
Botaurus lentiginosus	American bittern	Year-round
Bubulcus ibis	Cattle egret	Year-round
Butorides virescens	Green heron	Year-round
Egretta thula	Snowy egret	Year-round
Nycticorax nycticorax	Black-crowned night-heron	Year-round
Pelgadis chihi	White-faced ibis	Summer
Fulica americana	American coot	Year-round
Gallinula chloropus	Common moorhen	Winter
Laterallus jamaicensis coturniculus	California black rail	Summer; Spring
Porzana Carolina	Sora	Winter
Rallus limicola	Virginia rail	Year-round
Rallus longirostris	Clapper rail	Year-round
Rallus longirostris levipes	Light-footed clapper rail	Year-round
Rallus longirostris obsoletus	California clapper rail	Year-round
Pelecanus erythrorhynchos	American white pelican	Year-round
Pelecanus occidentalis	Brown pelican	Year-round
Pelecanus occidentalis californicus	California brown pelican	Year-round
Phalacrocorax auritus	Double-crested cormorant	Year-round
Phalacrocorax pelagicus	Pelagic cormorant	Year-round
Phalacrocorax penicillatus	Brandt's cormorant	Year-round
Halocyptena microsoma	Least storm-petrel	Year-round
Oceanodroma homochroa	Ashy storm-petrel	Year-round
Oceanodroma leucorhoa	Leach's storm-petrel	Year-round
Oceanodroma melania	Black storm-petrel	Year-round
Phoebastria immutabilis	Laysan Albatross	Year-round
Phoebastria nigripes	Black-footed albatross	Year-round
Pterodroma cookii	Cook's petrel	Year-round
Pterodroma ultima	Murphy's petrel	Year-round
Puffinus bulleri	Buller's shearwater	Year-round
Puffinus carneipes	Flesh-footed shearwater	Year-round
Puffinus creatopus	Pink-footed shearwater	Year-round
Puffinus griseus	Sooty shearwater	Year-round
Puffinus opisthomelas	Black-vented shearwater	Year-round
Puffinus tenuirostris	Short-tailed shearwater	Year-round

APPENDIX B ACOUSTIC MODELING

B.1 INTRODUCTION

The marine mammal acoustics effects analysis was conducted in accordance with current Navy sonar policy, as advised by the Chief of Naval Operations Environmental Readiness Division. Accordingly, ensonified areas and exposure estimates for marine mammals were reported based on Sound Exposure Level (SEL) and Sound Pressure Level (SPL) thresholds. PTS is the criterion used to establish the onset of non-recoverable physiological effects. TTS is the criterion used to establish the onset of recoverable physiological effects, and a behavioral response function is used to determine non-physiological behavioral effects. Environmental parameters were collected and archived, and propagation modeling was performed with the Naval Oceanographic Office's Oceanographic and Atmospheric Master Library (OAML) CASS/GRAB model (Weinberg and Keenan 2008). The acoustics effects modeling utilized the databases and tools collectively referred to as the Navy Acoustic Effects Model (NAEMO) (Marine Species Modeling Team 2012). Results were then computed for the defined operational scenario. This section provides a brief discussion of several key components of the acoustics effects modeling process, specifically: environmental inputs, acoustic sources, propagation modeling, and the NAEMO modeling software suite.

B.2 SOURCE CHARACTERISTICS AND SCENARIO DESCRIPTION

The source modeled for this training event was the AN/SQQ-32 which is a high frequency sonar source. One AN/SQQ-32 was modeled for 24 hours a day for 8 days of active sonar transmission. The source will not transmit continuously during the 24 hours. Additional source specific information is classified.

B.3 ENVIRONMENTAL CHARACTERISTICS

Data for four environmental characteristics (bathymetry, sound speed profile, sediment characteristics, and wind speed) were obtained for all seasons to support the acoustic analysis. The databases used to obtain these data and the resulting parameters are provided in Appendix Table B-1. All of the databases are maintained by OAML.

Appendix Table B-1. Environmental Parameters for Civilian Port Defense.

Model / Parameter	Data Input	Database
Propagation Model	Specific data are not applicable for this parameter.	Comprehensive Acoustic System Simulation Version 4.2a
Absorption Model	Specific data are not applicable for this parameter.	Francois-Garrison (the CASS/GRAB default)
Analysis Locations	Proposed action area	Database not used for this parameter
Analysis Specifics	18 radials => 1 radial per 20 degrees Range increment: 50 meters Depth increment: 2 meters	Database not used for this parameter
Bathymetry	Data was obtained from a location at 33° 30'N, 118° 15'W. Resolution was at five hundredths (0.05) of a degree.	Digital Bathymetric Data Base Variable Resolution (DBDB-V) Version 5.4
Sound Speed Profiles	Sound speed profiles were extracted at the highest database resolution of 0.25 degree.	Generalized Digital Environmental Model Variable (GDEM-V) Version 3.0
Wind Speed	Wind speed was extracted at the highest database resolution of one (1) degree. Average wind speed: 7 knots (13 km/hour)	Surface Marine Gridded Climatology (SMGC) Version 2.0
Geo-Acoustic Parameters	Sediment type of silt was determined for the proposed action area.	High Frequency Environmental Acoustics Version 1.1 HFEVA
Surface Reflection Coefficient Model	Specific data are not applicable for this parameter.	Navy Standard Forward Surface Loss Model

B.4 MARINE MAMMAL DENSITY ESTIMATES

Marine mammal densities utilized in the acoustic analysis were based on the best available science for the proposed action area. Baseline marine mammal distribution and density data from the NMSDD (Department of the Navy 2012) were Department of the Navy 2012) were first extracted for the proposed action area. Datasets that comprise the Navy Marine Species Density Database (NMSDD) include surveys, average published population estimates, and Relative Environmental Suitability (RES) models (Kaschner et al. 2006).

B.5 CRITERIA AND THRESHOLDS

Harassment criteria for marine mammals are evaluated based on thresholds developed from observations of trained cetaceans exposed to intense underwater sound under controlled conditions (Finneran et al. 2005; Finneran and Schlundt 2003; Schlundt et al. 2000). These data are the most applicable because they are based on controlled, tonal sound exposures within the tactical sonar frequency range and because the species studied are closely related to the animals expected at the proposed action area. Studies have reported behavioral alterations, or deviations from a subject's normal trained behavior and exposure levels above which animals were observed to exhibit behavioral deviations (Finneran and Schlundt 2003; Schlundt et al. 2000).

Criteria and thresholds used for determining the potential effects from the Proposed Action are consistent with those used in the HSTT EIS/OEIS. Appendix Table B-2below provides the criteria and thresholds used in this analysis for estimating exposures on marine mammal from the Proposed Action. Details regarding these criteria and thresholds can be found in Finneran and Jenkins (2012).

Appendix Table B-2. Functional Hearing Ranges, Criteria, and Thresholds for Quantitative Marine Mammal Analysis.

Group	Species	Behavioral Criteria	Physiological Criteria	
			Onset TTS	Onset PTS
Low-Frequency Cetaceans	All mysticetes	Mysticete Dose Function (Type I weighted)	178 dB SEL (Type II weighted)	198 dB SEL (Type II weighted)
Mid-Frequency Cetaceans	Most delphinids, beaked whales, medium and large toothed whales	Odontocete Dose Function (Type I weighted)	178 dB SEL (Type II weighted)	198 dB SEL (Type II weighted)
High-Frequency Cetaceans	Porpoises, River dolphins, *Cephalorynchus* spp., *Kogia* spp.	Odontocete Dose Function (Type I weighted)	152 dB SEL (Type II weighted)	172 dB SEL (Type II weighted)
Harbor Porpoises	Harbor porpoises	120 dB SPL, unweighted	152 dB SEL (Type II weighted)	172 dB SEL (Type II weighted)
Beaked Whales	All Ziphiidae	140 dB SPL, unweighted	198 dB SEL (Type II weighted)	198 dB SEL (Type II weighted)
Phocidae (in water)	Harbor, bearded, hooded, Common, spotted, ringed, Baikal, Caspian, harp, ribbon, gray seals, monk, elephant, Ross, crabeater, leopard, and Weddell seals	Odontocete Dose Function (Type I weighted)	183 dB SEL (Type I weighted)	197 dB SEL (Type I weighted)

B.6 NAEMO SOFTWARE

Modeling was accomplished utilizing the NAEMO software that is comprised of the following six components: Scenario Builder, Environment Builder, Acoustic Builder, Marine Species Distribution Builder, Scenario Simulator, and Post Processor. Details on the NAEMO Software is provided in (Marine Species Modeling Team 2012).

Using the best available information on the predicted density of marine mammals in the area being modeled, NAEMO derives an abundance (total number of individuals expected in a given area) and distributes the resulting number of virtual animals into an area bounded by the maximum distance determined by the energy propagation out to a criterion threshold value (energy footprint). For example, for non-impulsive sources, animats that are predicted to occur within a range that could receive sound pressure levels greater than or equal to 120 dB SPL are distributed. These animats are distributed based on density differences across the area, the group size, and known depth distributions (Watwood and Buonantony 2012). Animats change depth every four minutes but do not otherwise mimic actual animal behaviors.

For non-impulsive sources, NAEMO calculates the SPL and SEL for each active emission during an event. This is done by taking the following factors into account over the propagation paths: bathymetric relief and bottom types, sound speed, and attenuation contributors such as absorption, bottom loss and surface loss. Platforms such as a ship using one or more sound sources are modeled in accordance with relevant vehicle dynamics and time durations by moving them across an area whose size is representative of the training event's operational area. For each model iteration, the slow moving platform in this experiment was programmed to move along straight line tracks from a randomly selected initial location with a randomly selected course. Specular reflection was employed at the boundaries to contain the vehicle within the action area.

NAEMO records the SPL and SEL received by each animat within the ensonified area of the event and evaluates them in accordance with the species-specific threshold criteria. For each animat, predicted SEL effects are accumulated over the course of the event and the highest order SPL effect is determined. Each 24-hour period is independent of all others, and therefore, the same individual animat could be impacted during each independent scenario or 24-hour period. Initially, NAEMO provides the overpredicted impacts to marine species because predictions used in the model include: all animats facing the source, not accounting for horizontal avoidance and mitigation is not implemented. After the modeling results are complete they are further analyzed to produce final estimates of potential marine mammal exposures.

B.7 Results

For non-impulsive sources, NAEMO calculates maximum received SPL and accumulated SEL over the entire duration of the event for each animat based on the received sound levels. These data are then processed using a bootstrapping routine to compute the number of animats exposed to SPL and SEL in 1 dB bins across all track iterations and population draws. SEL is checked during this process to ensure that all animats are grouped in either an SPL or SEL category. Additional detail on the bootstrapping process is included in Section B.7.1.

A mean number of SPL and SEL exposures are computed for each 1 dB bin. The mean value is based on the number of animats exposed at that dB level from each track iteration and population draw. The behavioral risk function curve is applied to each 1 dB bin to compute the number of behaviorally exposed animats per bin. The number of behaviorally exposed animats per bin is summed to produce the total number of behavior exposures.

Mean 1 dB bin SEL exposures are then summed to determine the number of PTS and TTS exposures. PTS exposures represent the cumulative number of animats exposed at or above the PTS threshold. The number of TTS exposures represents the cumulative number of animats exposed at or above the TTS threshold and below the PTS threshold. Animats exposed below the TTS threshold were grouped in the SPL category.

B.7.1 Bootstrap Approach

Estimation of exposures in NAEMO is accomplished through the use of a simple random sampling with replacement by way of statistical bootstrapping. This sampling approach was chosen due to the fact that the number of individuals of a species expected within an area over which a given Navy activity occurs is often too small to offer a statistically significant sampling of the geographical area. Additionally, NAEMO depends on the fact that individual animats move vertically in the water column at a specified displacement frequency for sufficient sampling of the depth dimension. By overpopulating at the time of animat distribution and drawing samples from this overpopulation with replacement, NAEMO is able to provide sufficient sampling in the horizontal dimensions for statistical confidence. Sampling with replacement also produces statistically independent samples, which allows for the calculation of metrics such as standard error and confidence intervals for the underlying Monte Carlo process.

For each scenario and each species, the number of samples equating to the overpopulation factor is drawn from the raw data. Each sample size consists of the true population size of the species evaluated. Exposure data is then computed for each sample using 1 dB exposure bins. The average number of exposures across the sample and scenario iteration is then computed.

For example, assuming that an overpopulation factor of 10 was defined for a given species and that 15 ship track iterations were completed. The bootstrap Monte Carlo process would have generated statistics for 10 draws on each of the 15 raw animat data files generated by the 15 ship tracks evaluated for this scenario, thereby yielding 150 independent sets of exposure estimates. Samples drawn from the overpopulated population are replaced for the next draw, allowing for the re-sampling of animals. The resultant 150 sets of exposures were then combined to yield a mean number of exposures and a 95 percent confidence interval per species for the scenario. In addition to the mean, the statistics included the upper and lower bounds of all samples.

B.7.2 Estimated Exposures

Based on the methodology contained herein, Appendix Table B-3 and Appendix Table B-4 provide the modeled marine mammal exposures associated with the thresholds defined in section B.5.

Appendix Table B-3. Predicted Marine Mammal Exposures for a Single Day of Civilian Port Defense Training.

Common Name	Behavioral	TTS	PTS
Mysticetes			
Gray whale	0	0	0
Humpback whale*	0	0	0
Odontocetes			
Pacific White-Sided dolphin	2.69	2.33	0
Risso's dolphin	1.99	0.6	0
Bottlenose dolphin	0	0	0
Bottlenose dolphin coastal	3.65	2.4	0
Short-beaked common dolphin	52.76	38.13	0
Long-beaked common dolphin	0.32	0.67	0
Northern right whale dolphin	0	0	0
Dall's porpoise	0	0	0
Pinnipeds			
Guadalupe fur seal*	0	0	0
Northern fur seal	0	0	0
California sea lion	5.70	0	0
Northern elephant seal	0	0	0
Harbor seal	0.98	0	0

*Denotes ESA listed species
Cells highlighted in yellow indicate potential exposures (greater than 0.5) to MMPA marine mammals

Appendix Table B-4. Predicted Marine Mammal Exposure for 8 Days of Civilian Port Defense Training.

Common Name	Behavioral	TTS	PTS
Mysticetes			
Gray whale	0	0	0
Humpback whale*	0	0	0
Odontocetes			
Pacific White-Sided dolphin	21.48	18.66	0
Risso's dolphin	15.92	4.8	0
Bottlenose dolphin	0	0	0
Bottlenose dolphin coastal	29.2	19.2	0
Short-beaked common dolphin	422.10	305.06	0
Long-beaked common dolphin	2.62	5.33	0
Northern right whale dolphin	0	0	0
Dall's porpoise	0	0	0
Pinnipeds			
Guadalupe fur seal*	0	0	0
Northern fur seal	0	0	0
California sea lion	45.62	0	0
Northern elephant seal	0	0	0
Harbor seal	7.82	0	0

*Denotes ESA listed species
Cells highlighted in yellow indicate potential exposures (greater than 0.5) to MMPA marine mammals

APPENDIX C AIR CONFORMITY ANALYSIS

C.1 GENERAL CONFORMITY RULE

The United States (U.S.) Environmental Protection Agency (EPA) published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule*, in the Federal Register (40 Code of Federal Regulation (CFR) Parts 6, 51, and 93) on November 30, 1993. The U.S. Navy published *Clean Air Act (CAA) General Conformity Guidance* in Chief of Naval Operations Instruction (OPNAVINST) 5090.1D Chapter 22 (Chief of Naval Operations 2014). These publications provide guidance to document CAA Conformity requirements. Section 176 (c)(1) of the Federal CAA states that Federal agencies cannot engage in, support in any way, or provide financial assistance for, license or permit, or approve any activity that does not conform to an applicable State Implementation Plan. A State Implementation Plan is a compilation of a state's air quality control plan that is approved by the EPA. The plan identifies how each state will attain and/or maintain the criteria pollutants also known as the National Ambient Air Quality Standards (NAAQS) described in Section 109 of the CAA and 40 CFR 50.4 through 50.18.

The General Conformity Rule is used to determine if Federal Actions meet the requirements of the State Implementation Plan by ensuring that air emissions related to the action do not (1) cause or contribute to violations of the NAAQS, (2) increase the frequency or severity of an existing violation of the NAAQS, or (3) delay attainment of the NAAQS. The General Conformity Rule applies only to Federal Actions in locations designated as nonattainment or maintenance areas for any criteria air pollutant under 40 CFR §81 Subpart C. Federal actions may be exempt from the Conformity Rule if the action is classified as an exempt activity (40 CFR §93 Subpart B) and they do not exceed designated *de minimis* levels for the applicable criteria pollutants set forth in 40 CFR § 93.153(b). These standards are reflected in Appendix F of OPNAVINST 5090.1D Chapter 22. If the Federal action exceeds the *de minimis* levels in Appendix Table C-1, the action does not conform to the applicable State Implementation Plan, the General Conformity Rule applies, and a formal Conformity Determination is required.

Appendix Table C-1. *De Minimis* Thresholds for Conformity Determination

Pollutant	Nonattainment or Maintenance Area Type	*De Minimis* Threshold (TPY)
Ozone (VOC or NO_x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Ozone (NO_x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
CO, SO_2 and NO_2	All nonattainment & maintenance	100
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
$PM_{2.5}$	All nonattainment & maintenance	100
Lead (Pb)	All nonattainment & maintenance	25
Tons per year (TPY), Volatile organic compounds (VOC), Nitrogen oxide (NO_x), Carbon monoxide (CO), Sulfur dioxide (SO_2), Nitrogen dioxide (NO_2), Particulate matter under 10 microns (PM_{10}), Particulate matter under 2.5 microns ($PM_{2.5}$)		

C.2 PROPOSED ACTION

C.2.1 Proposed Action Summary

The purpose of the Proposed Action is to train personnel in the skills necessary to ensure U.S. ports remain free of mine threats. These events employ the use of various mine detection and neutralization systems in and around various ports. The Civilian Port Defense training exercise for this Environmental Assessment (EA) would be conducted in the Ports of Los Angeles/Long Beach or the Port of San Diego; all ports are located in the South Coast Air Basin (SCAB). This EA evaluates the following alternatives: the No Action Alternative, Alternative 1 (Preferred Alternative) which would allow training to occur within the Los Angeles/Long Beach proposed action area, and Alternative 2 which would allow for training to occur in the San Diego action area. Details of the Proposed Action and Alternatives can be found in Chapter 2.

For the purpose of this Conformity Analysis, only emissions from Alternative 1 will be evaluated since emissions from Alternative 2 were evaluated in the Hawaii-Southern California Testing and Training Final Environmental Impact Statement/Overseas Environmental Impact Statement (Department of the Navy 2013) and determined to be exempt.

C.2.2 Proposed Action Location: South Coast Air Basin

The proposed action would occur in the Ports of Los Angeles/Long Beach area, located in the SCAB. The SCAB includes Orange County and portions of Los Angeles, Riverside, and San Bernardino Counties, as well as some marine areas (e.g., San Clemente Island and its adjacent waters within 3 nm). This area is classified as an extreme nonattainment area for the federal 8-hour ozone standard, a maintenance area for carbon monoxide (CO), nitrogen dioxide (NO_2) and particulate matter less than 10 microns (PM_{10}), a moderate nonattainment area for particulate matter less than 2.5 microns ($PM_{2.5}$), and a nonattainment area for lead (Pb). Federal 8-hour ozone precursors are nitrogen oxides (NO_x) and Volatile Organic Compounds (VOCs).

C.2.3 Proposed Action Emission Sources

Emission sources used during the Proposed Action that have potential to impact air quality in the SCAB include MH-53 helicopters, surface vessels, and auxiliary diesel engines. The CPD surface vessels include a Landing Platform Dock (LPD) or Littoral Combat Ship (LCS), an AVENGER class ship, and various small gasoline outboard vessels. The emission source, quantity, fuel type, number of engines, and engine size per source are provided in Appendix Table C-2 below. Guided Missile Frigate was used as a surrogate for the larger LCS vessel because emission factors were not available for the LCS and the engines are comparable in size.

Appendix Table C-2. Proposed Action Emission Sources

Emissions Source	Quantity	Fuel Type	Number of Engines and Engine Size/Source
MH-53 Helicopters	2	Jet Fuel	Three – 4,380 horsepower (hp)
EOD MCM PLT-F580 CCRC	3	Gasoline	One - 55 hp
MK7 MMS PLT-470	1	Gasoline	One - 55 hp
MK7 MMS PLT-7M RHIB	1	Gasoline	Two - 150 hp
AVG UUV PLT-F580 CCRC	1	Gasoline	One - 55 hp
AVG UUV PLT-8.5M RHIB	1	Gasoline	Two - 150 hp
AVENGER	1	Diesel	Four - 600 hp
AVENGER Generators	1	Diesel	Three - 503 hp
LCS	1	Diesel	Two – 20,500 hp
LCS Generators	1	Diesel	Four – 1,340 hp

C.3 HELICOPTER EMISSIONS

Two MH-53 helicopters would be utilized in mine detection and mine neutralization operations at altitudes as low as 75 to 100 feet (ft, 23 to 30 meters [m]) while towing in-water devices. Emissions from aircraft operations that occur from ground level up to 3,000 ft (914 m) above ground level affect surface air quality and must be included in emission inventory estimates. The above ground level ceiling is assumed to be the atmospheric mixing height above which any pollutant generated would not contribute to increased pollutant concentrations at ground level (the mixing zone). Helicopter operations within the mixing zone include the landing, take-off cycle, and hover mode during mine hunting operations. For each mode of operation, an aircraft engine operates at a specified power setting for a specific period (time-in-mode). The pollutant emission rate is a function of the engine's operating mode, fuel flow rate, and the engine's overall efficiency.

For the Proposed Action, time-in-modes, percent power settings, and fuel flow rates used were derived from Appendix Table C-2 (Modal Emission Rates for Helicopters) in the EA for the Homebasing of the MH-60R/S on the East Coast of the U.S. (Department of the Navy 2002). Emission factors were obtained from the Navy Aircraft Environmental Support Office for the T64-GE-415 engine burning JP-5 Fuel (Aircraft Environmental Support Office 1999). The T64-GE-415 engine was used as a surrogate for the T64-GE-416 engine because emission data was not available for the T64-GE-416 engine and the two engines are nearly identical. Using this data, CO, NO_x, PM_{10}, and VOC emissions for the two helicopters were calculated by applying the equation below:

Emission= TIM*FF*HEL*ENG*OPS/YR*EF*CF

TIM= Time-in-Mode (in minutes [min])
FF= Fuel Flow Rate (in pounds [lbs] per hour [hr])
HEL= Number of Helicopters
ENG= Number of Engines in Use
OPS/YR= Number of Operations per Year
EF= Emission Factor (in lbs /1000 lbs of fuel)
CF= (Time-in-Mode*1 hour [hr] /60 min; EF* 0.001)

Appendix Table C-3 lists the various engine power modes, time-in-mode, fuel flow, corresponding emission factors, and total annual emissions for the two helicopter engines operating for a total of 32 hours during the training exercise. PM_{10} and $PM_{2.5}$ emissions were assumed to be equal since most particulate matter emitted from aircraft has an aerodynamic diameter of less than < 2.5 microns (Federal Aviation Administration 2002). NO_x are equal to NO_2 emissions and were generated in greatest quantity followed by CO, PM_{10} and $PM_{2.5}$, and VOCs.

Appendix Table C-3. Helicopter Emissions.

	Mode	Time in mode (min)	Fuel flow rate (lbs/hr)	Hel (#)	Eng (#)	Ops/yr (#)	Total fuel[1] used (lbs)	Emission factor (lbs/lbs of fuel)				Total annual emissions (lbs)			
								CO	NO_x[2]	VOC	PM_{10}[3]	CO	NO_X	VOC	PM_{10}
Departure	APU	80	197.00	2	1	1	525.33	1.47	6.25	0.23	2.21	0.77	3.28	0.12	1.16
	Start up	20.8	269.00	2	3	1	559.52	74.33	2.12	28.25	2.21	41.59	1.19	15.81	1.24
	Warm up	64	606.54	2	3	1	3881.86	15.83	3.93	8.79	2.21	61.45	15.26	34.12	8.58
	Un-stick	1.6	782.77	2	3	1	125.24	9.73	4.90	4.82	2.21	1.22	0.61	0.60	0.28
	Taxi/ Out hold	40	694.65	2	3	1	2778.60	12.24	4.42	6.55	2.21	34.01	12.29	18.20	6.14
	Hover	12	1452	2	3	1	1742.40	2.28	7.94	0.18	2.21	3.97	13.83	0.31	3.85
	Climb out	20	1629	2	3	1	3258.00	1.67	8.68	0.11	2.21	5.44	28.28	0.36	7.20
Arrival	Un-stick	1.6	782.77	2	3	1	125.24	9.73	4.90	4.82	2.21	1.22	0.61	0.60	0.28
	Taxi to refuel	32	694.65	2	3	1	2222.88	12.24	4.42	6.55	2.21	27.21	9.83	14.56	4.91
	Hot refuel	120	606.54	2	3	1	7278.48	15.83	3.93	8.79	2.21	115.22	28.60	63.98	16.09
	Taxi 8 dm	32	694.65	2	3	1	2222.88	12.24	4.42	6.55	2.21	27.21	9.83	14.56	4.91
	APU	40	197.00	2	1	1	262.67	1.47	6.25	0.23	2.21	0.39	1.64	0.06	0.58
	Shut down	16	269.00	2	3	1	430.40	74.33	2.12	28.25	2.21	31.99	0.91	12.16	0.95
Mine operation	Hover	1440	1452.00	2	3	1	209,088.00	2.28	7.94	0.18	2.21	476.72	1659.74	37.64	462.08
Total lbs												**828.40**	**1785.93**	**213.08**	**518.25**

[1] JP-5 fuel is unleaded. Lead emissions were not calculated due to a lack of source, [2] $NO_x = NO_2$ emissions, [3] $PM_{10} = PM_{2.5}$ emissions

C.4 GASOLINE -POWERED MARINE VESSELS

Several two-stroke and four-stroke gasoline-powered vessels are utilized as support vessels during the CPD Training Exercise. For emission calculations, it was assumed that all vessels will be operated continuously at 80 percent load capacity for the entire duration of the operation, 168 hours.

NO_x, CO, PM, and VOC emissions for two stroke and four stroke gasoline engines were calculated using EPA emission factors for non-road engines (United States Environmental Protection Agency 2010). Zero-mile steady stead emission factors (g/bhp-hr) for hydrocarbon, CO, NO_x, and PM reported for outboard engines (United States Environmental Protection Agency 2010) were converted to transient emission factors listed in Appendix Table C-4. Hydrocarbon emission factors were converted to VOC emission factors using EPA conversion factors for hydrocarbon exhaust (United States Department of Environmental Management 2010).

Appendix Table C-4. Emission Factors for Two Stroke and Four Stroke Gasoline-Powered Engines.

Engine Type	Transient Emission Factors (grams/brake horsepower-hr)			
	NO_x	CO	PM	VOC
4 – Stroke Gasoline[1], 150 HP	5.18	166.04	0.06	5.67
2 – Stroke Gasoline[1], 55 HP	1.34	348.49	2.20	146.09

[1] Not a source of lead emissions. Fuel is unleaded.

Emissions were calculated for the gasoline support vessels using the data in Appendix Table A-2 and Appendix Table A-4 by applying the equation below.

Emissions = VESS*P*ENG*EF*N*L

VESS = Number of Vessels
P= average rated brake horsepower (bhp)
ENG= Number of Engines
EF= Emission Factor (grams/bhp-hr)
N= number of operating hours
L= Load Factor (assumed 80% load)

Emissions were calculated for each gasoline-powered vessel and totaled for each criteria pollutant in Appendix Table C-5. CO emissions were generated in greatest quantity followed by VOCs, NO_x, and PM. It is assumed that PM_{10} and $PM_{2.5}$ emissions are equal since 92% of the total PM emissions are assumed to be smaller than 2.5 microns (United States Environmental Protection Agency 2010).

Appendix Table C-5. Emission Calculations for Gasoline-Powered Vessels.

Vessels	Emissions (lbs/operation)				
	NO_X	CO	PM_{10}	$PM_{2.5}$	VOC
EOD MCM PLT-F580 CCRC	65.45	11739.60	107.46	107.46	7136.08
MK7 MMS PLT-F470	21.82	3913.20	35.82	35.82	2378.69
MK7 MMS PLT-7m RHIB	460.04	14746.06	5.33	5.33	503.38
AVG UUV PLT-F580 CCRC	21.82	3913.20	35.82	35.82	2378.69
AVG UUV PLT-8.5m RHIB	460.04	14746.06	5.33	5.33	503.38
Total lbs	**1029.17**	**49058.12**	**189.76**	**189.76**	**12900.22**

C.5 DIESEL-POWERED MARINE VESSELS AND GENERATORS

Two diesel-powered marine vessels, the AVENGER Class and LCS would be utilized during the Proposed Action for 168 hours. The AVENGER Class vessel is a Mine Countermeasures Ship that would be used to detect and classify mines using imaging sonar combining the role of the mine detection and mine neutralization in one hull. The LCS vessel is a larger size vessel that will be used for transporting passengers and afloat forward staging for equipment and helicopters.

Ocean-going vessels are a significant source of diesel PM and ozone-forming NO_x in communities near ports (California Environmental Protection Agency Air Resources Board 2005). To estimate emissions for marine diesel vessels, the engines displacement/cylinder and the type and number of auxiliary engines (generators) onboard must be known in addition to the engine brake horsepower, the number of engines, and operating hours. For the AVENGER Class vessel, EPA emission factors were used for vessels with an engine displacement of greater than 3.5 and less than 5 liters/cylinder (United States Environmental Protection Agency 2008b). The following adjustment factors were applied to the emission factors listed: (1) steady state emission factors were converted to transient emission factors, (2) a PM adjustment factor of 0.97 was used to convert PM_{10} to $PM_{2.5}$, and (3) a hydrocarbon adjustment factor of 1.053 were used to convert hydrocarbons to VOCs (United States Environmental Protection Agency 2008b). The emission factors for the Avenger Class vessel can be found in Appendix Table C-6. Limited data was available for the LCS vessel that has an engine displacement/cylinder greater than 30 liters. Transient emission factors for the LCS vessel were obtained from the database developed for Naval Sea Systems Command by John J. McMullen Associates, Inc. (2001). These emission factors (lbs/hr) are a combined rate which includes the main propulsion engines and auxiliary engines. They can be found in Appendix Table C-7.

Appendix Table C-6. Emission Factors for the Avenger Class Vessel.

Vessels	Transient Emission Factors (grams/bhp-hr)				
	NO_x	CO	PM_{10}	$PM_{2.5}$	VOC
AVENGER	8.21	1.34	0.22	0.22	0.21

Appendix Table C-7. Emission Factors for the LCS Vessel.

Vessels	Transient Emission Factors (lbs/hr)				
	NO_x	CO	PM_{10}	$PM_{2.5}$	VOC
LCS	66.35	65.75	3.14	3.14	7.89

For the Avenger Class vessel, estimates were made for PM, NO_x, CO, and VOCs using the equation below:

Emissions = VESS*P*ENG*EF*N*L

VESS = Number of Vessels
P= Average Rated Brake Horsepower (bhp)
ENG= Number of Engines
EF= Emission Factor (grams/bhp-hr)
N= Number of Operating Hours
L= Load Factor

For the LCS vessel, emission estimates were made for PM, NO_x, CO, and VOCs using the equation below:

Emissions = EF*N

EF= Emission Factor (lbs/hr)
N= Number of Operating Hours

Load factors were assigned based on average vessel speeds of approximately 4 knots throughout the Proposed Action. Emissions were calculated for each diesel surface vessel and totaled for each criteria pollutant in Appendix Table C-8. NO_x emissions were generated in greatest quantity followed by CO, VOCs, and PM.

Appendix Table C-8. Emission Calculations for Diesel Powered Vessels.

Vessels	Emissions (lbs/operation)				
	NO_x	CO	PM_{10}	$PM_{2.5}$	VOC
AVENGER	1822.61	298.24	49.71	48.22	47.11
LCS	11146.80	11046.00	527.52	527.52	1325.52
Total lbs	**12696.41**	**11344.25**	**577.23**	**575.74**	**1372.63**

Emissions were estimated for the auxiliary engines (generators) aboard the AVENGER Class vessel using EPA emission factors for auxiliary engines (United States Environmental Protection Agency 2008b). The same hydrocarbon and PM adjustment factors, applied to the main propulsion engines, were used to adjust the emission factors listed in Appendix Table C-9. Emissions were not calculated for the LCS auxiliary engines separately because a combined emission rate for the propulsion and auxiliary engines was provided by John J. McMullen Associates Inc.,(2001).

Appendix Table C-9. Emission Factors for Diesel Auxiliary Engines.

Vessels	Emission Factors (grams/bhp-hr)				
	NO_x	CO	PM_{10}	$PM_{2.5}$	VOC
AVENGER	8.21	1.34	0.22	0.22	0.21

Estimates were made for NO_x, CO, PM, and VOCs using the equation below:

Emissions = P*ENG*EF*N*L

P= Average Rated Brake Horsepower (bhp)
ENG= Number of Engines
EF= Emission Factor (grams/bhp-hr)
N= Number of Operating Hours
L= Load Factor (50%)

Emissions were calculated for the diesel auxiliary engines shown in Appendix Table C-10. NO_x emissions were generated in greatest quantity followed by CO, PM, and VOCs.

Appendix Table C-10. Emission Calculations for the Avenger Class Auxiliary Engines.

Auxiliary Engines	Emissions (lbs/operation)				
	NO_x	CO	PM_{10}	$PM_{2.5}$	VOC
AVENGER	2291.67	374.04	61.41	61.41	59.57

C.6 Emissions Evaluation Conclusion

Emissions from the MH-53 helicopters, gasoline-powered vessels, diesel-powered vessels, and auxiliary engines were totaled and converted into tons per year as shown in Appendix Table C-11. The Total VOC, NO_x, CO, PM_{10}, and $PM_{2.5}$ emissions were compared to the *de minimis* thresholds set forth in 40 CFR § 93.153(b).

Appendix Table C-11. Estimated Total Air Emissions for the Proposed Action.

Alternative 1	Emissions by Criteria Pollutants (TPY)				
	VOC	NO_X	CO	PM_{10}	$PM_{2.5}$
Aircraft	0.11	0.89	0.41	0.26	0.26
Gasoline Vessels	6.45	0.51	24.53	0.09	0.09
Diesel Vessels	0.69	6.35	5.67	0.29	0.29
Auxiliary Engines	0.05	1.15	0.19	0.03	0.03
Total	7.30	8.90	30.80	0.67	0.67
De Minimis Threshold	10	10	100	100	100
Exceeds Threshold	NO	NO	NO	NO	NO

The U.S. Navy concludes that the *de minimis* thresholds for applicable criteria pollutants would not be exceeded by implementation of the Proposed Action. The emissions data supporting that conclusion are shown in Appendix Table C-11, which summarizes the calculated estimates and *de minimis* limits. Therefore, the U.S. Navy concludes that further formal Conformity Determination procedures are not required, resulting in this Record of Non-Applicability.

C.7 NAVY RECORD OF NON-APPLICABILITY FOR CLEAN AIR ACT CONFORMITY

The proposed action falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

Action Proponents: Commander Pacific Fleet
Naval Mine and Anti-Submarine Warfare Command

Proposed Action: West Coast Civilian Port Defense Training

Location: Port of Long Angeles/Long Beach

Proposed Action Name: West Coast Civilian Port Defense Training

Proposed Action & Emissions Summary: See attached Conformity Analysis for West Coast Civilian Port Defense Training

Affected Air Basin: South Coast Air Basin

Date RONA prepared: 3/30/2015

RONA prepared by: Stacie Paquette, Air Quality Analyst, Naval Undersea Warfare Center Division, Newport

Proposed Action Exemption(s): The proposed action is exempt from the Conformity Rule 40 CFR § 93.153(c). The total of direct and indirect emissions are below the specified emission levels referenced in 40 CFR § 93.153(b)(1).

Attainment Area Status and Emissions Evaluation Conclusion:

The proposed action is classified as an extreme nonattainment area for the federal 8-hour ozone standard, a maintenance area for carbon monoxide (CO), nitrogen dioxide (NO_2) and particulate matter less than 10 microns (PM_{10}), a moderate nonattainment area for particulate matter less than 2.5 microns ($PM_{2.5}$), and a nonattainment area for lead (Pb).

All nonattainment and maintenance pollutants were found below *de minimis* levels. It's determined that this action conforms to the applicable State Implementation Plan and a formal Conformity Determination is not required.

RONA Approval:

Signature: Larry M. Foster
Name/Rank: LARRY M. FOSTER / GS-15 Date: 6/12/15
Position: DIVISION HEAD N465 Activity: COMMANDER, U.S. PACIFIC FLEET

C.8 REFERENCES

Aircraft Environmental Support Office. (1999). T64-GE-415 Engine Fuel Flow and Emission Indexes by Percentage of Torque (% Q), Draft: Revision A. (Memorandum Report No. 9905A).

California Environmental Protection Agency Air Resources Board. (2005). Emissions Estimation Methodology for Ocean-Going Vessels.

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United States Department of Environmental Management. (2010). Conversion Factors for Hydrocarbon Emission Components. (NR-002d).

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United States Environmental Protection Agency. (2010). Exhaust Emission Factors for Non-road Engine Modeling-Spark Ignition. (U.S. EPA-420-R-10-019, NR-010f).

APPENDIX D CALIFORNIA COASTAL NEGATIVE DETERMINATION

DEPARTMENT OF THE NAVY
COMMANDER
UNITED STATES PACIFIC FLEET
250 MAKALAPA DRIVE
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:
5090
Ser N465/0597
June 12, 2015

Mr. Mark Delaplaine
Federal Consistency Manager
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

Dear Mr. Delaplaine:

Subject: COASTAL ZONE MANAGEMENT ACT NEGATIVE DETERMINATION FOR 2015 WEST COAST CIVILIAN PORT DEFENSE TRAINING ENVIRONMENTAL ASSESSMENT

Enclosed please find the Department of the Navy's Negative Determination under the Coastal Zone Management Act (CZMA) of 1972, as amended (16 United States Code 1456), as implemented by the provisions of 15 Code of Federal Regulations Section 930.35.

The United States Department of the Navy (Navy) is proposing to conduct the West Coast Civilian Port Defense training activities in the area off of the California coast, to include the area encompassing the ports of Los Angeles and Long Beach, in October through November of 2015. The purpose of the Proposed Action is to train personnel in the skills necessary to ensure United States (U.S.) ports remain free of mine threats as articulated in the 2015 West Coast Civilian Port Defense Draft Environmental Assessment (EA) (enclosure 2). The training activities proposed to occur off the coast of Southern California are similar to training conducted in the Port of San Diego and is covered in a previous Consistency Determination for the Hawaii-Southern California Training and Testing Environmental Impact Statement/Overseas Environmental Impact Statement(EIS/OEIS). This Negative Determination is submitted based on the Navy's thorough consistency assessment and findings on the coastal effects of the Proposed Action.

Pursuant to Section 307(c)(1) of the federal CZMA, the Navy has determined that the Proposed Action would have no reasonably foreseeable effects on California's coastal uses or resources. The basis for this Negative Determination is detailed in Enclosure 1.

Subject: COASTAL ZONE MANAGEMENT ACT NEGATIVE DETERMINATION FOR 2015 WEST COAST CIVILIAN PORT DEFENSE TRAINING ENVIRONMENTAL ASSESSMENT

The Navy points of contact for this information are Mr. John Van Name, U.S. Pacific Fleet, at 808-471-1714, e-mail: john.vanname@navy.mil and LCDR Gretchen Sosbee, Commander Navy Region Southwest, at 619-532-1396, e-mail: gretchen.sosbee@navy.mil.

Sincerely,

L. M. Foster
By direction

Enclosures: 1. CZMA Negative Determination for California
2. CD ROM 2015 West Coast Civilian Port Defense Draft EA

Copy to: (w/encls)
Mr. Chris Stathos, Commander, Navy Region Southwest (N45)

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

July 17, 2015

L.M. Foster
Department of the Navy
Commander
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, HA 96860-3131

Attn: John Van Name

Re: **ND-0024-15,** Department of the Navy, Negative Determination, 2015 West Coast Civilian Port Defense Training, Ports of Los Angeles and Long Beach, Los Angeles Co.

Dear L.M. Foster:

The Navy has submitted a negative determination for a two-week Civilian Port Defense Training event for training its west coast personnel on the skills needed to keep civilian ports free of mine threats. These training events alternate annually between the east and west coasts of the U.S. The training involves air, surface, and subsurface vehicles and other assets that transport various acoustic, laser, and video sensors which seek out and neutralize mines and mine-shaped objects deployed. The activities would occur inside and outside the breakwater in the two ports, out to the 300 ft. depth contour. The Navy summarizes the training as follows:

> *Naval forces provide mine warfare capabilities to defend the homeland per the Maritime Operational Threat Response Plan. These activities are conducted in conjunction with other federal agencies, principally the Department of Homeland Security. The three pillars of Mine Warfare include airborne (helicopter), surface (ship and unmanned vehicles), and undersea (divers, marine mammal systems, and unmanned vehicles), all of which may be used in order to ensure that strategic U.S. ports are cleared of mine threats.*
>
> *Assets used during Civilian Port Defense training include up to four unmanned underwater vehicles, marine mammal systems, up to two helicopters, Explosive Ordnance Disposal platoons, and AVENGER class ships (225 ft [69 m]). The AVENGER is a surface mine countermeasure vessel specifically outfitted for mine countermeasure capability. The Proposed Action also includes the placement, use, and recovery of up to 20 bottom placed non-explosive mine training shapes, mine detection (identifying objects), and mine neutralization (disrupting, disabling or detonating [not part of the Proposed Action]).*

As noted in the above passage, no actual detonations would occur during the training. All equipment would be removed from the seafloor at the end of the training. Vessel speeds would be less than 10 knots during training, to minimize the potential for collisions with marine mammals, sea turtles and other vessels. Underwater unmanned vehicles are slow-moving and would be closely monitored. Recreational and commercial boating activities would not be restricted, and the Navy will coordinate with the Coast Guard to provide Notices to Mariners (and develop safety zones, if warranted). The Navy will also coordinate with the two Ports.

The two types of activities raising potential marine resource concerns are sonar use and helicopter tows, and the Navy is also coordinating with the National Marine Fisheries Service (NMFS) concerning these potential effects. Only one of the four types of sonar sources has the potential to affect or disturb marine resources: AN/SQQ-32, a high frequency (10-200 kHz) source. Helicopter-towed devices would move rapidly through the water, at speeds of up to 40 knots (46 mph). To protect marine resources from these activities, the Navy has included the following monitoring, avoidance, and minimization measures:

> *5.2.1.1 High-Frequency Active Sonar*
> *The Navy will have one Lookout on ships or aircraft conducting high-frequency active sonar activities associated with mine warfare activities at sea.*
>
> *Mitigation will include visual observation from a vessel or aircraft (with the exception of platforms operating at high altitudes) immediately before and during active transmission within a mitigation zone of 200 yards (yd, 183 m) from the active sonar source. If the source can be turned off during the activity, active transmission will cease if a marine mammal is sighted within the mitigation zone. Active transmission will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on a determination of its course and speed and the relative motion between the animal and the source, (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes for an aircraft-deployed source, (4) the mitigation zone has been clear from any additional sightings for a period of 30 minutes for a vessel-deployed source, (5) the vessel or aircraft has repositioned itself more than 400 yd (366 m) away from the location of the last sighting, or (6) the vessel concludes that dolphins are deliberately closing in to ride the vessel's bow wave (and there are no other marine mammal sightings within the mitigation zone).*
>
> *5.2.2.1 Vessels*
> *While underway, vessels will have a minimum of one Lookout.*
>
> *Vessels will avoid approaching marine mammals head on and will maneuver to maintain a mitigation zone of 500 yd (457 m) around observed whales, and 200 yd (183 m) around all other marine mammals (except bow riding dolphins), providing it is safe to do so.*

5.2.2.2 Towed In-Water Devices

> *The Navy will have one Lookout during activities using towed in-water devices when towed from a manned platform.*
>
> *The Navy will ensure that towed in-water devices being towed from manned platforms avoid coming within a mitigation zone of 250 yd (229 m) around any observed marine mammal, providing it is safe to do so.*

Under the federal consistency regulations (Section 930.35), a negative determination can be submitted for an activity "which is the same as or similar to activities for which consistency determinations have been prepared in the past." The Commission staff has concurred with negative determinations submitted by the Navy for similar training activities in various locations in coastal waters off San Diego County (ND-032-02, ND-015-01, ND-024-99). The Navy has agreed, as it did during these past reviews, to provide the Commission staff with copies of any post-monitoring reports provided to NMFS. In reviewing the past monitoring reports prepared for NMFS (and copied to us), the Commission staff notes that the monitoring reports did not document any adverse effects on marine mammals or sea turtles. Moreover, it appears fairly clear that, based on the information provided in the Navy's Draft Environmental Assessment for the proposed training, the marine mammals potentially affected - dolphins, seals and sea lions - are frequently-surfacing species, and thus easily spotted and avoided.

In conclusion, with the commitments described above, and given the short term nature of the training and past monitoring results from similar activities conducted in the various San Diego County offshore areas (and which involved use of similar equipment), we agree that the proposed training at POLA/POLB would be similar to these previously-concurred-with San Diego County Navy mine threat training events, and would not adversely affect coastal zone resources. We therefore **concur** with your negative determination made pursuant to 15 CFR 930.35 of the NOAA implementing regulations. Please contact Mark Delaplaine at (415) 904-5289 if you have any questions regarding this matter.

Sincerely,

(for) CHARLES LESTER
Executive Director

cc: Long Beach District
Port of Long Beach
Port of Los Angeles
NMFS

APPENDIX E NMFS ESA INFORMAL CONSULTATION PACKAGE

DEPARTMENT OF THE NAVY
COMMANDER
UNITED STATES PACIFIC FLEET
250 MAKALAPA DRIVE
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:
5090
Ser N465/0700
July 20, 2015

Mr. Chris Yates
Assistant Regional Administrator
Office of Protected Resources
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802

SUBJECT: REQUEST FOR INFORMAL CONSULTATION UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT FOR WEST COAST CIVILIAN PORT DEFENSE TRAINING

Dear Mr. Yates:

In accordance with section 7 of the Endangered Species Act (ESA), the United States Navy (Navy) requests informal consultation on Civilian Port Defense (CPD) training activities occurring within the Pacific Ocean off the coast of Southern California.

The proposed action may affect listed species that may occur within the CPD Action Area by exposing them to sound and other environmental stressors associated with training activities. The enclosed ESA Informal Consultation Information document (Enclosure 1) serves as the basis of this request for informal consultation under the ESA pursuant to 50 C.F.R. §402.12(f). Enclosure 2 includes a CD-ROM of the ESA Informal Consultation Information document in addition to the CPD Draft Environmental Assessment (DEA) prepared as the Navy's primary environmental planning document under the National Environmental Policy Act and provides additional information not detailed in the Supplemental Information. The Navy is requesting informal consultation on Alternative 1 within the DEA.

The Navy requests concurrence that the described actions may affect, but are not likely to adversely affect scalloped hammerhead shark, Eastern Pacific DPS (*Sphyma lewini*); loggerhead sea turtle, North Pacific DPS (*Caretta caretta*); green sea turtle, East Pacific DPS (*Chelonia mydas*); leatherback sea turtle (*Dermochelys coriacea*); olive ridley sea turtle (*Lepidochelys kempii*); Humpback whale (*Megaptera novaeangliae*); and Guadalupe fur seal (*Arctocephalus townsendi*).

SUBJECT: REQUEST FOR INFORMAL CONSULTATION UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT FOR WEST COAST CIVILIAN PORT DEFENSE TRAINING

My point of contact is Chip Johnson (chip.johnson@navy.mil, (619)767-1567) regarding this informal consultation request.

We appreciate your continued support in helping the Navy meet its environmental responsibilities.

Sincerely,

L. M. FOSTER
Director, Environmental Readiness
By direction

Enclosures:
1. ESA Informal Consultation Information document for the Navy's CPD training
2. CD-ROM of the ESA Informal Consultation Information for the Navy's CPD training and the West Coast Civilian Port Defense Draft Environmental Assessment

Copy to:
Mr. John Fiorentino, NMFS Office of Protected Resources (w/encl 2 only)

Endangered Species Act Section 7 Informal Consultation for West Coast Civilian Port Defense Training

July 2015

Lead Agency
Department of the Navy

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SECTION 1 INTRODUCTION

The purpose of this document is to provide supplemental information in support of informal consultation to address the potential effects of west coast Civilian Port Defense Training on species listed as endangered or threatened under the Endangered Species Act (ESA), their designated critical habitat and species proposed for listing. The Navy intends to carry out the Proposed Action described in Section 2 below, in accordance with Sections 5013 and 5062 of Title 10, United States Code.

The Navy is preparing an Environmental Assessment for the proposed west coast Civilian Port Defense training to evaluate all components and potential impacts of the Proposed Action.

SECTION 2 DESCRIPTION OF THE ACTION AREA AND PROPOSED ACTION

Civilian Port Defense training activities are naval mine warfare exercises conducted in support of maritime homeland defense, per the Maritime Operational Threat Response Plan. These activities are conducted in conjunction with other federal agencies, principally the Department of Homeland Security. The three pillars of Mine Warfare include airborne (helicopter), surface (ship and unmanned vehicles), and undersea (divers, marine mammal systems, and unmanned vehicles), all of which may be used in order to ensure that strategic United States (U.S.) ports are cleared of mine threats. Civilian Port Defense training activities would occur on the U.S. west coast in the fall of 2015 within the Los Angeles/Long Beach proposed action area identified by Naval Mine and Anti-Submarine Warfare Command (Figure 2-1).

Civilian Port Defense training events are conducted in ports or major surrounding waterways, within the shipping lanes, and seaward to the 300 foot (ft, 91 meter [m]) depth contour. The events employ the use of various mine detection sensors, some of which utilize high frequency (greater than 10 kilohertz [kHz]) active acoustics for detection of mines and mine-like objects in and around various ports. Active acoustic transmission would be used for approximately 8 days during the two week long training event during the October-November 2015 timeframe. Assets used during Civilian Port Defense training could include up to four unmanned underwater vehicles, marine mammal systems, up to two helicopters operating (two to four hours during daylight) at altitudes as low as 75 to 100 ft (23 to 31 m), Explosive Ordnance Disposal platoons, a Littoral Combat Ship or Landing Dock Platform and a Mine Warfare Ship. The Mine Warfare Class ship (e.g., AVENGER) is a surface mine countermeasure vessel specifically outfitted for mine countermeasure capability. Table 2-1 provides types of vessels, lengths and drafts, and typical speeds of the vessels used during the Civilian Port Defense training.

Table 2-1. Vessel Types, Lengths and Drafts, and Speeds Used During the Civilian Port Defense Training Activities.

Type	Length/Draft	Typical Operating Speed
Littoral Combat Ship	115 m/18 m (4 m displacement)	<10 knots
Landing Platform Dock	208 m/32 m (7 m displacement)	< 10 knots
Mine Warfare Class Ship (Mine Countermeasure)	68 m/12 m (12 m displacement)	5-8 knots

The Proposed Action also includes the placement, use, and recovery of up to 20 bottom placed non-explosive mine training shapes. These mine training shapes, are relatively small, and generally less than 6 ft (1.8 m) in length. Mine shapes may be retrieved by Navy divers, typically explosive ordnance disposal personnel, and may be brought to beach side locations to ensure that the neutralization measures are effective and the shapes are secured. The final step in training is a beach side activity that involves explosive ordnance disposal personnel assessing the retrieved mine shape to gather facts (intelligence) on the type and identifying how the mine works, disassembling the non-explosive mine shape or disposing of it. Given the uncertainties of the location of the beach side activities, they are outside the scope of this analysis. Prior to engaging in beach side activities, all permits and environmental documentation will be obtained as necessary. The entire training event takes place over two weeks utilizing a variety of assets and scenarios.

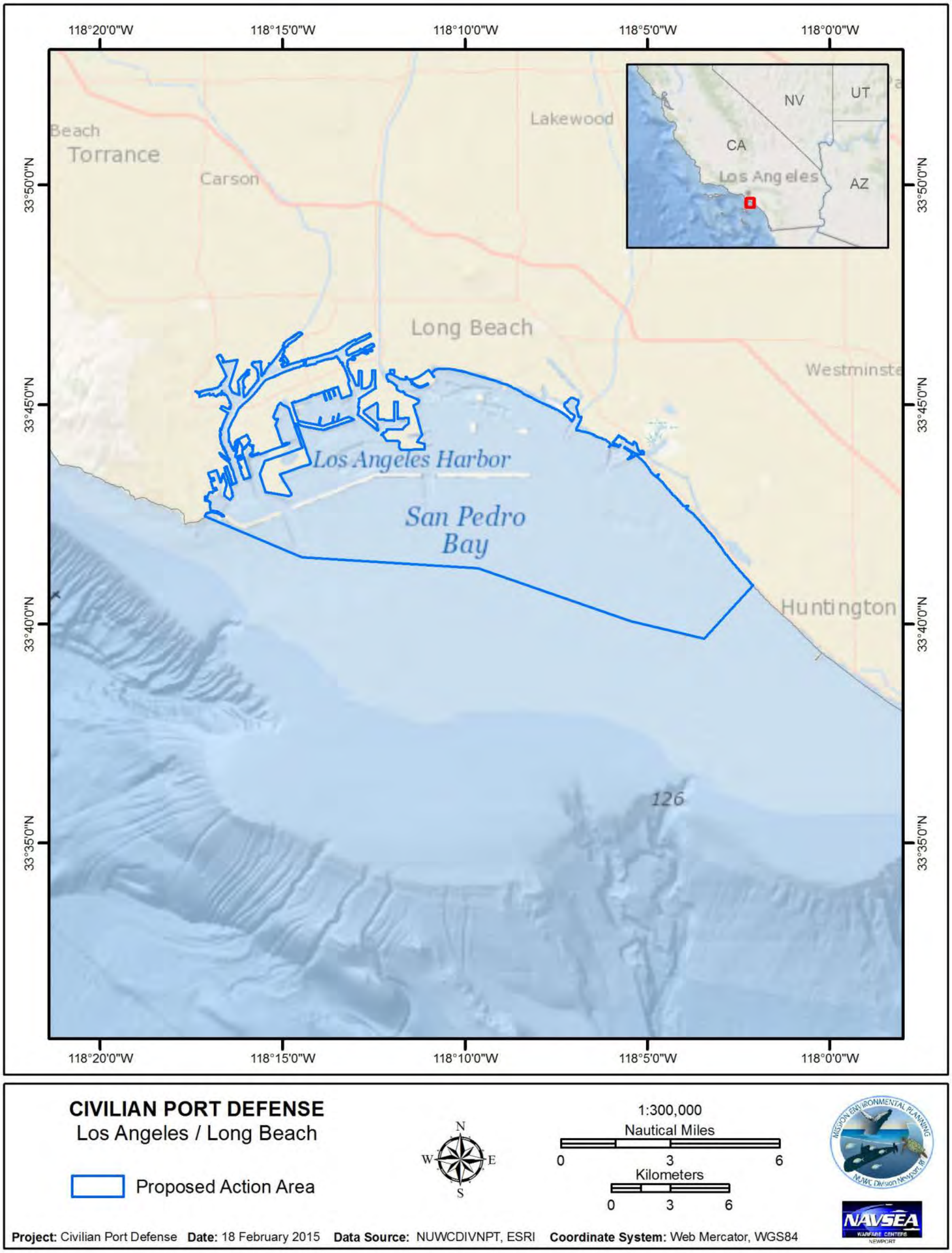

Figure 2-1. The Los Angeles/Long Beach Civilian Port Defense Proposed Action Area.

2.1 Mine Detection Systems

Mine detection systems are used to locate, classify, and map suspected mines (Figure 2-2). Once located, the mines can either be neutralized or avoided. These systems are specialized to either locate mines on the surface, in the water column, or on the seafloor.

- **Towed or Hull-Mounted Mine Detection Systems**. These detection systems use acoustic and low-energy laser or video sensors to locate and classify suspect mines. Helicopters, ships, and unmanned vehicles are used for towed systems, which can rapidly assess large areas.
- **Unmanned/Remotely Operated Vehicles**. These vehicles use acoustic and video or low-energy laser systems to locate and classify mines. Unmanned/remotely operated vehicles provide mine warfare capabilities in nearshore littoral areas, surf zones, ports, and channels.
- **Airborne Laser Mine Detection Systems**. Airborne laser detection systems work in concert with neutralization systems. The detection system initially locates mines and a neutralization system is then used to relocate and neutralize the mine.
- **Marine Mammal Systems.** Navy personnel and Navy marine mammals work together to detect specified underwater objects. The Navy deploys trained bottlenose dolphins and California sea lions as part of the marine mammal mine-hunting and object-recovery system.

Sonar systems to be used during Civilian Port Defense training would include AN/SQQ-32, AN/AQS-24 and handheld sonars (AN/PQS 2A). The AN/SQQ-32 is a high frequency (between 10 and 200 kHz) sonar system; the specific source parameters of the AN/SQQ-32 are classified. The AN/AQS-24 (well above 200 kHz) and handheld sonars are considered *de minimis* sources, which are defined as sources with low source levels, narrow beams, downward directed transmission, short pulse lengths, frequencies above known hearing ranges, or some combination of these factors (Department of the Navy 2013). *De minimis* sources have been determined to not have potential impact to marine mammals.

2.2 Mine Neutralization

Mine neutralization systems disrupt, disable, or detonate mines to clear ports and shipping lanes. Mine neutralization systems can clear individual mines or a large number of mines quickly. Two types of mine neutralization could be conducted, mechanical minesweeping and influence system minesweeping. Mechanical minesweeping consists of cutting the tether of mines moored in the water column or other means of physically releasing the mine. Moored mines cut loose by mechanical sweeping must then be neutralized or rendered safe for subsequent analysis. Influence minesweeping consists of simulating the magnetic, electric, acoustic, seismic, or pressure signature of a ship so that the mine detonates (no in-water detonations would occur as part of the Proposed Action).

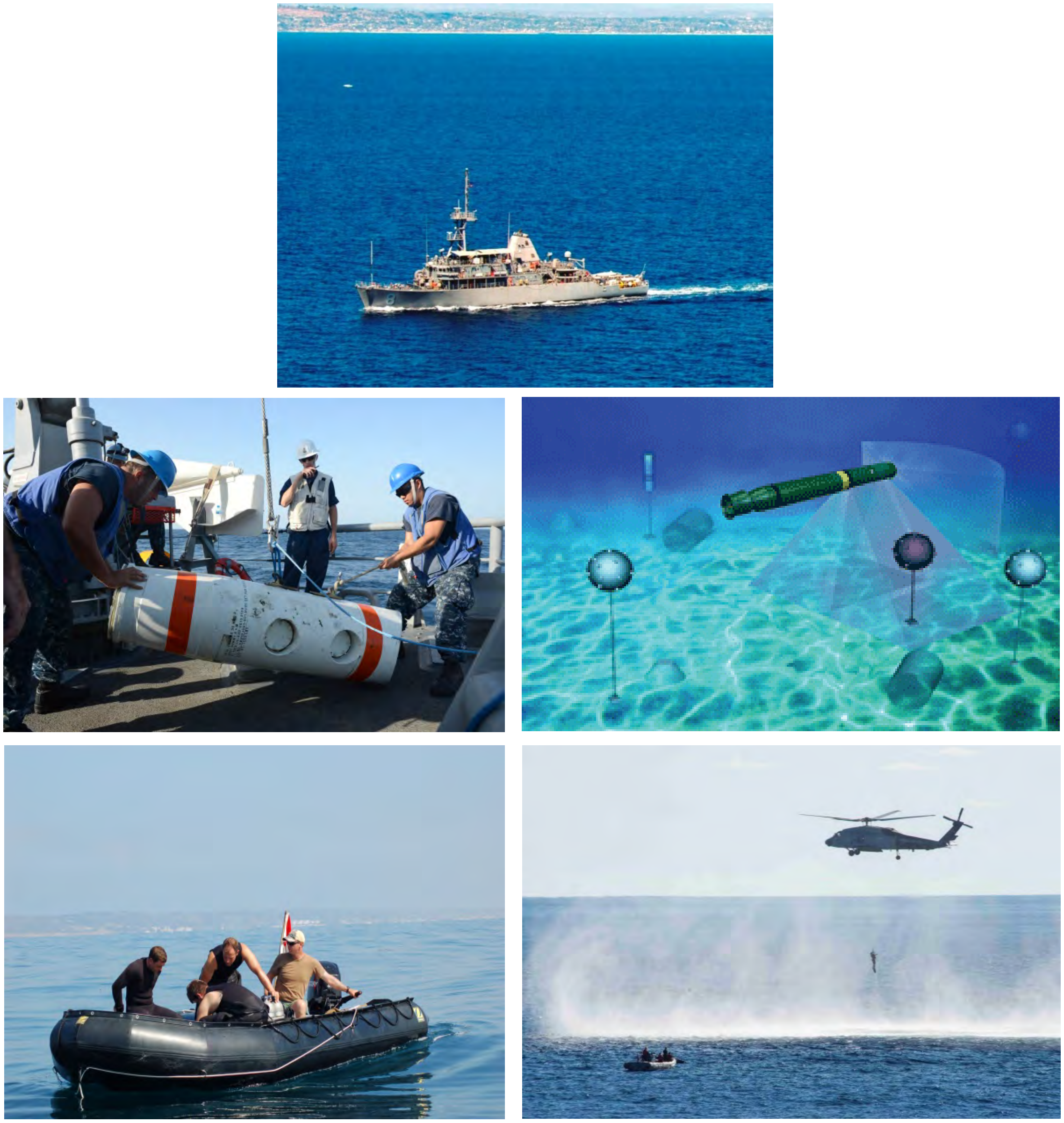

Figure 2-2. Mine Warfare Scenarios.

A mine warfare class ship type, used for mine countermeasures (top); inert mine-like training shape (middle left); concept for unmanned underwater vehicle use (middle right); EOD dive boat (bottom left); SH-60 helicopter in low hover (bottom right).

SECTION 3 POTENTIAL STRESSORS

Potential environmental stressors include physical (vessel movement, seafloor devices and in-water devices), energy (electromagnetic devices and laser), acoustic (vessel/aircraft noise, acoustic transmission), and secondary stressors. The potential environmental consequences of these stressors have been analyzed for resources associated with the physical, biological, and socioeconomic environment. Quantitative analysis was performed on those resources for which numerical impact thresholds have been established, namely marine mammals. For those resources for which non-impulsive acoustic thresholds have not been established and/or appropriate information was not available, a qualitative approach was taken (e.g. acoustic impacts on fish and sea turtles).

SECTION 4 LISTED SPECIES

Threatened and endangered species listed under the ESA under National Marine Fisheries Service (NMFS) jurisdiction that may occur in the proposed action area are listed in Table 4-1.

Table 4-1. Species Listed under the Endangered Species Act that May be Affected by the Proposed Action.

Common Name	Scientific Name	Status
Fish		
Scalloped hammerhead shark, Eastern Pacific DPS	*Sphyma lewini*	Endangered
Sea Turtles		
Loggerhead sea turtle, North Pacific DPS	*Caretta caretta*	Endangered
Green sea turtle, East Pacific DPS[1]	*Chelonia mydas*	Threatened[1]
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Olive ridley sea turtle	*Lepidochelys kempii*	Endangered
Marine Mammals		
Humpback whale	*Megaptera novaeangliae*	Endangered
Guadalupe fur seal	*Arctocephalus townsendi*	Threatened

DPS = Distinct Population Segment
[1]Proposed revision and new DPS from NMFS (80 FR 15272 March 23, 2015)

4.1 Species Not Considered Further

4.1.1 Black Abalone

Black abalone (*Haliotis cracherodii*) is listed as endangered under the ESA (74 FR 1937). Critical habitat for black abalone was designated by NMFS in 2011, but does not fall within the proposed action area.

Black abalone prefers rocky intertidal and subtidal habitats (National Oceanic and Atmospheric Administration (NOAA) 2015) from the shore to a depth of 197 ft (60 m) (California Department of Fish and Game 2005), but more often only to 20 ft (6 m), where they wedge themselves between rocks (Butler et al. 2009). Their range extends from northern California to the southernmost point of Baja California, Mexico. The majority of black abalone may be found in the high intertidal zone where drift kelp fragments tend to be concentrated by breaking surf (Butler et al. 2009). Black abalone are herbivores that feed on a variety of kelp species. Black abalone may be present in the Southern California proposed action area, depending on the bottom type, as a rocky substrate is preferred.

Black abalone historically occurred from Crescent City, California, USA, to southern Baja California, Mexico (Butler et al. 2009), but today the species' constricted range occurs from Point Arena, California, USA, to Bahia Tortugas, Mexico, and it is rare north of San Francisco, California, USA (Butler et al. 2009), and south of Punta Eugenia, Mexico.

Massive declines in black abalone began in 1986 that resulted in significant large-scale population reductions by the early 1990s (Lafferty and Kuris 1993). Evidence of population declines has also been observed in central California (Raimondi et al. 2002). The Black Abalone Status Review Team estimates that, unless effective measures are put in place to counter the population decline caused by withering syndrome and overfishing, the species will be extinct within 30 years (Butler et al. 2009).

The ability to sense magnetic fields is thought to assist invertebrates with navigation and orientation (Lohmann et al. 1997; Normandeau Associates Inc. et al. 2011). Neither of the ESA-listed abalone travel long distances during their lives, and thus, are not thought to be included in this group of electromagnetically sensitive invertebrates. However, because susceptibility is variable within taxonomic groups, it is not possible to make generalized predictions for groups of marine invertebrates.

Sensitivity thresholds vary by species ranging from 3 to 300 G, and responses included non-lethal physiological and behavioral changes (Normandeau Associates Inc. et al. 2011). Human-introduced electromagnetic fields could disrupt these cues and interfere with navigation, orientation, or migration. Because electromagnetic fields weaken exponentially with increasing distance from their source, large and sustained magnetic fields present greater exposure risks than small and transient fields (Normandeau Associates Inc. et al. 2011). Transient or moving electromagnetic fields such as the ones associated with the Proposed Action may cause temporary disturbance to susceptible organisms' navigation and orientation, but the fields would be small and would have no population level or long-term effects.

Studies of sound energy effects on invertebrates are few, and identify only behavioral responses. Non-auditory injury, permanent threshold shift (PTS), temporary threshold shift (TTS), and masking studies have not been conducted for invertebrates. Both behavioral and auditory brainstem response studies suggest that crustaceans may sense sounds up to 3 kHz, but best sensitivity is likely below 200 Hz (Goodall et al. 1990; Lovell et al. 2005; Lovell et al. 2006). Non-arthropod invertebrates have no air-filled cavities that are capable of detecting the pressure component of sound (Bundelmann 1992). Therefore, it is almost impossible to distinguish between behavioral reactions based on reception of sound, reception of water-borne or substrate-borne vibrations, or reception of local water movements (Bundelmann 1992). With the ambient noise levels of the proposed action area being elevated and the inability of any species of abalone to differentiate between types of noise or have the ability to hear the noise, the vessel noise from the proposed action would have no significant additional masking effect to the environment and would not impact white or black abalone.

Given the low probability of black abalone being in the proposed action area (low populations numbers and limited offshore suitable substrate), no anticipated Navy training activities near shore and tidal rocky habitat, limited likely reaction of invertebrates to sound or other stressors, the probability of being exposed to any stressor capable of eliciting a negative response is sufficiently low as to be discountable. Therefore, the black abalone is not carried forward further in this analysis.

4.1.2 White abalone

White abalone (*Haliotis sorenseni*) is listed as endangered under the ESA (66 FR 29046). Currently, no critical habitat has been designated for white abalone.

Historically, white abalone occurred from Point Conception, California to Punta Abreojos, Baja California, Mexico. They are the deepest-living of the west coast abalone species (Hobday and Tegner 2000): they had been caught at depths of 66 to 197 ft (20 to 60 m) but had been reported as having had the highest abundance at depths of 80 to 100 ft (25 to 30 m) (Cox 1960; Tutschulte 1976). At these depths, white abalone are found in open low relief rock or boulder habitat surrounded by sand (Davis et al. 1996; Tutschulte 1976). White abalone inhabits a more southern range than black abalone, beginning at Point Conception and extending to Baja California, Mexico. White abalone also typically occupy deeper waters than black abalone, from depths of 80 to 100 ft (25 to 30 m), and prefer rocky habitat interspersed with sand channels, enabling them to feed on drifting macroalgae and red algae. In Southern California, white abalone are more commonly found near the offshore islands than the mainland coast (National Oceanic and Atmospheric Administration (NOAA) 2015).

According to the California Department of Fish and Game (2005), white abalone are classified as "near extinction." Current population estimates indicate that white abalone may have declined by as much as 99 percent in the last 25 years. An abundance estimate based on deep survey data (Davis et al. 1998) estimated that 1,600 animals were spread over the entire geographic range documented for this species (Hobday and Tegner 2000).

White abalone could conceivably be present in the proposed action area, however, population numbers are exceedingly low with more common occurrence out of the proposed action area near offshore islands and underwater banks with rocky substrate (as opposed to the soft-bottom habitat typical of the proposed action area). Given the low probability of white abalone being in the present (low populations numbers and limited offshore suitable substrate), limited likely reaction of invertebrates to sound or other stressors, the probability of being exposed to any stressor capable of eliciting a negative response is sufficiently low as to be discountable. Therefore, the white abalone is not carried forward further in this analysis.

4.1.3 Steelhead trout

Steelhead trout (*Oncorhynchus mykiss*) is an anadromous form of rainbow trout and is federally protected under the ESA (71 FR 834). Of the 15 steelhead trout distinct population segments, the endangered Southern California Coast segment is the one most likely to occur in the proposed action area (Table 4-1) (National Marine Fisheries Service 2014d). Critical habitat for steelhead trout, designated in areas of California, Oregon, Washington, and Idaho, occurs outside of the proposed action area.

Steelhead trout exhibit a great diversity of life history patterns, and are phylogenetically and ecologically complex. Steelhead may exhibit either an anadromous life style, or a freshwater residency, where they spend their entire life in freshwater (National Marine Fisheries Service 1997). Anadromous steelhead trout inhabit the saltwater ecosystem for most of their life history and migrate upstream into freshwater habitats to spawn. The present distribution of steelhead trout extends from the Kamchatka Peninsula in Asia, east to Alaska and south to southern California, although the species' historical range extended at least to Mexico (Good et al. 2005). Juvenile steelhead trout feed primarily on zooplankton. Adult steelhead trout feed on aquatic and terrestrial insects, mollusks, crustaceans, fish eggs, minnows, and other small fish species (National Marine Fisheries Service 2014d).

The steelhead trout that migrate to the ocean develop a much more pointed head, become more silvery in color, and typically grow much larger than the rainbow trout that remain in fresh water. Steelhead trout tend to move immediately offshore on entering the marine environment, although, in general, steelhead tend to remain closer to shore than other Pacific salmon species (Beamish et al. 2005). They generally remain within the coastal waters of the California Current (Beamish et al. 2005). The ocean distributions for listed steelhead are not known in detail, but steelhead trout are caught only rarely in ocean salmon fisheries. Studies suggest that steelhead trout do not generally congregate in large schools as do other Pacific salmon species (Burgner et al. 1992; Groot and Margolis 1991). Trends in abundance and reproductive success of Pacific salmonids are typically observed through monitoring in the streams and rivers in which they spawn. Boughton et al. (2005) assessed the occurrence of steelhead trout in southern California coastal watersheds in which the species occurred historically by conducting a combination of field reconnaissance and spot checks (snorkel surveys). Surveys indicated that between 38 percent and 45 percent of the streams surveyed in the range of the Southern California steelhead trout ESU contained the species, but that there were higher extirpation rates in the southern end of the range. Anthropogenic barriers appeared to be the factor most associated with extirpations. Of the 11 streams surveyed that drain into the proposed action area, only San Mateo Creek contained steelhead trout. Although the authors expressed some uncertainty, NMFS (2005) concluded that, with the exception of the small population in San Mateo Creek, the anadromous form of the species appears to be completely extirpated from all systems between the Santa Monica Mountains and the Mexican border. The San Mateo Creek population was formerly considered extirpated (Nehlsen et al. 1991), but California Department of Fish and Game documented presence of the species in 2003 (National Marine Fisheries Service 2005). Many of the streams in this region contain resident populations of steelhead trout. The most recent monitoring data available for the Southern California steelhead trout ESU is from watersheds outside of the proposed action area (i.e., Santa Ynez River, Ventura River, Santa Clara River, Topanga Creek, and Malibu Creek). Surveys indicated that very small (<10 fish), but consistent, runs of the species occur on an annual basis (Ford 2011). The most recent status review report for the Southern California steelhead trout ESU questioned how such small annual runs could persist, and speculated that the runs could be maintained either by strays from some another source population or by production of smolts from the resident population of rainbow trout (Ford 2011).

Behavioral reactions of steelhead trout to non-impulsive acoustic sources could include temporary disruption or alteration of natural activities such as swimming, schooling, feeding, and migrating. Gearin et al. (2000) studied the effects of exposing fish to sounds produced by acoustic deterrent devices, which produce sounds in the mid frequency range. Adult sockeye salmon exhibited an initial startle response to the placement of inactive acoustic alarms but resumed their normal swimming pattern within 10 to 15 seconds. After 30 seconds, the fish approached the inactive alarm to within 1 ft (30 centimeters [cm]). When the experiment was conducted with an alarm active, the fish exhibited the same initial startle response from the insertion of the alarm into the tank; but were swimming within 30 cm of the active alarm within 30 seconds. After five minutes, the fish did not show any reaction or behavior change except for the initial startle response. However, since the Proposed Action uses sonar frequencies outside of the known hearing range of the steelhead trout, behavioral reactions are not expected. In summary, the information available suggests extremely low abundance of Southern California steelhead trout in the proposed action area. The only fish observed in a watershed that drains into the proposed action area were in San Mateo Creek in 2002. Additionally, watersheds further north have very low documented abundance, with surveys indicating annual returns of less than 10 fish. Southern California steelhead trout eggs, fry, or juveniles still in freshwater habitats will not be exposed to Navy activities. Steelhead trout juveniles or adults in coastal waters would be extremely rare in the proposed action area and are therefore not carried forward for analysis.

4.2 Species Considered Further

4.2.1 Fish

ESA-listed fish that may occur in the proposed action area are described below. There is currently no critical habitat for any ESA-listed fish in the vicinity of the proposed action area.

4.2.1.1 Scalloped Hammerhead Shark

The Eastern Pacific distinct population segment of scalloped hammerhead shark (*Sphyma lewini*), the only segment occurring within the proposed action area, is listed as threatened under the ESA (79 FR 38213). Currently, no critical habitat is designated for scalloped hammerhead sharks.

The scalloped hammerhead shark is circumglobal (National Marine Fisheries Service 2014c), occurring in all temperate to tropical waters from the surface to depths of 902 ft (275 m) (Duncan and Holland 2006) and possibly deeper (Compagno 1984; Duncan and Holland 2006; Klimley and Nelson 1984; Miller et al. 2014). Although scalloped hammerhead sharks can be located in deep water, they appear to inhabit the thermocline in temperatures between 73 and 79 degrees Fahrenheit (°F; 23 and 26 degrees Celsius [°C]) (Bessudo et al. 2011; Ketchum et al. 2014a; Ketchum et al. 2014b). The scalloped hammerhead shark remains close to shore during the day and moves to deeper waters at night to feed (Bester 2003). For example, Klimley (1993) documented nighttime migrations of scalloped hammerheads at depths ranging from 328 and 1,476 ft (100 to 450 m) near a seamount in the southern Gulf of California. A genetic marker study suggests that females typically remain close to coastal habitats, while males are more likely to disperse across larger open ocean areas (Daly-Engel et al. 2012). In the eastern Pacific, the scalloped hammerhead ranges from southern California (including the Gulf of California) to Panama, Ecuador, and northern Peru.

Scalloped hammerhead sharks are not a common Southern California species. Historically, three species of hammerhead sharks have been reported in California waters, although all are noted as uncommon species: smooth hammerhead shark (*Sphyrna zygaena*), bonnethead shark (*S. tiburo*), and scalloped hammerhead shark (*S. lewini*) (Robins et al. 1991; Shane 2001). All three species have similar eastern Pacific distributions with smooth hammerhead shark being the more frequent of the uncommon species in California waters (Allen et al. 2006). Furthermore, there have only been infrequent bycatches of scalloped hammerhead sharks in Southern California.

• First documented catch of a scalloped hammerhead in Southern California was for a single shark caught 1 mile (2 km) off Santa Barbara in 1977 (Fusaro and Anderson 1980)

• Three catches were recorded from Los Angeles County in 1984, with one shark reported as a juvenile (Seigel 1985)

• 19 juvenile sharks (9 females/10 males) were caught by commercial gillnet and scientific research gillnets in south San Diego Bay from 1996-1997 (Shane 2001)

Given the temperature preference for scalloped hammerhead sharks (23-26°C), there could be a possibility of relatively low presence in Southern California during warm water conditions including atypical warm water periods associated with strong El Niño events, or future summer water temperature elevations occurring as the result of climate change along the U.S. West Coast.

Scalloped hammerhead sharks consume a widely varied diet including teleost fishes, other sharks, rays, and invertebrates like squid, shrimp, and crab (Bethea et al. 2011; National Marine Fisheries Service 2014c; Torres-Rojas et al. 2010; Vaske et al. 2009). Juveniles feed mainly on coastal benthic prey as well as epipelagic and benthic squid (Galván-Magaña et al. 2013; Musick and Fowler 2007; Torres-Rojas et al. 2010; Torres-Rojas et al. 2014).

4.2.2 Sea Turtles

ESA-listed sea turtles that may occur in the proposed action area are described below. There is currently no critical habitat for any sea turtles in the vicinity of the proposed action area.

4.2.2.1 Loggerhead Sea Turtle

The North Pacific Ocean distinct population segment of loggerhead turtle (*Caretta caretta*) is most likely to occur in the proposed action area. This distinct population segment is listed as endangered under the ESA (76 FR 58868). Critical habitat has been designated for the loggerhead sea turtle, but is located outside of the proposed action area.

Loggerheads are circumglobal, inhabiting continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters. Major nesting grounds are generally located in temperate and subtropical regions, with scattered nesting in the tropics (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1998a). The loggerhead turtle is found in habitats ranging from coastal estuaries to the open ocean (Dodd Jr. 1988). The species can be found hundreds of kilometers out to sea, as well as in inshore areas, such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Most of the loggerheads observed in the eastern North Pacific Ocean are believed to come from beaches in Japan where the nesting season is late May to August (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1998a). Migratory routes can be coastal or can involve crossing deep ocean waters (Schroeder et al. 2003). Loggerhead turtles travel to northern waters during spring and summer as water temperatures warm, and southward and offshore toward warmer waters in fall and winter; loggerheads are noted to occur year round in offshore waters of sufficient temperature. Loggerhead sea turtles feed mostly on hard-shelled prey such as conch and whelks. In general, loggerhead sea turtles hearing sensitivity less than 1 kHz with greatest sensitivity between 50-800 Hz (Bartol et al. 1999; Lavender et al. 2014; Martin et al. 2012).

4.2.2.2 Green Sea Turtle

Green sea turtles (*Chelonia mydas*) that may occur within the proposed action area are part of the East Pacific distinct population segment which is listed as threatened under the ESA (43 FR 32800). Critical habitat has been designated for the green sea turtle, but is located outside of the proposed action area.

Green turtles in the eastern North Pacific have been sighted from Baja California to southern Alaska, but most commonly occur from San Diego to more southern waters. Green turtles inhabit beaches for nesting, open ocean convergence zones during migration, and coastal areas for foraging in benthic habitats (National Marine Fisheries Service 2014a). Green sea turtles account for the greatest percentage of strandings in regional stranding records maintained by NMFS' West Coast Region (National Marine Fisheries Service West Coast Region 2015). There is a year-round population of green turtles in Long Beach, California (Eguchi et al. 2010). This population mainly inhabits a 3 mi (4.8 km) stretch of the San Gabriel River in Long Beach that lies between two power plants which keeps the waters warm year-round. This population of green turtles is believed to be a small subpopulation (about 30 to 40 individuals) of the resident population that resides about 100 mi (160 km) up the coast in San Diego Bay. Green turtles appear to rely upon this warm water source and are unlikely to migrate into the bay or overlap with the proposed action area (Totten 2015). Green sea turtles feed primarily on seagrasses and algae.

4.2.2.3 Leatherback Sea Turtle

The leatherback turtle (*Dermochelys coriacea*) is listed as endangered throughout its range under the ESA (61 FR 17). Critical habitat has been designated for the leatherback sea turtle on the west coast of California, Oregon, and Washington (United States Fish and Wildlife Service 2012), but is located outside of the proposed action area.

Leatherback turtles are commonly known as pelagic (open ocean) animals, but they also forage in coastal waters (National Marine Fisheries Service 2014b). The leatherback turtle is the most widely distributed of all sea turtles, found from tropical to subpolar oceans, and nests on tropical and occasionally subtropical beaches (Gilman 2008; Myers and Hays 2006; National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992). Found from 71 degrees North latitude (° N) to 47 degrees South latitude (° S), it has the most extensive range of any adult turtle (Eckert 1995). Adult leatherback turtles forage in temperate and subpolar regions in all oceans, and migrate to tropical nesting beaches between 30° N and 20° S. Leatherbacks have a wide nesting distribution, primarily on isolated mainland beaches in tropical oceans (mainly in the Atlantic and Pacific Oceans, with few in the Indian Ocean) and temperate oceans (southwest Indian Ocean) (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992), and to a lesser degree on some islands. Leatherback turtles are highly migratory, exploiting convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters (Eckert and Eckert 1988; Eckert 1999; Morreale et al. 1994). Few quantitative data are available concerning the seasonality, abundance, or distribution of leatherbacks in the central northern Pacific Ocean. In the eastern North Pacific Ocean, leatherback turtles are broadly distributed from the tropics to as far north as Alaska, where 19 occurrences were documented between 1960 and 2001 (Eckert 1993; Hodge and Wing 2000). Stinson (1984) concluded that the leatherback was the most common sea turtle in U.S. waters north of Mexico. Aerial surveys off California, Oregon, and Washington indicate that most leatherbacks occur in waters over the continental slope, with a few beyond the continental shelf (Eckert 1993). While the leatherback is known to occur throughout the California Current Large Marine Ecosystem, it is not known to nest anywhere along the U.S. Pacific Ocean coast. In general, turtle sightings increase during summer, as warm water moves northward along the coast (Stinson 1984). Sightings may also be more numerous in warm years than in cold years. Leatherback sea turtles feed mainly on soft-bodied animals like salps and jellyfish. Leatherback turtles are regularly seen off the western coast of the United States, with the greatest densities found off central California. Off central California, sea surface temperatures are highest during the summer and fall, and oceanographic conditions create favorable habitat for leatherback turtle prey (jellyfish). Recent research measuring hatchling leatherback turtle auditory evoked potentials has shown that hatchling leatherbacks respond to tonal stimuli between 50 and 1,200 underwater (maximum sensitivity: 100 to 400 Hz) (Piniak et al. 2012).

4.2.2.4 Olive Ridley Sea Turtle

Olive ridley sea turtles (*Lepidochelys olivacea*) that are part of the Pacific Coast of Mexico breeding population are listed as endangered under the ESA (61 FR 17), while all other populations are listed as threatened. Because it is difficult to distinguish between the two populations, all olive ridley sea turtles within the proposed action area will be considered part of the endangered population. There is currently no designated critical habitat for the olive ridley sea turtle.

In the eastern Pacific, olive ridley turtles nest along the Mexico and Central American coast, with large nesting aggregations occurring at a few select beaches located in Mexico and Costa Rica. Few turtles nest as far north as southern Baja California, Mexico (Brown and Brown 1982; Fritts et al. 1982). Olive ridley turtles occur off the coast of Southern and Central California, but are not known to nest on California beaches. Although they are the most abundant north Pacific sea turtle, surprisingly little is known of the oceanic distribution and critical foraging areas of Pacific ridley turtles. Olive ridley turtles are occasionally seen in shallow waters (less than 165 ft [50 m] deep), although these sightings are relatively rare (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1998b). In general, turtle sightings increase during summer as warm water moves northward along the coast (Steiner and Walder 2005; Stinson 1984). Olive ridley sea turtles feed primarily on benthic invertebrates such as lobster, crabs, tunicates, mollusks, and shrimp, but have also been known to eat algae and fish. There is no information on olive ridley turtle hearing. However, we assume that their hearing sensitivities will be similar to those of green, leatherback and loggerhead turtles: their best hearing sensitivity will be in the low frequency range, with maximum sensitivity below 400 Hz and an upper hearing range not likely to exceed 2,000 Hz.

4.2.3 Marine Mammals

ESA-listed marine mammals that may occur in the proposed action area are described below. There is currently no designated critical habitat for any of the ESA-listed marine mammals that may occur in the proposed action area.

4.2.3.1 Humpback Whale

The humpback whale (*Megaptera novaeangliae*) is listed as endangered throughout its range under the ESA (35 FR 18319). There is currently no designated critical habitat for the humpback whale. While several biologically important areas have been identified for humpback whales off the coast of California (Calambokidis et al. 2015), none are located within the proposed action area.

Humpback whales are distributed worldwide in all major oceans and most seas. They typically are found during the summer in high-latitude feeding grounds and during the winter in the tropics and subtropics around islands, over shallow banks, and along continental coasts, where calving occurs. Most humpback whale sightings are in nearshore and continental shelf waters; however, humpback whales frequently travel through deep oceanic waters during migration (Calambokidis et al. 2001; Clapham 2000; Clapham and Mattila 1990). Peak occurrence in southern California occurs from December through June (Calambokidis et al. 2001). During late summer, more humpback whales are sighted north of the Channel Islands, and limited occurrence is expected south of the Channel Islands (Caretta et al. 2010).

Humpback whales prey on a wide variety of invertebrates and small schooling fishes. The most common invertebrate prey are krill; the most common fish prey are herring, mackerel, sand lance, sardines, anchovies, and capelin (Clapham and Mead 1999). Feeding occurs both at the surface and in deeper waters. Humpback whale audiograms using a mathematical model based on the internal structure of the ear estimate sensitivity is from 700 Hz to 10 kHz, with maximum relative sensitivity between 2 kHz and 6 kHz (Ketten and Mountain 2014).

4.2.3.2 Guadalupe Fur Seal

The Guadalupe fur seal (*Arctocephalus townsendi*) is listed as threatened throughout its range under the ESA (50 FR 51252). The Mexico breeding stock contains the entire population of Guadalupe fur seals. There is currently no designated critical habitat for Guadalupe fur seals.

Guadalupe fur seals' historic range included the Gulf of the Farallones, California to the Revillagigedo Islands, Mexico (Belcher and Lee 2002; Rick et al. 2009). Currently, they breed mainly on Guadalupe Island, Mexico, 135 nautical miles off of the Pacific Coast of Baja California. A smaller breeding colony, discovered in 1997, appears to have been established at Isla Benito del Este, Baja California, Mexico (Belcher and Lee 2002). Guadalupe fur seals inhabit the tropical waters of central and southern California and Mexico. During the breeding season (September to May), they are often found in coastal rocky habitats, though there is little information about where the seals reside outside of breeding season. Guadalupe fur seals breed mostly on Guadalupe Island off the coast of Mexico, but also off of Baja California and southern California's San Miguel Island (National Oceanic and Atmospheric Administration 2015). The Channel Islands are used as haul outs for Guadalupe fur seals (Belcher and Lee 2002; Hanni et al. 1997). Catalina is the closest of the Channel Islands to the proposed action area at roughly 26 nautical miles. Guadalupe fur seals feed on a variety of cephalopods, fish, and crustaceans (Arurioles-Gamboa and Camacho-Rios 2007). Specifically, scat analysis has shown that Guadalupe fur seals feed primarily on nine different vertically migrating squid species, a variety of myctophid fishes, and both Pacific and frigate mackerel (Gallo-Reynoso and Figueroa-Carranza 1996; Gallo-Reynoso et al. 2000). Underwater hearing in otariid seals is adapted to low frequency sound and less auditory bandwidth than phocid seals. Hearing in otariid seals has been tested in two species present in the Action Area: California sea lion (Kastak and Schusterman 1998) and northern fur seal (Babushina et al. 1991; Moore and Schusterman 1987). Based on these studies, Guadalupe fur seals would be expected to hear sounds within the ranges of 50 Hz to 75 kHz in air and 50 Hz to 50 kHz in water.

SECTION 5 EFFECTS OF THE ACTION

This section discusses potential environmental consequences of the Proposed Action to the ESA-listed species described in Section 4. Components of the Proposed Action that may potentially impact the ESA-listed species include:

- Physical – vessel movement, seafloor devices and in-water devices
- Energy – electromagnetic devices and laser use
- Acoustic – vessel/aircraft noise and acoustic transmission
- Secondary – transmission of marine mammal diseases and parasites

5.1 Physical Stressors

The possible effects of physical stressors (disturbance or strike) to fish include being struck by an object moving through the water (e.g., vessels, in-water devices), or an object placed onto the seafloor (e.g., seafloor devices). The area of operation, vertical distribution, and density of in-water or seafloor devices also play central roles in the likelihood of impact.

5.1.1 Vessel Movement

The vessels that would be utilized during the Proposed Action include a Mine Warfare ship, particularly mine countermeasure class ship (225 ft [68.5 m]), an afloat forward staging base (Littoral Combat Ship [387 ft; 118 m] or Landing Dock Platform [684 ft; 208 m]), and small support boats. All vessels would typically operate at speeds less than 10 knots (18 kilometers [km]/hour).

Vessels have the potential to affect ESA-listed fish, sea turtles, and marine mammals by altering their behavior patterns or causing mortality or serious injury from collisions. Marine species are frequently exposed to vessel movement due to research, ecotourism, commercial, government, and private vessel traffic. It is difficult to differentiate between behavioral responses to vessel sound and visual cues associated with the presence of a vessel; thus, it is assumed that both play a role in prompting reactions from animals.

5.1.1.1 Fish

Scalloped hammerhead sharks give birth to live pups, which tend to be coastal bottom-dwellers (Castro 1983). Thus, vessel movement would have no effect on the ichthyoplankton (eggs or larvae) of ESA-listed fish, and no measurable effects to fish recruitment would occur. Scalloped hammerhead sharks are likely not present in significant quantities in the Proposed Action area and only during extreme warm water conditions. Transiting vessels may elicit a behavioral reaction from fish, though any response would be considered minor, transitory, and temporary in nature. In the upper portions of the water column, fish could potentially be displaced, injured, or killed by vessel and propeller movements. However, some Navy rigid hull inflatables boats (RHIBs) and boats use shrouded propellers which would reduce the change for propeller injuries. The likelihood of collision between vessels and adult or juvenile fish is extremely low because fish are highly mobile and are capable of detecting and avoiding approaching objects. While startle reactions to unmanned underwater vehicles and divers could occur either due to vehicle presence or sound (Yoklavich et al. 2013), these would again be transitory responses. Any behavioral reactions by adult or juvenile fish are not expected to result in substantial changes in an individual's fitness, or species recruitment, and are not expected to result in long-term or population-level effects. Given the expected slow speeds of surface vessels and underwater vehicles during the Proposed Action, collision between ESA-listed scalloped hammerhead sharks and vessels is not expected to occur.

5.1.1.2 Sea Turtles

Sea turtles have been observed to elicit short-term responses in their reactions to vessels, and their reaction time was greatly dependent on the speed of the vessel (Hazel et al. 2007). Sea turtles have been documented to flee frequently when encountering a slow-moving (2 knots [4 km/hour]) vessel, but infrequently when encountering a moderate-moving (6 knots [11 km/hour]) vessel, and only rarely when encountering a fast-moving (10 knots [18 km/hour]) vessel. The proportion of turtles that fled to avoid a vessel decreased significantly as vessel speed increased, and turtles that fled from moderate and fast approaches (6 and 10 knots [11 and 18 km/hour], respectively) did so at significantly shorter distances from the vessel than turtles that fled from slow approaches (Hazel et al. 2007). During the Proposed Action, vessel speeds would typically operate at speeds not exceeding 10 knots (18 km/hour) during transit and 3 knots (5.5 km/hr) during training, which would lessen the likelihood of vessel collisions with sea turtles. Sea turtles as a group are not common within the Proposed Action area and would at best be transitory. Any change to an individual's behavior is not expected to result in long-term or population-level effects. Therefore, collision with vessels is not expected to occur.

5.1.1.3 Marine Mammals

Marine mammals react to vessels in a variety of ways. Some respond negatively by retreating or engaging in antagonistic responses, while other animals ignore the stimulus altogether (Terhune and Verboom 1999; Watkins 1986). Silber et al. (2010) concludes that large whales that are in close proximity to a vessel may not regard the vessel as a threat, or may be involved in a vital activity (i.e., mating or feeding) which may not allow them to have a proper avoidance response. Cetacean species generally pay little attention to transiting vessel traffic as it approaches, although they may engage in last minute avoidance maneuvers (Laist et al. 2001). Baleen whale responses to vessel traffic range from avoidance maneuvers to disinterest in the presence of vessels (Nowacek et al. 2007; Scheidat et al. 2004).

The size of a ship and speed of travel affect the likelihood of a collision. Reviews of stranding and collision records indicate that larger ships (262.5 ft [80 m] or larger) and ships traveling at or above 14 knots (26 km/hour) have a much higher instance of collisions with whales that result in mortality or serious injury (Laist et al. 2001). Proposed Action vessel speeds would not exceed 10 knots (18 km/hour) during training, which would lessen the likelihood of vessel collisions with marine mammals. Therefore, the probability of vessel collision during training activities is reduced. Additionally, the vessels associated with the Proposed Action would follow the standard operating procedures and mitigation measures outlined in Section 6 to avoid impacting marine mammals. Any change to an individual's behavior from vessel use is not expected to result in long-term or population-level effects. Therefore, collision with vessels is not expected to occur.

5.1.1.4 Summary

Vessel movement may affect, but is not likely to adversely affect ESA-listed scalloped hammerhead sharks, loggerhead sea turtles, green sea turtles, leatherback sea turtles, olive ridley sea turtles, humpback whales, or Guadalupe fur seals.

5.1.2 Seafloor Devices

Seafloor objects, such as mine training shapes, are relatively small, generally less than 6 ft (1.8 m) in length. No more than 20 mine training shapes would be deployed over the course of training. These devices may be temporarily (7 to 30 days) deployed on the seafloor. Because of the short duration of their interaction with the seafloor, no corrosion of the devices is anticipated and, therefore, no metals are expected to be introduced into the environment. Seafloor devices would be deployed by a surface vessel through the water column. Seafloor devices are stationary and do not pose a threat to highly mobile organisms.

The placement and removal of objects on the seafloor could also result in a minor sediment disruption in the training area. The sediment disruption would be limited to the area immediately surrounding the object placed on the seafloor. The potential impact would be temporary and localized due to the minimal number of objects and the infrequency of training activities, and soft sediment is expected to recover quickly, shifting back following a disturbance of tidal energy. No long-term increases in turbidity would be anticipated.

5.1.2.1 Fish

Seafloor devices would be deployed by a surface vessel through the water column; this is where the potential for strike would occur. Before a potential seafloor device strike, some fish would sense a pressure wave through the water and respond by remaining in place, moving away from the object, or moving toward it (Hawkins and Johnstone 1978). Any fish displaced a small distance away by the movements from a sinking object nearby would likely resume normal activities after a brief disturbance. However, others could be disturbed and may exhibit a generalized stress response. If the seafloor device collided with an organism, direct injury in addition to stress may result. The stress response in vertebrates is to rapidly raise the blood sugar level to prepare the fish for the fight or flight response (Helfman et al. 2009).

The ability of a fish to return to what it was doing following a physical strike (or near miss resulting in a stress response) is a function of fitness, genetic, and environmental factors. Some fish are more tolerant of environmental or human-caused stressors than others and become acclimated more easily. Within a species, the rate at which an individual recovers from a physical disturbance or strike may be influenced by its age, sex, reproductive state, and general condition. A fish that has reacted to a sudden disturbance by swimming at burst speed would tire after some time; its blood hormone and sugar levels may not return to normal for 24 hours (Helfman et al. 2009).

Exposure to seafloor devices used during the Proposed Action may cause short-term disturbance to an individual fish or, if struck, could lead to injury or death. The potential for a fish to be close to a seafloor device during deployment, and therefore to be at risk for collision, is very low due to the high mobility of scalloped hammerhead sharks. Exposure to seafloor devices is not expected to change an individual’s growth, survival, annual reproductive success, or lifetime reproductive success (fitness); thus exposure to seafloor devices is not expected to result in population-level impacts to scalloped hammerhead sharks.

5.1.2.2 Sea Turtles

Similar to the discussion for fish, above, short-term behavioral disturbance to an individual could occur during the deployment of seafloor devices. The potential for a sea turtle to be close to a seafloor device during deployment, and therefore to be at risk for collision, is very low due to the small geographic area within which the mine training shapes would be deployed and the wide distribution of sea turtle habitat. Any sea turtle displaced a small distance away by the movements from a sinking object nearby would likely resume normal activities after a brief disturbance. Exposure to seafloor devices would be short-term and localized and is not expected to change an individual's growth, survival, annual reproductive success, or lifetime reproductive success (fitness); thus, exposure to seafloor devices is not expected to result in population-level impacts.

5.1.2.3 Marine Mammals

Similar to the discussions for fish and sea turtles above, short-term behavioral disturbance to an individual mammal could occur during the deployment of seafloor devices. The potential for a marine mammal to be close to a seafloor device near the seafloor or during deployment is low because of the small geographic area within which the mine training shapes would be deployed and the wide distribution of marine mammal habitat. Any marine mammal displaced a small distance away by the movements from a sinking object nearby would likely resume normal activities after a brief disturbance. Exposure to seafloor devices would be short-term and localized and is not expected to change an individual's growth, survival, annual reproductive success, or lifetime reproductive success (fitness); thus, exposure to seafloor devices is not expected to result in population-level impacts. Additionally, the use of standard operating procedures and mitigation measures would reduce the likelihood of impact to ESA-listed marine mammals.

5.1.2.4 Summary

Seafloor objects may affect, but are not likely to adversely affect ESA-listed scalloped hammerhead sharks, loggerhead sea turtles, green sea turtles, leatherback sea turtles, olive ridley sea turtles, humpback whales, or Guadalupe fur seals.

5.1.3 In-Water Devices

In-water devices associated with the Proposed Action include unmanned underwater vehicles and towed devices. These devices are self-propelled or towed through the water from helicopters. In-water devices are generally smaller than most other Navy vessels ranging from 27 ft (8 m) to about 49 ft (15 m). In-water devices can operate anywhere from the water surface to near-bottom.

Unmanned underwater vehicles are slow moving through the water column and have very limited potential to strike marine species because an animal in the water could avoid a slow moving object. Unmanned underwater vehicles and towed devices are closely monitored by observers manning other platforms in use during the training event. The devices which are towed through the water column by a helicopter are generally less than 33 ft (10 m) in length and operate at 10 to 40 knots (18 to 74 km/hour). Due to the potential speed of the towed system by helicopter, there is a potential for strike to marine resources and the use of in-water towed devices may cause short-term and localized disturbance to an individual marine species; these short-term disturbances could cause injury or mortality due to strikes. In-water devices do not come in contact with the seafloor because of potential damage to the device. Both black abalone and white abalone are a bottom-dwelling species that would not be disrupted by in-water devices; thus, in-water devices associated with the Proposed Action would have no effect on black or white abalone.

5.1.3.1 Fish

The potential for a fish to be struck by either an unmanned underwater vehicle or a towed system is similar to that identified for vessels. The likelihood of collision is low given the high mobility of most fishes, including ESA-listed scalloped hammerhead sharks, and their ability to detect and avoid approaching objects. The use of in-water devices may result in short-term and localized displacement of fishes in the water column. However, these behavioral reactions are not expected to result in substantial changes to an individual’s fitness, or species recruitment, and are not expected to result in population-level impacts. Scalloped hammerhead sharks give birth to live pups, which tend to be coastal bottom-dwellers (Castro 1983). Thus, in-water devices would have no effect on the eggs or larvae of ESA-listed fish, and no measurable effects to fish recruitment would occur.

5.1.3.2 Sea Turtles

The potential for a sea turtle to be struck by either the unmanned underwater vehicle or a towed system is similar to that identified for vessels. Unmanned underwater vehicles move slowly through the water and have a limited potential to strike a sea turtle because sea turtles could avoid the slowly moving object. Towed mine warfare systems operate at higher speeds than the unmanned underwater vehicles and pose a greater collision risk to sea turtles. Although the potential for collision may affect an individual sea turtle, population-level effects are not expected as it would not interfere with the population’s survival. However, any behavioral reactions from in-water devices are not expected to result in substantial changes in an individual’s fitness and are not expected to result in population-level effects.

5.1.3.3 Marine Mammals

The potential for a marine mammal to be struck by either the unmanned underwater vehicle or a towed system is similar to that identified for vessels. Physical disturbance from the use of in-water devices is not expected to result in more than a momentary behavioral response. Unmanned underwater vehicles move slowly through the water column and have a limited potential to strike a marine mammals. Moving towed mine warfare systems pose only a slight collision risk. However, the implementation of mitigation measures and standard operating procedures (detailed in Section 6) would reduce the likelihood of impact to ESA-listed humpback whales and Guadalupe fur seals.

5.1.3.4 Summary

In-water devices associated with Civilian Port Defense training activities may affect, but are not likely to adversely affect ESA- listed scalloped hammerhead sharks, loggerhead sea turtles, green sea turtles, leatherback sea turtles, olive ridley sea turtles, humpback whales, or Guadalupe fur seals.

5.2 Energy Stressors

The energy stressors associated with the Proposed Action include electromagnetic device and laser use. Low levels of both electromagnetic device and laser use could be used in the Proposed Action. Both of the potential energy stressors are temporary and brief in nature.

5.2.1 Electromagnetic Devices

The magnetic field generated by electromagnetic devices used during the Proposed Action is of relatively minute strength, typically moving through the water column creating a transient magnetic field. Typically, the maximum magnetic field generated would be approximately 23 gauss (G). This level of electromagnetic density is very low compared to magnetic fields generated by other everyday items. The magnetic field generated is between the levels of a refrigerator magnet (150 to 200 G) and a standard household can opener (up to 4 G at 4 inches [10 cm] away). The magnetic field generated of the mine warfare sources is comparable to the earth's magnetic field at a distance of 13.12 ft (4 m), which is approximately 0.5 G. The strength of the field at just under 26 ft (8 m) is only 40 percent of the earth's field, and only 10 percent at 79 ft (24 m). At a radius of 656 ft (200 m), the magnetic field would be approximately 0.002 G (U.S Department of the Navy 2005).

ESA regulations do not provide threshold criteria to determine the significance of the potential effects from activities that involve the use of varying electromagnetic frequencies. Many organisms, primarily marine vertebrates, have been studied to determine their thresholds for detecting electromagnetic fields (Normandeau Associates Inc. et al. 2011); however, no data are available on predictable responses to exposure above or below detection thresholds.

5.2.1.1 Fish

The primary fishes that have been identified as capable of detecting electromagnetic fields include salmonids (trout, salmon char, etc.), elasmobranchs (sharks, skates, and rays), tuna, eels, and stargazers. Only elasmobranchs will be carried forward in this analysis as they represent the ESA-listed scalloped hammerhead sharks which could be capable of detecting the electromagnetic fields in the proposed action area.

For any electromagnetically sensitive fishes in close proximity to the source, the generation of electromagnetic fields has the potential to interfere with prey detection and navigation. They may also experience temporary disturbance of normal sensory perception or could experience avoidance reactions (Kalmijn 2000), resulting in alterations of behavior and avoidance of normal foraging areas or migration routes. Potential impacts of electromagnetic activity on fishes may not be relevant to early life stages (eggs, larvae, juveniles) due to ontogenic (lifestage-based) shifts in habitat utilization (Botsford et al. 2009; Sabates et al. 2007). However, these effects would occur to individuals within close proximity to the electromagnetic field. The devices would be moving through the water and would only be deployed for a temporary period during a typical four hour operation period. No population-level or long-term effects are anticipated. Mortality from electromagnetic devices is not expected due to the low level electromagnetic field generated from the mine warfare systems used in training.

5.2.1.2 Sea Turtles

Sea turtles use geomagnetic fields to navigate while at sea; changes in or interference with those fields may impact their movement (Lohmann and Lohmann 1996; Lohmann et al. 1997). Experiments show that sea turtles can detect changes in magnetic fields, which may cause them to deviate from their original direction (Lohmann and Lohmann 1996; Lohmann et al. 1997). If located in the immediate area (within about 650 ft [200 m]) where electromagnetic devices are being used, ESA-listed sea turtles could deviate from their original movements, but the extent of this disturbance is likely to be inconsequential. The electromagnetic devices used in the Proposed Action are relatively low intensity (0.002 G at 650 ft [200 m] from the source), temporary in duration, and very localized, and are, therefore, not expected to cause more than short term behavioral disturbances. Impacts of exposure to electromagnetic stressors are not expected to result in substantial changes to an individual's behavior, growth, survival, annual reproductive success, lifetime reproductive success (fitness), or species recruitment, and are not expected to result in population-level impacts.

5.2.1.3 Marine Mammals

Based on the available literature, no evidence of electrosensitivity in marine mammals was found except recently in the Guiana dolphin (Czech-Damal et al. 2011). Normandeau et al. (2011) reviewed available information on electromagnetic and magnetic field sensitivity of marine organisms (including marine mammals) for an impact assessment of offshore wind farms for the U.S. Department of the Interior and concluded there is no evidence to suggest any magnetic sensitivity for sea lion or fur seals.

Fin, humpbacks, and sperm whales have shown positive correlations with geomagnetic field differences. Although none of the studies have determined the mechanism for magnetosensitivity, the suggestion from these studies is that whales can sense the Earth's magnetic field and may use it to migrate long distances. Cetaceans appear to use the Earth's magnetic field for migration in two ways: as a map by moving parallel to the contours of the local field topography, and as a timer based on the regular fluctuations in the field allowing animals to monitor their progress on this map (Klinowska 1990). Cetaceans do not appear to use the Earth's magnetic field for directional information (i.e. they do not use magnetic fields as an internal compass) (Klinowska 1990). Potential impacts to marine mammals associated with electromagnetic fields are dependent on the marine mammal's proximity to the source and the strength of the magnetic field. Electromagnetic fields associated with the Proposed Action are relatively weak (only 10 percent of the earth's magnetic field at 79 ft [24 m]), temporary in duration, and localized. Once the source is turned off or moves from a location, the electromagnetic field is gone. If a marine mammal is sensitive to electromagnetic fields, it would have to be present within the electromagnetic field (approximately 656 ft [200 m] from the source) during the activity in order to detect it. Due to the standard operating procedures and mitigation measures outlined in Section 6, which would be in effect during the Proposed Action the chance occurrence of a marine mammal in close enough vicinity to the electromagnetic device is unlikely. Research suggests that pinnipeds, like the ESA-listed Guadalupe fur seal, are not sensitive to electromagnetic fields (Normandeau Associates Inc. et al. 2011).

Again, detection does not necessarily signify a significant biological response rising to the level of take as defined under the ESA. Given the small area associated with mine fields, the infrequency and short duration of magnetic energy use, the low intensity of electromagnetic energy sources, and the density of cetaceans in these areas, the likelihood of ESA-listed cetaceans being exposed to electromagnetic energy at sufficient intensities to create a biologically relevant response is so low as to be discountable.

5.2.1.4 Summary

Electromagnetic devices associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed scalloped hammerhead sharks, loggerhead sea turtles, green sea turtles, leatherback sea turtles, olive ridley sea turtles, or humpback whales. Electromagnetic devices would have no effect on Guadalupe fur seals.

5.2.2 Lasers

Within the category of low energy lasers, the highest potential level of exposure would be from an airborne laser beam directed at the ocean's surface. An assessment on the use of low energy lasers by the Navy determined that low energy lasers have an extremely low potential to impact marine biological resources (Swope 2010). The assessment determined that the maximum potential for laser exposure is at the ocean's surface, where laser intensity is greatest (Swope 2010). Any heat that the laser generates would rapidly dissipate due to the large heat capacity of water and the large volume of water in which the laser is used. Based on the parameters of the low energy lasers and the behavior and life history of major biological groups, it was determined the area most vulnerable to laser energy would be at or above the water's surface, to the eye of a sea turtle or marine mammal. Low energy lasers have an extremely low potential to impact invertebrates or fish, due to attenuation of the laser's energy in the water column. ESA-listed invertebrates and fish would not be impacted from the use of lasers.

5.2.2.1 Sea Turtles

While all points on a sea turtle's body would have roughly the same probability of laser exposure, only eye exposure is of concern for low-energy lasers. Swope (2010) evaluated light detection and ranging (LIDAR) and determined that due to the way the system is used, animals would only be exposed to one pulse from the LIDAR. Swope calculated the single exposure limited for various species of marine mammals and sea turtles and determined that the energy associated with the laser at the surface was below a single exposure limit for all species. There is no suspected effect due to heat from the laser beam. Furthermore, 96 percent of a laser beam projected into the ocean is absorbed, scattered, or otherwise lost (Guenther et al. 1996). Therefore, lasers associated with the Proposed Action are not expected to affect sea turtles.

5.2.2.2 Marine Mammals

The potential for impacts to marine mammals from laser use would be the same as described for sea turtles. Given the usage characteristics, platform movement, and animal movement, it would not be possible for a marine mammal to experience eye damage from the lasers used during the Proposed Action.

5.2.2.3 Summary

Laser use associated with the Proposed Action would have no effect on ESA-listed scalloped hammerhead sharks, loggerhead sea turtles, green sea turtles, leatherback sea turtles, olive ridley sea turtles, humpback whales, or Guadalupe fur seals.

5.3 Acoustic Stressors

The acoustic stressors associated with the Proposed Action include vessel noise, aircraft noise, and high frequency acoustic transmissions. In order to determine the potential impacts of these stressors on the ESA-listed species, hearing capabilities are discussed as well as each stressor as it relates to the ability of the ESA-listed species to perceive and react to each sound source.

5.3.1 Vessel Noise

Marine species within the proposed action area may be exposed to vessel noise during the Proposed Action. The potential impact from vessel noise is from masking of other biologically relevant sounds. The proposed action area has high levels of anthropogenic noise due to the industrialized waterfronts (e.g., harbors, marinas, shipping lanes).

Vessel noise could disturb ESA-listed fish, sea turtles, and marine mammals, and potentially elicit an alerting, avoidance, or other behavioral reaction. Some marine species may have habituated to vessel noise, and may be more likely to respond to the sight of a vessel rather than the sound of a vessel, although both may play a role in prompting reactions (Hazel et al. 2007). The ambient noise level within active shipping areas of Los Angeles/Long Beach has been estimated around 140 dB sound pressure level (Tetra Tech Inc 2011). Existing ambient acoustic levels in non-shipping areas around Terminal Island in the Port of Long Beach ranged between 120 dB and 132 dB (Tetra Tech Inc 2011). In 2012 and 2013, approximately 4,550 and 4,500 vessel calls, respectively, for ships over 10,000 deadweight tons arrived at the Ports of Los Angeles and Long Beach (Louttit and Chavez 2014; U.S. Department of Transportation). This level of shipping would mean approximately 9,000 large ship transits to and from these ports and through the proposed action area. By comparison, the next nearest large regional port, Port of San Diego, only had 318 vessel calls in 2012. With ambient levels of noise being elevated, the additional vessel noise would likely be masked by the existing environmental noise and marine species would not be impacted by the sound of the vessels, but perhaps by the sight of an approaching vessel.

Individual response to vessel noise can be variable and influenced by the number of vessels in their perceptual field, the distance between a vessel and animal, a vessel’s speed and vector, the predictability of a vessel’s path, noise associated with a vessel (particularly engine noise which on Navy ships is minimized as much as engineering design will allow), and behavioral state of the animal.

5.3.1.1 Fish

An increase in background sound can have an effect on the ability of a fish to hear a potential mate or predator or to glean information about its general environment. In effect, acoustic communication and orientation of fish may potentially be restricted by noise regimes in their environment that are within the hearing range of the fish. However, with the ambient noise levels of the proposed action area being elevated, the vessel noise from the proposed action would have no significant additional masking effect to the environment and therefore would not impact fish.

Noise from the small number of Navy vessels and boats is also not expected to impact scalloped hammerhead shark as available evidence does not suggest that ship noise can injure or kill a fish (Popper 2014). Further, we would expect the species to engage in avoidance behavior if vessels are moving in their direction. Misund (1997) found that fish ahead of a ship showed avoidance reactions at ranges of 160 to 490 ft (49–149 m). When the vessel passed over them, some species of fish responded with sudden escape responses that included lateral avoidance or downward compression of the school. We do not expect temporary behavioral reactions (e.g., temporary cessation of feeding) to impact individual fitness as individuals will resume feeding upon cessation of the sound exposure and unconsumed prey will still be available in the environment. Furthermore, while small boat, and it could be assume larger vessel, sounds may influence some fish behavior for some species (ex., startle response, masking), other fish species can be equally unresponsive (Becker et al. 2013).

5.3.1.2 Sea Turtles

Little is known about how sea turtles use sound in their environment. Based on knowledge of their sensory biology (Bartol and Ketten 2006; Bartol and Musick 2002; Levenson et al. 2004), sea turtles may be able to detect objects within the water column (e.g., vessels, prey, predators) via some combination of auditory and visual cues. However, research examining the ability of sea turtles to avoid collisions with vessels shows they may rely more on their vision than auditory cues (Hazel et al. 2007). Similarly, while sea turtles may rely on acoustic cues to identify nesting beaches, they appear to rely on other non-acoustic cues for navigation, such as magnetic fields (Lohmann and Lohmann 1996) and light (Avens and Lohmann 2003). Additionally, they are not known to produce sounds underwater for communication. As a result, sound may play a limited role in a sea turtle's environment. With the ambient noise levels of the proposed action area being elevated, the vessel noise from the Proposed Action would have no significant additional masking effect to the environment and therefore would not impact a sea turtle's ability to perceive other biologically relevant sounds. Sea turtles are frequently exposed to research, ecotourism, commercial, government, and private vessel traffic. Some sea turtles may have habituated to vessel noise (Hazel et al. 2007). Any reactions are likely to be minor and short-term avoidance reactions, leading to no long-term consequences for the individual or population.

5.3.1.3 Marine Mammals

Critical ratios have been determined for pinnipeds (Southall et al. 2000, 2003) and detections of signals under varying masking conditions have been determined for active echolocation and passive listening tasks in odontocetes (Au and Pawloski 1989; Erbe 2000; Johnson 1971). These studies provide baseline information from which the probability of masking can be estimated. Clark et al. (2009) developed a methodology for estimating masking effects on communication signals for low frequency cetaceans, including calculating the cumulative impact of multiple noise sources. This technique was used in Stellwagen Bank National Marine Sanctuary and showed, when two commercial vessels pass through a North Atlantic right whale's optimal communication space (estimated as a sphere of water with a diameter of 12 miles [20 km]), that space is decreased by 84 percent. This methodology relies on empirical data on source levels of calls (which is unknown for many species), and requires many assumptions about ambient noise conditions and simplifications of animal behavior, but it is an important step in determining the impact of anthropogenic noise on animal communication. Vocal changes in response to anthropogenic noise can occur across the repertoire of sound production modes used by marine mammals, such as whistling, echolocation click production, calling, and singing. Changes to vocal behavior and call structure may result from a need to compensate for an increase in background noise. In cetaceans, vocalization changes have been reported from exposure to anthropogenic sources such as sonar, vessel noise, and seismic surveying.

Vessel noise could elicit an alerting, avoidance, or other behavioral reaction. Based on studies of a number of species, mysticetes are not expected to be disturbed by vessels that maintain a reasonable distance from them, which varies with vessel size, geographic location, and tolerance levels of individuals. For pinnipeds, data indicate tolerance of vessel approaches, especially for animals in the water. Navy vessels do not purposefully approach marine mammals and are not expected to elicit significant behavioral responses. The implementation of mitigation as described in Section 6 would further reduce any potential impacts of vessel noise. With the ambient noise levels within the proposed action area being elevated, the vessel noise from the proposed action would have no significant additional masking effect to the environment and therefore would not impact marine mammals. In summary, ESA-listed cetaceans such as humpback whales are either not likely to respond to vessel noise or are not likely to measurably respond in ways that would significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Therefore, the effects of vessel noise on ESA-listed cetaceans are insignificant and not likely to adversely affect them during the short duration of the Proposed Action.

5.3.1.4 Summary

Vessel noise associated with the Proposed Action may affect, but are not likely to adversely affect ESA-listed scalloped hammerhead sharks, loggerhead sea turtles, green sea turtles, leatherback sea turtles, olive ridley sea turtles, humpback whales, or Guadalupe fur seals.

5.3.2 Aircraft Noise

Fish, sea turtles, and marine mammals may be exposed to aircraft-generated noise wherever aircraft overflights occur in the proposed action area. Rotary-wing aircraft (helicopters) are used throughout the proposed action area. Helicopters produce low-frequency sound and vibration (Pepper et al. 2003; Richardson et al. 1995). Most marine invertebrates would not sense low-frequency sounds above the ambient noise levels, distant sounds, or aircraft noise transmitted through the air-water interface.

Noise generated from helicopters is transient in nature and variable in intensity. Helicopter sounds contain dominant tones from the rotors that are generally below 500 Hz. Helicopters often radiate more sound forward than aft. The underwater noise produced is generally brief when compared with the duration of audibility in the air. The sound pressure level from an H-60 helicopter hovering at a 50 ft (15 m) altitude would be approximately 125 dB re 1 μPa at 1 m below the water surface, which is lower than the ambient sound that has been estimated in and around the Ports of Los Angeles/Long Beach. Helicopter flights associated with the Proposed Action could occur at altitudes as low as 75 to 100 ft (23 to 31 m), and typically last two to four hours.

5.3.2.1 Fish

Scalloped hammerhead sharks may be exposed to aircraft-generated noise wherever aircraft overflights occur; however, sound is primarily transferred into the water from air in a narrow cone under the aircraft. Some species of fish could respond to noise associated with low-altitude aircraft overflights or to the surface disturbance created by downdrafts from helicopters. Aircraft overflights have the potential to affect surface waters and, therefore, to expose fish occupying those upper portions of the water column to sound and general disturbance potentially resulting in short-term behavioral or physiological responses. If fish were to respond to aircraft overflights, only short-term behavioral or physiological reactions (e.g., swimming away and increased heart rate) would be expected, however no long-term or population-level effects on fish are expected from aircraft noise.

5.3.2.2 Sea Turtles

Sea turtles may respond to both the physical presence and to the noise generated by the aircraft. Underwater sounds from aircraft are strongest just below the surface and directly under the aircraft. Low flight altitudes of helicopters during the Proposed Action may occur under 100 ft (31 m) and may elicit a behavioral response due to the proximity to sea turtles, the slower airspeed, and therefore longer exposure duration, and the downdraft created by the helicopter's rotor. Sea turtles would likely avoid the area under the helicopter. It is unlikely that an individual would be exposed repeatedly for long periods of time due to the short duration of training. Short-term reactions to aircraft are not likely to disrupt major behavioral patterns or to result in serious injury to any sea turtles.

5.3.2.3 Marine Mammals

Marine mammals may respond to both the physical presence and to the noise generated by the aircraft. Underwater sounds from aircraft are strongest just below the surface and directly under the aircraft. Low flight altitudes of helicopters during the Proposed Action may occur under 100 ft (31 m) and may elicit a somewhat stronger behavioral response due to the proximity to marine mammals, the slower airspeed and therefore longer exposure duration, and the downdraft created by the helicopter's rotor (Figure 2-2). Marine mammals would likely avoid the area under the helicopter. It is unlikely that an individual would be exposed repeatedly for long periods of time due to the short duration of training. Marine mammals located at or near the surface when aircraft flies overhead at low-altitude may be startled, divert their attention to the aircraft, or avoid the immediate area by swimming away or diving. Short-term reactions to aircraft are not likely to disrupt major behavior patterns such as migrating, breeding, feeding, and sheltering, or to seriously injure any marine mammals.

5.3.2.4 Summary

Aircraft noise associated with the Proposed Action may affect, but is not likely to adversely affect ESA-listed, scalloped hammerhead sharks, loggerhead sea turtles, green sea turtles, leatherback sea turtles, olive ridley sea turtles, humpback whales, or Guadalupe fur seals.

5.3.3 Acoustic Transmissions

Sonar systems to be used during proposed Civilian Port Defense training would include AN/SQQ-32, AN/AQS-24 and handheld sonars (AN/PQS 2A). Of these sonar sources, only the AN/SQQ-32 would require quantitative acoustic effects analysis, given its source parameters, which are classified. The remaining sources are either above the hearing range of marine species or have narrow beam widths and short pulse lengths that would not result in any effects to marine species. All active acoustic sources proposed for Civilian Port Defense training would emit signals considered to be high-frequency (greater than 10 kHz).

5.3.3.1 Fish

Few fish species have been shown to be able to detect the high-frequency sounds associated with the Proposed Action. Although hearing capability data only exist for fewer than 100 of the 32,000 fish species, current data suggest that most species of fish detect sounds from 50 to 1,000 Hz, with few fish hearing sounds above 4 kHz (Popper 2008). It is believed that most fish have their best hearing sensitivity from 100 to 400 Hz (Popper 2003). Studies have also shown that high-frequency emissions may be detected by some fish species. Experiments on several species of the Clupeidae (i.e., herrings, shads, and menhadens) have obtained responses to frequencies between 40 and 180 kHz (Astrup 1999); however, no hearing specialists are listed as threatened or endangered under the ESA in the proposed action area. The ESA-listed species that may occur in the proposed action area are the scalloped hammerhead sharks, which are hearing generalists whose hearing range is well below the transmit frequencies of the Proposed Action. The highest sensitivity hearing range for sharks is from 40 Hz to roughly 800 Hz (Myrberg 2001). Thus, scalloped hammerhead sharks are able to detect low-frequency sounds only and would not be affected by the high frequency acoustic sources of the Proposed Action.

5.3.3.2 Sea Turtles

Sea turtles are low-frequency hearing specialists, typically hearing frequencies from 30 to 2 kHz, with a range of maximum sensitivity between 100 and 800 Hz (Bartol and Ketten 2006; Bartol et al. 1999; Lenhardt 1994, 2002; Ridgway et al. 1969). Hearing below 80 Hz is less sensitive but still potentially usable (Lenhardt 1994). Given that the acoustic sources associated with the Proposed Action are high frequency (above 10 kHz), sea turtles would not be able to perceive the acoustic transmission.

5.3.3.3 Marine Mammals

In assessing the potential effects on marine mammals expected to occur in the proposed action area from acoustic transmissions, a variety of factors must be considered, including source characteristics, animal presence, animal hearing range, duration of exposure, and impact thresholds for species that may be present.

Mine warfare sonar employs high frequencies (above 10 kHz) that attenuate rapidly in the water, thus producing only a small area of potential auditory masking. Anatomical and paleontological evidence suggests that the inner ears of mysticetes (baleen whales), like the humpback whale, are well adapted for hearing at lower frequencies (Ketten 1998; Richardson 1995). Functional hearing in low-frequency mysticetes is conservatively estimated to be between 7 Hz and 22 kHz (Southall et al. 2007). Some calls of humpback whales have been found to exceed 10 kHz (Ketten 1998; Richardson 1995). Higher-frequency mine warfare sonar systems are typically outside the hearing and vocalization ranges of mysticetes; therefore, mysticetes are unlikely to be able to detect the higher frequency mine warfare sonar, and these systems would not interfere with their communication or detection of biologically relevant sounds. Otariids, like the Guadalupe fur seal, have functional hearing limits that are estimated to be 50 Hz to 50 kHz in water and 50 Hz to 75 kHz in air (Babushina et al. 1991; Moore and Schusterman 1976).

Potential acoustic impacts to ESA-listed marine mammals could include non-recoverable physiological effects, recoverable physiological effects, and behavioral effects. Criteria and thresholds for measuring these effects induced from underwater acoustic energy have been established for marine mammals. PTS in hearing is the criterion used to establish the onset of non-recoverable physiological effects, TTS in hearing is the criterion used to establish the onset of recoverable physiological effects, and a behavioral response function is used to determine non-physiological behavioral effects. The MMPA describes Level A harassment as potential injury and Level B harassment as potential disturbance. An analysis of the potential effects to marine mammals from the proposed acoustic sources was conducted using a methodology that calculates the total sound exposures level and maximum sound pressure level that a marine mammal may receive from the acoustic transmissions. The Navy Acoustic Effects Model (NAEMO) was used for all modeling analysis (Marine Species Modeling Team 2012). Environmental characteristics (e.g., bathymetry, wind speed, and sound speed profiles) and source characteristics (i.e., source level, source frequency, transmit length and interval, and horizontal beam width) are used to determine the propagation loss of the acoustic energy, which was completed using the Comprehensive Acoustic System Simulation/Gaussian Ray Bundle (CASS/GRAB) propagation model. The propagation loss then was used in NAEMO to create acoustic footprints, model source movements, and calculate received energy levels around the source. Animats, or representative animals, are distributed based on density data obtained from the Navy Marine Species Density Database (NMSDD) (Department of the Navy 2012). This database is based on surveys, published population estimates, and a Relative Environmental Suitability (RES) model (Kaschner et al. 2006). The energy received by each distributed animat within the model is summed into a total sound exposure level, which is compared to the acoustic effects criteria to calculate potential exposures at the PTS and TTS level. Additionally, the maximum sound pressure level received by each animat predicts probability of behavioral harassment via the behavioral risk function. The estimated sound exposure level and sound pressure level received by each animat is then compared to a set of thresholds (Finneran and Jenkins 2012). The output from the acoustic modeling provided both the predicted ranges to the various levels of effect as well as estimated exposures of marine mammal species.

The model and current acoustic criteria for assessing acoustic effects to ESA-listed humpback whales and Guadalupe fur seals was used and zero Level A and Level B exposures to ESA-listed species were predicted. .Additionally, the use of standard practices and mitigation measures described in Section 6 would ensure the area is generally clear of marine mammals, including

ESA-listed marine mammals, during training events. The Navy has submitted an application for an Incidental Harassment Authorization pursuant to the Marine Mammal Protection Act which is currently under review by NMFS Headquarters for the proposed Civilian Port Defense training activities

5.3.3.4 Summary

Acoustic transmissions associated with the Proposed Action would have no effect on ESA-listed scalloped hammerhead sharks, loggerhead sea turtles, green sea turtles, leatherback sea turtles, and olive ridley sea turtles. Acoustic transmissions associated with the Proposed Action may affect, but are not likely to adversely affect humpback whales and Guadalupe fur seals.

5.4 Secondary Stressors

5.4.1 Transmission of Marine Mammal Diseases and Parasites

The U.S. Navy deploys trained Atlantic bottlenose dolphins (*Tursiops truncatus*) and California sea lions (*Zalophus californianus*) for integrated training involving two primary mission areas; to find objects such as inert mine shapes, and to detect swimmers or other intruders around Navy facilities such as piers. When deployed, the animals are part of what the Navy refers to as Marine Mammal Systems. These Marine Mammal Systems include one or more motorized small boats, several crew members, and a trained marine mammal. Based on the standard procedures with which these systems are deployed, it is not reasonably foreseeable that use of these marine mammals systems would result in the transmission of disease or parasites to cetacea or pinnipeds in the Study Area based on the following.

Each trained animal is deployed under behavioral control to find the intruding swimmer or submerged object. Upon finding the 'target' of the search, the animal returns to the boat and alerts the animal handlers that an object or swimmer has been detected. In the case of a detected object, the human handlers give the animal a marker that the animal can bite onto and carry down to place near the detected object. In the case of a detected swimmer, animals are given a localization marker or leg cuff that they are trained to deploy via a pressure trigger. After deploying the localization marker or leg cuff the animal swims free of the area to return to the animal support boat. For detected objects, human divers or remote vehicles are deployed to recover the item. Swimmers that have been marked with a leg cuff are reeled-in by security support boat personnel via a line attached to the cuff.

Marine mammal systems deploy approximately 1 to 2 weeks before the beginning of a training exercise to allow the animals to acclimate to the local environment. There are 4 to 12 marine mammals involved per exercise. Systems typically participate in object detection and recovery, both participating in mine warfare events, and assisting with the recovery of inert mine shapes at the conclusion of an event. Marine Mammal Systems may also participate in port security and anti-terrorism/force protection events.

During the past 40 years, the Navy Marine Mammal Program has deployed globally. To date, there have been no known instances of deployment-associated disease transfer to or from Navy marine mammals. Navy animals are maintained under the control of animal handlers and are prevented from having sustained contact with indigenous animals.

When not engaged in the training event, Navy Marine Mammals are either housed in temporary enclosures or aboard ships involved in training exercises. All marine mammal waste is disposed of in a manner approved for the specific holding facilities. When working, sea lions are transported in boats and dolphins are transferred in boats or by swimming along-side the boat under the handler's control. Their open-ocean time is under stimulus control and is monitored by their trainers.

Navy marine mammals receive excellent veterinarian care (per SECNAVINST 3900.41E). Appendix A, Section 8, of the Swimmer Interdiction Security System Final EIS (Space and Naval Warfare Systems Center 2009) provides an overview of the veterinary care provided for the Navy's marine mammals. Appendix B, Section 2, of the Swimmer Interdiction Security System Final EIS provides detailed information on the health screening process for communicable diseases. The following is a brief summary of the care received by all of the Navy's marine mammals:

1. Qualified veterinarians conduct routine and pre-deployment health examinations on the Navy's marine mammals; only animals determined as healthy are allowed to deploy.

2. Restaurant-quality frozen fish are fed to prevent diseases that can be caused by ingesting fresh fish (e.g., parasitic diseases).

3. Navy animals are routinely dewormed to prevent parasitic and protozoal diseases.

4. If a valid and reliable screening test is available for a regionally relevant pathogen (e.g., polymerase chain reaction assays for morbillivirus), such tests are run on appropriate animal samples to ensure that animals are not shedding these pathogens.

The Navy Marine Mammal Program routinely does the following to further mitigate the low risk of disease transmission from captive to wild marine mammals during training events:

1. Marine mammal waste is disposed of in an approved system dependent upon the animal's specific housing enclosure and location.

2. Onsite personnel are made aware of the potential for disease transfer, and report any sightings of wild marine mammals so that all personnel are alert to the presence of the animal.

3. Marine mammal handlers visually scan for indigenous marine animals, for at least 5 minutes before animals are deployed and maintain a vigilant watch while the animal is working in the water. If a wild marine mammal is seen approaching or within 100 m, the animal handler will hold the marine mammal in the boat or recall the animal immediately if the animal has already been sent on the mission.

4. The Navy obtains appropriate state agriculture and other necessary permits and strictly adheres to the conditions of the permit.

5.4.1.1 Summary

Due to the very small amount of time that the Navy marine mammals spend in the open ocean; the control that the trainers have over the animals; the collection and proper disposal of marine mammal waste; the exceptional screening and veterinarian care given to the Navy's animals; the visual monitoring for indigenous marine mammals; and an over forty year track record with zero known incidents, there is no scientific basis to conclude that the use of Navy marine mammals during training activities would have any effect on wild ESA-listed marine mammals. Therefore, the use of marine mammal systems associated with the Proposed Action would have no effect on ESA-listed humpback whale or Guadalupe fur seal.

SECTION 6 STANDARD OPERATING PROCEDURES AND MITIGATION MEASURES

The mitigation measures applicable to this proposed action are the same as those identified in the Hawaii-Southern California Training and Testing (HSTT) Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS), Chapter 5. Both standard operating procedures and mitigation measures would be implemented during the proposed action. Standard operating procedures serve the primary purpose of providing for safety and mission success, and are implemented regardless of their secondary benefits (e.g., to a resource). Mitigation measures are used to avoid or reduce potential impacts. The standard operating procedures and mitigation measures that are applicable to the Proposed Action are provided below.

6.1 Standard Operating Procedures

6.1.1 Vessel Safety

For the purposes of this section, the term ‘ship’ is inclusive of surface ships and surfaced submarines. The term ‘vessel’ is inclusive of ships and small boats (e.g., rigid-hull inflatable boats).

Ships operated by or for the Navy have personnel assigned to stand watch at all times, day and night, when moving through the water (underway). Watch personnel undertake extensive training in accordance with the U.S. Navy Lookout Training Handbook or civilian equivalent, including on-the-job instruction and a formal Personal Qualification Standard program (or equivalent program for supporting contractors or civilians), to certify that they have demonstrated all necessary skills (such as detection and reporting of floating or partially submerged objects). Watch personnel are composed of officers, enlisted men and women, and civilian equivalents. Their duties may be performed in conjunction with other job responsibilities, such as navigating the ship or supervising other personnel. While on watch, personnel employ visual search techniques, including the use of binoculars, using a scanning method in accordance with the U.S. Navy Lookout Training Handbook or civilian equivalent. After sunset and prior to sunrise, watch personnel employ night visual search techniques, which could include the use of night vision devices.

A primary duty of watch personnel is to detect and report all objects and disturbances sighted in the water that may be indicative of a threat to the ship and its crew, such as debris, a periscope, surfaced submarine, or surface disturbance. Per safety requirements, watch personnel also report any marine mammals sighted that have the potential to be in the direct path of the ship as a standard collision avoidance procedure. Because watch personnel are primarily posted for safety of navigation, range clearance, and man-overboard precautions, they are not normally posted while ships are moored to a pier. When anchored or moored to a buoy, a watch team is still maintained but with fewer personnel than when underway. When moored or at anchor, watch personnel may maintain security and safety of the ship by scanning the water for any indications of a threat (as described above).

While underway, Navy ships (with the exception of submarines) greater than 65 ft (20 m) in length have at least two watch personnel; Navy ships less than 65 ft (20 m) in length, surfaced submarines, and contractor ships have at least one watch person. While underway, watch personnel are alert at all times and have access to binoculars. Due to limited manning and space limitations, small boats do not have dedicated watch personnel, and the boat crew is responsible for maintaining the safety of the boat and surrounding environment.

All vessels use extreme caution and proceed at a "safe speed" so they can take proper and effective action to avoid a collision with any sighted object or disturbance, and can be stopped within a distance appropriate to the prevailing circumstances and conditions.

6.1.2 Aircraft Safety

Pilots of Navy aircraft make every attempt to avoid large flocks of birds in order to reduce the safety risk involved with a potential bird strike.

6.1.3 Laser Procedures

The following procedures are applicable to lasers of sufficient intensity to cause human eye damage.

6.1.3.1 Laser Operators

Only properly trained and authorized personnel operate lasers.

6.1.3.2 Laser Activity Clearance

Prior to commencing activities involving lasers, the operator ensures that the area is clear of unprotected or unauthorized personnel in the laser impact area by performing a personnel inspection or a flyover. The operator also ensures that any personnel within the area are aware of laser activities and are properly protected.

6.1.4 Towed In-Water Device Procedures

Prior to deploying a towed device from a manned platform, there is a standard operating procedure to search the intended path of the device for any floating debris (e.g., driftwood) or other potential obstructions (e.g., concentrations of floating vegetation [Sargassum or kelp paddies] and animals), which have the potential to cause damage to the device.

6.2 Mitigation Measures

For the mitigation measures described below, the Lookout Procedures and Mitigation Zone Procedure sections from the Hawaii-Southern California Training and Testing (HSTT) Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS) have been combined. For details regarding the methodology for analyzing each measure, see the August 2013 Hawaii-Southern California Training and Testing (HSTT) Final Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS), (Chapter 5 Standard Operating Procedures, and Mitigation and Monitoring) available at http://hstteis.com .

6.2.1 Acoustic Stressors

6.2.1.1 High-Frequency Active Sonar

The Navy will have one Lookout on ships or aircraft conducting high-frequency active sonar activities associated with anti-submarine warfare and mine warfare activities at sea.

Mitigation will include visual observation from a vessel or aircraft (with the exception of platforms operating at high altitudes) immediately before and during active transmission within a mitigation zone of 200 yards (yd [183 m]) from the active sonar source. If the source can be turned off during the activity, active transmission will cease if a marine mammal is sighted within the mitigation zone. Active transmission will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on a determination of its course and speed and the relative motion between the animal and the source, (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes for an aircraft-deployed source, (4) the mitigation zone has been clear from any additional sightings for a period of 30 minutes for a vessel-deployed source, (5) the vessel or aircraft has repositioned itself more than 400 yd (366 m) away from the location of the last sighting, or (6) the vessel concludes that dolphins are deliberately closing in to ride the vessel's bow wave (and there are no other marine mammal sightings within the mitigation zone).

6.2.2 Physical Disturbance and Strike

6.2.2.1 Vessels

While underway, vessels will have a minimum of one Lookout.

Vessels will avoid approaching marine mammals and sea turtles head on and will maneuver to maintain a mitigation zone of 500 yd (457 m) around observed whales, and 200 yd (183 m) around all other marine mammals (except bow riding dolphins), providing it is safe to do so.

6.2.2.2 Towed In-Water Devices

The Navy will have one Lookout during activities using towed in-water devices when towed from a manned platform.

The Navy will ensure that towed in-water devices being towed from manned platforms avoid coming within a mitigation zone of 250 yd (229 m) around any observed marine mammal or sea turtle, providing it is safe to do so.

SECTION 7 CONCLUSION

Some stressors associated with the Proposed Action would either have no effect on all species (ex., lasers), or may affect, but not adversely affect select other species as indicated in Table 7-1.

Under the Proposed Action however, given the limited duration of the training event, small number of participating Navy assets, low animal occurrence in the Action Area, and likely limited behavioral responses to the types of activities described, ESA-listed species are not likely to be measurably impacted in ways that would significantly disrupt normal behavior patterns including, but are not limited to, breeding, feeding or sheltering. Nor would significant individual or any population level impacts be anticipated.

Table 7-1. Status And Effect Determinations of ESA-listed Species under This Proposed Action.

	Stressor								
	Physical			Energy		Acoustic			Secondary
ESA species	Vessel Movement	Seafloor Devices	In-water Devices	Electro-magnetic Devices	Lasers	Vessel Noise	Aircraft Noise	Acoustic Trans-mission	Disease/ Parasite Transmission
Fish									
Scalloped hammerhead shark	NLAA	NLAA	NLAA	NLAA	NE	NLAA	NLAA	NE	N/A
Sea Turtles									
Loggerhead sea turtle	NLAA	NLAA	NLAA	NLAA	NE	NLAA	NLAA	NE	N/A
Green sea turtle	NLAA	NLAA	NLAA	NLAA	NE	NLAA	NLAA	NE	N/A
Leatherback sea turtle	NLAA	NLAA	NLAA	NLAA	NE	NLAA	NLAA	NE	N/A
Olive ridley sea turtle	NLAA	NLAA	NLAA	NLAA	NE	NLAA	NLAA	NE	N/A
Marine Mammals									
Humpback whale	NLAA	NLAA	NLAA	NLAA	NE	NLAA	NLAA	NLAA	NE
Guadalupe fur seal	NLAA	NLAA	NLAA	NE	NE	NLAA	NLAA	NLAA	NE

No Critical Habitat designated within the Proposed Action Area
NE= No effect; N/A= Not applicable
NLAA= May affect, not likely to adversely effect

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

October 6, 2015

In reply refer to:
2015/3358

Larry M. Foster
Director, Environmental Readiness
Department of the Navy
Commander
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860-3131

Re: Endangered Species Act Section 7(a) (2) Concurrence Letter, Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response, and Marine Mammal Protection Act Comments for the Civilian Port Defense Training

Dear Mr. Foster:

On July 27, 2015, NOAA's National Marine Fisheries Service (NMFS) received your request for a written concurrence that the United States Navy (Navy) Civilian Port Defense training is not likely to adversely affect (NLAA) species listed as threated or endangered designated under the Endangered Species Act (ESA). This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for preparation of letters of concurrence.

NMFS also reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), including conservation measures and any determination you made regarding potential effects of the action in the EFH Assessment. This review was pursuant to section 305(b)(2) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance on the use of the ESA consultation process to complete the EFH consultation. In this case, NMFS concluded that the action would not adversely affect EFH. Thus, consultation under the MSA is not required for this action.

NMFS also provides preliminary comments concerning potential effects on whales, dolphins, porpoises, seals, and sea lions which are protected under the Marine Mammal Protection Act (MMPA). *See* 16 U.S.C. § 1361 *et seq.* Under the MMPA, it is generally illegal to "take" a marine mammal without prior authorization from NMFS. "Take" is defined as harassing, hunting, capturing, or killing, or attempting to harass, hunt, capture, or kill any marine mammal. Except with respect to military readiness activities and certain scientific research conducted by, or on behalf of, the Federal Government, "harassment" is defined as any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The concurrence letter will be available through NMFS' Public Consultation Tracking System [https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts]. A complete record of this consultation is on file at the NMFS West Coast Regional Office.

Proposed Action and Action Area

Civilian Port Defense activities are naval mine warfare exercises conducted in support of maritime homeland defense, per the Maritime Operational Threat Response Plan. These activities are conducted in conjunction with other federal agencies, principally the Department of Homeland Security. The three pillars of Mine Warfare include airborne (helicopter), surface (ship and unmanned vehicles), and undersea (divers, marine mammal systems, and unmanned vehicles), all of which are used in order to ensure that strategic U.S. ports are cleared of mine threats. Assets used during Civilian Port Defense training activities would occur on the U.S. West Coast in the fall of 2015 within the Los Angeles/Long Beach proposed action area identified by Naval Mine and Anti-Submarine Warfare Command (Figure 1).

Civilian Port Defense training events are conducted in ports or major surrounding waterways, within the shipping lanes, and seaward to the 300 foot (ft, 91 meter [m]) depth contour). The events employ the use of various mine detection sensors, some of which utilize high frequency (greater than 10 kilohertz [kHz]) active acoustics for detection of mines and mine-like objects in and around various ports. Active acoustic transmission would be used for approximately 8 days during the two week long training event during the October-November 2015 timeframe. Assets used during Civilian Port Defense training could include up to four unmanned underwater vehicles, marine mammal systems, up to two helicopters operating (two to four hours during daylight) at altitudes as low as 75 to 100 ft (23 to 31 m), Explosive Ordnance Disposal platoons, a Littoral Combat Ship or Landing Dock Platform and a Mine Warfare Ship. The Mine Warfare Class ship (*e.g.,* AVENGER) is a surface mine countermeasure vessel specifically outfitted for mine countermeasure capability.

The proposed action also includes the placement, use, and recovery of up to 20 bottom placed non-explosive mine training shapes. These mine training shapes, are relatively small, and generally less than 6 ft (1.8 m) in length. Mine shapes may be retrieved by Navy divers, typically explosive ordnance disposal personnel, and may be brought to beach side locations to ensure that the neutralization measures are effective and the shapes are secured. The final step in training is a beach side activity that involves explosive ordnance disposal personnel assessing the retrieved mine shape to gather facts (intelligence) on the type and identifying how the mine works, disassembling the non-explosive mine shape, neutralizing it, or disposing of it. The entire training event is expected to take place over two weeks utilizing a variety of assets and scenarios.

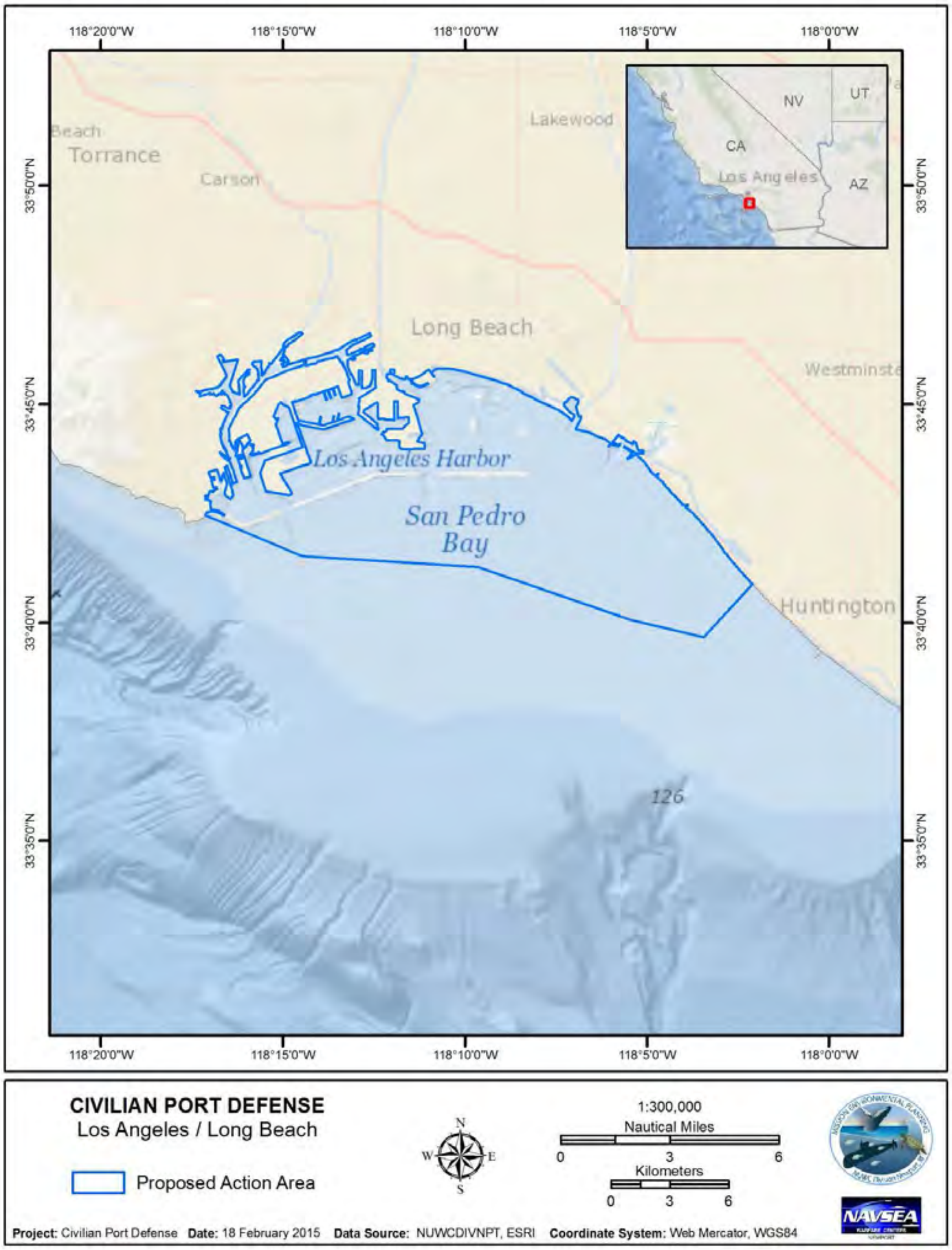

Figure 1. Los Angeles/Long Beach proposed action area identified by Naval Mine and Anti-Submarine Warfare Command

The following descriptions detail the possible range of activities which could take place during a Civilian Port Defense training event. The descriptions are inclusive, but many activities are not included within the analysis of this specific event because mine detection, including towed or hull-mounted sources, would be the only portion of Civilian Port Defense training that the Navy is seeking concurrence. The Navy concluded that all other activities that could take place during a Civilian Port Defense training event would have no effect on species listed as threated or endangered; furthermore, the Navy determined that the proposed activities will have no effect on critical habitats designated under the ESA.

Mine Detection Systems

Mine detection systems are used to locate, classify, and map suspected mines (Figure 2). Once located, the mines can either be neutralized or avoided. These systems are specialized to either locate mines on the surface, in the water column, or on the sea floor.

- *Towed or Hull-Mounted Mine Detection Systems.* These detection systems use acoustic and laser or video sensors to locate and classify suspect mines. Helicopters, ships, and unmanned vehicles are used with towed systems, which can rapidly assess large areas.
- *Unmanned/Remotely Operated Vehicles.* These vehicles use acoustic and video or lasers systems to locate and classify mines. Unmanned/remotely operated vehicles provide mine warfare capabilities in nearshore littoral areas, surf zones, ports, and channels.
- *Airborne Laser Mine Detection Systems.* Airborne laser detection systems work in concert with neutralization systems. The detection system initially locates mines and a neutralization system is then used to relocate and neutralize the mine.
- *Marine Mammal Systems.* Navy personnel and Navy marine mammals work together to detect specified underwater objects. The Navy deploys trained bottlenose dolphins and California sea lions as part of the marine mammal mine-hunting and object-recovery system.

Sonar systems to be used during Civilian Port Defense Mine Detection training would include AN/SQQ-32, AN/AQS-24, and handheld sonars (*e.g.,* AN/PQS-2A). Of these sonar sources, only the AN/SQQ-32 would require quantitative acoustic effects analysis, given its source parameters. The AN/SQQ-32 is a high frequency (between 10 and 200 kilohertz [kHz]) sonar system; however, the specific source parameters of the AN/SQQ-32 are classified. The Navy considers the AN/AQS-24 and handheld sonars as *de minimis* sources, which are defined as devices with low source levels, narrow beams, downward directed transmission, short pulse lengths, frequencies above known hearing ranges for marine species, or some combination of these factors (Department of the Navy 2013).

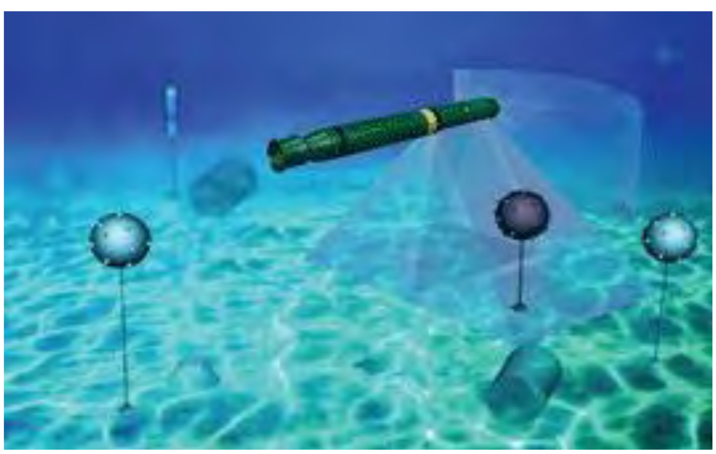

Figure 2. Example Mine Detection System

Mine Neutralization

Mine neutralization systems disrupt, disable, or detonate mines to clear ports and shipping lanes. Mine neutralization systems can clear individual mines or a large number of mines quickly. Two types of mine neutralization could be conducted, mechanical minesweeping and influence system minesweeping. Mechanical minesweeping consists of cutting the tether of mines moored in the water column or other means of physically releasing the mine. Moored mines cut loose by mechanical sweeping must then be neutralized or rendered safe for subsequent analysis. Influence minesweeping consists of simulating the magnetic, electric, acoustic, seismic, or pressure signature of a ship so that the mine detonates (no in-water detonations would occur as part of the proposed action).

Agency's Effects Determination

The Navy has determined that the Project is not likely to adversely affect the threatened: Guadalupe fur seal (*Arctocephalus townsendi*), green sea turtle, East Pacific distinct population segment (*Chelonia mydas*), olive Ridley sea turtle (*Lepidochelys olivacea*), or the endangered: humpback whale (*Megaptera novaeangliae*), loggerhead sea turtle (*Caretta caretta*), leatherback sea turtle (*Dermochelys coriacea*), and scalloped hammerhead shark, Eastern Pacific distinct population segment (*Sphyrna lewini*).

The Navy did not make an initial determination for the blue whale (*Balaenoptera musculus*) or fin whale (*B. physalus*), but after further consultation, the Navy determined that a similar evaluation and determination of not likely to adversely affect would pertain to the blue whale and fin whale as it did for the humpback whale.

Their reasoning for the above determinations include the low likelihood that sharks and sea turtles would perceive any of the acoustic transmissions, the model output results and current acoustic criteria for acoustic impacts to marine mammals predicting zero Level A and Level B[1] exposures, the Navy's standard practices and mitigation measures ensuring that all marine mammals and sea turtles are clear of the action area, and the short duration of the proposed activity.

Consultation History

On April 23, 2015, NMFS West Coast Regional Office received a hard copy and two CD-ROMs of the Civilian Port Defense training Incidental Harassment Authorization (IHA) request, draft Environmental Assessment, and Navy transmittal letter of April 16, 2015, that was sent to NOAA Fisheries' Office of Protected Resources in Silver Spring, Maryland. On August 4, 2015, NMFS staff received an email with attachments of the Civilian Port Defense training IHA request and Navy transmittal letter of April 16, 2015, sent to NOAA Fisheries' Office of Protected Resources in Silver Spring, Maryland. The initial ESA consultation request was received by NMFS from the Navy on July 27, 2015. NMFS deemed the information complete, but on August 26, 2015, NMFS emailed Navy staff requesting clarification regarding the criteria for the Navy's *de minimus* determinations, further clarification on the acoustic sound sources and modeling results, and reasoning why blue and

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[1] The term "take," as defined in Section 3 (16 United States Code [U.S.C.] § 1362 (13)) of the MMPA, means "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." "Harassment" was further defined in the 1994 amendments to the MMPA, which provided two levels of harassment: Level A (potential injury) and Level B (potential disturbance). The National Defense Authorization Act of Fiscal Year 2004 (PL 108-136) amended the definition of "harassment" as applied to military readiness activities or scientific research activities conducted by or on behalf of the federal government, consistent with Section 104(c)(3) [16 U.S.C. § 1374(c)(3)]. For military readiness activities, the relevant definition of harassment is any act that:

• Injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild ("Level A harassment"); or

• Disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered ("Level B harassment") [16 U.S.C. § 1362(18)(B)(i) and (ii)] fin whales were not included. On August 26 and 27, 2015, the Navy responded via email with extensive information on the Navy's model and results, the *de minimus* criteria, and the explanation that the Navy did initially consider blue and fin whales, but because of the inshore nature of the activities, high frequency sound source, limited duration of the proposed training event, and standard mitigation for shutdown for any marine mammal, modeling for a relatively rare occurrence (blue and fin whales) that close to shore was not warranted. On September 1, 2015, NMFS staff recommended to Navy staff to reconsider their determination to exclude blue and fin whales from the proposed action because of the possibility that both may be present in the action area, especially given the unpredictable nature of these animals and the current oceanographic anomalies present off the U.S. West Coast. On September 2, 2015, NMFS staff received an email from the Navy indicating that they would like to include blue and fin whales in the proposed action.

ENDANGERED SPECIES ACT

Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). The applicable standard to find that a proposed action is not likely to adversely affect listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur.

The proposed action includes four potential impacts that may cause adverse effects on ESA-listed marine mammals, sea turtles, and fish species that occur in the vicinity of the proposed training area. These include physical (vessel movement, seafloor devices and in-water devices), energy (electromagnetic devices and laser), acoustic (vessel/aircraft noise, acoustic transmission), and secondary stressors. For those species for which non-impulsive acoustic thresholds have not been established and/or appropriate information was not available, a qualitative approach was taken (*e.g.,* acoustic impacts on fish and sea turtles).

Vessel Movement

The vessels that would be utilized during the proposed action include a Mine Warfare ship, particularly mine countermeasure class ship (225 ft [68.5 m]), an afloat forward staging base (Littoral Combat Ship [387 ft; 118 m] or Landing Dock Platform [684 ft; 208 m]), and small support boats. All vessels would operate at speeds of 10 knots or less (18 kilometers [km]/hour), but do have the potential to affect ESA-listed fish, sea turtles, and marine mammals by altering their behavior patterns or causing mortality or serious injury from collisions.

Sharks

Scalloped hammerhead sharks (*Sphyrna lewini*) give birth to live pups, which tend to be coastal bottom-dwellers (Castro 1983). Thus, vessel movement at the surface would have no effect on the pups, and no measurable effects to shark recruitment would occur. Scalloped hammerhead sharks are likely not present in significant quantities in the proposed action area; however, individuals may be observed in the proposed action area during extreme warm water conditions. Transiting vessels may elicit a behavioral reaction from fish, like sharks, though any response would be considered minor, transitory, and temporary in nature. In the upper portions of the water column, sharks could potentially be displaced, injured, or killed by vessel and propeller movements. The likelihood of collision between vessels and adult or juvenile shark is extremely low because sharks are highly mobile and are capable of detecting and avoiding approaching objects. Any behavioral reactions by adult or juvenile sharks are not expected to result in substantial changes in an individual's fitness, or species recruitment, and are not expected to result in long-term or population-level effects. Given the expected speeds of surface vessels and underwater vehicles during the proposed action, we conclude that a collision between a scalloped hammerhead shark and vessels is not likely to occur. As a result, vessel movement may affect, but is not likely to adversely affect the scalloped hammerhead shark.

Marine Mammals

Marine mammals, such as the ESA-listed Guadalupe fur seal (*Arctocephalus townsendi*), blue whale (*Balaenoptera musculus*), fin whale (*B. physalus*), and humpback whale (*Megaptera novaeangliae*), react to vessels in a variety of ways. Some may respond (*i.e.,* avoid the vessel), while other animals ignore the stimulus altogether. Silber *et al.* (2010) concludes that large whales that are in close proximity to a vessel may not regard the vessel as a threat, or may be involved in a vital activity (*i.e.,* mating or feeding) which may reduce the likelihood of an avoidance response. Cetacean species generally pay little attention to transiting vessel traffic as it approaches, although they may engage in last minute avoidance maneuvers (Laist *et al.* 2001). Baleen whale responses to vessel traffic range from avoidance maneuvers to disinterest in the presence of vessels (Nowacek *et al.* 2007; Scheidat *et al.* 2004).

The size of a ship and speed of travel affect the likelihood and severity of a collision. Reviews of stranding and collision records indicate that larger ships (262.5 ft [80 m] or larger) and ships traveling at or above 14 knots (26 km/hour) have a much higher instance of collisions with whales that result in mortality or serious injury (Laist *et al.* 2001). During the proposed activities, vessels would operate at speeds not exceeding 10 knots (18 km/hour) during transit and 3 knots (5.5 km/hr) during training, which would lessen the likelihood of a vessel collision with a marine mammal resulting in serious injury or mortality. Additionally, the vessels associated with the proposed action would follow the standard operating procedures (*e.g.,* lookouts to detect biological resources) and mitigation measures (*e.g.,* maneuvers to maintain 500 yard safety zone away from observed whales and at least a 200 yard safety zone away from other marine mammals), to avoid impacting marine mammals and therefore, the probability of vessel collision during training activities is reduced. The Navy also proposes to cease activities if a marine mammals is observed within the safety zones described above. More importantly, the use of biological monitors will ensure that these safety zones are clear of marine mammals (and sea turtles and sharks) which will reduce the likelihood of potential impacts to a marine mammal (and a sea turtle or shark). As a result, the likelihood that vessel movement will impact a marine mammal is extremely low. Due to the short duration of the proposed action (two weeks), any non-collision impact to marine mammals from vessel, *i.e.,* short-term avoidance of the area or the momentary interruption of feeding, is not likely because listed individuals are not expected to be feeding in the area and the likelihood that a listed marine mammal is present in the action is extremely low; thus, we expect that behavioral reactions from vessel movement are extremely unlikely to occur and will be discountable. Taking into account the speed of the vessels and the preventative measures described above, we conclude that it would be extremely unlikely that a blue whale, fin whale, humpback whale, or Guadalupe fur seal would be struck by a vessel. Similarly we conclude that it would be extremely unlikely that any non-collision effects would occur as a result of the Civilian Port Defense training activities. As a result, vessel movement may affect, but is not likely to adversely affect the Guadalupe fur seal, blue whale, fin whale, and humpback whale.

Sea Turtles

The probability of impact with a sea turtle was estimated using the same approach presented above for marine mammals for the following ESA-listed sea turtles: green sea turtle (*Chelonia mydas*), loggerhead sea turtle (*Caretta caretta*), olive Ridley sea turtle (*Lepidochelys olivacea*), and leatherback sea turtle (*Dermochelys coriacea*). Sea turtles have been observed to elicit short-term responses in their reactions to vessels, and their reaction time was greatly dependent on the speed of the vessel (Hazel *et al.* 2007). Sea turtles have been documented to flee frequently when encountering a vessel traveling at 2 knots (4 km/hour), but infrequently when encountering a vessel traveling at 6 knots (11 km/hour), and only rarely when encountering a vessel traveling at 10 knots (18 km/hour). The proportion of turtles that fled to avoid a vessel decreased significantly as vessel speed increased, and turtles that fled from vessels traveling between 6 and 10 knots (11 and 18 km/hour, respectively) did so at significantly shorter distances from the vessel than turtles that fled from slow approaches (Hazel *et al.* 2007). First, the fact that sea turtles are not commonly present in the proposed action area diminishes the likelihood of a collision. Furthermore, during the proposed activities, vessels would operate at speeds not exceeding 10 knots (18 km/hour) during transit and 3 knots (5.5 km/hr) during training. We expect that the slower speeds will be predominate based on the extent of the proposed training activities compared to the time vessels are expected to be in transit. Given the similarity of speeds (*i.e.,* 3 knots and 2 knots), we expect that a turtle will flee from oncoming vessels operating at three knots or less, thereby making the chances of a collision between the vessel and turtle extremely unlikely. With regard to vessels operating at up to 10 knots, based on Hazel *et al.* (2007), even though it is unlikely or rare for turtles to flee at these speeds, the Navy's standard operating procedures (*e.g.,* lookouts to detect biological resources) would ensure that the mitigation safety zone is clear before and during activities. As a result, the likelihood that vessel movement will impact a sea turtle is extremely low. Due to the short duration of the proposed action (two weeks), any non-collision impact to sea turtles from vessel movement, *i.e.,* short-term avoidance of the area, is not likely because the likelihood that a listed sea turtle is present in the action is extremely low; thus, we expect that behavioral reactions from vessel movement are extremely unlikely to occur and will be discountable. Taking into account the speed of the vessels and the preventative measures described above, we conclude that it would be extremely unlikely that a green sea turtle, loggerhead sea turtle, olive Ridley sea turtle, and leatherback sea turtle would be struck by a vessel. Similarly we conclude that it would be extremely unlikely that any non-collision effects would occur as a result of the Civilian Port Defense training activities. As a result, vessel movement may affect, but is not likely to adversely affect the green sea turtle, loggerhead sea turtle, olive Ridley sea turtle, and leatherback sea turtle.

<u>Sea floor devices</u>

Seafloor objects, such as mine training shapes, are relatively small, generally less than 6 ft (1.8 m) in length. No more than 20 mine training shapes would be deployed over the course of the Civilian Port Defense training. These devices will be temporarily (7 to 30 days) deployed on the seafloor. Because of the short duration of their interaction with the seafloor, no corrosion of the devices is anticipated and, therefore, no metals are expected to be introduced into the environment. Seafloor devices would be deployed by a surface vessel through the water column and once placed, are stationary and do not pose a threat to highly mobile organisms.

The placement and removal of objects on the seafloor could result in a minor sediment disruption in the training area. The sediment disruption would be limited to the area immediately surrounding the object placed on the seafloor. The potential impact would be temporary and localized due to the minimal number of objects and the infrequency of training activities, and soft sediment is expected to recover quickly, shifting back following a disturbance of tidal energy. No long-term increases in turbidity would be anticipated.

Seafloor devices would be deployed by a surface vessel through the water column; this is where the potential for strike would occur. However, the potential for a marine mammal or sea turtle to be close to a device near the seafloor or during deployment is low because of the small geographic area within which the mine training shapes would be deployed, the low number of individuals expected to be in the area, and the wide distribution of marine mammal and sea turtle habitat. Before a potential seafloor device strike, we expect that a shark could sense the device traveling through the water and respond by darting away from a deployed sea floor device (Kajiura and Holland 2002; Hart and Collin 2015). However, any shark, marine mammal, or sea turtle displaced a small distance away by the movements from a sinking object nearby would likely resume normal activities after such a brief disturbance.

If the seafloor device collided with an organism, direct injury in addition to stress may result. The stress response in vertebrates is to rapidly raise the blood sugar level to prepare the animal for the fight or flight response (Helfman *et al.* 2009). The ability of a shark, marine mammal, or sea turtle to return to what it was doing following a physical strike (or near miss resulting in a stress response) is a function of fitness, genetic, and environmental factors. Within a species, the rate at which an individual recovers from a physical disturbance or strike may be influenced by its age, sex, reproductive state, and general condition. A fish, like the shark, that has reacted to a sudden disturbance by swimming at burst speed could tire after some time and its blood hormone and sugar levels may not return to normal for 24 hours (Helfman *et al.* 2009). However, the potential for a shark to be close to a seafloor device during deployment, and therefore to be at risk for collision or disturbance, is extremely low due to the low numbers of scalloped hammerhead sharks and their expected avoidance behavior described above. The use of the Navy's standard operating procedures and mitigation measures (*e.g.,* lookouts to detect biological resources that would ensure that the mitigation safety zone is clear before and during activities) would further reduce the likelihood of impact to ESA-listed marine mammals, sea turtles, and sharks. Therefore, the risk of collision with a sea floor device is expected to be discountable. Due to the short duration of the proposed action, any impact to marine mammals, sea turtles, and sharks from the deployment of sea floor devices, *i.e.* avoidance of the area or the momentary action of fleeing, is extremely unlike to occur because the likelihood that a listed individual is present in the action is extremely low; thus, we expect that behavioral reactions from the deployment of sea floor devices will be discountable. As a result, deployment of sea floor devices may affect, but is not likely to adversely affect the scalloped hammerhead shark, blue whale, fin whale, humpback whale, Guadalupe fur seal, green sea turtle, loggerhead sea turtle, olive Ridley sea turtle, and leatherback sea turtle.

In-Water Devices

In-water devices associated with the proposed action include unmanned underwater vehicles and towed devices. These devices are self-propelled or towed through the water from helicopters. In-water devices range from 27 ft (8 m) to about 49 ft (15 m) and can operate anywhere from the water surface to near-bottom. Unmanned underwater vehicles are slow moving through the water column and have very limited potential to strike marine species because, based on our understanding of the physical capabilities and natural inclinations of the aforementioned animals, animals in the water are expected to avoid a slow moving object. Unmanned underwater vehicles and towed devices are closely monitored by observers manning other platforms in use during the training event. The devices which are towed through the water column by a helicopter are generally less than 33 ft (10 m) in length and operate at 10 to 40 knots (18 to 74 km/hour). Due to the potential speed of the towed system by helicopter, there is a potential for strike to marine resources. The use of in-water towed devices may cause short-term and localized disturbance to an individual marine species and these short-term disturbances could cause injury or mortality due to strikes. Scalloped hammerhead sharks give birth to live pups, which tend to be coastal bottom-dwellers (Castro 1983). However, in-water devices do not come in contact with the seafloor because of potential damage to the device. We conclude that in-water devices would likely have no effect on the pups of ESA-listed sharks, and no measurable effects to shark recruitment would occur.

The potential for a shark, marine mammal, or sea turtle to be struck by either an unmanned underwater vehicle or a towed system is similar to that identified for vessels. Unmanned underwater vehicles move slowly through the water column and have a limited potential to strike sharks, marine mammals, or sea turtles. Additionally, the observer vessels associated with the proposed action would follow the standard operating procedures (*e.g.,* lookouts to detect biological resources) and mitigation measures (*e.g.,* maneuvers to maintain 500 yard safety zone away from observed whales and at least a 200 yard safety zone away from other marine mammals), and would ensure that these safety zones are clear to avoid impacting marine mammals and therefore, the probability of a collision with an unmanned underwater vehicle during training activities is reduced. Therefore, collision with a moving unmanned underwater vehicles is extremely unlikely.

Towed mine warfare systems operate at higher speeds than the unmanned underwater vehicles and could pose a greater collision risk to sharks, marine mammals, or sea turtles. However, the implementation of mitigation measures and the Navy's standard operating procedures (*e.g.,* lookouts to detect biological resources that would ensure that the mitigation safety zone is clear before and during activities) and the short duration (2 weeks) of the proposed action would reduce the likelihood of impact to ESA-listed species in the area. Taking into account the speed of the vessels and the preventative measures described above, we conclude that it would be extremely unlikely that a marine mammal, shark, or sea turtle would be struck by a vessel. Therefore, moving towed mine warfare systems pose only a slight collision risk and are expected to be discountable. Physical disturbance from the use of in-water devices is not expected to result in more than a momentary behavioral response, possibly resulting in short-term and localized displacement in the water column. We conclude that it would be extremely unlikely that any non-collision effects would occur as a result of the Civilian Port Defense training activities because the likelihood that a listed individual is present in the action is extremely low.

Due to the short duration of the proposed action (two weeks), any impact to marine mammals from in-water devices, such as temporary avoidance of the area or the momentary interruption of feeding, is not likely because listed individuals are not expected to be feeding in the area and the likelihood that a listed individual is present in the action is extremely low; thus, we expect that behavioral reactions from vessel movement are extremely unlikely to occur and will be discountable. As a result, the use of unmanned underwater vehicles or a towed system may affect, but is not likely to adversely affect the scalloped hammerhead shark, the blue whale, fin whale, humpback whale, Guadalupe fur seal, green sea turtle, loggerhead sea turtle, olive Ridley sea turtle, and leatherback sea turtle.

Electromagnetic Devices

The magnetic field generated by electromagnetic devices that are proposed for use for Civilian Port Defense training is of relatively minute strength, moving through the water column creating a transient magnetic field. Typically, the maximum magnetic field generated at the source would be approximately 23 gauss (G). This level of electromagnetic density is very low compared to magnetic fields generated by other everyday items. The magnetic field generated is between the levels of a refrigerator magnet (150 to 200 G) and a standard household can opener (up to 4 G at 4 inches [10 cm] away). At a distance of 13.12 ft (4 m), the magnetic field generated from the mine warfare sources declines to approximately the equivalent of the Earth's magnetic field (approximately 0.5 G). The strength of the field at just under 26 ft (8 m) is only 40 percent of the earth's field, and only 10 percent at 79 ft (24 m). At a radius of 656 ft (200 m), the magnetic field would be approximately 0.002 G (U.S Department of the Navy 2005).

We are unaware of quantitative threshold criteria to determine the significance of the potential effects from activities that involve the use of varying electromagnetic frequencies. Many organisms, primarily marine vertebrates, have been studied to determine their thresholds for detecting electromagnetic fields (Normandeau Associates Inc. *et al.* 2011); however, no data are available on predictable responses to exposure above or below detection thresholds.

Sharks

The primary fish that have been identified as capable of detecting electromagnetic fields include salmonids (trout, salmon char, etc.), elasmobranchs (sharks, skates, and rays), tuna, eels, and stargazers.

For any electromagnetically sensitive fish in close proximity to the source, the generation of electromagnetic fields has the potential to interfere with prey detection and navigation. They may also experience temporary disturbance of normal sensory perception or could experience avoidance reactions (Kalmijn 2000), resulting in alterations of behavior and avoidance of normal foraging areas or migration routes. Potential impacts of electromagnetic activity on fish may not be relevant to early life stages (eggs, larvae, juveniles) due to ontogenic (lifestage-based) shifts in habitat utilization (Botsford *et al.* 2009; Sabates *et al.* 2007). However, these effects would occur to individuals within close proximity to the electromagnetic field. The proposed devices would be moving through the water and would only be deployed for a temporary period during a typical four hour operation period. We conclude that no individual short- or long-term effects are anticipated and mortality from electromagnetic devices is not expected due to the low level electromagnetic field generated from the mine warfare systems used in training. As a result, the use of electromagnetic devices may affect, but is not likely to adversely affect the scalloped hammerhead shark.

Marine Mammals

Based on the available literature, no evidence of electrosensitivity in marine mammals was found except recently in the Guiana dolphin (Czech-Damal *et al.* 2011). Normandeau *et al.* (2011) reviewed available information on electromagnetic and magnetic field sensitivity of marine organisms (including marine mammals) for an impact assessment of offshore wind farms for the U.S. Department of the Interior and concluded there was no evidence to suggest any magnetic sensitivity for sea lions or fur seals.

Fin whales, humpback whales, and sperm whales have shown positive correlations with geomagnetic field differences (Walker *et al.* 1992), although none of the studies have determined the mechanism for magnetosensitivity. The suggestion from these studies is that whales can sense the Earth's magnetic field and may use it to migrate long distances (Kirschvink *et al.* 1986). Cetaceans appear to use the Earth's magnetic field for migration in two ways: as a "map" by moving parallel to the contours of the local field bathymetry and topography, and as a timer based on the regular fluctuations in the field, which is assumed to allow animals to monitor their progress on the "map" (Klinowska 1990). Cetaceans do not appear to use the Earth's magnetic field for directional information (*i.e.,* they do not use magnetic fields as an internal compass; Klinowska 1990). Potential impacts to marine mammals associated with electromagnetic fields are dependent on the marine mammal's proximity to the source and the strength of the magnetic field. Mazzuca *et al.* (1999) reviewed mass stranding events between 1957 and 1998 of cetaceans in the Hawaii Archipelago and while it was possible that the results of their study shared certain similarities with other events worldwide, none were as curious as those consistent with the hypotheses that certain coastal configurations, bottom topography, and geomagnetic anomalies may play a role in the cause and location of mass strandings. Electromagnetic fields associated with the proposed action are relatively weak (only 10 percent of the Earth's magnetic field at 79 ft [24 m]), temporary in duration, and localized. Once the source is turned off or moves from a location, the electromagnetic field is gone. If a marine mammal is sensitive to electromagnetic fields, it would have to be present within the electromagnetic field (approximately 656 ft [200 m] from the source) during the activity in order to detect it. Due to the standard operating procedures and the Navy's mitigation measures, we conclude that the chance occurrence of a marine mammal in close enough vicinity to the electromagnetic device is unlikely. Research suggests that pinnipeds, like the Guadalupe fur seal, are not sensitive to electromagnetic fields (Normandeau Associates Inc. *et al.* 2011) and we conclude would likely have no effect on the Guadalupe fur seal.

Detection does not necessarily signify a significant biological response rising to the level of take as defined under the ESA. Given the small area associated with mine fields, the infrequency and short duration of magnetic energy use, the low intensity of electromagnetic energy sources, and the density of cetaceans in these areas, the likelihood of ESA-listed cetaceans being exposed to electromagnetic energy at sufficient intensities to create a biologically relevant response is so low as to be discountable. As a result, the use of electromagnetic devices may affect, but is not likely to adversely affect the blue whale, fin whale, and humpback whale.

Sea Turtles

Sea turtles use geomagnetic fields to navigate while at sea; changes in or interference with those fields may impact their movement (Lohmann and Lohmann 1996; Lohmann *et al.* 1997). Experiments show that sea turtles can detect changes in magnetic fields, which may cause them to deviate from their original direction (Lohmann and Lohmann 1996; Lohmann *et al*. 1997). If located in the immediate area (within about 650 ft [200 m]) where electromagnetic devices are being used, ESA-listed sea turtles could deviate from their original movements, but the extent of this disturbance is likely to be inconsequential. The proposed electromagnetic devices are relatively low intensity (0.002 G at 650 ft [200 m] from the source), temporary in duration, and very localized, and are, therefore, not expected to cause more than short term behavioral disturbances. Given the small area associated with mine fields, the infrequency and short duration of magnetic energy use, the low intensity of electromagnetic energy sources, and the density of sea turtles in these areas, the likelihood of ESA-listed sea turtles being exposed to electromagnetic energy at sufficient intensities to create a biologically relevant response is so low as to be discountable. As a result, use of electromagnetic devices may affect, but is not likely to adversely affect the green sea turtle, loggerhead sea turtle, olive Ridley sea turtle, and leatherback sea turtle.

<u>Lasers</u>

The highest potential level of exposure from low energy lasers would be from an airborne laser beam directed at the ocean's surface. An assessment on the use of low energy lasers by the Navy determined that low energy lasers have an extremely low potential to impact marine biological resources (Swope 2010). The assessment determined that the maximum potential for laser exposure is at the ocean's surface, where laser intensity is greatest (Swope 2010). Any heat that the laser generates would rapidly dissipate due to the large heat capacity of water and the large volume of water in which the laser is used. Low energy lasers have an extremely low potential to impact invertebrates or fish, due to attenuation of the laser's energy in the water column. Based on the parameters of the low energy lasers and the behavior and life history of major biological groups, it was determined the area vulnerable to laser energy would be at or above the water's surface, to the eye of a sea turtle or marine mammal. Sharks are not expected at or above the water's surface. Swope (2010) evaluated light detection and ranging (LIDAR) and calculated the single exposure limit for various species of marine mammals and sea turtles and determined that the energy associated with the laser at the surface was below a single exposure limit for all species. There is no suspected effect due to heat from the laser beam. Furthermore, 96 percent of a laser beam projected into the ocean is absorbed, scattered, or otherwise lost (Guenther *et al.* 1996). Although all points on a sea turtle's body would have roughly the same probability of laser exposure, only eye exposure is of concern for low-energy lasers. Given the usage characteristics, platform movement, and animal movement, we conclude that it would not be possible for a marine mammal or turtle to experience eye damage from the lasers proposed for use during Civilian Port Defense training. As a result, the use of lasers would have no effect on the scalloped hammerhead shark, blue whale, fin whale, humpback whale, Guadalupe fur seal, green sea turtle, loggerhead sea turtle, olive Ridley sea turtle, and leatherback sea turtle.

Acoustic Impacts

Potential acoustic impacts associated with the Civilian Port Defense training include vessel noise, aircraft noise, and high frequency acoustic transmissions. In order to determine the potential acoustic impacts on the ESA-listed species, hearing capabilities are discussed as well as each acoustic source as it relates to the ability of the ESA-listed species to perceive and react to each sound source. NOAA is developing comprehensive guidance on sound characteristics likely to cause injury and behavioral disruption in the context of the MMPA, ESA, and other statutes. Until formal guidance is available, NMFS uses conservative thresholds of received sound pressure levels from broad band sounds that may cause behavioral disturbance and injury. These conservative thresholds are applied in both MMPA permits and ESA Section 7 consultations for marine mammals to evaluate the potential for sound effects. The criterion levels specified here are specific to the levels of harassment as defined under the MMPA. Level A criterion for in-water Permanent Threshold Shift (PTS; injury) is 190 $dB_{\text{Root Mean Square (rms)}}$ re 1 μPa for pinnipeds and 180 dB_{rms} re 1 μPa. Level B criterion for in-water for behavioral disruption for impulsive noise, is 160 dB_{rms} re 1 μPa; Level B criterion for in-water for behavioral disruption for non-pulse noise is 120 dB_{rms} re 1 μPa. There is no threshold established for Level A criterion for in-air PTS (injury), but for the Level B criterion in-air for harbor seals it is 90 dB_{rms} and for all other pinniped species, it is 80 dB_{rms}. We evaluated the proposed project activities using the above acoustic thresholds. In the ESA context, these thresholds are informative as the thresholds at which we might expect either behavioral changes or physical injury to an animal to occur, but the actual anticipated effects would be the result of the specific circumstances of the action (as further explained below).

Vessel Noise

Vessel noise could disturb fish, sea turtles, and marine mammals, and potentially elicit an alert, avoidance, or other behavioral reactions such as diving and moving away from the source. The types of disturbance of concern in this consultation are: 1) masking and 2) animal disturbance from in water sound.

The proposed action area has high levels of anthropogenic noise due to the industrialized waterfronts (*e.g.,* harbors, marinas, shipping lanes) caused by research, ecotourism, commercial or private vessels, or government activities. The proposed activities are not expected to accumulate anymore noise into that already noisy environment. Some marine species may have habituated to vessel noise, and may be more likely to respond to the sight of a vessel rather than the sound of a vessel, although both may play a role in prompting reactions (Hazel *et al.* 2007). The ambient noise level within active shipping areas of Los Angeles/Long Beach has been estimated around 140 dB sound pressure level (Tetra Tech Inc 2011). Existing ambient acoustic levels in non-shipping areas around Terminal Island in the Port of Long Beach ranged between 120 dB and 132 dB (Tetra Tech Inc. 2011). In 2012 and 2013, approximately 4,550 and 4,500 vessel calls, respectively, for ships over 10,000 deadweight tons arrived at the Ports of Los Angeles and Long Beach (Louttit and Chavez 2014; U.S. Department of Transportation 2015). This level of shipping would mean approximately 9,000 large ship transits to and from these ports and through the proposed action area. By comparison, the next nearest large regional port, Port of San Diego, only had 318 vessel calls in 2012. With ambient noise levels being so elevated, the vessel noise would likely be masked by the existing environmental noise.

<u>Masking</u>

Masking, or "auditory interference," is the obscuring of sounds of interest by other interfering sounds, generally at similar frequencies. When this occurs, noises interfere with an animal's ability to hear calls of its conspecifics or have its own calls heard. Marine mammals use acoustic signals for a variety of purposes, which differ among species, but include communication between individuals, navigation, foraging, reproduction, and acquisition of information about their environment (Erbe and Farmer 2000; Tyack and Clark 2000). Masking generally occurs when the interfering noise is louder than, and of a similar frequency to, the auditory signal received or produced by the animal. Masking of important acoustic cues may threaten community-scale life processes, affecting the behavior and perhaps reducing an animal's ability to perform normal life functions (Southall *et al.* 2007; McWilliams and Hawkins 2013).

An increase in background sound can have an effect on the ability of a marine mammal, sea turtle, or shark to hear a potential mate or predator or to glean information about its general environment. In effect, acoustic communication and orientation of a marine mammal, sea turtle, or shark may potentially be restricted by noise regimes in their environment that are within their hearing range. Masking occurs when a loud sound drowns out a softer sound or when noise is at the same frequency as a sound signal. This is of particular concern to marine animals when the noise is at frequencies similar to those of biologically important signals, such as mating calls.

<u>Masking and Marine Mammals:</u>

Critical ratios have been determined for pinnipeds (Southall *et al.* 2000, 2003) and detections of signals under varying masking conditions have been determined for active echolocation and passive listening tasks in odontocetes (Au and Pawloski 1989; Erbe 2000; Johnson 1971). These studies provide baseline information from which the probability of masking can be estimated. Clark *et al.* (2009) developed a methodology for estimating masking effects on communication signals for low frequency cetaceans, including calculating the cumulative impact of multiple noise sources. This technique was used on in Stellwagen Bank National Marine Sanctuary (U.S. East Coast) and showed, when two commercial vessels pass through a North Atlantic right whale's (*Eubalaena glacialis*) optimal communication space (estimated as a sphere of water with a diameter of 12 miles [20 km]), that space decreased by 84 percent. This methodology relied on empirical data on source levels of calls (which is unknown for many species), and requires many assumptions about ambient noise conditions and simplifications of animal behavior, but is an important step in determining the impact of anthropogenic noise on animal communication. Vocal changes in response to anthropogenic noise can occur across the repertoire of sound production modes used by marine mammals, such as whistling, echolocation click production, calling, and singing. Changes to vocal behavior and call structure may result from a need to compensate for an increase in background noise. In cetaceans, vocalization changes have been reported from exposure to anthropogenic sources such as sonar, vessel noise, and seismic surveying.

While masking is a concern for marine mammals as it may interfere with their ability to hear acoustics signals from their environment, the proposed action is not expected to influence the existing ambient noise in the proposed action area or the already present masking effect in the environment.

Masking and Turtles

Based on knowledge of their sensory biology (Bartol and Ketten 2006; Bartol and Musick 2002; Levenson *et al.* 2004), sea turtles may be able to detect objects within the water column (*e.g.,* vessels, prey, predators) via some combination of auditory and visual cues. However, research examining the ability of sea turtles to avoid collisions with vessels shows they may rely more on their vision than auditory cues (Hazel *et al.* 2007). Similarly, while sea turtles may rely on acoustic cues to identify nesting beaches, they appear to rely on other non-acoustic cues for navigation, such as magnetic fields (Lohmann and Lohmann 1996) and light (Avens and Lohmann 2003). Additionally, they are not known to produce sounds underwater for communication. As a result, sound may play a limited role in a sea turtle's environment. With the ambient noise levels of the proposed action area being elevated, the vessel noise from the proposed action would have no additional masking effect to the environment and therefore would not impact a sea turtle's ability to perceive other biologically relevant sounds. Sea turtles are frequently exposed to research, ecotourism, commercial, government, and private vessel traffic. Some sea turtles may have even habituated to vessel noise (Hazel *et al.* 2007).

Masking and Sharks

Sharks hear sounds with frequencies ranging from 10 Hz to 800 Hz, and are especially responsive to sounds lower than 375 Hz, easily detecting prey at distances of more than 800 feet. Based on knowledge of their sensory biology (Carrier *et al.* 2012), sharks may be able to detect objects within the water column (*e.g.,* vessels, prey, predators) via some combination of auditory and visual cues. The otolithic organs in other fish respond directionally to sound due to the polarizations of the sensory hair cells (Lu and Popper 2001). This is likely to be the case with sharks, as well. However, very little is known about hearing sensitivity, masking by noise, and temporal sensitivity in sharks. Additionally, they are not known to produce sounds underwater for communication. As a result, sound may play a limited role in the shark's environment. With the ambient noise levels of the proposed action area being elevated, the vessel noise from the proposed action would have no additional masking effect to the environment and therefore would not impact a shark's ability to perceive other biologically relevant sounds.

Animal Disturbance from In-water Sound

Vessel noise has the potential to create in-water sound that could disturb sharks, sea turtles, or marine mammals which could result in behavioral (*e.g.,* avoidance) or physiological responses (*e.g.,* stress, increased heart rate). Individual response to vessel noise can be variable and influenced by the number of vessels in their perceptual field, the distance between a vessel and animal, a vessel's speed and vector, the predictability of a vessel's path, noise associated with a vessel (particularly engine noise which on Navy ships is minimized as much as engineering design will allow), the length of time a vessel is present, the duration of vessel presence (including rate of occurrence), and behavioral state of the animal.

While vessel movements have the potential to expose sharks, marine mammals, or sea turtles occupying the water column to noise and general disturbance, potentially resulting in short-term behavioral or physiological responses, such responses would not be expected to compromise the health, condition, or fitness of an individual animal, because the impacts from vessel noise would be temporary, infrequent, and localized. Based on studies of a number of species, mysticetes (*e.g.,* blue whale, fin whale, humpback whale) are not expected to be disturbed by vessels that maintain a reasonable distance from the animal, which varies with vessel size, geographic location, and tolerance levels of individuals. For pinnipeds, like the Guadalupe fur seal, data indicate tolerance of vessel approaches, especially for animals in the water. The vessels associated with the proposed action would follow the standard operating procedures (*e.g.,* lookouts to detect biological resources) and mitigation measures (*e.g.,* maneuvers to maintain 500 yard safety zone away from observed whales and at least a 200 yard safety zone away from other marine mammals), to minimize or avoid impacting marine mammals.

We conclude that any reactions are likely to be minor, since any short-term avoidance reactions will not lead to long-term consequences for the individual shark, marine mammal, or sea turtle or their population in the action area. We also expect that individual sharks, marine mammals, or sea turtles are either not likely to respond to vessel noise or are not likely to measurably respond in ways that would significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Any reactions are likely to be minor and short-term avoidance reactions, leading to no long-term consequences for the individual. The implementation of the Navy's mitigation measures would further reduce any potential impacts of vessel noise. As a result, vessel noise generated by the Civilian Port Defense training may affect, but is not likely to adversely affect the scalloped hammerhead shark, blue whale, fin whale, humpback whale, Guadalupe fur seal, green sea turtle, loggerhead sea turtle, olive Ridley sea turtle, and leatherback sea turtle.

Aircraft Noise

Sharks, sea turtles, and marine mammals may be exposed to aircraft-generated noise wherever aircraft overflights occur in the proposed action area. Rotary-wing aircraft (helicopters) are used throughout the proposed action area. Helicopters produce low-frequency sound and vibration (Pepper *et al.* 2003; Richardson *et al.* 1995). Most marine invertebrates would not sense low-frequency sounds above the ambient noise levels, distant sounds, or aircraft noise transmitted through the air-water interface.

Noise generated from helicopters is transient in nature and variable in intensity. Helicopter sounds contain dominant tones from the rotors that are generally below 500 Hz. Helicopters often radiate more sound forward than aft. The underwater noise produced is generally brief when compared with the duration of audibility in the air. The sound pressure level from an H-60 helicopter hovering at a 50 ft (15 m) altitude would be approximately 125 dB re 1 µPa at 1m below the water surface, which is lower than the ambient sound that has been estimated in and around the Ports of Los Angeles/Long Beach. Helicopter flights associated with the Civilian Port Defense training could occur at altitudes as low as 75 to 100 ft (23 to 31 m), and typically last two to four hours.

Sharks

Scalloped hammerhead sharks may be exposed to aircraft-generated noise wherever aircraft overflights occur; however, sound is primarily transferred into the water from air in a narrow cone under the aircraft. Some species of fish, not necessarily sharks, could respond to noise associated with low-altitude aircraft overflights or to the surface disturbance created by downdrafts from helicopters. Aircraft overflights have the potential to affect surface waters and, therefore, to expose sharks if occupying those upper portions of the water column to sound and general disturbance potentially resulting in short-term behavioral or physiological responses. If sharks were to respond to aircraft overflights, only minor, short-term behavioral or physiological reactions (*e.g.,* swimming away and increased heart rate with no resulting diminution in fitness) would be expected; however, no long-term on sharks are expected from aircraft noise.

Marine mammals and sea turtles may respond to both the physical presence and to the noise generated by the aircraft. Aircraft produce noise at frequencies that are well within the frequency range of cetacean calls and also produce visual signals such as the aircraft itself and the shadow (Richardson *et al.* 1995; Richardson and Würsig 1997). Underwater sounds from aircraft are strongest just below the surface and directly under the aircraft. Underwater sounds from aircraft are strongest just below the surface and directly under the aircraft. Low flight altitudes of helicopters may occur under 100 ft (31 m) and may elicit a somewhat stronger behavioral response due to the proximity to marine mammals and sea turtles, the slower airspeed and therefore longer exposure duration, and the downdraft created by the helicopter's rotor. Luksenburg and Parsons (2009) confirmed that even brief straight line helicopter overflights can affect the behavior of bowhead whales (*B. mysticetus*), but the behavioral effects may not be biologically significant (Patenaude *et al.* 2002). However, the sensitivity to aircraft may depend on the animals' behavioral state at the time of exposure (*e.g.,* resting, socializing, foraging, or traveling). Resting individuals appeared to be most sensitive to disturbance (Würsig *et al.* 1998) and the altitude and lateral distance of the aircraft to the animal is an important factor affecting the response (Luksenburg and Parsons 2009). The role of vision in observed responses of cetaceans to aircraft remains unclear (Richardson *et al.* 1995; Richardson and Würsig 1997). The aircraft or its shadow may represent a disturbing factor, in addition to noise, but this has not been adequately studied (Luksenburg and Parsons 2009). Marine mammals, like sea turtles, would likely avoid the area under the helicopter. Based on the potential physical presence and the noise generated by the aircraft, we expect that, should the low altitude overflights affect marine mammals or sea turtles located at or near the surface at all, they may be startled, divert their attention to the aircraft, or avoid the immediate area by swimming away or diving; such minor, short-term reactions to aircraft are not expected to rise to the level of disrupting major behavior patterns such as migrating, breeding, feeding, and sheltering, nor could they be expected to injure or kill any listed marine mammals or sea turtles. As a result, aircraft noise generated by the Civilian Port Defense training may affect, but is not likely to adversely affect the scalloped hammerhead shark, blue whale, fin whale, humpback whale, Guadalupe fur seal, green sea turtle, loggerhead sea turtle, olive Ridley sea turtle, and leatherback sea turtle.

Sonar Systems

Sonar systems to be used during proposed Civilian Port Defense training would include AN/SQQ-32, AN/AQS-24 and handheld sonars (AN/PQS 2A). Of these sonar sources, only the AN/SQQ-32 requires quantitative acoustic effects analysis, given its source parameters, which are classified. The remaining sources have been classified as *de minimis* sources, which are either above the hearing range of marine species or have narrow beam widths and short pulse lengths that would not result in any effects to marine species, including marine mammals, sea turtles, and the scalloped hammerhead shark. All active acoustic sources proposed for Civilian Port Defense training would emit signals considered to be high-frequency (greater than 10 kHz).

Sharks

Few fish species have been shown to be able to detect the high-frequency sounds associated expected by the Civilian Port Defense training activities. Although hearing capability data only exist for fewer than 100 of the 32,000 fish species, current data suggest that most species of fish detect sounds from 50 to 1,000 Hz, with few fish hearing sounds above 4 kHz (Popper 2008). It is believed that most fish have their best hearing sensitivity from 100 to 400 Hz (Popper 2003). Studies have also shown that high-frequency emissions may be detected by some fish species. Experiments on several species of the Clupeidae (*i.e.,* herrings, shads, and menhadens) have obtained responses to frequencies between 40 and 180 kHz (Astrup 1999); however, no hearing specialists are listed as threatened or endangered under the ESA in the proposed action area. The scalloped hammerhead shark, which is a hearing generalist has a hearing range well below the transmit frequencies expected to be produced by the proposed activities. The highest sensitivity hearing range for sharks is from 40 Hz to roughly 800 Hz (Myrberg 2001). We conclude that the scalloped hammerhead shark is able to detect low-frequency sounds only and would not be affected by the high frequency acoustic sources from the proposed action.

Marine Mammals

In assessing the potential effects on marine mammals expected to occur in the proposed action area from acoustic transmissions, a variety of factors must be considered, including source characteristics, animal presence and hearing range, duration of exposure, and impact thresholds for species that may be present.

Mine warfare sonar employs high frequencies (above 10 kHz) that attenuate rapidly in the water, thus producing only a small area of potential auditory masking. Anatomical and paleontological evidence suggests that the inner ears of mysticetes (baleen whales), like the humpback whale, are well adapted for hearing at lower frequencies (Ketten 1998; Richardson 1995). Functional hearing in low-frequency mysticetes is conservatively estimated to be between 7 Hz and 22 kHz (Southall *et al.* 2007). Some calls of humpback whales have been found to exceed 10 kHz (Ketten 1998; Richardson 1995). Higher-frequency mine warfare sonar systems are typically outside the hearing and vocalization ranges of mysticetes; therefore, mysticetes are unlikely to be able to detect the higher frequency mine warfare sonar, and these systems would not interfere with their communication or detection of biologically relevant sounds. Otariids, like the Guadalupe fur seal, have functional hearing limits that are estimated to be 50 Hz to 50 kHz in water and 50 Hz to 75 kHz in air (Babushina *et al.* 1991; Moore and Schusterman 1976).

Potential acoustic impacts to ESA-listed marine mammals could include non-recoverable physiological effects, recoverable physiological effects, and behavioral effects. Criteria and thresholds for measuring these effects induced from underwater acoustic energy have been established for marine mammals. PTS in hearing, is the criterion used to establish the onset of non-recoverable physiological effects, Temporary Threshold Shift (TTS) in hearing, is the criterion used to establish the onset of recoverable physiological effects, and a behavioral response function is used to determine non-physiological behavioral effects. The MMPA describes Level A harassment as potential injury and Level B harassment as potential disturbance. An analysis of the potential effects to marine mammals for the proposed acoustic sources was conducted using a methodology that calculates the total sound exposures level and maximum sound pressure level that a marine mammal may receive from the acoustic transmissions. The Navy Acoustic Effects Model (NAEMO) was used for all modeling analysis (Marine Species Modeling Team 2012). Environmental characteristics (*e.g.,* bathymetry, wind speed, and sound speed profiles) and source characteristics (*i.e.,* source level, source frequency, transmit length and interval, and horizontal beam width) are used to determine the propagation loss of the acoustic energy, which was completed using the Comprehensive Acoustic System Simulation/Gaussian Ray Bundle propagation model. The propagation loss then was used in NAEMO to create acoustic footprints, model source movements, and calculate received energy levels around the source. Animats, or representative animals, are distributed based on density data obtained from the Navy Marine Species Density Database (Department of the Navy 2012). This database is based on surveys, published population estimates, and a Relative Environmental Suitability model (Kaschner *et al.* 2006). The energy received by each distributed animat within the model is summed into a total sound exposure level, which is compared to the acoustic effects criteria to calculate potential exposures at the PTS and TTS level. Additionally, the maximum sound pressure level received by each animat predicts probability of behavioral harassment via the behavioral risk function. The estimated sound exposure level and sound pressure level received by each animat is then compared to a set of thresholds (Finneran and Jenkins 2012). The output from the acoustic modeling provided both the predicted ranges to the various levels of effect as well as estimated exposures of marine mammal species.

The model and current acoustic criteria for assessing acoustic effects to humpback whales (results would be the same for blue whales and fin whales) and Guadalupe fur seals was used and zero Level A and Level B exposures were predicted. Additionally, the use of the Navy's standard practices and mitigation measures would ensure the area is generally clear of marine mammals, including ESA-listed marine mammals, during training events. As a result, aircraft noise generated by the Civilian Port Defense training may affect, but is not likely to adversely affect the blue whale, fin whale, humpback whale, and Guadalupe fur seal.

Sea Turtles

Sea turtles are low-frequency hearing specialists, typically hearing frequencies from 30 to 2 kHz, with a range of maximum sensitivity between 100 and 800 Hz (Bartol and Ketten 2006; Bartol *et al.* 1999; Lenhardt 1994, 2002; Ridgway *et al.* 1969). Hearing below 80 Hz is less sensitive but still potentially usable (Lenhardt 1994). Given that the acoustic sources associated with the proposed action are high frequency (above 10 kHz), we conclude that sea turtles would not be able to perceive the acoustic transmission and would likely not be affected by the high frequency acoustic sources from the proposed action.

Transmission of Marine Mammal Diseases and Parasites

The U.S. Navy deploys trained Atlantic bottlenose dolphins (*Tursiops truncatus*) and California sea lions (*Zalophus californianus*) for integrated training involving two primary mission areas; to find objects such as inert mine shapes, and to detect swimmers or other intruders around Navy facilities such as piers. When deployed, the animals are part of what the Navy refers to as Marine Mammal Systems. Based on the standard procedures with which these systems are deployed, it is not reasonably foreseeable that use of these marine mammals systems would result in the transmission of disease or parasites to cetacea or pinnipeds in the proposed action area. Due to the very small amount of time that the Navy marine mammals spend in the open ocean; the control that the trainers have over the animals; the collection and proper disposal of marine mammal waste; the exceptional screening and veterinarian care given to the Navy's animals; the visual monitoring for indigenous marine mammals; and an over forty year track record with zero known incidents, we conclude that the use of Navy marine mammals during training activities would have no effect on the blue whale, fin whale, humpback whale and Guadalupe fur seal.

Conclusion

Based on this analysis, NMFS concurs with the Navy that the proposed action is not likely to adversely affect the subject listed species.

Reinitiation of Consultation

Reinitiation of consultation is required and shall be requested by the Navy or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (2) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this concurrence letter; or if (3) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16). This concludes the ESA portion of this consultation.

MARINE MAMMAL PROTECTION ACT

Although several marine mammal species are listed as federally endangered or threatened under the ESA, the Marine Mammal Protection Act of 1972 (MMPA) is the principal Federal legislation that guides marine mammal species protection and conservation. Under the MMPA, "take" of a marine mammal is permitted by NMFS under an Incidental Harassment Authorization (IHA) when the specified activity is incidental, but not intentional, of a small number of marine mammals.

The Navy has submitted an application to NMFS requesting an IHA for this action, but only for non-ESA listed marine mammals. This application is currently under review by NMFS' Office of Protected Resources.

Thank you for coordinating with NMFS regarding this project. We appreciate your efforts to comply with Federal regulations and to conserve and protect marine mammals, sea turtles, fish, and essential fish habitat. Please direct questions regarding this letter to Monica.DeAngelis, 562-980-3232, Monica.DeAngelis@noaa.gov.

Sincerely,

William W. Stelle, Jr.
Regional Administrator

cc: Chip Johnson, U.S. Pacific Fleet, Environmental Readiness, San Diego Detachment, N465CJ
Administrative File: 151422WCR2015PR00227

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APPENDIX F MARINE MAMMAL PROTECTION ACT COORESPONDENCE

DEPARTMENT OF THE NAVY
COMMANDER
UNITED STATES PACIFIC FLEET
250 MAKALAPA DRIVE
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:
5090
Ser N465/0367
16 APR 15

Ms. Jolie Harrison
Supervisor, Incidental Take Program Permits
Office of Protected Resources
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
1315 East-West Highway, B-SSMC3 Room 13822
Silver Spring, MD 20910-3282

SUBJECT: WEST COAST CIVILIAN PORT DEFENSE TRAINING REQUEST FOR INCIDENTAL HARRASSMENT AUTHORIZATION

Dear Ms. Harrison,

In accordance with the Marine Mammal Protection Act, as amended (16 U.S.C. §1361, et. seq.), and Section 216.104 of Title 50 Code of Federal Regulations, the United States Navy requests an Incidental Harassment Authorization (IHA) for the take of marine mammals.

The Navy is requesting an IHA for the incidental taking of a specified number of marine mammals, incidental to Civilian Port Defense training activities proposed to be conducted near the Ports of Los Angeles and Long Beach from October to November 2015. Enclosures (1), (2), and (3) focus on the specific information required by NMFS for consideration of an incidental take request.

We appreciate your continued support in helping the Navy to meet its environmental responsibilities. The Navy's point of contact is Ms. Cory Scott, who can be reached at e-mail cory.l.scott@navy.mil or (808) 471-4696.

L. M. FOSTER
By direction

Enclosures:
1. IHA application
2. Draft Environmental Assessment (EA) for West Coast Civilian Port Defense
3. CD-ROMs of IHA application, EA, and transmittal

Copy to: (w/encls)
Mr. Rodney R. McInnis, Administrator, Southwest Region
National Marine Fisheries Service
Mr. Ronald B. Carmichael, Chief of Naval Operations (N454)

Copy to: (w/o encls)
Mr. John Fiorentino, NMFS HQ, Incidental Take Program Permits
Mr. Chris Stathos, Commander, Navy Region Southwest (N45)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

OCT 19 2015

Commander, U.S. Pacific Fleet
250 Makalapa Drive
Pearl Harbor, HI 96860-3131

Dear Sir or Madam:

Enclosed is an Incidental Harassment Authorization (IHA) issued to the Commander, U.S. Pacific Fleet, under the authority of Section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq*), to take marine mammals, by harassment, incidental to 2015 Civilian Port Defense training activities within and near the Ports of Los Angeles and Long Beach, California. You are required to comply with the conditions contained in the IHA, including all mitigation, monitoring, and reporting requirements. In addition, you must cooperate with any federal, state, or local agency monitoring the impacts of your activities.

If you have any questions concerning the IHA or its requirements, please contact John Fiorentino, Office of Protected Resources, National Marine Fisheries Service at 301-427-8477.

Sincerely,

PERRY GAYACDO

for Donna S. Wieting, Director
Office of Protected Resources

Enclosures

Incidental Harassment Authorization

The Commander, U.S. Pacific Fleet, 250 Makalapa Drive, Pearl Harbor, Hawaii 96860, and persons operating under his authority (i.e., Navy), is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1371(a)(5)(D)) and 50 CFR 216.107, to harass marine mammals incidental to Civilian Port Defense training activities proposed to be conducted near the Ports of Los Angeles and Long Beach, California from October to December 2015:

1. This Authorization is valid from October 25, 2015, through December 31, 2015.

2. This Authorization is valid for the incidental taking of a specified number of marine mammals, incidental to Civilian Port Defense training activities proposed to be conducted near the Ports of Los Angeles and Long Beach, California, as described in the Incidental Harassment Authorization (IHA) application, from October to December 2015

3. Species Impacted and Level of Takes: The holder of this Authorization (Holder) is hereby authorized to take, by Level B harassment only, 8 long-beaked common dolphins (*Delphinus capensis*), 727 short-beaked common dolphins (*Delphinus delphis*), 21 Risso's dolphins (*Grampus griseus*), 40 Pacific white-sided dolphins (*Lagenorhynchus obilquidens*), 48 bottlenose dolphins (*Tursiops truncates*), 8 harbor seals (*Phoca vitulina*), and 46 California sea lions (*Zalophus californianus*) incidental to Civilian Port Defense training activities proposed to be conducted near the Ports of Los Angeles and Long Beach, California.

4. The taking of any marine mammal in a manner prohibited under this IHA must be reported immediately to NMFS' Office of Protected Resources, 1315 East-West Highway, Silver Spring, MD 20910; phone 301-427-8401; fax 301-713-0376.

5. Mitigation Requirements: The Holder is required to abide by the following mitigation conditions listed in 5(a)-(b). Failure to comply with these conditions may result in the modification, suspension, or revocation of this IHA.

(a) *Lookouts* - The following are protective measures concerning the use of Lookouts:

Procedural Measures - The Navy will have two types of lookouts for the purposes of conducting visual observations: (1) those positioned on surface ships, and (2) those positioned in aircraft or on boats. Lookouts positioned on surface ships will be dedicated solely to diligent observation of the air and surface of the water. Their observation objectives will include, but are not limited to, detecting the presence of biological resources and recreational or fishing boats, observing mitigation zones, and monitoring for vessel and personnel safety concerns. Lookouts positioned in aircraft or on boats will, to the maximum extent practicable and consistent with aircraft and boat safety and training requirements, comply with the observation objectives described above for Lookouts positioned on surface ships.

Active Sonar - The Navy will have one Lookout on ships or aircraft conducting high-frequency active sonar activities associated with mine warfare activities at sea.

Vessels - While underway, vessels will have a minimum of one Lookout.

Towed In-Water Devices - The Navy will have one Lookout during activities using towed in-water devices when towed from a manned platform.

(b) *Mitigation Zones* - The following are protective measures concerning the implementation of mitigation zones:

Active Sonar - Mitigation will include visual observation from a vessel or aircraft (with the exception of platforms operating at high altitudes) immediately before and during active transmission within a mitigation zone of 200 yards (yds. [183 m]) from the active sonar source. If the source can be turned off during the activity, active transmission will cease if a marine mammal is sighted within the mitigation zone. Active transmission will recommence if any one of the following conditions is met: (1) the animal is observed exiting the mitigation zone, (2) the animal is thought to have exited the mitigation zone based on a determination of its course and speed and the relative motion between the animal and the source, (3) the mitigation zone has been clear from any additional sightings for a period of 10 minutes for an aircraft-deployed source, (4) the mitigation zone has been clear from any additional sightings for a period of 30 minutes for a vessel-deployed source, (5) the vessel or aircraft has repositioned itself more than 400 yds (366 m) away from the location of the last sighting, or (6) the vessel concludes that dolphins are deliberately closing in to ride the vessel's bow wave (and there are no other marine mammal sightings within the mitigation zone).

Vessels - Vessels will avoid approaching marine mammals head on and will maneuver to maintain a mitigation zone of 500 yds (457 m) around observed whales, and 200 yds (183 m) around all other marine mammals (except bow riding dolphins), providing it is safe to do so.

Towed In-Water Devices - The Navy will ensure that towed in-water devices being towed from manned platforms avoid coming within a mitigation zone of 250 yds (229 m) around any observed marine mammal, providing it is safe to do so.

6. Monitoring and Reporting Requirements: The Holder is required to implement the following monitoring and reporting requirements. Failure to comply with these conditions may result in the modification, suspension, or revocation of this Authorization.

General Notification of Injured or Dead Marine Mammals – If any injury or death of a marine mammal is observed during the Civilian Port Defense training activities, the Navy will immediately halt the activity and report the incident to NMFS following the standard monitoring and reporting measures consistent with the Navy Hawaii-Southern California Training and

Testing Environmental Impact Statement/Overseas Environmental Impact Statement. The reporting measures include the following procedures:

Navy personnel shall ensure that NMFS (regional stranding coordinator) is notified immediately (or as soon as clearance procedures allow) if an injured or dead marine mammal is found during or shortly after, and in the vicinity of, any Navy training activity utilizing high-frequency active sonar. The Navy shall provide NMFS with species or description of the animal(s), the condition of the animal(s) (including carcass condition if the animal is dead), location, time of first discovery, observed behaviors (if alive), and photo or video (if available). The Navy shall consult the Stranding Response and Communication Plan to obtain more specific reporting requirements for specific circumstances.

Vessel Strike – Vessel strike during Navy Civilian Port Defense training activities in the Study Area is not anticipated; however, in the event that a Navy vessel strikes a whale, the Navy shall do the following:

Immediately report to NMFS (pursuant to the established Communication Protocol) the:

- Species identification (if known);
- Location (latitude/longitude) of the animal (or location of the strike if the animal has disappeared);
- Whether the animal is alive or dead (or unknown); and
- The time of the strike.

As soon as feasible, the Navy shall report to or provide to NMFS, the:

- Size, length, and description (critical if species is not known) of animal;
- An estimate of the injury status (*e.g.,* dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared, etc.);
- Description of the behavior of the whale during event, immediately after the strike, and following the strike (until the report is made or the animal is no longer sighted);
- Vessel class/type and operational status;
- Vessel length;
- Vessel speed and heading; and
- To the best extent possible, obtain a photo or video of the struck animal, if the animal is still in view.

Within 2 weeks of the strike, provide NMFS:

- A detailed description of the specific actions of the vessel in the 30-minute timeframe immediately preceding the strike, during the event, and immediately after the strike (*e.g.,* the speed and changes in speed, the direction and changes in direction, other maneuvers, sonar use, etc., if not classified);
- A narrative description of marine mammal sightings during the event and immediately after, and any information as to sightings prior to the strike, if available; and use established Navy shipboard procedures to make a camera available to attempt to capture photographs following a ship strike.

NMFS and the Navy will coordinate to determine the services the Navy may provide to assist NMFS with the investigation of the strike. The response and support activities to be provided by the Navy are dependent on resource availability, must be consistent with military security, and must be logistically feasible without compromising Navy personnel safety. Assistance requested and provided may vary based on distance of strike from shore, the nature of the vessel that hit the whale, available nearby Navy resources, operational and installation commitments, or other factors.

7. A copy of this Authorization must be in the possession of the on-site Commanding Officer in order to take marine mammals under the authority of this Incidental Harassment Authorization while conducting the specified activities.

8. This Authorization may be modified, suspended, or withdrawn if the Holder or any person operating under his authority fails to abide by the conditions prescribed herein or if the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

9. Penalties and Permit Sanctions: Any person who violates any provision of this Authorization is subject to civil and criminal penalties, permit sanctions, and forfeiture as authorized under the MMPA.

Perry Gayaldo

for Donna S. Wieting,
Director,
Office of Protected Resources,
National Marine Fisheries Service.

OCT 19 2015

Date

APPENDIX G PREPARERS

Name	Role	Education and Experience
Naval Undersea Warfare Center, Division Newport		
Code 1023, Environmental Branch, Mission Environmental Planning Program		
Amy Farak	Project Lead, Document Review	B.S. Marine Biology and French. Experience: 14 years Environmental Planning and Biological Analysis.
Jennifer James	Project Coordination, Document Development	MESM Wetlands Biology, B.S. Wildlife Biology and Management. Experience: 11 years Environmental Planning, 14 years Biological Research.
Natasha Dickenson	Document Review	B.A. Biology, M.S. Oceanography. Experience: 15 years Marine Environmental Science.
Code 70, Ranges, Engineering, and Analysis Department		
Bert Neales	Marine Species Modeling	B.S Computer Science. Experience: 17 years Modeling and simulation; 13 years Submarine/Torpedo Radiated Noise Processing; 7 years Acoustic Effects Modeling as Lead Software Developer.
McLaughlin Research Corporation (MRC)		
Heather Hopkins	Document Development	B.S. Wildlife and Conservation Biology. Experience: 5 years Biological Research; 7 years Environmental Planning.
Erin Roach	Document Development	B.S. Marine Biology. Experience: 3 years Marine Research; 2 years QA/QC; 2 years Environmental Planning.
Benjamin Bartley	Marine Species Modeling/GIS Analyst	B.S. Fisheries Science and Management. Experience: 4 years Acoustic Modeling, 2 years GIS.

APPENDIX H REFERENCES

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